EP Model

Water Source Heat Pump

½ to 6 Ton

Equipped with added standard features, a stronger, quieter cabinet and improved durability along with a variety of options—providing additional energy efficient solutions to accommodate your building requirements.

EP Model	UP TO 21.7 EER GLHP	UP TO 6.0 COP WSHP

Made in the U.S.A.

Commercial Sales Catalog
fhp-mfg.com

BOSCH
Invented for life

Table of Contents

Model Nomenclature

EP 048- 1 VT C -F L T

MODEL:
EP

NOMINAL CAPACITY:
007, 009, 012, 015, 018, 024,
030, 036, 042, 048, 060, 070

VOLTAGE DESIGNATION:
0 - 115/1/60
1 - 208-230/1/60
2 - 265/1/60
3 - 208-230/3/60
4 - 460/3/60

CABINET CONFIGURATION:
VT - Vertical
HZ - Horizontal

HEAT EXCHANGER MATERIAL:
C - Copper
N - Cupro-Nickel

SUPPLY AIR LOCATION
VT UNITS:
T - TOP

HZ UNITS:
S - STRAIGHT THRU
E - END DISCHARGE

RETURN AIR LOCATION:
L - Left
R - Right

WATER CONNECTIONS:
F - Front

Certified Performance Data

ASHRAE / AHRI / ISO 13256-1. English (I-P) Units												
Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86˚F		Heating 68˚F		Coolng 59˚F		Heating 50˚F		Cooling 77˚F		Heating 32˚F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
EP with PSC Motor												
EP007	6,800	15.7	8,800	5.7	8,400	25.1	7,000	4.9	7,400	18.5	5,100	3.6
EP009	9,000	16.2	11,200	5.5	10,500	25.5	9,000	4.5	9,500	19.3	6,800	3.6
EP012	12,200	14.9	16,500	5.1	114,600	22.7	13,000	4.3	13,000	17.5	10,000	3.6
EP with ECM Motor (Constant Torque or Constant Air Flow)												
EP015	15,200	17.5	17,500	5.6	17,000	28.8	13,000	4.6	16,200	20.6	11,000	3.9
EP018	19,500	16.4	21,300	5.3	21,300	25.6	17,700	4.5	20,500	19.0	14,800	3.8
EP024	24,500	18.2	28,500	5.7	28,400	28.1	23,700	4.6	26,000	21.1	18,000	4.0
EP030	27,000	16.6	31,000	5.9	31,700	27.0	25,000	5.2	28,500	19.4	20,500	4.3
EP036	36,000	17.2	41,000	5.6	40,200	25.9	34,400	4.9	37,500	19.7	26,000	4.1
EP042	40,600	18.2	42,400	6.0	45,000	25.7	35,000	5.1	42,200	21.7	26,800	4.1
EP048	47,400	17.2	50,000	5.3	52,900	26.1	40,500	4.3	49,500	20.0	33,400	3.7
EP060	60,400	16.2	71,500	5.7	66,500	24.1	56,700	4.9	61,500	18.5	47,000	4.2
EP070	68,000	16.2	86,000	5.6	71,400	22.4	71,400	5.0	70,500	18.5	56,500	4.2

Tabulated performance data is at noted water temperatures and entering air conditions of 80.6°F DB/66.2°F WB at ARI/ISO 13256-1 rated CFM.

FHP Bosch

Specializing in efficient green technology for commercial heating and cooling products, FHP Bosch is one of the leading manufacturers of Geothermal and Water Source heat pumps, which assures that you are buying a unit you can trust. We are part of Bosch Thermotechnology Corp., a Robert Bosch Group unit dedicated to providing highly efficient heating and cooling solutions to the private and public sector.

FHP Bosch has a state of the art facility with the latest manufacturing technology available. Each unit is factory tested according to Bosch quality standards in order to ensure our customers the highest levelof satisfaction and comfort. We carefully select our suppliers in order to equip our products with the best components available.

Advantages of FHP Bosch Technology

- Low installation costs
- Lower operating costs
- Flexibility of options
- Outstanding comfort control
- Energy efficiency
- Space savings
- Superior quality
- Quiet operation
- Reliability & longevity
- Flexibility in designing

EP Model 007 - 070

- 12 Models from ½ through 6 tons
- Horizontal and Vertical Configurations

Standard Features

Cabinet

The EP Model cabinetry is constructed using G90 galvanized sheet metal. This steel provides superior corrosion protection for units located indoors.

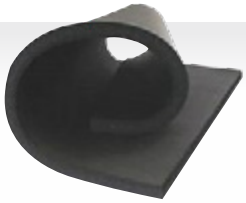
All interior surfaces are lined with ½" thick, 1.5 lb./cu. ft. density, Micromat insulation for thermal insulation and acoustical attenuation. This insulation is non-combustible, non-hydroscopic and does not support fungal growth. Insulation meets NFPA 90A and 90B for fire protection, UL 181 erosion requirements and is certfied to meet GREENGUARD Indoor Air Quality Standard for Low Emitting Products.

Protection against corrosion is a feature in the EP Model. A stainless steel drain pan will last the lifetime of the unit and resist corrosion and cracking that may occur with coated steel or plastic materials. Air side coils have aluminum side plates to prevent corrosion.

Taking all into consideration the life expectancy of the EP Model is anticipated to be well in excess of the industry standard of 19 years.

MERV 8 or MERV 13 Filter Option

2" 4-Sided Filter Rack



Closed-cell Foam Insulation (Optional)

Schrader Valves

Flow Proving Switch (Fluid Differential Pressure Switch)

Standard Features

Quiet Operation

All panels are insulated with ½" thick, 1.5 lb./cu.ft. density Micromat fiberglass insulation as standard for both thermal insulation and noise reduction.

Noise reduction is a critical consideration of the unit design. All EP units have a unique floating base. The compressor is mounted on a heavy steel plate which rests on a high density rubber pad on the base of the unit. In addition, compressors are mounted on rubber grommets. This double isolation, unique to FHP Bosch, is standard in all EP Model units preventing vibration and noise transmission from the compressor to the unit structure resulting in exceptionally quiet operation.

The EP offers optional ½" thick, closed-cell foam insulation to help aid indoor air quality (IAQ) and to further attenuate low frequency noise from the compressor compartment. The closed-cell foam insulation option is available in all unit sizes. For additional sound attenuation, an optional compressor blanket is available on unit sizes 024-070.

Standard

Optional

Serviceability

All units are designed to be serviced from the front of the unit. Schrader valves for high and low pressure gauges and the electrical box components are easily accessible for diagnosing and servicing the unit.

Insulated bulkheads in all units, separate the compressor section from the blower section, allowing the unit to be serviced during operation.

Large removable panels aid in servicing the unit. Separate electrical knockouts in the unit corner post allow for easy and safe routing of high and low voltage lines to the inside of the cabinet.

Unit Configurations

All units are available in horizontal and vertical configurations. Additionally, several choices of return air and supply air are offered as standard, providing configuration flexibility.

Filter Racks

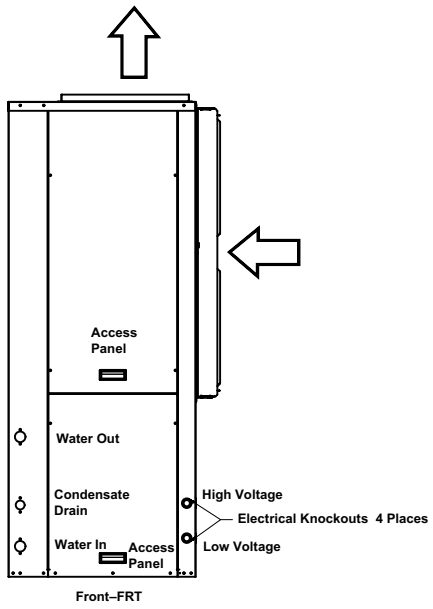
Four sided enclosed filter racks accommodating either a 1" or a 2" filter are standard on all EP units. Four sided filter racks minimize unfiltered air from entering the unit. Filter doors allow for easy routine maintenance and changing of the air filter. A 1" return duct collar is integral to the filter rack eliminating the need for field mounted duct collars. Units are shipped with a standard 1" MERV 5 filter. Optional 2" MERV 8 or MERV 13 are available.

Hanging Brackets

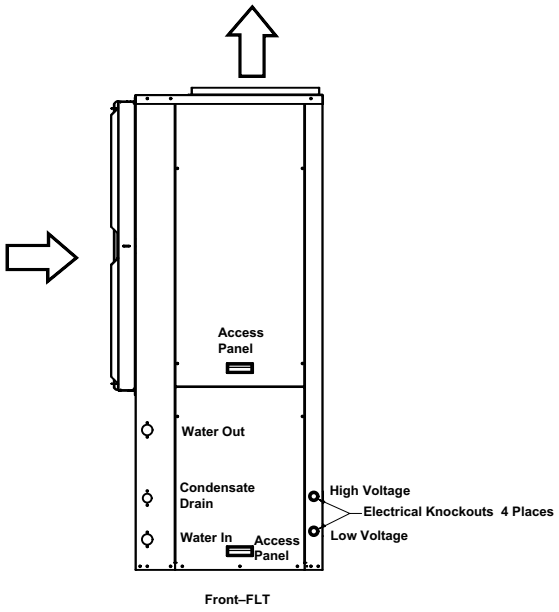
All horizontal units come standard with hanging bracket kits for suspending the unit from field supplied hanger rods. These kits include heavy duty steel brackets and rubber grommets for sound and vibration isolation from the building structure.

Unit Configuration

Vertical



Right Hand Return Top Discharge FRT

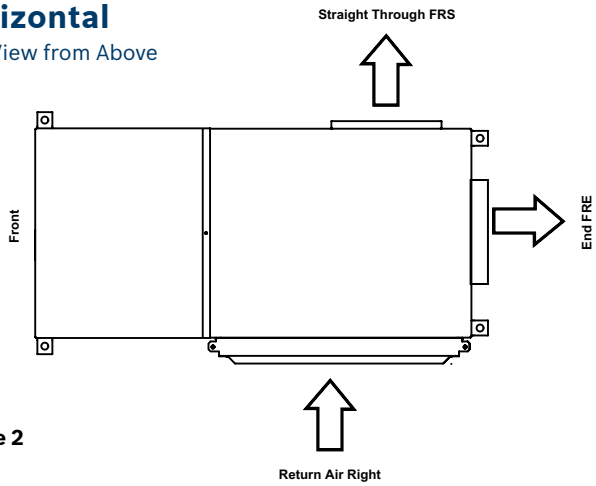


Left Hand Return Top Discharge FLT

Figure 1

Horizontal

Plan View from Above



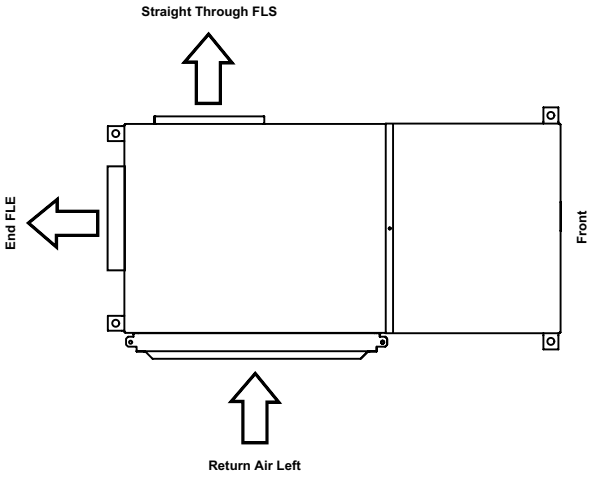


Figure 2

Blower and Motor

Large blower wheels allow the unit to operate at lower fan speeds for quieter operation.

PSC blower motors are standard on unit sizes ½ through 1 ton. Multiple speed ECM motors are standard on units sizes 1½ through 6 tons, allowing the user to select the correct speed to deliver the specified airflow and the design system static pressure.

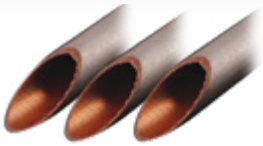
An optional ECM variable speed motor is available for 1½ - 6 tons. Both Constant Torque and Constant CFM motors deliver the high static needed for a MERV 13 filter. This means that currently only the 7.9 and 12 with PSC motors are excluded from a MERV 13 filter.

Motors are mounted on the fan housing with rubber grommets to reduce noise and vibration transmission to the unit and airstream.

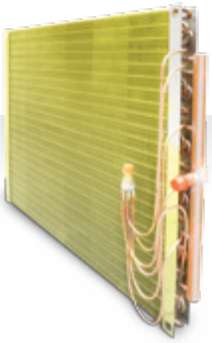
A 1" supply air duct-flange connection is standard, facilitating duct installation on the unit. Horizontal units are field convertible from straight through to an end discharge arrangement. This is true except for cases where there is electric heat installed.

Single Capacity Rotary and Scroll Compressors

Coax Coil



Tin Electro-Plated Copper Tubing



DuoGuard™ Evaporator Coil

Water Connections

All water connections are heavy duty bronze FPT fittings securely fastened to the unit corner post. This allows connecting to a flexible hose kit without the use of a backup wrench making for easier, faster installation.

Refrigerant Circuit

EP Model units are designed using the optimum combination of compressor, water and air coils to provide peak performance.

Heavy duty heat pump compressors are used in all units. Rotary or scroll compressors offer optimum performance for each unit size.

Refrigerant to water heat exchangers are coaxial tube-in-tube type providing a robust construction, ensuring many years of trouble free operation. Coaxial coils are selected and designed for peak performance, offering the best combination of low water pressure drop and maximum heat transfer in both the cooling and heating modes. Standard coaxial coils have a copper interior water tube and a steel outer shell. Optional Cupro-Nickel coils are available for applications where the water is of lower quality.

In geothermal applications where fluid temperatures can drop below the dew point of the surrounding air, optional insulation is available to prevent water coils and refrigerant piping from sweating.

Evaporator Coil

EP comes standard with a copper coil aluminum fin evaporator coil. Available as an option is the DuoGuard™ evaporator coil protection. DuoGuard™ Protection® - Tin Electro-Plated Copper Tubing with High-Tech Polymer Coated Aluminum Fins will protect the evaporator coil from all forms of corrosive elements in the airstream.

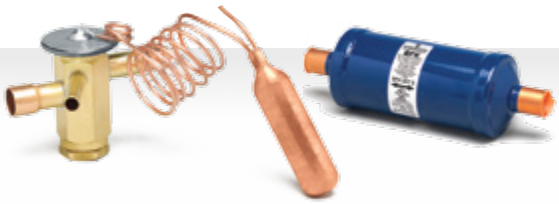
A pilot operated four-way reversing valve in the refrigeration circuit allows the unit to operate in either the heating or cooling mode. All FHP Bosch units have the reversing valve energized in cooling mode, which allows the unit to fail to heating mode for building protection. This will ensure you are not left without heat in the middle of winter should the reversing valve coil fail.

Refrigerant flow to the air coil is controlled by a thermal expansion valve (TXV) as standard in all EP units. These TXV's are designed to vary the flow of refrigerant depending on the load. TXV's provide unit optimization and a more stable control over a wider range of operating conditions than fixed orifice capillary tube devices.

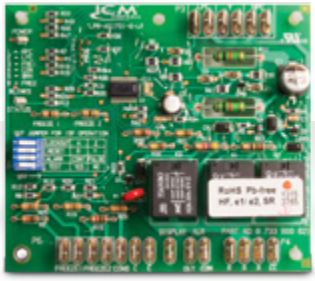
EP Model units are rated to withstand 600 PSIG working refrigerant pressure and 450 PSIG working water pressure.

All EP units, two tons and above, are provided with filter driers to ensure that no residual water or other foreign material is present to contaminate the refrigerant system and lead to premature failure.

High and low pressure switches are factory installed in the refrigerant circuit, protecting the unit against high pressure conditions or loss of refrigerant charge. Schrader service valves are standard on the high and low pressure lines of all units, allowing connection to gauges for service diagnostics and to either evacuate, reclaim or recharge refrigerant into the system.



TXV Valve (Standard)



UPM Control Board

Unit Protection Module

Each EP unit is factory provided with a Unit Protection Module (UPM) that controls the unit operation and monitors the safety controls that protect the unit. Powered by a standard 75 VA transformer, the UPM interfaces with the thermostat or direct digital controller. The main purpose of the UPM is to protect the compressors by monitoring the different states of switches and sensors. This module provides time delays and protects the unit against freezing of the water-to-air refrigerant and refrigerant-to-air heat exchangers as well as condensate overflow.

Standard safety controls include the following:

- High pressure switch located in the refrigerant discharge line.
- Low pressure switch located in the refrigerant suction line.
- Standard low fluid temperature (freeze) protection sensor. The freeze protection sensor, located on the refrigerant liquid line entering the coaxial heat exchanger is designed to disable compressor operation when the unit is in the heating mode, should the refrigerant temperature fall below either 30°F (-1.1°C) or 15°F (-9.4°C).
- Condensate overflow protection sensor is standard and factory mounted in the drain pan of the unit.
- Low air coil temperature (freeze) protection sensor disables the compressor when the refrigerant entering the air coil drops below 30°F (-1.1°C).

UPM Control Board Features

- **Anti-Short Cycle Timer**—5 minute delay on break timer to prevent compressor short cycling.
- **Random Start**—Each controller has a unique random start delay ranging from 270 to 300 seconds after power is applied to the board. This will prevent the simultaneous start of multiple units after a power outage.
- **Low Pressure Bypass Timer**—The low pressure switch is bypassed for 120 seconds after a call for compressor operation to prevent nuisance low pressure lockouts during cold start-up in the heating mode.
- **Brownout/Surge/Power Interruption Protection**—Prevents compressor operation should the voltage drop below 10% of unit rated value. The unit will restart once the voltage is within tolerance and the random start has timed out.
- **Malfunction (Alarm) Output**—The controller has a set of contacts for remote fault indication. This can be either a steady output or can be set to pulse with the fault code. Two connections are available - one to provide a 24 volt output, the other to provide a dry contact.
- **Test Service Mode**—A dip switch setting is provided to reduce all time delay settings to 10 seconds maximum during troubleshooting for verification of unit operation.
- **LED Fault Indication**—Two LED indicators are provided as follows:
- **Green**: Power LED indicates 18 – 30 VAC present at the board.
- **Red**: Fault indicator with blink codes identifying the particular fault. This information is available via the malfunction (alarm) output contacts.

  1 Blink - High Pressure
  2 Blinks - Low Pressure
  3 Blinks - Low Fluid Temperature (Freeze Protection)
  4 Blinks - Condensate Overflow
  5 Blinks - Brownout condition

- **Intelligent Reset**—If a fault condition is initiated, the 5 minute delay on break time period is initiated and the unit will restart after this delay expires. The UPM is configurable for either 2 or 4 fault occurrences before going into a hard lockout. The selection is made through a dip switch setting on the board. If the fault condition still exists or reoccurs twice or four times within one hour, the unit will go into a hard lockout and requires a manual lockout reset. A condensate overflow fault will, however, put the unit into a hard lockout immediately.
- **Lockout Reset**—A hard lockout can be reset by turning the unit thermostat off and then back on or by shutting off unit power at the circuit breaker. The method of reset is selectable by the dip switch on the board.

Unit Options

Hot Gas Reheat

Hot gas reheat (HGRH) allows the user to not only control space temperature, but also humidity levels within the conditioned space. Excessive moisture in the space can promote mold growth leading to damage in the structure or interior surfaces, as well as reducing the air quality and creating an unhealthy environment.

Possible causes of excess humidity could be by the unit having to operate under a widely varying load, an oversized short cycling unit, a high percentage of unconditioned outside air being introduced into the space, a high latent load in the space or any location where humidity infiltration is a problem.

Typical unit control is by a wall mounted thermostat that senses temperature in the occupied space. By utilizing a humidistat in addition to the thermostat, we are able to monitor the humidity levels in the space as well. The HGRH option allows cooling and dehumidification to satisfy both the thermostat and humidistat while preventing over cooling of the space while in the dehumidification mode.

Once the thermostat reaches set point temperature and the humidity is above set point, the unit controller will energize the reheat valve operating the unit in hot gas reheat mode, first cooling and dehumidifying, then reheating the air using hot refrigerant gas before delivering it to the space, usually 2 to 5°F below room temperature. The unit is operating as a dehumidifier. By reheating the air along a constant sensible heat line, the relative humidity of the leaving air is reduced. This option offers significant energy savings over the traditional means of reheating air with electric heating coils.

The moisture removal capacity of a specific heat pump is determined by the unit latent capacity rating. A heat pump's latent capacity can be determined by reviewing the heat pump specification data sheets. Depending upon the entering water and air conditions, a total and sensible capacity can be interpolated from the data sheets. Subtracting sensible capacity from total capacity yields latent capacity. Dividing the latent capacity by 1069 (BTU/LB of water vapor at 80° DB and 67° WB) yields the amount of moisture removal in pounds per hour.

Refrigerant Flow Path

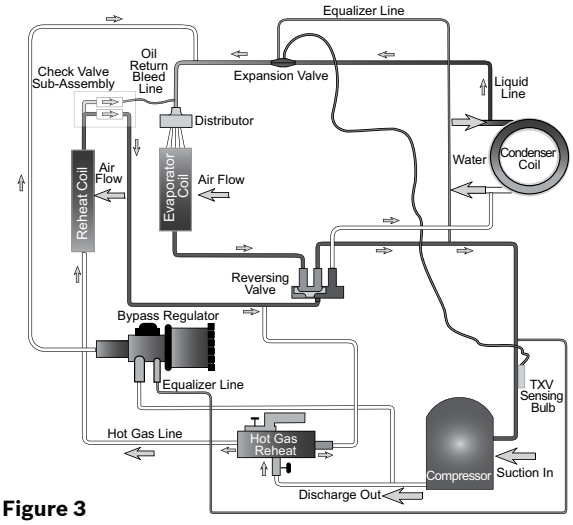


Figure 3

A hot gas reheat valve and a reheat coil are included in the refrigerant circuit. The refrigerant circuit in the cooling and heating mode is identical to a standard heat pump.

In the reheat mode, the compressor discharge gas is diverted through the reheat valve to the reheat coil which is located downstream of the cooling coil. The superheated refrigerant gas reheats the air leaving the cooling coil. The hot refrigerant gas then passes though the water to refrigerant coil where it is condensed to a liquid. From this point the rest of the cooling cycle is completed as in a regular heat pump. There are two check valves to prevent refrigerant flow into the reheat coil during standard cooling/heating cycles. A small copper bleeder line is connected to the outlet line of the reheat coil and between the expansion valve outlet and distributor to the air coil. This line is necessary to let any liquid/oil that may have migrated to the reheat coil during reheat to escape during standard cooling/heating modes (See Figure 3).

Hot Gas Reheat Sequence of Operation-On/Off Control

The sequence of operation in the cooling and heating mode is the same as a regular heat pump.

In the reheat mode, on a call from the humidistat, the reheat relay coil is energized through the “H” circuit. The cooling relay remains de-energized enabling the reheat solenoid. The blower relay, reversing valve and compressor contactor are energized through contacts on the reheat relay. (Note: The reheat mode always operates in the cooling mode.) Should the temperature in the space increase above set point, the compressor terminal Y is energized, which will de-energize the reheat valve putting the unit into straight cooling mode. A call for cooling or heating will always take precedence over hot gas reheat.

Hot Gas Reheat Control Options

There are several ways to control heat pumps with hot gas reheat. You should choose the method that best suits your specific application. Please refer to the Hot Gas Reheat wiring diagrams in the IOM for typical thermostat wiring. Most heat pump compatible thermostats in conjunction with a humidistat are acceptable for use, (Note: “O” output for reversing valve energized in cooling mode is required.) Combination thermostat/humidistat are also available.

Special Considerations

Some applications require special attention to maximize the performance of the hot gas reheat function:

- Low Temperature Well Water
- Indoor Pool Dehumidifying During Winter Months (Re: Heating Mode)

Consult the factory for special application considerations.

Low Temperature Well Water

When low temperature well water is utilized as the water source (below 55°F), a means of establishing two flow rates, one for the cooling/reheat mode and one for heating mode is recommended. In the cooling mode at low entering water temperatures and standard flow rates, discharge pressures and corresponding discharge gas temperatures are relatively low. At these conditions, when the reheat mode is initiated, the low temperature discharge gas can reduce reheat capacity. A means to reduce the water flow rate and elevate the discharge pressure/ temperature in cooling/reheat mode should be provided. Conversely, at low entering water temperatures in the heating mode, system suction pressure is reduced causing a loss in heating capacity. A means of providing higher flow in the heating mode should be provided. The simplest way to accomplish the above is to install water regulating valves.

Indoor Pool Dehumidifying During Winter Months

It is important to remember that when in the reheat/ dehumidification mode the heat pump is cooling and reheating. A secondary means of heating the space during the dehumidification mode should be provided. The indoor space temperature should be kept at least two (2) degrees F above the pool water temperature. If this is not done the warm pool water attempts to heat the space and the humidity levels increase exponentially. The heat pump is normally sized to handle the design latent load moisture removal. A second heat pump or resistance heat should be provided to handle the structure's shell loss load.

Protective coatings are highly recommended for all pool applications, due to the highly corrosive chemical environment.

Sequence of Operation - Modulating Hot Gas Reheat (MHGR)

Modulating Hot Gas Reheat differs from On/Off in that the reheat function is always active. The purpose of MHGRH is to deliver air at or close to neutral conditions.

Air is cooled and dehumidified by the cooling coil to around 55°F DB/54°F WB. A sensor located in the supply air stream is set at the required leaving dry bulb temperature and will send a signal to the modulating hot gas reheat valve to direct the flow of hot gas to maintain that temperature. See psychometric chart diagram(Figure 2). A typical application for this would be in treating 100% outside air. This air would be ducted directly into the space relieving the unit handling the zone of any outside air load. This can result in a smaller zone unit, less air flow and a savings in both initial and operating cost.

Control of the hot gas modulation is by the thermostat in the supply air duct or through a building management system. A separate controller is used to control the unit itself.

Psychometric Chart

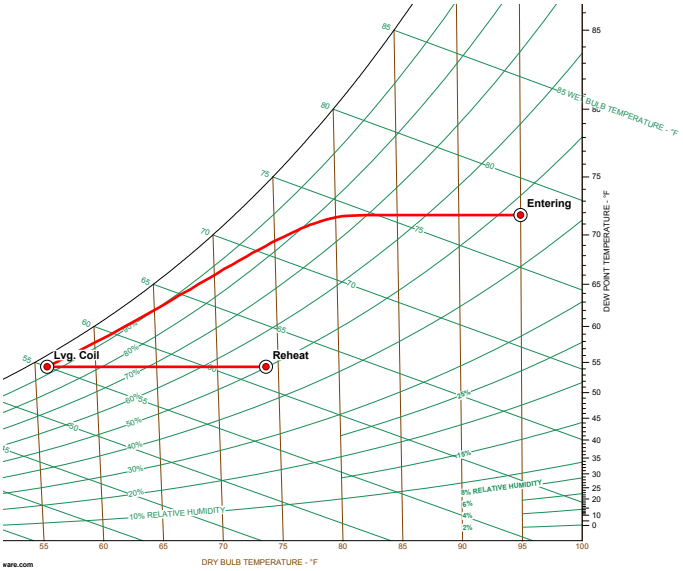


Figure 4

Waterside Economizer (Option) Common Waterside Economizer Applications

- Commercial application where perimeter heating is taking place while core cooling is required. Perimeter heat pumps operating in the heating mode extract heat from the building loop, thus dropping the building loop fluid temperature. Internal core cooling requirements are usually high even in the winter months due to people, lighting, and equipment loads. The moderate temperature loop water circulated through a core heat pump's waterside economizer coil can provide free-cooling without the use of mechanical cooling (Compressors). Also, in many areas code requires some type of economizer cycle. Waterside Economizers in lieu of air side economizers are an inexpensive way to satisfy code requirements in commercial applications.

- Tenant build out commercial applications where the central chilled water fluid loop serves as a individual zoned heat pump condenser water. In this application low temperature fluid is always available for free-cooling.

Flow Proving Switch

The function of the differential pressure switch is to prevent or stop compressor operation should the water supply fail. This will prevent the unit from locking out on a safety requiring a manual reset to restart. This optional control is internally mounted and factory installed.

The switch is piped between the water entering and leaving connections. Should the pressure drop across the water to refrigerant heat exchanger and fall below set value, the switch will open de-energizing the compressor. The blower operation will not be affected by this option.

Heat Recovery Package (Desuperheater)

Hot water needs account for a large percentage of the energy a home or building consumes every year and EP Model customers know that our efficient technology can help support their hot water needs through the optional heat recovery package. With the Heat Recovery Package, you can have part of the system dedicated to your air conditioning and heating and another portion to supplement your current hot water heating system to meet the needs of the building.

Hot Gas Bypass

The function of the hot gas bypass valve is to prevent icing of the air coil when the unit is operating at low load conditions. This situation could arise if the space experiences widely different loads, for example a conference center. Without a hot gas bypass circuit the evaporating temperature will fall and ice could form on the coil restricting air flow and aggravating the situation. Eventually the coil could be totally blocked resulting in possible refrigerant liquid entering the compressor and failure of the system.

The hot gas bypass valve located in the compressor discharge line diverts hot gas to the inlet of the air coil. The valve is factory set to open when the evaporating pressure falls to 75 PSI and will modulate to prevent the pressure falling any lower. This setting is field adjustable and this set point may be adjusted as required.

DDC Control Board

RS Base DDC Sensor

RS Plus DDC Sensor

RS Pro DDC Sensor

DDC Controls (Option)

The optional FHP Bosch factory mounted DDC Controller is preprogrammed and installed on the unit with the Unit Protection Module (UPM) to be job site ready. The unit will operate in a 100% stand-alone control mode or connect to a Building Automation System (BAS) using open protocols BACnet™, Modbus, N2 or LonWorks® (with an optional Lon card). Stand-alone DDC modules must use remote intelligent sensors and are to be programmed by the FHP Bosch BACview® controller only.

Zone temperatures, leaving air temperatures and water temperatures can be monitored from the central control computer and unit fault indication displayed.

Available inputs/outputs include:

- Discharge air temperature
- Leaving water temperature
- Fan run time
- Override time remaining
- Night setback status
- Percent of units cooling
- Percent of units heating
- Cooling set point
- Heating set point
- Status of all the alarms
- Space temperature
- Occupied heating and cooling set points
- Continuous or cycle fan during occupied mode
- Command for occupied or unoccupied mode
- Command for override of the unoccupied mode (unit resorts to occupied set points)
- Set point adjustment

DDC Room Sensors

To complement the controller, FHP Bosch offers a line of intelligent space sensors, which provide precision measurement and communication capabilities in an attractive low profile enclosure. A hidden communications jack provides access to the HVAC control system for commissioning and maintenance.

Models available include:

- The RS Pro has a large LCD display and easy-to-use occupant controls for set point adjustment.
- The RS Plus offers a local set point adjustment and override to an occupied mode and LED indication of current status.
- The RS Standard which has no local temperature set point adjustment.

A BACview® hand held diagnostic tool is available to allow local access to display and modify user defined properties without any computer software. These space sensors will monitor, sense and provide local control for the room.

ZS Base
DDC Zone Sensor (ZS)

ZS Plus
DDC Zone Sensor (ZS)

ZS Pro
DDC Zone Sensor (ZS)

DDC Zone Sensors*

The Pro Zone Sensor (ZS) has an LCD screen that can display the current temperature and set temperature. It can also display relative humidity and CO_2 settings as well as their current readings. It comes with a button for additional information that can be displayed.

The Pro ZS can be ordered in any of the following combinations:

- Temperature setting only
- Temperature with relative humidity settings
- Temperature, relative humidity, and CO_2 settings

The Plus Zone Sensor (ZS) has a little different look to it. It has a occupied indicator that identifies the sensor to be operating in occupied conditions. It comes with a slide bar of for some manual temperature control in the occupied mode +/- setting can be adjusted during commissioning.

The Plus ZS can be ordered in any of the following combinations:

- Temperature setting only

The Base Zone Sensor (ZS) is limited to only sensing capabilities without local controllability.

The Base ZS can be ordered in any of the following combinations:

- Temperature sensor
- Temperature and relative humidity sensor

* Available now through special handling sheet in applications department. Will replace Room Sensor (RS) in the middle of 2014.

Additional Factory Installed Options

- 5, 10, 15, 20 kW Electric Heaters
- EMS, Compressor Monitor, and Pump Relays
- Boilerless Control
- Compressor Monitor Relay
- DuoGuard™ Air Coil
- Pump Relay
- Closed Cell Foam Insulation
- Phase Monitor
- Flow Proving Switch
- 40 Amp Disconnect Switch
- Comfort Alert Module
- Two Way Solenoid Valve
- Automatic Flow Control Valve
- Circulating Pump
- Wire for 208 Volt
- Straight Cooling Unit
- MERV 8 or 13 Filters

Multiple Stage Thermostats

Hose Kit

Accessories

Thermostats

The unit control may be as simple as a single stage thermostat or the unit may have a DDC controller integrated into the building management system.

Thermostats may be manual change over, auto change over or non programmable depending on the requirements of the project. A full line of thermostats are available at FHP Bosch as an accessory.

Hose Kits

Hose kits are recommended between the unit and system loop piping. This will help eliminate the transmission of vibration and noise from the unit to the space. Hose kit options are available in the accessories section of the BST selection software.

Hoses are fire rated fiber reinforced EPDM Stainless Steel braid hoses with swivel connections.

Maximum working pressure 400 PSI for sizes ½" – 1" and 300 PSI for sizes 1¼" – 2".

A variety of hose kits are available depending on the job requirement. Kits 2 through 6 includes supply and return ported ball shut-off valves with P/T ports.

- **Kit 1 –** Hoses only, either 24" or 36" long.
- **Kit 2 –** Hose kit with ball valves on the supply and return hoses. Valves have P/T (pressure/temperature) ports to facilitate pressure and temperature readings.
- **Kit 3 –** Hose kit with automatic flow control valve. The design flow rate is preset at the factory per the design conditions and will automatically limit the flow to this value. This will greatly facilitate balancing of the fluid loop and ensuring each unit gets the required flow.
- **Kit 4 –** Hose kit with an automatic flow control valve and a Y-strainer and blow down valve on the supply side. The filter screen is 20 mesh, 304 stainless steel to help prevent dirt and debris from entering the water coil.
- **Kit 5** – Hose kit with an automatic flow-control valve and a 24V, 2 position solenoid valve on the return. This could be used to shut off flow to the unit when there is not a call for heating or cooling. A typical application would be with VFD pumping.
- **Kit 6 –** Hose kit with an automatic flow control valve, Y-strainer/BD valve, and 24V, 2 position solenoid valve on the return.

Systems

EP Models may be used in a variety of different applications depending on the system design. An overview of tower/boiler and geothermal systems is given below. There could be several variations and combinations of these systems.

Cooling Tower/Boiler Systems

Water source heat pumps with cooling tower/boiler systems have been used for many years and are recognized as having a low installation cost and providing more energy efficient operation than most other systems on the market.

In a typical building, each office or space would receive its own heat pump. This ensures that the unit will independently satisfy the heating or cooling requirements for that space irrespective of the requirements of any other space. Unlike some other systems, this offers individual control and enhanced comfort in all areas.

All the units are connected to a common water loop containing, in addition to the heat pumps, a cooling tower, boiler, a primary and standby pump and a loop water temperature controller. In the summer cooling mode, the units are cooling and rejecting heat to the water loop. This heat is then rejected to the atmosphere through a cooling tower. In winter, heat is taken from the loop and, together with the compressor's heat of compression, used to heat the space. The heat removed from the loop is then replenished by the boiler. The loop water temperature controller will keep the fluid within certain temperature limits, typically 70°F in winter and 85°F in summer, by cycling either the cooling tower or boiler operation.

In today's modern buildings the interior core usually has a net cooling requirement year round irrespective of the outside temperature. This is due to the internal heat gains from people, office equipment and lighting. The heat from heat pumps operating in cooling is rejected to the common water loop and is absorbed by heat pumps on the building's perimeter that are in the heating mode. In effect the system is transferring energy around the building areas from where it is in excess to those areas where it is needed. In many instances we find a balanced system where the heat generated in the interior space is sufficient to heat the perimeter, resulting in neither the cooling tower nor boiler operating. This concept, unique to a water source system, provides the most energy efficient system on the market.

Geothermal Systems

The earth has a tremendous capacity of storing thermal energy, which can be utilized to heat or cool a building.

A geothermal system offers all the benefits of a cooling tower and boiler system with the additional advantage of having overall greater energy efficiency. As the cost of energy increases, geothermal installations are becoming the system of choice by developers and design engineers.

There are several alternative methods of utilizing the energy contained in a geothermal system, giving the design engineer several options for selecting the one that is right for a particular application.

Earth Coupling Options

Ground Loop Systems (Closed Loop)

Lengths of high density polyethylene piping are buried in the earth either in vertical bore holes or horizontal trenches depending on the space available.

Fluid from the loop inside the building circulates through these pipes either rejecting heat to the ground when there is a net cooling requirement or absorbing heat from the ground when heating is the dominant requirement.

The temperature of the earth below 6 feet is relatively constant and is not affected by the ambient temperature. For this reason, the ground temperature is cooler than the summer ambient and warmer than the winter ambient in most regions. Geothermal systems are able to operate effectively in extreme ambient conditions exceeding 100°F in summer and -30°F in winter. This is one of the reasons why geothermal systems have such an advantage over other systems. An additional advantage is that no fossil fuels are used, reducing the carbon emission of the building.

Even in areas which are cooling or heating dominant a hybrid system can be used with a downsized cooling tower or boiler. This system will reduce the installed cost significantly with only a modest impact on overall operating efficiency.

Geothermal systems may cost more to install but the savings in energy and low maintenance costs more than off set this with payback times typically five years or even less.

Vertical Ground Loop System

This method is used mainly in commercial buildings or where space for a loop field is limited. Vertical holes 100 to 400 feet deep are drilled in the ground, and a single loop of high density polyethylene pipe with a U-tube at the bottom is installed. The bore hole is then sealed with grout to ensure good contact for heat transfer with the soil. The size of the project will determine how many bore holes are required. The vertical ground loops are then connected to a horizontal header pipe that carries fluid to the building and circulated to each heat pump. The Earth's temperature is stable below the surface which is an advantage for this system and provides for the greater efficiency. Vertical ground loop fields may be located under buildings, parking lots, or athletic fields. The life expectancy is in excess of 50 years.

Horizontal Ground Loop System

This type is cost effective on smaller projects or where there is sufficient space for the loop field. Trenches, three to six feet deep are dug in which a series of high density polyethylene pipes are laid. These loops are manifolded and connected to the loop inside the building which feeds the heat pumps. The fluid is then circulated, absorbing or rejecting heat to the earth depending on the requirement for heating or cooling.

Typical Heat Pump System

Surface Water, Lake or Pond System

This type of design is economical when a project is located near a body of water. Fluid circulates through polyethylene piping in a closed system, just as it does through ground loops, but in this case, underwater. The pipes may be coiled in a slinky to fit more surface into a given amount of space. The lake needs to be a minimum size and depth depending on the building load. Lake loops have no adverse impact on the aquatic system. Specialized lake heat exchangers are also available for this application. New technology is emerging for stainless steel and titanium heat exchangers.

Well Water System

This type of installation is only possible if there is sufficient ground water available in a well. The water must be of good quality. Local codes may limit the use of this system in certain areas. The arrangement is referred to as an open system which means that water is pumped directly from the source into the geothermal unit and then discharged either into a return well or a body of water. The water quality is unaffected other than a change in the temperature. Refer to the installation manuals for water quality guidelines.

Typical Heat Pump Operation

Cooling Mode

In the cooling mode, hot high pressure refrigerant gas is pumped from the compressor to the water-to-refrigerant heat exchanger via the reversing valve.

Water, or an anti-freeze solution, flowing through the water-to-refrigerant heat exchanger transfers heat from the refrigerant to the fluid raising the fluid temperature while condensing the hot gas into a liquid. This liquid refrigerant then flows through a metering device, where the refrigerant is expanded to a cold liquid, to the air-to-refrigerant heat exchanger coil.

The air-to-refrigerant heat exchanger cools and dehumidifies air by evaporating the liquid refrigerant. The cooling cycle is completed when the refrigerant flows as a low pressure gas through the reversing valve and back to the suction side of the compressor.

Cool dehumidified air is circulated to the space maintaining comfort conditions.

Heating Mode

During the heating mode, the high pressure refrigerant gas is pumped from the compressor to the air-to-refrigerant heat exchanger coil via the reversing valve.

In the air-to-refrigerant heat exchanger coil, the heat is removed by the air that passes over the coil surface, and the hot gas condenses into a liquid.

The heated air is ducted to the space and provides heating for the building.

The refrigerant liquid then flows through a metering device to the water-to-refrigerant heat exchanger.

Typical Unit Installation

Water-to-Air Heat Pump Cycle — Cooling

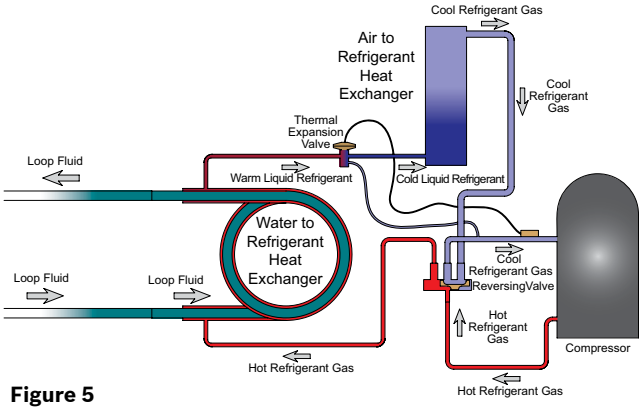


Figure 5

Water-to-Air Heat Pump Cycle — Heating

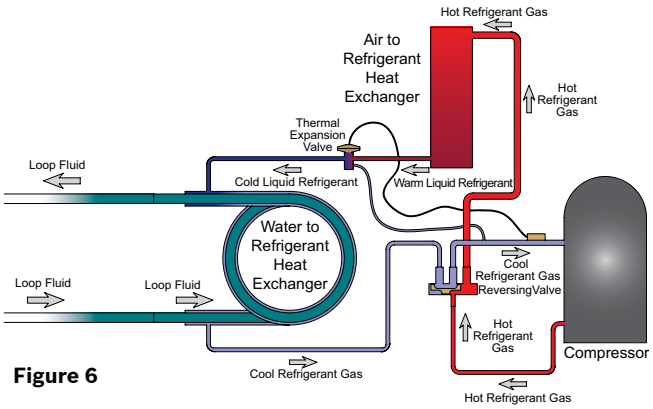


Figure 6

Vertical Unit Installation

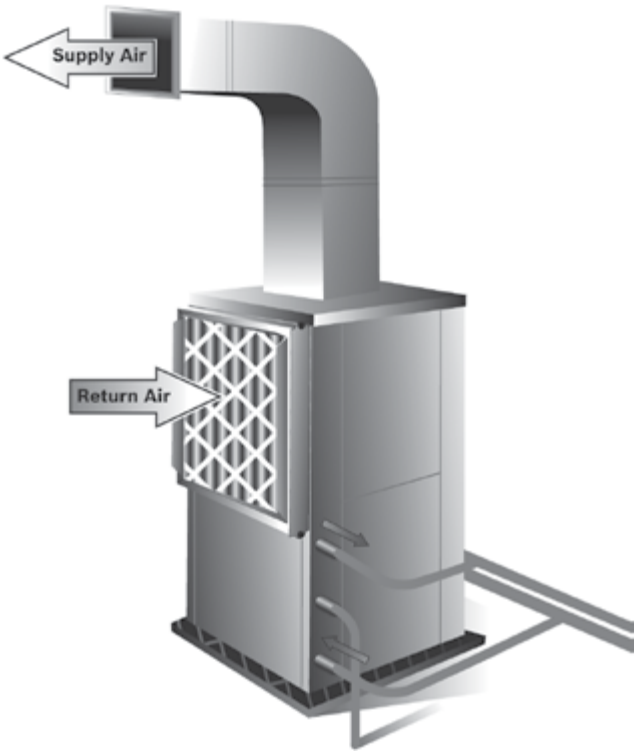


Figure 7

Water, or an anti-freeze solution, circulates through this heat exchanger and is cooled by the evaporating refrigerant which evaporates into a gas. The heating cycle is completed when the refrigerant flows as a low pressure gas through the reversing valve and back to the suction side of the compressor.

Unit Location

Any mechanical device will, at some point in time require servicing and repair.

With this in mind sufficient space must be provided around the unit for service personnel to perform maintenance or repair.

Units are not designed for outdoor installation. Avoid locations where the unit may be exposed to freezing conditions or where the humidity levels could cause condensation on the unit panels, for example, when exposed to outdoor ambient conditions.

Vertical units are normally installed in a closet or mechanical plant room.

If installed in a closet or other confined space, ensure adequate space for return air to the unit.

Sufficient space must be provided for filter replacement and access to the compressor and blower for service.

Units should be set on a piece of rubber, neoprene or other vibration absorbing material at least ⅓" to ½" thick. The pad should extend ¾" over the entire base of the unit.

Avoid direct line of sight to the unit. Install a sound baffle over any door that has a return air grille.

Typical Unit Installation

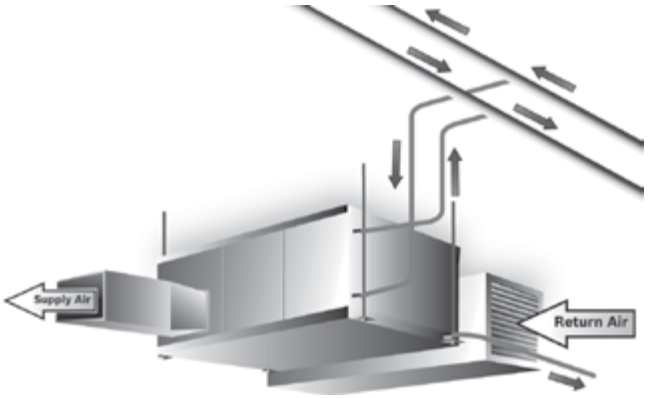


Figure 8

Horizontal Unit Installation

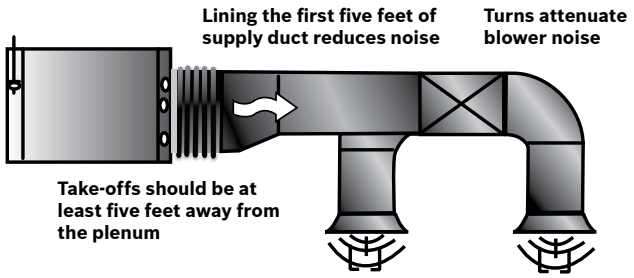
Horizontal units are typically suspended above the ceiling by four (field supplied) 3/8" threaded rods fastened to the unit by the factory supplied hanger bracket kits. The kits include rubber isolators to help prevent transmission of vibration and noise to the building structure. Units should be located directly below a structural member, so that it is securely anchored.

A horizontal unit should be positioned to allow for removal of the filters and access panels. Allow at least 18" clearance on each side of the unit for service and 36" in front of the unit for maintenance access. The filter needs to be slid out and sufficient space must be provided to allow this.

Do not install the unit above any piping or electrical raceways. The unit should be able to be removed to the floor without major rearrangement of other mechanical or ceiling components.

Consideration needs to be made as to the location of the units. Avoid installing units directly above occupied spaces (e.g. above office desks or classrooms). This will minimize possible disruption to the occupants if maintenance or service is required as well as keeping a potential source of noise out of the area. If possible, units should be installed above the hallway drop ceiling in schools, and the supply and return air is routed directly into classrooms. Local code may require fire dampers to be used in this application.

Ductwork and Sound Attenuation Considerations



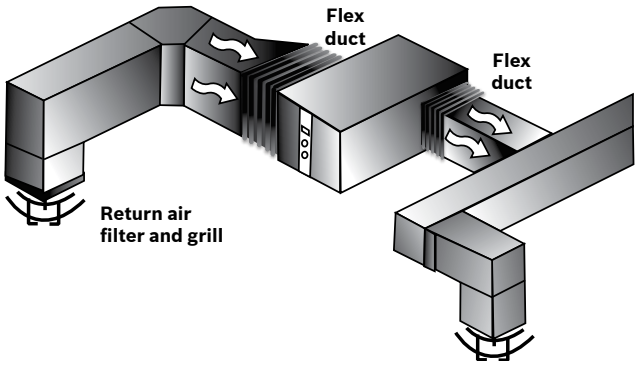
Supply Air Ducting

Figure 9

Sound is becoming an increasingly important factor in all HVAC installations. The EP Model has been designed to minimize sound, but sound acoustical design plays an important part of the sound level in the space.

Most of the problems associated with HVAC generated sound can be avoided by paying close attention to duct design and equipment placement.

A discharge flange is provided on all horizontal unit models for fastening of ductwork. We recommend using a flexible collar between the discharge flange and the duct transformation to reduce vibration transmission from the cabinet and to simplify disconnection of the unit from the ceiling ductwork.



Return Air Ducting

Figure 10

Return air to the unit could be either free return or ducted. The filter rack is provided with a 1" flange should a ducted return be used. We recommend using a flexible collar between the return flange and the duct transformation to reduce vibration transmission from the cabinet and to simplify disconnection of the unit from the ductwork.

Sound is transmitted down the ductwork and it is important to avoid direct line of sight between the unit and the space, both on the return or supply side. To accomplish this, design the duct runs with two 90° turns.

As a general recommendation, duct interiors should have an acoustic / thermal lining of least ½" thick over the entire duct run or a minimum of the first 5 feet of the supply trunk.

Line the last five diameters of duct before each outlet with a one-inch thick sound blanket. Line elbows and transition pieces, as well as a short distance upstream and downstream of the fittings.

Elbows, tees and dampers can create turbulence or distortion in the airflow. Using aerodynamic fittings will help in reducing this effect. Place a straight length of duct, 5 to 10 times the duct width, before the next fitting to smooth out airflow.

Diffusers that are located in the bottom of a trunk duct can also produce noise.

Balancing dampers should be located several duct widths upstream from an air outlet.

Ductwork should be mounted and supported using isolation devices that absorb vibration.

Applications such as Hotel, Motel, Dormitory or Nursing Home that use a single duct discharge are susceptible to noise. These applications typically have low static pressures and short duct lengths. In these applications the discharge duct must be fully lined and have a square elbow without turning vanes. A velocity not exceeding 500 to 600 fpm is recommended. Return air for these applications should enter through a sidewall grille and route up the stud space to a ceiling plenum.

For horizontal heat pumps mounted in the ceiling plenum, an insulated return plenum is sometimes placed at the return air opening to further attenuate line-of-sight sound transmission through return openings.

Piping

The water loop system is typically designed using a “reverse return” piping system which includes a flow control device so that flow requirements are met for each zone.

A high pressure stainless steel flexible hose kit is recommended to connect the unit to the building’s hard piping and acts as a sound attenuator for both the unit operating noise and hydraulic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service.

Hose kits come in several configurations, but in all cases should include supply and return shutoff ball valves to allow removal of a unit without the need to shut down the entire heat pump system. The hose kit may contain either a manual or automatic flow control that may be preset to ensure correct water flow to the unit.

Other components of the hose kit may be a Y-strainer to prevent dirt from fouling the water coil. A blow down valve is recommended with the Y-strainer.

Many installations today use variable frequency drives on the water loop pump as an energy saving measure. This requires the flow to the unit be shut off when it is not operating. This can be accomplished by including a 2-way solenoid valve in the hose kit, which is field wired to open when the compressor is energized. A factory supplied, internal 2-position solenoid valve is also an option.

Pressure / Temperature ports should be included in these fittings to allow the service technician to measure water flow and temperatures when checking unit operation.

Condensate Drain Piping

Condensate piping can be made of steel, copper or PVC pipe. In most cases, PVC pipe eliminates the need to wrap insulation around the pipe to prevent sweating.

A ¾" FPT condensate drain connection is installed in the unit. The condensate piping must be trapped at the unit and pitched away from the unit not less than ¼" 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 cleanout if the trap becomes clogged. 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.

Operating Limits

The EP Models are capable of operating over a wide range of conditions. For operation in a geothermal application or any other installation where the loop fluid temperature may drop below the ambient dew point, the extended range option is recommended. This consists of additional insulation on the piping to prevent condensation.

- Maximum and minimum fluid conditions are at unit rated flow rate.
- Maximum and minimum operating limits may not be combined. If one value is at either maximum or minimum, the other two should be at normal operating range.
- Entering fluid temperatures below 45°F in the heating mode require antifreeze.

Typical Unit Installation

To ensure that you get the optimal performance from your FHP heat pump it is important that they be selected accurately to match your design conditions.

Prior to making equipment selections the zone conditions need to be determined. FHP Bosch recommends using a building load program to determine the heating and cooling loads.

The catalog provides a wide range of entering air and water conditions that will meet most applications. The unit performance can be determined by referring to the data tables from page 23 to 34.

Our Bosch Select Tools Selection Software (BST) is designed to provide you with a fast and accurate selection based on your specific conditions. This software is available through the commercial website. You may click on the BST link and request an account.

The following is a typical example for a unit selection. Design conditions are given as follows:

Total Cooling Load	= 35.57 MBTUH
Sensible Cooling Load	= 30.01 MBTUH
Total Heating Load	= 38.92 MBTUH
Air Flow Required	= 1400 CFM
Entering Air Temp Cooling (db/wb)	= 75°F / 63°F
Entering Air Temp Heating	= 60°F
Entering Water Temp Cooling	= 80°F
Entering Water Temp Heating	= 70°F

FHP model EP036 would not be sufficient given these conditions as it provides a total cooling capacity of 34.0 MBTUH and a sensible capacity of 27.7 MBTUH.

The next size unit, the EP042 has a total cooling capacity of 40.2 MBTUH and a sensible capacity of 32.9 MBTUH. This meets the design conditions as closely as possible.

Please be aware that interpolation between ratings within a table is allowed, but extrapolation is a method of estimating new data by expanding outside a known range of data points and should not be considered accurate.

Unit Operating Limits—EP Model

Operating Limits – Cooling & Heating	Standard Unit	Extended Range Option
Cooling		
Minimum ambient air temperature °F	50	50
Maximum ambient air temperature °F	100	100
Minimum evaporator entering air db/wb °F	68/57	68/57
Rated air coil entering air db/wb °F	80/67	80/67
Maximum evaporator entering air db/wb °F	95/85	95/85
Minimum water coil entering fluid temperature °F	70	40
Water loop typical coil entering fluid range temperature °F	70/90	70/90
Maximum water coil entering fluid temperature °F	110	110
Heating		
Minimum ambient air temperature °F	50	40
Maximum ambient air temperature °F	100	85
Minimum evaporator entering air db °F	50	50
Rated air coil entering air °F	68	68
Maximum evaporator entering air db °F	80	80
Normal water coil entering fluid range °F	50-80	25-80*
Minimum water coil entering Fluid °F	50	20*

* = antifreeze solution is required at these fluid temperatures.

Physical Data

Model EP Water Source Heat Pump

EP Model	007	009	012	015	018	024
Compressor Type (Qty 1)	Rotary	Rotary	Rotary	Rotary	Rotary	Scroll
Max Water Working Pressure (PSIG/kPa)	450/3100	450/3100	450/3100	450/3100	450/3100	450/3100
Standard Fan Motor & Blower						
Fan Motor Type/Speeds	PSC/3	PSC/3	PSC/3	ECM Const Torque/3 speed	ECM Const Torque/3 speed	ECM Const Torque/3 speed
Fan Motor (HP)	1/10	1/10	1/10	1/3	1/3	1/3
Blower Wheel Size (Dia. x W), in	4.5x4.5	4.5x4.5	5.5x5.5	5.5x4.5	9x7	9x7
ECM Constant CFM						
Fan Motor Type/Speeds	NA	NA	NA	ECM Const CFM/ Adj., 3 speed	ECM Const CFM/ Adj., 3 speed	ECM Const CFM/ Adj., 3 speed
Fan Motor (HP)				1/3	1/3	1/2* / 1/3
Water Connection Size						
FPT, in	3/4	3/4	3/4	3/4	3/4	3/4
Coaxial Coil Volume (gal)	0.15	0.15	0.31	0.31	0.31	0.48
Vertical Cabinet						
Refrigeration Charge (oz)	29	31	46	35	35	65
Air Coil Dimensions (H x L)	12x16.5	12x16.5	16x16.5	16.5x20	16.5x20	24x21
Standard Filter - 1" Throwaway (H x L)	15x20	15x20	18x20	20x20	20x20	24x24
Weight - Operating (lbs)	140	154	166	191	195	229
Weight - Shipping (lbs)	160	174	186	208	212	242
Horizontal Cabinet						
Refrigeration Charge (oz)	29	31	46	35	35	65
Air Coil Dimensions (H x L)	12x16.5	12x16.5	16x16.5	18x18.5	18x18.5	18x28
Standard Filter - 1" Throwaway (H x L)	15x20	15x20	18x20	18x20	18x20	20x30
Weight - Operating (lbs)	165	172	173	190	198	307
Weight - Shipping (lbs)	185	192	205	218	222	340

EP Model	030	036	042	048	060	070
Compressor Type (Qty 1)	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Max Water Working Pressure (PSIG/kPa)	450/3100	450/3100	450/3100	450/3100	450/3100	450/3100
Standard Fan Motor & Blower						
Fan Motor Type/Speeds	ECM Const Torque/3 speed	ECM Const Torque/3 speed	ECM Const Torque/3 speed	ECM Const Torque/3 speed	ECM Const Torque/3 speed	ECM Const Torque/3 speed
Fan Motor (HP)	1/2	3/4	3/4	3/4	1	1
Blower Wheel Size (Dia. x W)	9x7	9x7	10x8	10x8	11x9	11x9
ECM Constant CFM						
Fan Motor Type/Speeds	ECM Const CFM / 3 speed	ECM Const CFM / 3 speed	ECM Const CFM / 3 speed	ECM Const CFM / 3 speed	ECM Const CFM / 3 speed	ECM Const CFM / 3 speed
Fan Motor (HP)	1/2	3/4	3/4	3/4	1	1
Water Connection Size						
FPT	1	1	1	1	1	1
Coaxial Coil Volume (gal)	0.39	0.62	0.62	0.62	0.62	0.85
Vertical Cabinet						
Refrigeration Charge (oz)	71	71	83	86	92	127
Air Coil Dimensions (H x L)	24x27	24x27	32x27	32x27	40x27	40x27
Standard Filter - 1" Throwaway (H x L)	24x30	24x30	16x30 (2)	16x30 (2)	20x30 (2)	20x30 (2)
Weight - Operating (lbs)	269	281	334	340	396	444
Weight - Shipping (lbs)	292	304	360	366	422	470
Horizontal Cabinet						
Refrigeration Charge (oz)	71	71	80	82	90	127
Air Coil Dimensions (H x L)	20x32.5	20x32.5	20x43.25	20x43.25	20x54	20x54
Standard Filter - 1" Throwaway (H x L)	20x34.5	20x34.5	20x24 (2)	20x24 (2)	20x28 (2)	20x28 (2)
Weight - Operating (lbs)	358	369	400	405	452	494
Weight - Shipping (lbs)	404	415	465	470	520	562

*On this select unit 024 with -4 voltage (460/1/60), the ECM Constant Torque motor will be 1/2 HP rather than 1/3 HP

Horizontal Cabinet Corner Weights

Configuration			Left Hand Evaporator				Right Hand Evaporator			
Model		Total	Left Front*	Right Front*	Left Back	Right Back	Left Front*	Right Front*	Left Back	Right Back
EPH 007	lbs	165	40	40	42	42	41	39	39	39
	kg	75	18	18	19	19	19	18	18	18
EPH 009	lbs	172	42	42	44	44	42	41	41	41
	kg	78	19	19	20	20	19	19	19	19
EPH 012	lbs	173	46	46	42	45	40	44	40	40
	kg	79	21	21	19	21	18	20	18	18
EPH 015	lbs	190	45	45	45	53	47	46	47	47
	kg	86	20	20	20	25	21	21	21	21
EPH 018	lbs	198	51	51	49	50	48	49	47	47
	kg	90	23	23	22	23	22	22	22	22
EPH 024	lbs	307	80	80	78	79	70	77	68	68
	kg	140	36	36	36	36	32	35	31	31
EPH 030	lbs	358	99	99	88	92	79	96	78	78
	kg	163	45	45	40	42	36	44	35	35
EPH 036	lbs	369	100	100	92	94	83	96	81	81
	kg	168	45	45	42	43	38	44	36	36
EPH 042	lbs	400	107	107	99	105	89	103	88	88
	kg	182	49	49	45	48	40	47	40	40
EPH 048	lbs	405	106	106	108	102	89	102	85	85
	kg	184	48	48	49	46	41	46	39	39
EPH 060	lbs	452	116	116	118	118	100	111	95	95
	kg	205	53	53	54	54	44	50	43	43
EPH 070	lbs	494	155	155	122	121	96	151	98	98
	kg	225	71	71	55	55	44	69	45	45

* Front is control box end.

Capacity Data

EP007 (All Data at 300 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1	0.6 (1.5)	75/63	7.8	6.8	8.8	0.34	23.0	30	0.7 (1.6)	60	5.1	3.9	0.43	3.5
			80/67	8.3	7.1	9.3	0.33	25.0			70	5.0	3.6	0.46	3.2
			85/71	8.8	7.3	9.9	0.32	27.1			80	4.8	3.3	0.49	2.9
	2	2.3 (5.2)	75/63	8.0	7.0	9.0	0.31	26.1		2.4 (5.6)	60	5.4	4.2	0.43	3.7
			80/67	8.6	7.2	9.6	0.30	29.0			70	5.2	3.9	0.46	3.3
			85/71	9.2	7.4	10.1	0.28	32.4			80	5.0	3.6	0.50	3.0
	3	4.7 (10.8)	75/63	8.1	7.0	9.1	0.30	26.9		5.0 (11.6)	60	5.5	4.3	0.43	3.8
			80/67	8.7	7.2	9.6	0.29	30.0			70	5.3	3.9	0.46	3.4
			85/71	9.3	7.5	10.2	0.27	34.3			80	5.1	3.6	0.50	3.0
60	1	0.6 (1.4)	75/63	7.4	6.7	8.5	0.38	19.2	40	0.7 (1.6)	60	6.0	4.7	0.43	4.1
			80/67	7.8	6.9	9.0	0.38	20.5			70	5.8	4.4	0.47	3.7
			85/71	8.4	7.2	9.5	0.37	22.5			80	5.6	4.1	0.50	3.3
	2	2.2 (5.0)	75/63	7.6	6.7	8.7	0.36	21.2		2.3 (5.4)	60	6.4	5.1	0.43	4.4
			80/67	8.1	7.0	9.2	0.34	23.4			70	6.1	4.7	0.47	3.8
			85/71	8.7	7.3	9.8	0.34	25.9			80	5.9	4.4	0.51	3.4
	3	4.5 (10.5)	75/63	7.7	6.8	8.7	0.35	22.0		4.9 (11.2)	60	6.5	5.2	0.43	4.4
			80/67	8.2	7.0	9.3	0.34	24.1			70	6.3	4.8	0.47	4.0
			85/71	8.8	7.3	9.8	0.33	26.6			80	6.0	4.5	0.51	3.5
70	1	0.6 (1.4)	75/63	6.9	6.5	8.2	0.43	15.9	50	0.6 (1.5)	60	6.9	5.6	0.43	4.7
			80/67	7.4	6.7	8.7	0.43	17.2			70	6.6	5.2	0.47	4.1
			85/71	7.9	7.0	9.2	0.42	18.6			80	6.4	4.8	0.51	3.7
	2	2.1 (4.9)	75/63	7.1	6.6	8.4	0.41	17.4		2.3 (5.2)	60	7.3	6.0	0.43	5.0
			80/67	7.7	6.8	8.9	0.40	19.2			70	7.1	5.6	0.47	4.4
			85/71	8.2	7.0	9.4	0.39	20.8			80	6.8	5.2	0.52	3.9
	3	4.4 (10.1)	75/63	7.2	6.6	8.4	0.40	18.1		4.7 (10.8)	60	7.5	6.2	0.43	5.1
			80/67	7.7	6.9	8.9	0.39	19.7			70	7.2	5.8	0.47	4.5
			85/71	8.3	7.1	9.5	0.38	21.7			80	6.9	5.3	0.52	3.9
80	1	0.6 (1.4)	75/63	6.5	6.3	7.9	0.48	13.5	60	0.6 (1.4)	60	7.8	6.5	0.43	5.3
			80/67	7.0	6.6	8.3	0.48	14.6			70	7.5	6.1	0.48	4.6
			85/71	7.4	6.9	8.8	0.47	15.6			80	7.3	5.7	0.52	4.1
	2	2.0 (4.7)	75/63	6.7	6.4	8.0	0.45	14.7		2.2 (5.0)	60	8.3	7.0	0.43	5.7
			80/67	7.2	6.7	8.5	0.45	15.9			70	8.0	6.6	0.48	4.9
			85/71	7.7	7.0	9.0	0.44	17.4			80	7.7	6.1	0.52	4.3
	3	4.2 (9.8)	75/63	6.8	6.4	8.1	0.45	15.2		4.5 (10.5)	60	8.5	7.2	0.43	5.8
			80/67	7.3	6.7	8.6	0.44	16.5			70	8.2	6.7	0.48	5.1
			85/71	7.8	7.0	9.1	0.43	17.9			80	7.9	6.3	0.52	4.4
85	1	0.6 (1.3)	75/63	6.3	6.2	7.7	0.50	12.5	70	0.6 (1.4)	60	8.7	7.4	0.43	5.9
			80/67	6.7	6.5	8.2	0.50	13.3			70	8.4	6.9	0.48	5.2
			85/71	7.2	6.8	8.6	0.50	14.4			80	8.1	6.5	0.52	4.6
	2	2.0 (4.6)	75/63	6.5	6.3	7.9	0.48	13.5		2.1 (4.9)	60	9.3	8.1	0.43	6.4
			80/67	6.9	6.6	8.3	0.48	14.4			70	9.0	7.5	0.48	5.5
			85/71	7.4	6.9	8.8	0.47	15.6			80	8.7	7.0	0.53	4.9
	3	4.2 (9.6)	75/63	6.6	6.3	7.9	0.47	14.0		4.4 (10.1)	60	9.6	8.3	0.43	6.6
			80/67	7.0	6.6	8.4	0.47	14.9			70	9.2	7.8	0.48	5.7
			85/71	7.5	6.9	8.9	0.46	16.2			80	8.9	7.2	0.53	5.0
90	1	0.6 (1.3)	75/63	6.1	6.1	7.6	0.53	11.5	80	0.6 (1.4)	60	9.6	8.3	0.43	6.6
			80/67	6.5	6.4	8.0	0.53	12.3			70	9.3	7.9	0.48	5.7
			85/71	6.9	6.7	8.5	0.52	13.1			80	9.0	7.4	0.53	5.0
	2	2.0 (4.6)	75/63	6.3	6.2	7.7	0.50	12.4		2.0 (4.7)	60	10.4	9.1	0.42	7.2
			80/67	6.7	6.5	8.2	0.50	13.3			70	10.0	8.6	0.48	6.2
			85/71	7.2	6.8	8.6	0.50	14.4			80	9.6	8.0	0.53	5.3
	3	4.1 (9.5)	75/63	6.4	6.3	7.8	0.50	12.9		4.2 (9.8)	60	10.7	9.4	0.42	7.5
			80/67	6.8	6.5	8.2	0.49	13.7			70	10.3	8.8	0.48	6.4
			85/71	7.3	6.8	8.7	0.49	14.9			80	9.8	8.2	0.53	5.4
100	1	0.6 (1.3)	75/63	5.7	5.7	7.3	0.58	9.8							
			80/67	6.1	6.1	7.7	0.58	10.5							
			85/71	6.5	6.5	8.2	0.58	11.2							
	2	1.9 (4.4)	75/63	5.9	5.9	7.4	0.55	10.6							
			80/67	6.3	6.3	7.9	0.55	11.3							
			85/71	6.7	6.6	8.3	0.55	12.1							
	3	4.0 (9.2)	75/63	5.9	5.9	7.5	0.55	10.7							
			80/67	6.4	6.4	7.9	0.54	11.7							
			85/71	6.8	6.7	8.3	0.54	12.5							
110	1	0.5 (1.2)	75/63	5.3	5.3	7.0	0.63	8.4							
			80/67	5.7	5.7	7.4	0.63	9.0							
			85/71	6.0	6.0	7.8	0.63	9.5							
	2	1.9 (4.3)	75/63	5.5	5.5	7.1	0.61	9.0							
			80/67	5.8	5.8	7.5	0.61	9.5							
			85/71	6.2	6.2	7.9	0.61	10.2							
	3	3.9 (8.9)	75/63	5.5	5.5	7.2	0.60	9.1							
			80/67	5.9	5.9	7.6	0.60	9.8							
			85/71	6.3	6.3	8.0	0.60	10.5							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP009 (All Data at 300 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1	0.5 (1.2)	75/63	9.8	7.8	11.1	0.42	23.2	30	0.5 (1.3)	60	6.6	4.9	0.54	3.6
			80/67	10.4	8.0	11.7	0.41	25.0			70	6.4	4.6	0.59	3.2
			85/71	11.1	8.3	12.4	0.41	27.2			80	6.3	4.3	0.64	2.9
	2	1.8 (4.1)	75/63	10.3	8.0	11.4	0.36	28.4		1.9 (4.4)	60	7.0	5.4	0.55	3.8
			80/67	11.0	8.2	12.1	0.35	31.5			70	6.9	5.0	0.60	3.4
			85/71	11.7	8.5	12.8	0.33	35.0			80	6.7	4.7	0.65	3.1
	3	3.7 (8.6)	75/63	10.4	8.0	11.5	0.34	30.3		3.9 (9.1)	60	7.2	5.5	0.55	3.9
			80/67	11.1	8.3	12.2	0.33	34.0			70	7.0	5.2	0.60	3.4
			85/71	11.9	8.5	12.9	0.31	38.4			80	6.8	4.8	0.65	3.1
60	1	0.5 (1.1)	75/63	9.3	7.6	10.8	0.48	19.2	40	0.5 (1.2)	60	7.6	5.9	0.55	4.0
			80/67	9.9	7.8	11.4	0.48	20.6			70	7.4	5.6	0.61	3.6
			85/71	10.6	8.1	12.0	0.47	22.3			80	7.3	5.2	0.66	3.3
	2	1.7 (4)	75/63	9.8	7.8	11.1	0.43	22.9		1.8 (4.2)	60	8.2	6.5	0.56	4.3
			80/67	10.4	8.0	11.7	0.42	25.0			70	8.0	6.1	0.61	3.8
			85/71	11.1	8.3	12.4	0.40	27.5			80	7.7	5.7	0.67	3.4
	3	3.6 (8.3)	75/63	9.9	7.8	11.2	0.41	24.2		3.8 (8.8)	60	8.4	6.7	0.56	4.4
			80/67	10.6	8.1	11.8	0.40	26.8			70	8.2	6.3	0.62	3.9
			85/71	11.3	8.3	12.5	0.38	29.7			80	7.9	5.8	0.67	3.5
70	1	0.5 (1.1)	75/63	8.8	7.4	10.5	0.55	16.0	50	0.5 (1.2)	60	8.7	6.9	0.56	4.5
			80/67	9.4	7.6	11.1	0.54	17.2			70	8.5	6.5	0.62	4.0
			85/71	10.0	7.9	11.7	0.54	18.4			80	8.3	6.1	0.68	3.6
	2	1.7 (3.9)	75/63	9.2	7.6	10.7	0.49	18.6		1.8 (4.1)	60	9.4	7.6	0.57	4.9
			80/67	9.9	7.8	11.4	0.48	20.4			70	9.1	7.2	0.63	4.3
			85/71	10.5	8.0	12.0	0.47	22.1			80	8.9	6.7	0.69	3.8
	3	3.5 (8)	75/63	9.4	7.6	10.8	0.48	19.7		3.7 (8.5)	60	9.7	7.9	0.57	5.0
			80/67	10.0	7.9	11.5	0.46	21.5			70	9.4	7.4	0.63	4.4
			85/71	10.7	8.1	12.1	0.45	23.6			80	9.1	6.9	0.69	3.9
80	1	0.5 (1.1)	75/63	8.3	7.2	10.1	0.61	13.5	60	0.5 (1.1)	60	9.8	8.0	0.57	5.0
			80/67	8.9	7.4	10.7	0.61	14.5			70	9.5	7.5	0.63	4.4
			85/71	9.4	7.7	11.3	0.61	15.4			80	9.3	7.1	0.69	3.9
	2	1.6 (3.7)	75/63	8.7	7.3	10.4	0.56	15.5		1.7 (4.0)	60	10.6	8.8	0.58	5.4
			80/67	9.3	7.6	11.0	0.55	16.8			70	10.3	8.3	0.64	4.7
			85/71	10.0	7.9	11.6	0.55	18.3			80	10.0	7.8	0.71	4.2
	3	3.4 (7.8)	75/63	8.8	7.4	10.5	0.54	16.1		3.6 (8.2)	60	11.0	9.2	0.58	5.6
			80/67	9.5	7.7	11.1	0.54	17.7			70	10.6	8.6	0.65	4.8
			85/71	10.1	7.9	11.7	0.53	19.1			80	10.3	8.1	0.71	4.3
85	1	0.5 (1.1)	75/63	8.1	7.1	10.0	0.64	12.5	70	0.5 (1.1)	60	10.9	9.1	0.58	5.5
			80/67	8.6	7.3	10.5	0.64	13.3			70	10.6	8.6	0.64	4.8
			85/71	9.2	7.6	11.1	0.64	14.2			80	10.4	8.1	0.71	4.3
	2	1.6 (3.7)	75/63	8.5	7.2	10.2	0.59	14.3		1.7 (3.8)	60	11.9	10.1	0.58	6.0
			80/67	9.1	7.5	10.8	0.59	15.4			70	11.6	9.5	0.65	5.3
			85/71	9.7	7.8	11.4	0.58	16.6			80	11.2	8.9	0.72	4.6
	3	3.3 (7.6)	75/63	8.6	7.3	10.3	0.58	14.8		3.4 (7.9)	60	12.3	10.5	0.58	6.2
			80/67	9.2	7.5	10.9	0.57	16.1			70	11.9	9.9	0.65	5.4
			85/71	9.8	7.8	11.5	0.56	17.4			80	11.6	9.3	0.72	4.7
90	1	0.4 (1)	75/63	7.8	7.0	9.8	0.68	11.5	80	0.5 (1.1)	60	12.0	10.2	0.58	6.1
			80/67	8.3	7.2	10.4	0.68	12.2			70	11.7	9.7	0.65	5.3
			85/71	8.9	7.5	10.9	0.68	13.1			80	11.5	9.1	0.72	4.7
	2	1.6 (3.6)	75/63	8.2	7.1	10.0	0.63	13.0		1.6 (3.7)	60	13.2	11.4	0.58	6.7
			80/67	8.8	7.4	10.6	0.62	14.1			70	12.8	10.8	0.65	5.8
			85/71	9.4	7.6	11.2	0.62	15.1			80	12.5	10.1	0.73	5.1
	3	3.2 (7.5)	75/63	8.3	7.2	10.1	0.61	13.5		3.3 (7.7)	60	13.6	11.9	0.58	6.9
			80/67	8.9	7.4	10.7	0.61	14.6			70	13.2	11.2	0.65	5.9
			85/71	9.5	7.7	11.3	0.60	15.8			80	12.8	10.5	0.73	5.2
100	1	0.4 (1)	75/63	7.3	6.8	9.4	0.74	9.8							
			80/67	7.8	7.0	10.0	0.75	10.4							
			85/71	8.3	7.3	10.5	0.75	11.1							
	2	1.6 (3.6)	75/63	7.7	6.9	9.7	0.70	11.0							
			80/67	8.2	7.2	10.3	0.70	11.7							
			85/71	8.8	7.4	10.8	0.69	12.7							
	3	3.2 (7.3)	75/63	7.7	6.9	9.8	0.68	11.2							
			80/67	8.3	7.2	10.3	0.68	12.1							
			85/71	8.9	7.5	10.9	0.68	13.1							
110	1	0.4 (1)	75/63	6.8	6.6	9.1	0.81	8.4							
			80/67	7.2	6.8	9.6	0.81	8.8							
			85/71	7.7	7.1	10.1	0.82	9.4							
	2	1.5 (3.4)	75/63	7.1	6.7	9.3	0.77	9.2							
			80/67	7.6	7.0	9.9	0.77	9.8							
			85/71	8.1	7.2	10.4	0.77	10.5							
	3	3.1 (7.1)	75/63	7.2	6.7	9.4	0.76	9.5							
			80/67	7.7	7.0	9.9	0.76	10.1							
			85/71	8.3	7.3	10.5	0.75	11.0							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP012 (All Data at 400 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1.5	0.5 (1.0)	75/63	13.2	10.0	15.1	0.60	21.8	30	0.5 (1.1)	60	9.1	6.6	0.77	3.5
			80/67	14.1	10.4	16.0	0.60	23.5			70	8.9	6.3	0.83	3.2
			85/71	15.0	10.6	16.9	0.60	25.1			80	8.7	5.9	0.88	2.9
	2.5	1.2 (2.7)	75/63	13.7	10.3	15.5	0.54	25.1		1.2 (2.8)	60	9.6	7.2	0.77	3.7
			80/67	14.7	10.6	16.4	0.53	27.5			70	9.4	6.8	0.83	3.3
			85/71	15.7	10.8	17.4	0.52	29.9			80	9.2	6.3	0.89	3.0
	3.5	2.1 (4.9)	75/63	13.9	10.4	15.6	0.52	26.8		2.2 (5.1)	60	9.9	7.4	0.78	3.7
			80/67	14.9	10.7	16.6	0.51	29.4			70	9.6	7.0	0.84	3.4
			85/71	15.9	11.0	17.6	0.49	32.3			80	9.4	6.5	0.90	3.1
60	1.5	0.4 (1.0)	75/63	12.6	9.8	14.7	0.68	18.5	40	0.5 (1.1)	60	10.4	8.0	0.78	3.9
			80/67	13.4	10.1	15.6	0.68	19.7			70	10.2	7.5	0.85	3.5
			85/71	14.3	10.4	16.4	0.68	21.1			80	10.0	7.1	0.91	3.2
	2.5	1.1 (2.6)	75/63	13.1	10.0	15.0	0.62	21.0		1.2 (2.7)	60	11.1	8.6	0.79	4.1
			80/67	13.9	10.3	15.9	0.62	22.5			70	10.9	8.1	0.86	3.7
			85/71	14.9	10.6	16.9	0.61	24.5			80	10.6	7.6	0.93	3.4
	3.5	2.0 (4.7)	75/63	13.3	10.1	15.2	0.60	22.2		2.1 (5.0)	60	11.5	8.9	0.80	4.2
			80/67	14.2	10.4	16.1	0.59	24.1			70	11.2	8.4	0.87	3.8
			85/71	15.2	10.7	17.0	0.58	26.3			80	10.9	7.9	0.93	3.4
70	1.5	0.4 (1.0)	75/63	11.9	9.5	14.2	0.76	15.7	50	0.5 (1.0)	60	11.9	9.3	0.80	4.4
			80/67	12.7	9.8	15.1	0.76	16.7			70	11.7	8.9	0.87	3.9
			85/71	13.6	10.1	15.9	0.76	17.9			80	11.4	8.3	0.95	3.5
	2.5	1.1 (2.5)	75/63	12.4	9.7	14.6	0.70	17.6		1.1 (2.6)	60	12.7	10.1	0.81	4.6
			80/67	13.3	10.0	15.4	0.70	19.0			70	12.4	9.6	0.89	4.1
			85/71	14.1	10.3	16.3	0.69	20.3			80	12.1	9.0	0.96	3.7
	3.5	1.9 (4.5)	75/63	12.6	9.8	14.7	0.68	18.5		2.1 (4.8)	60	13.1	10.5	0.82	4.7
			80/67	13.5	10.1	15.6	0.67	20.0			70	12.8	9.9	0.89	4.2
			85/71	14.4	10.4	16.5	0.66	21.6			80	12.5	9.3	0.97	3.8
80	1.5	0.4 (1)	75/63	11.2	9.2	13.8	0.84	13.4	60	0.4 (1.0)	60	13.4	10.8	0.82	4.8
			80/67	12.0	9.5	14.6	0.84	14.3			70	13.2	10.2	0.90	4.3
			85/71	12.8	9.8	15.4	0.84	15.2			80	12.9	9.7	0.98	3.9
	2.5	1.0 (2.4)	75/63	11.7	9.4	14.1	0.78	14.9		1.1 (2.5)	60	14.4	11.8	0.83	5.1
			80/67	12.5	9.7	14.9	0.78	15.9			70	14.1	11.1	0.91	4.5
			85/71	13.3	10.0	15.8	0.78	17.0			80	13.7	10.5	0.99	4.0
	3.5	1.9 (4.4)	75/63	11.9	9.5	14.2	0.76	15.6		2.0 (4.6)	60	14.9	12.2	0.84	5.2
			80/67	12.7	9.8	15.1	0.76	16.7			70	14.5	11.6	0.92	4.6
			85/71	13.6	10.1	16.0	0.75	18.0			80	14.1	10.9	1.00	4.1
85	1.5	0.4 (0.9)	75/63	10.9	9.0	13.6	0.88	12.4	70	0.4 (1.0)	60	15.0	12.3	0.84	5.3
			80/67	11.6	9.4	14.3	0.88	13.1			70	14.7	11.7	0.92	4.7
			85/71	12.4	9.7	15.2	0.89	14.0			80	14.4	11.1	1.01	4.2
	2.5	1.0 (2.4)	75/63	11.3	9.2	13.8	0.83	13.6		1.1 (2.4)	60	16.2	13.5	0.85	5.6
			80/67	12.1	9.6	14.7	0.83	14.6			70	15.8	12.8	0.94	4.9
			85/71	12.9	9.9	15.5	0.83	15.6			80	15.4	12.1	1.03	4.4
	3.5	1.9 (4.3)	75/63	11.5	9.3	14.0	0.81	14.2		1.9 (4.5)	60	16.7	14.1	0.86	5.7
			80/67	12.3	9.6	14.8	0.80	15.3			70	16.3	13.3	0.95	5.1
			85/71	13.2	9.9	15.7	0.80	16.5			80	15.9	12.5	1.04	4.5
90	1.5	0.4 (0.9)	75/63	10.6	8.9	13.3	0.92	11.5	80	0.4 (0.9)	60	16.7	13.9	0.86	5.7
			80/67	11.3	9.2	14.1	0.92	12.2			70	16.3	13.3	0.95	5.1
			85/71	12.0	9.5	14.9	0.93	12.9			80	16.0	12.6	1.04	4.5
	2.5	1.0 (2.3)	75/63	11.0	9.1	13.6	0.87	12.6		1.0 (2.4)	60	18.0	15.3	0.87	6.1
			80/67	11.7	9.4	14.4	0.87	13.4			70	17.5	14.5	0.97	5.3
			85/71	12.6	9.7	15.3	0.87	14.4			80	17.1	13.7	1.06	4.7
	3.5	1.89 (4.3)	75/63	11.1	9.2	13.7	0.85	13.1		1.9 (4.3)	60	18.7	15.9	0.88	6.2
			80/67	11.9	9.5	14.5	0.85	14.0			70	18.2	15.1	0.98	5.5
			85/71	12.8	9.8	15.4	0.85	15.1			80	17.7	14.2	1.07	4.9
100	1.5	0.4 (0.9)	75/63	9.9	8.7	12.9	1.00	9.9							
			80/67	10.5	9.0	13.6	1.01	10.4							
			85/71	11.2	9.3	14.4	1.02	11.0							
	2.5	1.0 (2.3)	75/63	10.2	8.8	13.1	0.95	10.7							
			80/67	11.0	9.1	13.9	0.96	11.5							
			85/71	11.7	9.4	14.7	0.96	12.1							
	3.5	1.8 (4.1)	75/63	10.4	8.8	13.2	0.94	11.1							
			80/67	11.1	9.2	14.0	0.94	11.8							
			85/71	11.9	9.5	14.8	0.94	12.6							
110	1.5	0.4 (0.9)	75/63	9.2	8.3	12.4	1.08	8.5							
			80/67	9.8	8.7	13.1	1.09	8.9							
			85/71	10.5	9.0	13.8	1.10	9.5							
	2.5	1.0 (2.2)	75/63	9.5	8.5	12.6	1.04	9.1							
			80/67	10.2	8.8	13.4	1.05	9.7							
			85/71	10.9	9.2	14.2	1.05	10.3							
	3.5	1.7 (4)	75/63	9.6	8.6	12.7	1.02	9.3							
			80/67	10.3	8.9	13.5	1.03	10.0							
			85/71	11.1	9.2	14.3	1.03	10.7							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP015 (All Data at 500 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2	0.7 (1.7)	75/63	16.0	12.5	17.9	0.60	26.5	30	0.8 (1.8)	60	9.9	7.4	0.77	3.8
			80/67	17.0	12.9	18.9	0.59	28.6			70	9.7	7.0	0.85	3.4
			85/71	18.1	13.3	20.0	0.58	31.1			80	9.5	6.5	0.92	3.0
	3	1.5 (3.5)	75/63	16.4	12.7	18.2	0.55	29.9		1.7 (3.8)	60	10.3	7.8	0.78	3.9
			80/67	17.5	13.1	19.2	0.53	32.9			70	10.1	7.3	0.86	3.5
			85/71	18.7	13.5	20.3	0.51	36.3			80	9.9	6.8	0.93	3.1
	4	2.6 (5.9)	75/63	16.6	12.8	18.3	0.52	31.9		2.8 (6.4)	60	10.5	8.0	0.78	3.9
			80/67	17.8	13.2	19.4	0.50	35.5			70	10.3	7.5	0.86	3.5
			85/71	18.9	13.6	20.5	0.48	39.4			80	10.0	6.9	0.94	3.1
60	2	0.7 (1.7)	75/63	15.2	12.2	17.4	0.70	21.7	40	0.8 (1.8)	60	11.4	8.9	0.79	4.2
			80/67	16.2	12.6	18.4	0.69	23.3			70	11.2	8.3	0.87	3.8
			85/71	17.2	13.0	19.4	0.69	25.1			80	10.9	7.8	0.96	3.4
	3	1.5 (3.4)	75/63	15.6	12.4	17.7	0.65	24.1		1.6 (3.7)	60	11.9	9.4	0.80	4.4
			80/67	16.7	12.7	18.7	0.64	26.2			70	11.7	8.7	0.88	3.9
			85/71	17.8	13.1	19.8	0.62	28.6			80	11.3	8.2	0.97	3.4
	4	2.5 (5.7)	75/63	15.8	12.4	17.8	0.62	25.4		2.7 (6.2)	60	12.2	9.6	0.80	4.5
			80/67	16.9	12.8	18.9	0.61	27.9			70	11.9	9.0	0.88	4.0
			85/71	18.0	13.2	19.9	0.59	30.6			80	11.5	8.4	0.97	3.5
70	2	0.7 (1.6)	75/63	14.4	11.8	16.9	0.80	18.0	50	0.7 (1.7)	60	13.0	10.4	0.81	4.7
			80/67	15.4	12.3	17.9	0.80	19.3			70	12.7	9.8	0.90	4.2
			85/71	16.4	12.6	18.9	0.79	20.7			80	12.4	9.2	0.99	3.7
	3	1.4 (3.3)	75/63	14.8	12.0	17.2	0.75	19.7		1.5 (3.6)	60	13.7	11.0	0.81	5.0
			80/67	15.8	12.4	18.2	0.74	21.3			70	13.3	10.3	0.90	4.3
			85/71	16.9	12.8	19.2	0.73	23.1			80	12.9	9.6	1.00	3.8
	4	2.4 (5.5)	75/63	15.0	12.1	17.3	0.72	20.7		2.6 (6.0)	60	14.0	11.4	0.81	5.1
			80/67	16.1	12.5	18.3	0.71	22.6			70	13.6	10.6	0.91	4.4
			85/71	17.1	12.9	19.4	0.70	24.4			80	13.2	9.9	1.00	3.9
80	2	0.6 (1.5)	75/63	13.6	11.5	16.4	0.90	15.1	60	0.7 (1.7)	60	14.7	12.1	0.82	5.3
			80/67	14.5	11.9	17.3	0.90	16.1			70	14.3	11.4	0.91	4.6
			85/71	15.5	12.3	18.3	0.90	17.2			80	14.0	10.7	1.01	4.1
	3	1.4 (3.2)	75/63	14.0	11.7	16.6	0.85	16.4		1.5 (3.4)	60	15.4	12.8	0.82	5.5
			80/67	14.9	12.1	17.6	0.85	17.5			70	15.0	12.0	0.92	4.8
			85/71	16.0	12.5	18.6	0.84	19.0			80	14.6	11.2	1.02	4.2
	4	2.3 (5.4)	75/63	14.2	11.8	16.8	0.83	17.1		2.5 (5.8)	60	15.8	13.2	0.82	5.6
			80/67	15.2	12.2	17.7	0.82	18.5			70	15.4	12.4	0.92	4.9
			85/71	16.2	12.6	18.8	0.81	19.9			80	14.9	11.6	1.03	4.3
85	2	0.6 (1.5)	75/63	13.2	11.4	16.1	0.95	13.8	70	0.7 (1.6)	60	16.4	13.8	0.83	5.8
			80/67	14.1	11.7	17.1	0.95	14.8			70	16.0	13.0	0.93	5.1
			85/71	15.0	12.2	18.0	0.95	15.7			80	15.6	12.2	1.03	4.4
	3	1.3 (3.1)	75/63	13.6	11.5	16.4	0.91	15.0		1.4 (3.3)	60	17.3	14.6	0.83	6.1
			80/67	14.5	11.9	17.3	0.90	16.0			70	16.8	13.8	0.94	5.3
			85/71	15.5	12.3	18.3	0.90	17.2			80	16.3	12.9	1.04	4.6
	4	2.3 (5.3)	75/63	13.7	11.6	16.5	0.88	15.5		2.4 (5.6)	60	17.8	15.1	0.83	6.3
			80/67	14.7	12.0	17.5	0.88	16.7			70	17.2	14.2	0.94	5.4
			85/71	15.7	12.4	18.5	0.87	18.0			80	16.7	13.3	1.05	4.7
90	2	0.6 (1.5)	75/63	12.8	11.2	15.9	1.00	12.7	80	0.7 (1.6)	60	18.2	15.6	0.83	6.4
			80/67	13.7	11.6	16.8	1.01	13.6			70	17.8	14.7	0.94	5.6
			85/71	14.6	12.0	17.7	1.01	14.5			80	17.3	13.8	1.05	4.8
	3	1.3 (3.1)	75/63	13.1	11.3	16.1	0.96	13.6		1.4 (3.2)	60	19.2	16.6	0.83	6.8
			80/67	14.1	11.7	17.1	0.96	14.7			70	18.7	15.6	0.94	5.9
			85/71	15.0	12.2	18.0	0.95	15.7			80	18.1	14.7	1.05	5.0
	4	2.3 (5.2)	75/63	13.3	11.4	16.2	0.94	14.2		2.3 (5.4)	60	19.8	17.1	0.83	7.0
			80/67	14.3	11.8	17.2	0.93	15.3			70	19.2	16.2	0.94	6.0
			85/71	15.3	12.2	18.2	0.93	16.5			80	18.6	15.1	1.06	5.2
100	2	0.6 (1.4)	75/63	11.9	10.9	15.3	1.11	10.7							
			80/67	12.8	11.3	16.2	1.11	11.5							
			85/71	13.7	11.7	17.1	1.12	12.2							
	3	1.3 (3)	75/63	12.3	11.0	15.6	1.07	11.5							
			80/67	13.2	11.4	16.5	1.07	12.3							
			85/71	14.1	11.8	17.4	1.07	13.2							
	4	2.2 (5)	75/63	12.4	11.1	15.7	1.05	11.8							
			80/67	13.4	11.5	16.6	1.05	12.8							
			85/71	14.3	11.9	17.5	1.04	13.7							
110	2	0.6 (1.4)	75/63	11.1	10.5	14.8	1.22	9.1							
			80/67	11.9	10.9	15.7	1.23	9.7							
			85/71	12.7	11.4	16.5	1.23	10.3							
	3	1.3 (2.9)	75/63	11.4	10.6	15.0	1.18	9.7							
			80/67	12.2	11.1	15.9	1.18	10.3							
			85/71	13.1	11.5	16.8	1.19	11.0							
	4	2.1 (4.9)	75/63	11.6	10.7	15.1	1.16	10.0							
			80/67	12.4	11.2	16.0	1.16	10.6							
			85/71	13.3	11.6	16.9	1.16	11.4							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP018 (All Data at 600 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2.5	1.4 (3.2)	75/63	20.2	15.2	23.3	0.95	21.2	30	1.5 (3.4)	60	13.4	10.0	1.03	3.8
			80/67	21.5	15.6	24.6	0.93	23.1			70	13.0	9.4	1.08	3.5
			85/71	22.8	15.9	25.8	0.90	25.3			80	12.7	8.8	1.16	3.2
	4	3.2 (7.4)	75/63	20.8	15.4	23.9	0.95	21.8		3.4 (7.9)	60	14.0	10.5	1.05	3.9
			80/67	22.2	15.8	25.2	0.92	24.0			70	13.6	9.9	1.11	3.6
			85/71	23.5	16.2	26.5	0.89	26.4			80	13.2	9.3	1.18	3.3
	5	4.8 (11.1)	75/63	21.0	15.5	24.1	0.96	21.9		5.1 (11.9)	60	14.2	10.8	1.06	3.9
			80/67	22.4	15.9	25.4	0.93	24.2			70	13.9	10.1	1.12	3.7
			85/71	23.8	16.2	26.7	0.89	26.8			80	13.4	9.5	1.19	3.3
60	2.5	1.3 (3.1)	75/63	19.4	14.8	22.5	0.98	19.7	40	1.4 (3.3)	60	15.3	11.7	1.09	4.1
			80/67	20.6	15.2	23.7	0.97	21.3			70	14.9	11.0	1.15	3.8
			85/71	21.9	15.6	24.9	0.95	23.0			80	14.5	10.4	1.23	3.5
	4	3.1 (7.2)	75/63	19.9	15.0	23.0	0.96	20.7		3.3 (7.7)	60	16.0	12.4	1.11	4.2
			80/67	21.2	15.4	24.3	0.94	22.6			70	15.6	11.7	1.17	3.9
			85/71	22.6	15.8	25.5	0.91	24.8			80	15.2	11.0	1.25	3.6
	5	4.6 (10.7)	75/63	20.1	15.1	23.2	0.96	21.0		5.0 (11.4)	60	16.3	12.7	1.11	4.3
			80/67	21.4	15.5	24.5	0.93	23.0			70	15.9	11.9	1.17	4.0
			85/71	22.8	15.9	25.7	0.90	25.2			80	15.4	11.2	1.26	3.6
70	2.5	1.3 (3)	75/63	18.5	14.4	21.8	1.04	17.7	50	1.4 (3.2)	60	17.3	13.5	1.13	4.5
			80/67	19.7	14.8	23.0	1.04	19.0			70	16.8	12.8	1.20	4.1
			85/71	20.9	15.2	24.2	1.03	20.3			80	16.5	12.1	1.29	3.8
	4	3.0 (7)	75/63	19.0	14.6	22.2	1.01	18.9		3.2 (7.4)	60	18.2	14.4	1.14	4.7
			80/67	20.3	15.0	23.4	0.99	20.5			70	17.7	13.6	1.21	4.3
			85/71	21.5	15.4	24.7	0.98	22.0			80	17.3	12.8	1.31	3.9
	5	4.5 (10.4)	75/63	19.2	14.7	22.3	0.99	19.3		4.8 (11.1)	60	18.5	14.8	1.14	4.8
			80/67	20.5	15.1	23.6	0.98	21.0			70	18.0	13.9	1.22	4.3
			85/71	21.7	15.5	24.8	0.96	22.6			80	17.5	13.1	1.31	3.9
80	2.5	1.3 (2.9)	75/63	17.6	14.0	21.2	1.13	15.5	60	1.3 (3.1)	60	19.4	15.5	1.15	5.0
			80/67	18.7	14.4	22.3	1.14	16.5			70	18.9	14.7	1.23	4.5
			85/71	19.9	14.8	23.5	1.14	17.5			80	18.4	14.0	1.33	4.0
	4	2.9 (6.7)	75/63	18.1	14.2	21.5	1.08	16.7		3.1 (7.1)	60	20.4	16.6	1.15	5.2
			80/67	19.2	14.7	22.7	1.08	17.8			70	19.9	15.7	1.24	4.7
			85/71	20.5	15.0	23.9	1.07	19.1			80	19.4	14.8	1.35	4.2
	5	4.4 (10.1)	75/63	18.2	14.3	21.6	1.07	17.0		4.6 (10.7)	60	20.8	17.0	1.15	5.3
			80/67	19.4	14.7	22.8	1.06	18.3			70	20.3	16.1	1.24	4.8
			85/71	20.7	15.1	24.1	1.05	19.7			80	19.8	15.1	1.36	4.3
85	2.5	1.2 (2.8)	75/63	17.1	13.8	20.9	1.19	14.4	70	1.3 (3.0)	60	21.5	17.6	1.15	5.5
			80/67	18.2	14.2	22.0	1.19	15.3			70	21.0	16.8	1.25	4.9
			85/71	19.3	14.6	23.1	1.20	16.1			80	20.5	16.0	1.37	4.4
	4	2.9 (6.6)	75/63	17.6	14.0	21.2	1.13	15.5		3.0 (6.9)	60	22.7	18.9	1.16	5.8
			80/67	18.7	14.5	22.3	1.13	16.5			70	22.1	17.9	1.26	5.1
			85/71	19.9	14.8	23.5	1.13	17.6			80	21.6	17.0	1.39	4.6
	5	4.3 (9.9)	75/63	17.8	14.1	21.3	1.12	15.9		4.5 (10.3)	60	23.2	19.4	1.16	5.9
			80/67	18.9	14.5	22.4	1.11	17.0			70	22.6	18.4	1.27	5.2
			85/71	20.1	14.9	23.7	1.11	18.2			80	22.0	17.3	1.39	4.6
90	2.5	1.2 (2.8)	75/63	16.7	13.6	20.6	1.24	13.4	80	1.2 (2.9)	60	23.7	19.9	1.16	6.0
			80/67	17.7	14.1	21.7	1.25	14.1			70	23.2	18.9	1.28	5.3
			85/71	18.8	14.5	22.8	1.26	14.9			80	22.7	18.0	1.41	4.7
	4	2.8 (6.5)	75/63	17.1	13.8	20.9	1.19	14.4		2.9 (6.7)	60	25.1	21.3	1.16	6.3
			80/67	18.2	14.2	22.0	1.19	15.3			70	24.5	20.2	1.29	5.6
			85/71	19.4	14.7	23.2	1.19	16.3			80	23.9	19.1	1.44	4.9
	5	4.2 (9.8)	75/63	17.3	13.9	21.0	1.17	14.8		4.3 (10.0)	60	25.6	21.8	1.17	6.4
			80/67	18.4	14.3	22.1	1.17	15.7			70	25.0	20.7	1.30	5.6
			85/71	19.6	14.8	23.3	1.17	16.8			80	24.4	19.5	1.45	4.9
100	2.5	1.2 (2.7)	75/63	15.7	13.3	20.0	1.37	11.5							
			80/67	16.8	13.7	21.1	1.38	12.2							
			85/71	17.8	14.1	22.2	1.39	12.8							
	4	2.7 (6.3)	75/63	16.2	13.4	20.3	1.31	12.3							
			80/67	17.2	13.9	21.4	1.32	13.0							
			85/71	18.4	14.3	22.5	1.32	13.9							
	5	4.1 (9.5)	75/63	16.3	13.5	20.3	1.29	12.6							
			80/67	17.4	13.9	21.4	1.30	13.4							
			85/71	18.5	14.3	22.6	1.30	14.2							
110	2.5	1.1 (2.6)	75/63	14.8	12.9	19.5	1.49	9.9							
			80/67	15.8	13.3	20.5	1.51	10.4							
			85/71	16.8	13.7	21.6	1.53	10.9							
	4	2.6 (6.1)	75/63	15.2	13.0	19.7	1.44	10.5							
			80/67	16.2	13.5	20.8	1.45	11.1							
			85/71	17.3	14.0	21.9	1.47	11.8							
	5	4.0 (9.2)	75/63	15.3	13.1	19.7	1.42	10.7							
			80/67	16.4	13.5	20.9	1.44	11.4							
			85/71	17.4	14.0	22.0	1.45	12.0							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP024 (All Data at 800 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	3	0.9 (2.1)	75/63	27.1	20.5	30.5	1.05	25.9	30	1.0 (2.2)	60	18.2	13.6	1.38	3.9
			80/67	28.8	21.0	32.3	1.06	27.3			70	17.8	12.8	1.53	3.4
			85/71	30.6	21.6	34.1	1.06	28.8			80	17.6	11.9	1.71	3.0
	4	1.6 (3.6)	75/63	27.6	20.8	30.8	0.98	28.2		1.6 (3.8)	60	18.7	14.1	1.38	3.9
			80/67	29.4	21.3	32.7	0.98	30.0			70	18.3	13.2	1.54	3.5
			85/71	31.2	21.8	34.6	0.98	31.8			80	18.1	12.3	1.71	3.1
	6	3.2 (7.4)	75/63	28.1	21.0	31.1	0.92	30.8		3.4 (7.8)	60	19.3	14.7	1.39	4.1
			80/67	30.0	21.5	33.0	0.91	33.1			70	18.9	13.8	1.55	3.6
			85/71	31.9	22.1	34.9	0.90	35.5			80	18.6	12.8	1.72	3.2
60	3	0.9 (2.1)	75/63	25.8	20.0	29.7	1.20	21.5	40	0.9 (2.2)	60	20.7	16.0	1.41	4.3
			80/67	27.5	20.5	31.5	1.21	22.7			70	20.3	15.1	1.57	3.8
			85/71	29.2	21.1	33.3	1.22	23.9			80	20.0	14.2	1.74	3.4
	4	1.5 (3.5)	75/63	26.3	20.2	30.0	1.14	23.1		1.6 (3.6)	60	21.3	16.6	1.41	4.4
			80/67	28.1	20.7	31.9	1.14	24.6			70	21.0	15.7	1.58	3.9
			85/71	29.9	21.3	33.7	1.15	26.1			80	20.6	14.8	1.76	3.4
	6	3.1 (7.2)	75/63	26.8	20.4	30.4	1.08	24.9		3.3 (7.5)	60	22.1	17.4	1.42	4.5
			80/67	28.7	21.0	32.2	1.08	26.7			70	21.7	16.4	1.59	4.0
			85/71	30.5	21.6	34.0	1.07	28.5			80	21.3	15.4	1.77	3.5
70	3	0.9 (2)	75/63	24.6	19.4	29.0	1.36	18.1	50	0.9 (2.1)	60	23.4	18.6	1.44	4.8
			80/67	26.2	20.0	30.6	1.37	19.1			70	23.0	17.6	1.61	4.2
			85/71	27.8	20.6	32.3	1.39	20.1			80	22.6	16.6	1.79	3.7
	4	1.4 (3.3)	75/63	25.1	19.6	29.3	1.30	19.4		1.5 (3.5)	60	24.2	19.4	1.45	4.9
			80/67	26.7	20.3	30.9	1.31	20.5			70	23.8	18.4	1.62	4.3
			85/71	28.4	20.8	32.7	1.32	21.6			80	23.4	17.3	1.81	3.8
	6	3.0 (6.9)	75/63	25.6	19.8	29.6	1.24	20.7		3.1 (7.3)	60	25.2	20.3	1.46	5.0
			80/67	27.3	20.5	31.3	1.24	22.1			70	24.7	19.2	1.64	4.4
			85/71	29.0	21.1	33.1	1.24	23.3			80	24.2	18.0	1.83	3.9
80	3	0.8 (1.9)	75/63	23.3	18.9	28.2	1.53	15.3	60	0.9 (2.0)	60	26.3	21.3	1.48	5.2
			80/67	24.8	19.5	29.7	1.54	16.1			70	25.8	20.3	1.66	4.6
			85/71	26.4	20.1	31.4	1.56	17.0			80	25.4	19.2	1.85	4.0
	4	1.4 (3.2)	75/63	23.8	19.1	28.4	1.46	16.3		1.5 (3.4)	60	27.3	22.3	1.50	5.3
			80/67	25.3	19.7	30.1	1.48	17.2			70	26.8	21.2	1.67	4.7
			85/71	27.0	20.3	31.8	1.49	18.2			80	26.3	20.0	1.87	4.1
	6	2.8 (6.7)	75/63	24.2	19.3	28.7	1.41	17.2		3.0 (7.0)	60	28.5	23.4	1.51	5.5
			80/67	25.9	19.9	30.4	1.41	18.4			70	27.9	22.2	1.69	4.8
			85/71	27.6	20.5	32.2	1.42	19.5			80	27.3	21.0	1.88	4.2
85	3	0.8 (1.9)	75/63	22.7	18.7	27.8	1.61	14.1	70	0.8 (2.0)	60	29.3	24.2	1.52	5.6
			80/67	24.1	19.3	29.3	1.63	14.8			70	28.8	23.1	1.70	4.9
			85/71	25.6	19.9	30.9	1.65	15.5			80	28.4	21.9	1.90	4.4
	4	1.4 (3.2)	75/63	23.1	18.8	28.0	1.55	14.9		1.4 (3.3)	60	30.6	25.4	1.54	5.8
			80/67	24.7	19.4	29.7	1.56	15.8			70	29.9	24.3	1.73	5.1
			85/71	26.2	20.1	31.3	1.58	16.6			80	29.4	22.9	1.92	4.5
	6	2.9 (6.6)	75/63	23.5	19.0	28.3	1.49	15.8		2.9 (6.8)	60	32.0	26.8	1.57	6.0
			80/67	25.1	19.7	29.9	1.50	16.8			70	31.3	25.4	1.75	5.2
			85/71	26.8	20.2	31.7	1.51	17.8			80	30.6	24.0	1.95	4.6
90	3	0.8 (1.9)	75/63	22.0	18.4	27.4	1.71	12.9	80	0.8 (1.9)	60	32.5	27.2	1.58	6.0
			80/67	23.5	19.0	29.0	1.72	13.7			70	31.9	26.0	1.76	5.3
			85/71	24.9	19.6	30.5	1.74	14.3			80	31.4	24.7	1.97	4.7
	4	1.3 (3.1)	75/63	22.5	18.6	27.7	1.64	13.7		1.4 (3.2)	60	33.9	28.6	1.60	6.2
			80/67	23.9	19.2	29.2	1.66	14.5			70	33.3	27.3	1.79	5.4
			85/71	25.5	19.7	30.9	1.67	15.3			80	32.6	25.9	2.00	4.8
	6	2.8 (6.5)	75/63	22.9	18.7	27.9	1.59	14.5		2.8 (6.6)	60	35.5	30.4	1.64	6.3
			80/67	24.4	19.3	29.5	1.59	15.3			70	34.8	28.6	1.83	5.6
			85/71	26.0	20.0	31.2	1.60	16.2			80	34.0	27.1	2.04	4.9
100	3	0.8 (1.8)	75/63	20.8	17.8	26.7	1.90	10.9							
			80/67	22.1	18.5	28.2	1.92	11.5							
			85/71	23.5	19.1	29.7	1.94	12.1							
	4	1.3 (3)	75/63	21.2	18.0	27.0	1.84	11.5							
			80/67	22.5	18.7	28.4	1.86	12.1							
			85/71	24.0	19.3	29.9	1.87	12.8							
	6	2.7 (6.3)	75/63	21.5	18.2	27.2	1.78	12.1							
			80/67	23.0	18.8	28.7	1.79	12.9							
			85/71	24.5	19.4	30.2	1.81	13.6							
110	3	0.8 (1.8)	75/63	19.4	17.3	26.1	2.13	9.2							
			80/67	20.8	17.9	27.5	2.14	9.7							
			85/71	22.1	18.6	29.0	2.16	10.3							
	4	1.3 (3)	75/63	19.8	17.5	26.2	2.06	9.6							
			80/67	21.1	18.1	27.7	2.07	10.2							
			85/71	22.5	18.8	29.1	2.08	10.8							
	6	2.6 (6.1)	75/63	20.1	17.6	26.4	2.01	10.0							
			80/67	21.5	18.2	27.9	2.01	10.7							
			85/71	23.0	18.9	29.4	2.02	11.4							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP030 (All Data at 1000 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	4	0.6 (1.3)	75/63	30.0	24.0	34.0	1.23	24.5	30	0.6 (1.3)	60	19.8	15.0	1.43	4.1
			80/67	31.9	24.6	36.1	1.27	25.2			70	19.4	14.1	1.60	3.6
			85/71	33.8	25.4	38.1	1.31	25.8			80	19.0	13.0	1.78	3.1
	6	1.1 (2.6)	75/63	30.9	24.3	34.6	1.14	27.2		1.2 (2.8)	60	20.5	15.7	1.43	4.2
			80/67	32.8	25.0	36.7	1.17	28.1			70	20.0	14.6	1.60	3.7
			85/71	34.8	25.7	38.9	1.21	28.7			80	19.6	13.3	1.78	3.2
	8	1.9 (4.4)	75/63	31.3	24.5	34.9	1.09	28.8		2.0 (4.7)	60	21.0	16.1	1.43	4.3
			80/67	33.2	25.2	36.9	1.12	29.7			70	20.5	15.2	1.60	3.8
			85/71	35.3	25.9	39.2	1.16	30.5			80	19.8	14.0	1.78	3.2
60	4	0.5 (1.2)	75/63	28.7	23.4	33.1	1.38	20.8	40	0.6 (1.3)	60	22.4	17.6	1.43	4.6
			80/67	30.4	24.2	35.0	1.42	21.5			70	21.8	16.5	1.60	4.0
			85/71	32.3	24.9	37.1	1.47	22.0			80	21.5	15.3	1.79	3.5
	6	1.1 (2.5)	75/63	29.5	23.7	33.7	1.29	22.9		1.2 (2.7)	60	23.4	18.5	1.43	4.8
			80/67	31.4	24.4	35.7	1.33	23.7			70	22.8	17.3	1.60	4.2
			85/71	33.2	25.2	37.7	1.37	24.3			80	22.3	16.2	1.79	3.6
	8	1.9 (4.3)	75/63	29.9	23.9	33.9	1.25	24.0		1.9 (4.5)	60	23.9	19.2	1.43	4.9
			80/67	31.7	24.7	35.9	1.28	24.9			70	23.3	17.8	1.60	4.3
			85/71	33.8	25.3	38.2	1.32	25.7			80	22.5	16.6	1.79	3.7
70	4	0.5 (1.2)	75/63	27.3	22.8	32.3	1.54	17.7	50	0.5 (1.2)	60	25.3	20.4	1.43	5.2
			80/67	29.0	23.6	34.1	1.58	18.4			70	24.9	19.3	1.61	4.5
			85/71	30.8	24.4	36.1	1.63	18.9			80	24.3	18.1	1.81	3.9
	6	1.1 (2.5)	75/63	28.0	23.1	32.7	1.46	19.3		1.1 (2.6)	60	26.5	21.6	1.44	5.4
			80/67	29.9	23.9	34.7	1.49	20.1			70	26.0	20.8	1.62	4.7
			85/71	31.7	24.7	36.7	1.53	20.7			80	25.6	19.6	1.82	4.1
	8	1.8 (4.1)	75/63	28.4	23.3	32.9	1.41	20.1		1.9 (4.3)	60	27.2	22.5	1.45	5.5
			80/67	30.3	24.0	35.0	1.44	21.0			70	26.5	20.8	1.63	4.8
			85/71	32.2	24.8	37.1	1.48	21.7			80	25.9	19.7	1.82	4.2
80	4	0.5 (1.1)	75/63	25.9	22.3	31.4	1.72	15.1	60	0.5 (1.2)	60	28.6	23.7	1.46	5.7
			80/67	27.6	23.0	33.2	1.76	15.7			70	27.9	22.2	1.64	5.0
			85/71	29.3	23.8	35.1	1.81	16.2			80	27.3	21.0	1.84	4.4
	6	1.0 (2.4)	75/63	26.6	22.6	31.8	1.63	16.3		1.1 (2.5)	60	30.1	25.1	1.48	5.9
			80/67	28.3	23.3	33.7	1.67	17.0			70	29.3	23.5	1.66	5.2
			85/71	30.2	24.0	35.7	1.71	17.7			80	28.8	22.5	1.86	4.5
	8	1.7 (4)	75/63	26.9	22.7	32.0	1.59	16.9		1.8 (4.2)	60	30.8	25.9	1.50	6.0
			80/67	28.7	23.4	34.0	1.62	17.7			70	30.0	24.3	1.67	5.2
			85/71	30.6	24.3	36.0	1.66	18.5			80	29.4	22.9	1.87	4.6
85	4	0.5 (1.1)	75/63	25.2	22.0	31.0	1.82	13.9	70	0.5 (1.2)	60	32.1	26.9	1.52	6.2
			80/67	26.8	22.8	32.8	1.85	14.5			70	31.2	25.4	1.70	5.4
			85/71	28.6	23.5	34.7	1.91	15.0			80	30.6	24.1	1.89	4.7
	6	1.0 (2.3)	75/63	25.9	22.2	31.4	1.73	15.0		1.0 (2.5)	60	33.7	28.4	1.55	6.4
			80/67	27.6	23.1	33.2	1.76	15.7			70	33.2	27.6	1.74	5.6
			85/71	29.4	23.8	35.2	1.80	16.3			80	32.2	25.5	1.93	4.9
	8	1.7 (3.9)	75/63	26.2	22.4	31.6	1.68	15.6		1.8 (4.1)	60	34.8	29.6	1.58	6.4
			80/67	27.9	23.2	33.4	1.71	16.3			70	34.1	28.5	1.77	5.7
			85/71	29.8	23.9	35.4	1.75	17.0			80	33.5	27.3	1.97	5.0
90	4	0.5 (1.1)	75/63	24.5	21.7	30.5	1.92	12.8	80	0.5 (1.1)	60	35.8	30.4	1.60	6.5
			80/67	26.1	22.5	32.3	1.96	13.4			70	34.9	28.7	1.79	5.7
			85/71	27.8	23.3	34.2	2.00	13.9			80	34.2	27.3	1.99	5.0
	6	1.0 (2.3)	75/63	25.2	21.9	31.0	1.83	13.8		1.0 (2.3)	60	37.7	32.1	1.67	6.6
			80/67	26.8	22.8	32.7	1.86	14.4			70	36.9	30.5	1.86	5.8
			85/71	28.5	23.6	34.6	1.90	15.0			80	36.1	29.0	2.06	5.1
	8	1.7 (3.9)	75/63	25.5	22.1	31.2	1.78	14.3		1.7 (3.9)	60	39.2	33.4	1.72	6.7
			80/67	27.2	22.9	33.0	1.81	15.0			70	38.5	32.1	1.91	5.9
			85/71	29.0	23.6	34.9	1.85	15.7			80	37.7	31.3	2.12	5.2
100	4	0.5 (1.1)	75/63	23.0	21.1	29.7	2.14	10.8							
			80/67	24.6	22.0	31.5	2.17	11.3							
			85/71	26.2	22.8	33.2	2.22	11.8							
	6	1.0 (2.2)	75/63	23.6	21.4	30.1	2.04	11.6							
			80/67	25.3	22.1	31.9	2.08	12.2							
			85/71	26.9	23.0	33.7	2.12	12.7							
	8	1.6 (3.7)	75/63	23.9	21.5	30.2	2.00	12.0							
			80/67	25.6	22.3	32.1	2.03	12.6							
			85/71	27.3	23.2	33.9	2.07	13.2							
110	4	0.4 (1)	75/63	21.5	20.5	29.0	2.39	9.0							
			80/67	23.0	21.4	30.7	2.42	9.5							
			85/71	24.6	22.2	32.4	2.45	10.0							
	6	1.0 (2.2)	75/63	22.1	20.8	29.3	2.29	9.7							
			80/67	23.6	21.6	31.0	2.32	10.2							
			85/71	25.3	22.5	32.8	2.35	10.8							
	8	1.6 (3.6)	75/63	22.4	20.8	29.5	2.25	10.0							
			80/67	23.9	21.7	31.1	2.27	10.5							
			85/71	25.6	22.6	32.9	2.30	11.1							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP036 (All Data at 1200 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	4.5	0.9 (2.1)	75/63	37.1	29.1	42.4	1.64	22.6	30	0.7 (1.5)	60	26.3	20.0	1.90	4.1
			80/67	39.4	30.0	44.8	1.66	23.7			70	25.7	18.8	2.09	3.6
			85/71	42.0	30.7	47.5	1.68	24.9			80	25.2	17.4	2.31	3.2
	6	1.5 (3.4)	75/63	37.8	29.4	42.9	1.56	24.2		1.1 (2.6)	60	27.0	20.4	1.91	4.2
			80/67	40.3	30.3	45.4	1.58	25.6			70	26.7	19.4	2.10	3.7
			85/71	42.9	31.2	48.1	1.59	27.0			80	26.0	18.4	2.32	3.3
	9	3.1 (7.2)	75/63	38.6	29.7	43.4	1.48	26.1		2.3 (5.3)	60	28.3	21.7	1.92	4.3
			80/67	41.2	30.6	46.1	1.48	27.7			70	27.8	20.5	2.12	3.8
			85/71	43.9	31.4	48.9	1.49	29.4			80	27.1	19.4	2.34	3.4
60	4.5	0.9 (2)	75/63	35.4	28.4	41.3	1.81	19.5	40	0.6 (1.5)	60	29.5	23.1	1.94	4.5
			80/67	37.8	29.2	43.7	1.84	20.6			70	29.2	21.5	2.14	4.0
			85/71	40.1	30.2	46.1	1.86	21.6			80	28.3	20.6	2.36	3.5
	6	1.4 (3.3)	75/63	36.2	28.7	41.8	1.74	20.8		1.1 (2.5)	60	30.8	24.6	1.96	4.6
			80/67	38.5	29.6	44.2	1.75	22.0			70	30.6	22.6	2.16	4.2
			85/71	41.0	30.5	46.8	1.77	23.2			80	29.7	21.6	2.37	3.7
	9	3 (6.9)	75/63	36.9	29.0	42.3	1.66	22.3		2.2 (5.1)	60	32.1	25.3	1.97	4.8
			80/67	39.5	29.9	44.9	1.67	23.7			70	31.4	24.3	2.17	4.2
			85/71	42.0	30.8	47.5	1.67	25.1			80	31.1	22.8	2.39	3.8
70	4.5	0.8 (1.9)	75/63	33.9	27.8	40.3	2.00	17.0	50	0.6 (1.4)	60	33.7	26.9	1.99	5.0
			80/67	36.1	28.7	42.6	2.02	17.9			70	32.9	25.5	2.19	4.4
			85/71	38.4	29.6	45.0	2.04	18.8			80	32.3	24.4	2.41	3.9
	6	1.4 (3.2)	75/63	34.5	28.0	40.6	1.92	18.0		1.0 (2.4)	60	35.0	28.4	2.01	5.1
			80/67	36.8	28.9	43.0	1.94	19.0			70	34.4	27.0	2.21	4.6
			85/71	39.2	29.9	45.6	1.95	20.1			80	33.8	25.6	2.43	4.1
	9	2.9 (6.7)	75/63	35.2	28.3	41.1	1.84	19.1		2.2 (5.0)	60	36.6	29.6	2.03	5.3
			80/67	37.6	29.2	43.6	1.85	20.3			70	35.7	28.4	2.23	4.7
			85/71	40.0	30.1	46.1	1.86	21.5			80	35.0	27.0	2.45	4.2
80	4.5	0.8 (1.8)	75/63	32.1	27.0	39.1	2.19	14.6	60	0.6 (1.4)	60	37.8	30.8	2.04	5.4
			80/67	34.2	28.0	41.3	2.22	15.4			70	36.9	29.7	2.24	4.8
			85/71	36.4	28.9	43.7	2.24	16.2			80	36.3	28.0	2.47	4.3
	6	1.3 (3.1)	75/63	32.7	27.3	39.5	2.11	15.4		1.0 (2.4)	60	39.6	32.6	2.06	5.6
			80/67	35.0	28.3	41.9	2.13	16.4			70	38.7	30.8	2.26	5.0
			85/71	37.3	29.2	44.2	2.15	17.3			80	37.8	29.7	2.49	4.5
	9	2.8 (6.5)	75/63	33.5	27.4	40.0	2.04	16.4		2.2 (5.0)	60	41.6	34.6	2.08	5.9
			80/67	35.8	28.5	42.4	2.05	17.4			70	40.9	33.3	2.29	5.2
			85/71	38.2	29.4	44.9	2.06	18.5			80	39.7	31.0	2.52	4.6
85	4.5	0.8 (1.8)	75/63	31.2	26.7	38.6	2.30	13.5	70	0.6 (1.3)	60	42.3	35.1	2.09	5.9
			80/67	33.3	27.6	40.7	2.32	14.3			70	41.4	33.6	2.30	5.3
			85/71	35.4	28.5	43.0	2.35	15.1			80	40.5	32.2	2.53	4.7
	6	1.3 (3.1)	75/63	31.9	27.0	39.0	2.22	14.4		1.0 (2.2)	60	44.4	37.5	2.12	6.1
			80/67	34.0	27.9	41.2	2.24	15.2			70	43.3	34.9	2.33	5.5
			85/71	36.6	28.1	43.9	2.26	16.2			80	42.4	33.7	2.56	4.9
	9	2.8 (6.4)	75/63	32.5	27.2	39.4	2.14	15.2		2.0 (4.6)	60	47.4	40.4	2.16	6.4
			80/67	34.8	28.2	41.7	2.15	16.1			70	45.6	38.5	2.37	5.6
			85/71	37.1	29.1	44.1	2.16	17.1			80	44.7	36.2	2.60	5.0
90	4.5	0.8 (1.8)	75/63	30.3	26.3	38.0	2.41	12.5	80	0.6 (1.3)	60	47.0	39.6	2.16	6.4
			80/67	32.4	27.3	40.1	2.44	13.3			70	46.2	38.1	2.37	5.7
			85/71	34.6	28.2	42.4	2.46	14.1			80	45.3	36.4	2.61	5.1
	6	1.3 (3)	75/63	31.0	26.6	38.4	2.33	13.3		0.9 (2.2)	60	49.1	41.8	2.19	6.6
			80/67	33.1	27.5	40.7	2.35	14.1			70	48.1	40.4	2.41	5.9
			85/71	35.2	28.5	42.8	2.37	14.8			80	47.1	38.8	2.65	5.2
	9	2.7 (6.3)	75/63	31.6	26.9	38.8	2.25	14.0		1.9 (4.5)	60	52.8	45.3	2.24	6.9
			80/67	33.8	27.8	41.0	2.26	14.9			70	51.4	43.3	2.46	6.1
			85/71	35.8	28.7	43.2	2.28	15.7			80	49.7	40.1	2.69	5.4
100	4.5	0.7 (1.7)	75/63	28.6	25.6	37.0	2.66	10.7							
			80/67	30.5	26.6	39.1	2.68	11.4							
			85/71	32.6	27.6	41.2	2.69	12.1							
	6	1.3 (2.9)	75/63	29.2	25.9	37.4	2.58	11.3							
			80/67	31.2	26.8	39.4	2.59	12.0							
			85/71	33.4	27.7	41.7	2.60	12.8							
	9	2.6 (6.1)	75/63	29.8	26.1	37.7	2.49	11.9							
			80/67	31.9	27.0	39.9	2.51	12.7							
			85/71	34.0	28.1	42.1	2.51	13.5							
110	4.5	0.7 (1.7)	75/63	26.8	24.2	36.2	2.94	9.1							
			80/67	28.7	25.9	38.1	2.95	9.7							
			85/71	30.8	26.8	40.3	2.97	10.4							
	6	1.2 (2.8)	75/63	27.4	24.4	36.4	2.85	9.6							
			80/67	29.3	26.1	38.4	2.86	10.2							
			85/71	31.3	27.1	40.5	2.87	10.9							
	9	2.6 (5.9)	75/63	27.9	25.3	36.7	2.77	10.1							
			80/67	29.9	26.4	38.7	2.77	10.8							
			85/71	32.0	27.4	40.8	2.77	11.5							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP042 (All Data at 1400 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	5	0.6 (1.5)	75/63	43.5	34.3	49.1	1.68	25.8	30	0.8 (1.9)	60	26.2	20.3	1.87	4.1
			80/67	46.3	35.4	51.9	1.70	27.3			70	25.5	18.8	2.09	3.6
			85/71	49.2	36.3	55.0	1.72	28.6			80	25.0	17.5	2.33	3.1
	8	1.5 (3.5)	75/63	45.0	35.0	50.1	1.53	29.4		1.9 (4.3)	60	27.6	21.6	1.89	4.3
			80/67	48.1	36.0	53.2	1.54	31.3			70	26.9	20.2	2.11	3.7
			85/71	51.0	37.0	56.2	1.54	33.2			80	26.3	18.8	2.35	3.3
	11	2.7 (6.2)	75/63	45.8	35.2	50.7	1.46	31.4		3.3 (7.7)	60	28.4	22.4	1.90	4.4
			80/67	48.8	36.4	53.7	1.45	33.6			70	27.7	20.9	2.11	3.8
			85/71	52.0	37.4	56.9	1.45	35.9			80	27.0	19.4	2.35	3.4
60	5	0.6 (1.4)	75/63	41.6	33.4	47.8	1.88	22.1	40	0.8 (1.8)	60	29.9	23.7	1.91	4.6
			80/67	44.3	34.5	50.6	1.90	23.3			70	29.2	21.9	2.12	4.0
			85/71	47.1	35.5	53.4	1.92	24.5			80	28.8	20.9	2.37	3.6
	8	1.5 (3.4)	75/63	43.0	34.0	48.8	1.74	24.7		1.8 (4.2)	60	31.7	25.1	1.92	4.8
			80/67	45.9	35.1	51.7	1.74	26.3			70	30.8	23.8	2.15	4.2
			85/71	48.9	36.1	54.7	1.75	27.9			80	30.3	22.2	2.39	3.7
	11	2.6 (6)	75/63	43.7	34.3	49.3	1.67	26.2		3.2 (7.4)	60	32.8	26.3	1.94	5.0
			80/67	46.6	35.5	52.2	1.67	27.9			70	31.7	24.9	2.16	4.3
			85/71	49.7	36.5	55.3	1.67	29.7			80	31.0	23.3	2.40	3.8
70	5	0.6 (1.4)	75/63	39.5	32.7	46.3	2.08	19.0	50	0.7 (1.7)	60	33.9	27.4	1.95	5.1
			80/67	42.1	33.8	49.0	2.10	20.0			70	33.3	26.0	2.17	4.5
			85/71	44.9	34.7	51.9	2.13	21.1			80	32.3	24.1	2.42	3.9
	8	1.4 (3.3)	75/63	40.9	33.2	47.3	1.95	21.0		1.7 (4.0)	60	36.1	29.7	1.97	5.4
			80/67	43.6	34.3	50.1	1.95	22.3			70	35.1	27.4	2.20	4.7
			85/71	46.5	35.4	53.0	1.97	23.7			80	34.3	26.3	2.44	4.1
	11	2.5 (5.8)	75/63	41.5	33.5	47.7	1.88	22.1		3.1 (7.1)	60	37.2	30.7	1.99	5.5
			80/67	44.4	34.5	50.7	1.89	23.6			70	36.5	29.4	2.21	4.8
			85/71	47.3	35.7	53.6	1.89	25.0			80	35.4	27.5	2.46	4.2
80	5	0.6 (1.4)	75/63	37.5	31.8	45.0	2.31	16.3	60	0.7 (1.7)	60	38.2	31.6	2.00	5.6
			80/67	40.0	32.9	47.6	2.33	17.2			70	37.4	30.0	2.23	4.9
			85/71	42.5	34.0	50.2	2.35	18.1			80	36.7	28.7	2.47	4.3
	8	1.4 (3.2)	75/63	38.8	32.4	45.8	2.16	17.9		1.7 (3.9)	60	41.3	35.1	2.04	5.9
			80/67	41.5	33.4	48.6	2.18	19.1			70	40.1	33.2	2.26	5.2
			85/71	44.2	34.5	51.4	2.19	20.2			80	38.6	30.6	2.50	4.5
	11	2.4 (5.6)	75/63	39.4	32.6	46.2	2.10	18.8		3.0 (6.9)	60	42.5	35.7	2.05	6.1
			80/67	42.1	33.8	49.0	2.11	20.0			70	41.0	33.8	2.27	5.3
			85/71	45.0	34.7	52.0	2.12	21.3			80	40.1	32.1	2.52	4.7
85	5	0.6 (1.3)	75/63	36.4	31.4	44.3	2.42	15.0	70	0.7 (1.6)	60	43.0	36.1	2.06	6.1
			80/67	39.0	32.5	46.9	2.44	16.0			70	41.7	34.6	2.29	5.3
			85/71	41.4	33.6	49.4	2.47	16.8			80	41.1	32.8	2.53	4.8
	8	1.3 (3.1)	75/63	37.8	31.8	45.2	2.28	16.6		1.6 (3.8)	60	46.5	39.0	2.10	6.5
			80/67	40.3	33.0	47.8	2.29	17.6			70	45.5	37.8	2.33	5.7
			85/71	43.0	34.2	50.5	2.30	18.7			80	44.3	36.0	2.58	5.0
	11	2.4 (5.5)	75/63	38.3	32.2	45.5	2.22	17.3		2.9 (6.7)	60	48.1	40.8	2.12	6.6
			80/67	41.0	33.2	48.3	2.22	18.4			70	46.1	40.0	2.36	5.7
			85/71	43.7	34.4	51.0	2.23	19.6			80	45.2	37.0	2.60	5.1
90	5	0.6 (1.3)	75/63	35.5	30.9	43.7	2.55	13.9	80	0.7 (1.6)	60	47.9	40.8	2.12	6.6
			80/67	37.8	32.2	46.1	2.57	14.7			70	46.9	38.9	2.36	5.8
			85/71	40.2	33.3	48.7	2.59	15.5			80	45.9	37.1	2.61	5.2
	8	1.3 (3.1)	75/63	36.6	31.5	44.4	2.40	15.2		1.6 (3.6)	60	52.6	44.6	2.18	7.1
			80/67	39.2	32.7	47.0	2.41	16.2			70	47.9	42.5	2.37	5.9
			85/71	41.8	33.8	49.7	2.43	17.2			80	48.9	40.6	2.67	5.4
	11	2.3 (5.4)	75/63	37.2	31.7	44.8	2.34	15.9		2.8 (6.5)	60	53.9	48.1	2.22	7.1
			80/67	39.8	32.9	47.4	2.34	17.0			70	52.7	45.1	2.45	6.3
			85/71	42.5	34.0	50.2	2.35	18.1			80	51.3	42.3	2.71	5.6
100	5	0.6 (1.3)	75/63	33.4	30.2	42.4	2.81	11.9							
			80/67	35.6	31.3	44.8	2.84	12.6							
			85/71	38.0	32.5	47.3	2.86	13.3							
	8	1.3 (3)	75/63	34.5	30.5	43.1	2.67	12.9							
			80/67	36.9	31.8	45.5	2.68	13.8							
			85/71	39.4	33.0	48.2	2.69	14.6							
	11	2.3 (5.3)	75/63	34.9	30.8	43.3	2.61	13.4							
			80/67	37.5	31.9	46.0	2.61	14.4							
			85/71	40.1	33.2	48.6	2.62	15.3							
110	5	0.5 (1.2)	75/63	31.3	29.3	41.3	3.11	10.1							
			80/67	33.5	30.6	43.6	3.14	10.7							
			85/71	35.4	31.6	45.6	3.16	11.2							
	8	1.3 (2.9)	75/63	32.3	29.7	41.8	2.96	10.9							
			80/67	34.7	30.9	44.3	2.98	11.7							
			85/71	37.0	32.1	46.8	2.99	12.4							
	11	2.2 (5.1)	75/63	32.8	29.9	42.2	2.90	11.3							
			80/67	35.2	31.1	44.6	2.91	12.1							
			85/71	37.6	32.3	47.1	2.92	12.9							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP048 (All Data at 1600 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	6	1.6 (3.6)	75/63	49.9	39.2	56.9	2.14	23.3	30	1.1 (2.6)	60	32.7	24.6	2.41	4.0
			80/67	53.3	40.3	60.2	2.13	25.1			70	32.1	23.1	2.66	3.5
			85/71	56.6	41.4	63.6	2.10	26.9			80	31.5	21.8	2.95	3.1
	8	2.6 (6)	75/63	50.9	39.6	57.6	2.04	25.0		1.9 (4.3)	60	33.8	25.6	2.43	4.1
			80/67	54.4	40.7	61.1	2.01	27.0			70	33.1	24.0	2.68	3.6
			85/71	57.9	41.9	64.5	1.98	29.2			80	32.6	22.7	2.97	3.2
	12	5.4 (12.4)	75/63	52.1	40.0	58.5	1.94	26.9		3.9 (9.0)	60	35.3	26.8	2.45	4.2
			80/67	55.6	41.3	61.9	1.90	29.2			70	34.3	25.4	2.70	3.7
			85/71	59.3	42.4	65.5	1.86	31.9			80	33.8	23.9	3.00	3.3
60	6	1.5 (3.4)	75/63	47.8	38.2	55.5	2.37	20.1	40	1.1 (2.5)	60	37.2	28.8	2.48	4.4
			80/67	50.9	39.5	58.6	2.36	21.5			70	36.5	27.4	2.74	3.9
			85/71	54.2	40.5	61.9	2.35	23.1			80	35.9	25.9	3.04	3.5
	8	1.5 (5.8)	75/63	48.8	38.6	56.2	2.26	21.6		1.8 (4.2)	60	38.4	29.9	2.49	4.5
			80/67	52.1	39.8	59.5	2.24	23.2			70	37.7	28.5	2.76	4.0
			85/71	55.4	41.1	62.7	2.22	25.0			80	37.3	26.6	3.07	3.6
	12	5.2 (12)	75/63	49.8	39.1	56.8	2.15	23.1		3.7 (8.6)	60	40.0	31.6	2.52	4.7
			80/67	53.2	40.4	60.2	2.12	25.1			70	39.2	29.9	2.79	4.1
			85/71	56.7	41.6	63.6	2.09	27.2			80	38.6	28.3	3.10	3.7
70	6	1.4 (3.3)	75/63	45.5	37.3	54.0	2.64	17.3	50	1.0 (2.4)	60	42.1	33.5	2.55	4.8
			80/67	48.6	38.5	57.2	2.63	18.5			70	41.3	31.8	2.83	4.3
			85/71	51.6	39.8	60.2	2.62	19.7			80	41.0	30.2	3.13	3.8
	8	2.4 (5.6)	75/63	46.5	37.7	54.6	2.52	18.5		1.7 (4.0)	60	43.8	35.1	2.57	5.0
			80/67	49.6	39.0	57.8	2.50	19.8			70	42.9	33.3	2.85	4.4
			85/71	52.9	40.2	61.0	2.48	21.3			80	42.2	31.6	3.16	3.9
	12	5.0 (11.6)	75/63	47.5	38.1	55.3	2.40	19.8		3.6 (8.3)	60	45.6	37.3	2.60	5.1
			80/67	50.7	39.4	58.5	2.38	21.3			70	44.6	35.3	2.88	4.5
			85/71	54.1	40.7	61.8	2.35	23.1			80	43.8	33.2	3.19	4.0
80	6	1.4 (3.2)	75/63	43.3	36.4	52.7	2.93	14.8	60	1.0 (2.3)	60	47.7	38.7	2.62	5.3
			80/67	46.2	37.7	55.6	2.93	15.8			70	47.0	36.9	2.91	4.7
			85/71	49.2	38.8	58.7	2.93	16.8			80	45.9	34.9	3.22	4.2
	8	2.3 (5.4)	75/63	44.2	36.7	53.3	2.81	15.7		1.7 (3.9)	60	49.5	40.6	2.64	5.5
			80/67	47.2	38.1	56.2	2.80	16.9			70	48.5	38.6	2.93	4.8
			85/71	50.4	39.2	59.4	2.78	18.1			80	47.7	37.0	3.26	4.3
	12	4.8 (11.2)	75/63	45.2	37.1	53.8	2.69	16.8		3.5 (8.1)	60	51.8	42.8	2.67	5.7
			80/67	48.3	38.4	57.0	2.67	18.1			70	50.6	41.0	2.96	5.0
			85/71	51.5	39.7	60.1	2.64	19.5			80	49.9	38.3	3.28	4.5
85	6	1.4 (3.2)	75/63	42.1	36.0	52.0	3.09	13.6	70	1.0 (2.2)	60	53.1	44.1	2.68	5.8
			80/67	45.0	37.1	55.0	3.09	14.5			70	52.1	42.1	2.98	5.1
			85/71	47.8	38.5	57.8	3.09	15.5			80	51.3	40.1	3.31	4.5
	8	2.3 (5.3)	75/63	43.0	36.3	52.5	2.97	14.5		1.6 (3.8)	60	55.5	46.4	2.70	6.0
			80/67	45.9	37.6	55.5	2.96	15.5			70	54.8	44.9	3.01	5.3
			85/71	49.0	38.8	58.5	2.94	16.6			80	53.4	42.2	3.34	4.7
	12	4.8 (11)	75/63	44.0	36.6	53.1	2.85	15.5		3.4 (7.8)	60	58.2	49.1	2.72	6.3
			80/67	47.0	37.9	56.2	2.83	16.6			70	57.0	46.8	3.03	5.5
			85/71	50.1	39.2	59.2	2.80	17.9			80	55.8	44.4	3.37	4.9
90	6	1.3 (3.1)	75/63	41.0	35.4	51.5	3.26	12.6	80	0.9 (2.2)	60	58.9	49.8	2.73	6.3
			80/67	43.7	36.8	54.2	3.26	13.4			70	57.9	47.6	3.04	5.6
			85/71	46.7	37.9	57.2	3.26	14.3			80	56.9	45.4	3.38	4.9
	8	2.3 (5.2)	75/63	41.8	35.8	51.9	3.14	13.3		1.6 (3.6)	60	61.7	52.5	2.74	6.6
			80/67	44.7	37.1	54.8	3.13	14.3			70	60.5	50.2	3.06	5.8
			85/71	47.6	38.4	57.7	3.11	15.3			80	59.5	47.8	3.41	5.1
	12	4.7 (10.8)	75/63	42.8	36.1	52.4	3.01	14.2		3.3 (7.5)	60	64.9	55.6	2.76	6.9
			80/67	45.7	37.5	55.3	2.99	15.3			70	63.3	53.0	3.09	6.0
			85/71	48.8	38.6	58.5	2.97	16.4			80	61.9	50.4	3.44	5.3
100	6	1.3 (3)	75/63	38.7	34.4	50.3	3.63	10.7							
			80/67	41.3	35.8	52.9	3.63	11.4							
			85/71	43.9	37.1	55.6	3.63	12.1							
	8	2.2 (5.1)	75/63	39.5	34.8	50.7	3.50	11.3							
			80/67	42.1	36.2	53.3	3.49	12.1							
			85/71	44.9	37.4	56.1	3.48	12.9							
	12	4.5 (10.5)	75/63	40.3	35.1	51.1	3.38	11.9							
			80/67	43.1	36.5	53.9	3.36	12.8							
			85/71	46.0	37.8	56.8	3.34	13.8							
110	6	1.3 (2.9)	75/63	36.2	33.5	49.0	4.02	9.0							
			80/67	38.7	34.9	51.6	4.03	9.6							
			85/71	41.1	36.2	54.1	4.03	10.2							
	8	2.1 (4.9)	75/63	37.0	33.8	49.4	3.90	9.5							
			80/67	39.5	35.2	51.9	3.89	10.1							
			85/71	42.2	36.5	54.7	3.88	10.9							
	12	4.4 (10.2)	75/63	37.7	34.2	49.7	3.77	10.0							
			80/67	40.3	35.5	52.3	3.76	10.7							
			85/71	43.1	36.9	55.2	3.74	11.5							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP060 (All Data at 2000 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	7.5	1.2 (2.8)	75/63	64.4	50.2	74.5	3.07	20.9	30	1.7 (3.8)	60	44.2	33.8	3.16	4.1
			80/67	68.9	51.7	79.2	3.11	22.2			70	43.6	31.9	3.47	3.7
			85/71	73.0	53.5	83.5	3.14	23.3			80	43.2	30.2	3.82	3.3
	10	2.1 (4.8)	75/63	65.9	50.5	75.6	2.95	22.3		2.8 (6.4)	60	46.0	35.0	3.18	4.2
			80/67	70.2	52.5	80.1	2.97	23.6			70	45.1	33.3	3.50	3.8
			85/71	74.7	54.3	84.7	3.00	24.9			80	44.5	31.5	3.85	3.4
	15	4.3 (9.9)	75/63	67.2	51.4	76.6	2.83	23.8		5.8 (13.4)	60	47.6	36.8	3.21	4.3
			80/67	71.8	53.1	81.3	2.85	25.2			70	46.8	34.9	3.52	3.9
			85/71	76.6	54.8	86.2	2.86	26.8			80	46.1	33.0	3.87	3.5
60	7.5	1.2 (2.7)	75/63	61.9	49.0	72.9	3.34	18.5	40	1.6 (3.7)	60	49.8	39.0	3.24	4.5
			80/67	66.0	50.8	77.1	3.37	19.6			70	49.1	37.2	3.56	4.0
			85/71	70.2	52.6	81.4	3.40	20.7			80	48.9	35.6	3.92	3.7
	10	2.0 (4.6)	75/63	63.0	49.6	73.6	3.21	19.7		2.7 (6.2)	60	52.4	41.1	3.27	4.7
			80/67	67.3	51.3	77.9	3.23	20.9			70	51.5	39.1	3.59	4.2
			85/71	71.7	53.4	82.5	3.25	22.1			80	50.6	37.2	3.95	3.8
	15	4.2 (9.6)	75/63	64.3	50.0	74.5	3.08	20.9		5.6 (12.9)	60	54.5	43.0	3.30	4.8
			80/67	68.8	51.8	79.1	3.09	22.3			70	53.5	41.3	3.63	4.3
			85/71	73.5	53.7	83.8	3.10	23.7			80	52.6	38.9	3.99	3.9
70	7.5	1.2 (2.7)	75/63	59.2	47.6	71.1	3.65	16.2	50	1.5 (3.6)	60	56.8	45.6	3.34	5.0
			80/67	62.5	49.5	74.5	3.67	17.0			70	56.0	43.6	3.66	4.5
			85/71	63.1	51.1	75.1	3.66	17.3			80	55.2	41.4	4.03	4.0
	10	1.9 (4.5)	75/63	60.3	48.4	71.8	3.50	17.2		2.6 (6.0)	60	58.9	47.6	3.37	5.1
			80/67	64.5	50.1	76.1	3.52	18.3			70	58.4	46.1	3.70	4.6
			85/71	68.3	52.8	79.9	3.53	19.3			80	57.3	43.5	4.07	4.1
	15	4.0 (9.2)	75/63	61.6	48.9	72.7	3.37	18.3		5.4 (12.5)	60	62.5	50.6	3.41	5.4
			80/67	66.0	50.5	77.2	3.38	19.6			70	61.0	48.2	3.74	4.8
			85/71	70.4	52.6	81.6	3.38	20.8			80	59.8	45.8	4.11	4.3
80	7.5	1.1 (2.6)	75/63	53.4	46.4	66.3	3.97	13.5	60	1.5 (3.5)	60	64.0	52.4	3.43	5.5
			80/67	55.0	47.6	67.9	3.97	13.9			70	62.9	50.2	3.77	4.9
			85/71	66.4	52.4	79.9	4.09	16.3			80	62.0	47.9	4.15	4.4
	10	1.9 (4.3)	75/63	58.3	48.4	71.0	3.87	15.1		2.5 (5.8)	60	67.0	55.3	3.48	5.6
			80/67	62.8	50.7	75.6	3.89	16.1			70	65.7	52.9	3.81	5.0
			85/71	61.1	50.4	73.7	3.84	15.9			80	64.6	50.3	4.19	4.5
	15	3.9 (8.9)	75/63	58.6	47.5	70.7	3.70	15.9		5.2 (12.0)	60	70.7	58.5	3.52	5.9
			80/67	62.8	49.2	75.0	3.71	16.9			70	69.2	55.6	3.86	5.2
			85/71	68.8	53.0	81.8	3.91	17.6			80	67.6	53.0	4.25	4.7
85	7.5	1.1 (2.5)	75/63	53.1	44.0	66.7	4.17	12.7	70	1.4 (3.3)	60	71.5	59.8	3.54	5.9
			80/67	54.8	47.5	68.4	4.18	13.1			70	70.2	57.4	3.89	5.3
			85/71	64.7	52.1	78.8	4.28	15.1			80	69.2	54.7	4.28	4.7
	10	1.8 (4.2)	75/63	51.9	45.8	64.8	4.00	13.0		2.4 (5.6)	60	74.7	62.8	3.59	6.1
			80/67	61.2	50.1	74.6	4.08	15.0			70	73.1	60.0	3.93	5.4
			85/71	66.2	52.4	79.8	4.12	16.1			80	72.2	57.5	4.33	4.9
	15	3.8 (8.8)	75/63	55.9	44.3	68.6	3.89	14.4		5.0 (11.7)	60	79.4	66.8	3.65	6.4
			80/67	59.4	46.9	72.1	3.88	15.3			70	77.6	63.6	4.00	5.7
			85/71	66.9	52.3	80.4	4.08	16.4			80	75.7	60.7	4.39	5.1
90	7.5	1.1 (2.5)	75/63	51.7	43.3	65.9	4.38	11.8	80	1.4 (3.2)	60	79.5	67.3	3.65	6.4
			80/67	55.6	44.2	70.0	4.41	12.6			70	78.0	64.6	4.01	5.7
			85/71	62.8	51.0	77.6	4.48	14.0			80	76.6	61.9	4.41	5.1
	10	1.8 (4.2)	75/63	52.7	43.9	66.5	4.23	12.5		2.4 (5.4)	60	83.7	71.5	3.71	6.6
			80/67	56.5	45.5	70.4	4.24	13.3			70	81.9	68.5	4.07	5.9
			85/71	64.3	51.9	78.5	4.31	14.9			80	80.2	65.1	4.47	5.3
	15	3.8 (8.7)	75/63	53.8	44.3	67.1	4.08	13.2		4.9 (11.3)	60	87.8	74.2	3.77	6.8
			80/67	55.8	47.9	69.1	4.06	13.7			70	85.5	70.9	4.13	6.1
			85/71	65.1	51.5	79.2	4.27	15.3			80	84.1	68.8	4.55	5.4
100	7.5	1.0 (2.4)	75/63	49.0	41.2	64.7	4.84	10.1							
			80/67	52.0	43.2	67.9	4.86	10.7							
			85/71	51.8	47.3	67.6	4.86	10.7							
	10	1.8 (4.1)	75/63	48.2	44.3	63.3	4.66	10.3							
			80/67	52.0	45.8	67.3	4.68	11.1							
			85/71	60.4	50.4	76.1	4.76	12.7							
	15	3.6 (8.4)	75/63	50.1	43.6	64.8	4.52	11.1							
			80/67	53.0	46.6	67.7	4.51	11.7							
			85/71	54.4	48.1	69.1	4.50	12.1							
110	7.5	1.0 (2.3)	75/63	44.8	41.4	62.1	5.36	8.4							
			80/67	47.1	44.2	64.5	5.38	8.8							
			85/71	48.7	46.2	66.3	5.39	9.0							
	10	1.7 (3.9)	75/63	44.7	42.9	61.5	5.19	8.6							
			80/67	48.4	44.4	65.3	5.21	9.3							
			85/71	56.8	49.1	74.1	5.28	10.8							
	15	3.5 (8.2)	75/63	49.3	44.7	66.1	5.16	9.6							
			80/67	49.9	44.1	66.3	5.04	9.9							
			85/71	57.7	49.4	74.7	5.17	11.2							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Capacity Data

EP070 (All Data at 2200 CFM)

COOLING									HEATING						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	9	1.1 (2.5)	75/63	71.3	55.2	82.4	3.34	21.3	30	1.2 (2.7)	60	53.6	40.5	3.84	4.1
			80/67	75.9	57.2	87.2	3.40	22.3			70	52.9	38.5	4.20	3.7
			85/71	80.2	59.2	91.8	3.46	23.2			80	51.7	36.1	4.61	3.3
	12	1.8 (4.2)	75/63	72.7	56.0	83.3	3.20	22.7		2.0 (4.5)	60	56.1	42.4	3.86	4.3
			80/67	77.1	58.0	88.0	3.25	23.7			70	54.6	40.2	4.23	3.8
			85/71	82.5	59.6	93.5	3.30	25.0			80	53.6	37.9	4.65	3.4
	18	3.8 (8.8)	75/63	73.9	56.6	84.2	3.07	24.1		4.1 (9.4)	60	58.2	44.4	3.90	4.4
			80/67	79.0	58.3	89.3	3.10	25.5			70	56.5	41.9	4.26	3.9
			85/71	84.3	60.5	94.9	3.14	26.9			80	55.4	39.3	4.68	3.5
60	9	1.0 (2.4)	75/63	68.0	54.1	80.1	3.64	18.7	40	1.1 (2.6)	60	60.6	47.3	3.94	4.5
			80/67	72.4	56.0	84.7	3.70	19.6			70	59.5	44.9	4.32	4.0
			85/71	79.9	59.7	92.8	3.83	20.9			80	58.9	42.6	4.74	3.6
	12	1.8 (4.1)	75/63	69.5	54.6	81.1	3.50	19.8		1.9 (4.4)	60	63.7	49.7	3.98	4.7
			80/67	73.7	56.8	85.5	3.55	20.8			70	62.1	47.3	4.36	4.2
			85/71	78.4	59.5	90.4	3.60	21.8			80	61.0	44.8	4.79	3.7
	18	3.7 (8.5)	75/63	70.9	55.3	82.0	3.37	21.0		3.9 (9.1)	60	66.5	52.3	4.02	4.8
			80/67	75.6	57.5	87.0	3.41	22.2			70	64.6	49.5	4.40	4.3
			85/71	80.7	59.2	92.2	3.45	23.4			80	63.3	46.6	4.83	3.8
70	9	1.0 (2.4)	75/63	63.3	53.6	76.3	3.95	16.1	50	1.1 (2.5)	60	68.5	55.0	4.06	4.9
			80/67	69.0	54.9	82.3	4.03	17.1			70	67.6	52.3	4.45	4.5
			85/71	76.6	59.1	90.5	4.16	18.4			80	66.6	49.6	4.89	4.0
	12	1.7 (4)	75/63	66.3	53.1	78.9	3.83	17.3		1.8 (4.2)	60	71.4	57.7	4.11	5.1
			80/67	70.5	55.4	83.3	3.88	18.2			70	70.3	54.9	4.50	4.6
			85/71	77.8	59.1	91.2	4.01	19.4			80	69.0	52.0	4.94	4.1
	18	3.5 (8.2)	75/63	67.5	53.9	79.7	3.69	18.3		3.8 (8.8)	60	75.6	60.9	4.17	5.3
			80/67	72.2	55.8	84.6	3.73	19.3			70	73.4	58.4	4.56	4.7
			85/71	79.3	59.7	92.4	3.93	20.2			80	71.4	54.7	5.00	4.2
80	9	1.0 (2.3)	75/63	59.8	48.1	74.0	4.31	13.9	60	1.1 (2.4)	60	77.7	63.0	4.21	5.4
			80/67	67.7	55.3	82.4	4.43	15.3			70	76.4	60.1	4.61	4.9
			85/71	72.5	57.2	87.5	4.51	16.1			80	74.8	57.1	5.06	4.3
	12	1.6 (3.8)	75/63	59.9	52.2	73.5	4.15	14.4		1.8 (4.1)	60	81.3	66.3	4.27	5.6
			80/67	67.6	54.5	81.6	4.26	15.9			70	79.4	63.1	4.67	5.0
			85/71	73.9	57.5	88.4	4.36	17.0			80	77.6	60.1	5.13	4.4
	18	3.4 (7.9)	75/63	62.8	48.0	76.1	4.05	15.5		3.7 (8.5)	60	85.3	70.1	4.34	5.8
			80/67	70.1	55.7	84.0	4.18	16.8			70	83.0	67.4	4.75	5.1
			85/71	74.8	57.6	89.3	4.38	17.1			80	81.2	63.2	5.21	4.6
85	9	1.0 (2.2)	75/63	58.6	46.4	73.4	4.52	13.0	70	1.0 (2.3)	60	86.7	71.5	4.37	5.8
			80/67	65.9	54.3	81.2	4.63	14.2			70	85.2	68.4	4.79	5.2
			85/71	70.5	56.8	86.1	4.71	15.0			80	83.2	65.1	5.25	4.6
	12	1.6 (3.8)	75/63	59.3	48.0	73.6	4.37	13.6		1.7 (3.9)	60	90.7	75.4	4.45	6.0
			80/67	67.1	55.0	82.0	4.49	15.0			70	88.7	71.9	4.87	5.3
			85/71	63.2	50.1	77.7	4.41	14.3			80	86.9	68.5	5.34	4.8
	18	3.4 (7.8)	75/63	58.7	51.7	72.4	4.20	14.0		3.5 (8.2)	60	95.6	79.7	4.55	6.2
			80/67	68.3	55.1	82.8	4.40	15.5			70	93.0	76.8	4.97	5.5
			85/71	72.8	57.0	88.0	4.56	16.0			80	90.9	71.8	5.43	4.9
90	9	1.0 (2.2)	75/63	56.0	47.1	71.5	4.72	11.9	80	1.0 (2.3)	60	95.9	80.4	4.56	6.2
			80/67	63.7	53.7	79.7	4.84	13.2			70	94.3	76.8	4.99	5.5
			85/71	61.2	54.0	76.9	4.79	12.8			80	92.0	73.3	5.47	4.9
	12	1.6 (3.7)	75/63	60.4	51.7	75.6	4.63	13.0		1.7 (3.8)	60	100.9	84.7	4.66	6.3
			80/67	65.3	54.2	80.8	4.70	13.9			70	98.7	80.8	5.09	5.7
			85/71	69.9	56.4	85.7	4.77	14.7			80	96.1	77.0	5.57	5.1
	18	3.3 (7.7)	75/63	58.7	47.6	73.3	4.45	13.2		3.4 (7.9)	60	106.3	89.6	4.78	6.5
			80/67	65.8	54.0	81.3	4.69	14.0			70	103.7	85.3	5.22	5.8
			85/71	62.6	49.5	77.2	4.46	14.0			80	100.6	81.1	5.69	5.2
100	9	0.9 (2.1)	75/63	52.9	44.7	69.9	5.20	10.2							
			80/67	59.9	51.9	77.3	5.31	11.3							
			85/71	55.3	46.7	72.3	5.21	10.6							
	12	1.6 (3.6)	75/63	54.1	45.2	70.6	5.05	10.7							
			80/67	61.0	52.5	78.0	5.16	11.8							
			85/71	58.4	48.7	75.1	5.08	11.5							
	18	3.2 (7.5)	75/63	55.0	45.9	71.0	4.91	11.2							
			80/67	61.9	52.5	78.8	5.13	12.1							
			85/71	70.9	58.3	88.4	5.33	13.3							
110	9	0.9 (2.1)	75/63	50.9	47.1	69.7	5.76	8.8							
			80/67	57.0	51.4	76.2	5.85	9.8							
			85/71	53.0	51.0	71.9	5.77	9.2							
	12	1.5 (3.5)	75/63	52.7	48.1	71.1	5.64	9.3							
			80/67	57.5	51.2	76.3	5.72	10.1							
			85/71	64.6	55.9	84.5	6.07	10.6							
	18	3.1 (7.2)	75/63	53.5	48.5	71.8	5.58	9.6							
			80/67	51.3	45.2	68.9	5.40	9.5							
			85/71	54.2	46.4	71.8	5.39	10.1							

Extended Range - Anti-freeze required

AHRI/ISO13256-1 certified performance is rated at entering air conditions of 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Tabulated unit performance does not include fan or pump power corrections required for AHRI/ISO standard performance ratings.

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the FHP BST selection software.

Ratings below 40°F are with a methanol solution.

Due to variations in installation, actual performance may vary from the tabulated data. Performance contained herein are as a result of extensive testing by FHP and are not express warranties between the parties and may be changed at any time.

Continuous research and development to improve our products may result in a change to the current design and specifications without notice.

Antifreeze Correction Data

Antifreeze Type	Antifreeze % volume	Cooling			Heating		WPD Correction Factor EWT 30˚F
		EWT 90˚F			EWT 30˚F		
		Total Cap.	Sens. Cap	Power	Htg. Cap	Power	
Propylene Glycol	0	1.000	1.000	1.000	1.000	1.000	1.000
	5	0.997	0.997	1.004	0.989	0.997	1.060
	10	0.994	0.994	1.006	0.986	0.995	1.125
	15	0.990	0.990	1.009	0.978	0.988	1.190
	25	0.983	0.983	1.016	0.960	0.979	1.300
Methanol	5	0.997	0.997	1.003	0.990	0.997	1.060
	10	0.996	0.996	1.005	0.979	0.993	1.100
	15	0.994	0.994	1.008	0.970	0.990	1.140
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.160
	10	0.996	0.996	1.004	0.960	0.988	1.230
	15	0.992	0.992	1.006	0.944	0.983	1.280
	25	0.986	0.986	1.009	0.917	0.974	1.400
Ethylene Glycol	5	0.997	0.997	1.003	0.993	0.998	1.060
	10	0.995	0.995	1.004	0.986	0.996	1.120
	15	0.992	0.992	1.005	0.980	0.993	1.190
	25	0.988	0.988	1.009	0.970	0.990	1.330
	30	0.985	0.985	1.012	0.965	0.987	1.400

Electrical Data

For units with a factory installed heater kit option, there will be two separate data plates for each electrical circuit. The 1st data plate will be for the compressor power connection.

Model	Voltage Code	Voltage/ Phase/Hz	Voltage Min/Max	Compressor			Compressor Electrical Sizing	
				Quantity	RLA	LRA	Min Circuit Amps	Max Fuse/ HACR
EP018	1	208-230/60/1	197/253	1	7.4	33.0	9.3	15
EP024	1	208-230/60/1	197/253	1	13.5	58.3	16.9	30
EP030	1	208-230/60/1	197/253	1	12.8	58.3	26.5	25
EP036	1	208-230/60/1	197/253	1	16.0	77.0	20.0	30
EP042	1	208-230/60/1	197/253	1	16.7	79.0	20.9	30
EP048	1	208-230/60/1	197/253	1	19.9	109.0	24.9	40
EP060	1	208-230/60/1	197/253	1	25.0	134.0	31.3	50
EP070	1	208-230/60/1	197/253	1	26.3	134.0	26.5	50

Standard Motor – PSC for 007-012, ECM Constant Torque for 015-070

Model	Voltage Code	Voltage/Ph/Hz	Compressor			Blower			Min Circuit Amps	Max Fuse
			Quantity	RLA	LRA	Quantity	FLA	HP		
EP007	-1	208-230/1/60	1	2.5	17.7	1	0.96	0.1	4.1	15
	-2	265/1/60	1	2.6	13.5	1	0.85	0.1	4.1	15
EP009	-1	208-230/1/60	1	3.4	22.2	1	0.96	0.1	5.2	15
	-2	265/1/60	1	2.9	18.8	1	0.85	0.1	4.5	15
EP012	-0	115/1/60	1	9.6	58.4	1	2.2	0.1	14.2	20
	-1	208-230/1/60	1	4.6	27.9	1	0.96	0.1	6.7	15
	-2	265/1/60	1	3.8	22.2	1	0.85	0.1	5.6	15
EP015	-1	208-230/1/60	1	5.6	29	1	2.8	0.33	9.8	15
	-2	265/1/60	1	4.6	20	1	2.6	0.33	8.4	15
EP018	-1	208-230/1/60	1	7.4	33	1	2.8	0.33	12.1	15
	-2	265/1/60	1	6	28	1	2.6	0.33	10.1	15
EP024	-1	208-230/1/60	1	13.5	58.3	1	2.8	0.33	19.7	30
	-2	265/1/60	1	9	54	1	2.6	0.33	13.9	20
	-3	208-230/3/60	1	7.1	55.4	1	2.8	0.33	11.7	15
	-4	460/3/60	1	3.5	28	1	2.1	0.5	6.5	15
EP030	-1	208-230/1/60	1	12.8	58.3	1	4.1	0.5	20.1	30
	-2	265/1/60	1	9.6	54	1	3.6	0.5	15.6	25
	-3	208-230/3/60	1	7.7	55.4	1	2.8	0.5	12.4	20
	-4	460/3/60	1	3.6	28	1	2.1	0.5	6.6	15
EP036	-1	208-230/1/60	1	16	77	1	6	0.75	26.0	40
	-3	208-230/3/60	1	10	71	1	6	0.75	18.5	25
	-4	460/3/60	1	4.7	38	1	4.6	0.75	10.5	15
EP042	-1	208-230/1/60	1	16.7	79	1	6	0.75	26.9	40
	-3	208-230/3/60	1	10.4	73	1	6	0.75	19.0	25
	-4	460/3/60	1	5.8	38	1	4.6	0.75	11.9	15
EP048	-1	208-230/1/60	1	19.9	109	1	6	0.75	30.9	50
	-3	208-230/3/60	1	13.6	83.1	1	6	0.75	23.0	35
	-4	460/3/60	1	6.1	41	1	4.6	0.75	12.2	15
EP060	-1	208-230/1/60	1	25	134	1	7.6	1	38.9	60
	-3	208-230/3/60	1	15.9	110	1	7.6	1	27.5	40
	-4	460/3/60	1	7.1	52	1	4	1	12.9	20
EP070	-1	208-230/1/60	1	26.3	134	1	7.6	1	40.5	60
	-3	208-230/3/60	1	15.6	110	1	7.6	1	27.1	40
	-4	460/3/60	1	7.8	52	1	4	1	13.8	20

NOTE: For the wireless diagram please refer to pages 33 and 34 in the Installation & Maintenance Manual (IOM)

Electrical Data

ECM Constant Airflow Motor

Model	Voltage Code	Voltage/Ph/Hz	Compressor			Blower			Min Circuit Amps	Max Fuse
			Quantity	RLA	LRA	Quantity	FLA	HP		
EP015	-1	208-230/1/60	1	5.6	29	1	2.8	0.33	9.8	15
	-2	265/1/60	1	4.6	20	1	2.6	0.33	8.4	15
EP018	-1	208-230/1/60	1	7.4	33	1	2.8	0.33	12.1	15
	-2	265/1/60	1	6	28	1	2.6	0.33	10.1	15
EP024	-1	208-230/1/60	1	13.5	58.3	1	2.8	0.33	19.7	30
	-2	265/1/60	1	9	54	1	2.6	0.33	13.9	20
	-3	208-230/3/60	1	7.1	55.4	1	2.8	0.33	11.7	15
	-4	460/3/60*	1	3.5	28	1	4.1	0.5	8.5	15
EP030	-1	208-230/1/60	1	12.8	58.3	1	4.3	0.5	20.3	30
	-2	265/1/60	1	9.6	54	1	4.1	0.5	16.1	25
	-3	208-230/3/60	1	7.7	55.4	1	4.3	0.5	13.9	20
	-4	460/3/60*	1	3.6	28	1	4.1	0.5	8.6	15
EP036	-1	208-230/1/60	1	16	77	1	6.8	0.75	26.8	40
	-3	208-230/3/60	1	10	71	1	6.8	0.75	19.3	25
	-4	460/3/60*	1	4.7	38	1	5.5	0.75	11.4	15
EP042	-1	208-230/1/60	1	16.7	79	1	6.8	0.75	27.7	40
	-3	208-230/3/60	1	10.4	73	1	6.8	0.75	19.8	30
	-4	460/3/60*	1	5.8	38	1	5.5	0.75	12.8	15
EP048	-1	208-230/1/60	1	19.9	109	1	6.8	0.75	31.7	50
	-3	208-230/3/60	1	13.6	83.1	1	6.8	0.75	23.8	35
	-4	460/3/60*	1	6.1	41	1	5.5	0.75	13.1	15
EP060	-1	208-230/1/60	1	25	134	1	9.1	1	40.4	60
	-3	208-230/3/60	1	15.9	110	1	9.1	1	29.0	40
	-4	460/3/60*	1	7.1	52	1	6.9	1	15.8	20
EP070	-1	208-230/1/60	1	26.3	134	1	9.1	1	42.0	60
	-3	208-230/3/60	1	15.6	110	1	9.1	1	28.6	40
	-4	460/3/60*	1	7.8	52	1	6.9	1	16.7	20

NOTE: For the wireless diagram please refer to pages 33 and 34 in the Installation & Maintenance Manual (IOM)

Electrical Data

For Units with EH Option — Constant Torque ECM Motor

Model	EH Rated kW	Stage	Heater Watts		Heater AMPS			Ciruit	MCA		MOP	
			240	208	240V	208V	Motor FLA (A)	Fuses	240V	208V	240V	208V
EP018	4.8	1	4,800	3,600	20.0	17.3	2.8	-	28.5	25.1	30	30
EP024	4.8	1	4,800	3,600	20.0	17.3	2.8	-	28.5	25.1	30	30
EP024	9.6	1	9,600	7,200	40.0	34.6	2.8	-	53.5	46.8	60	50
EP030	4.8	1	4,800	3,600	20.0	17.3	4.1	-	30.1	26.8	35	30
EP030	9.6	1	9,600	7,200	40.0	34.6	4.1	-	55.1	48.4	60	50
EP036	4.8	1	4,800	3,600	20.0	17.3	6.0	-	32.5	29.1	35	30
EP036	9.6	1	9,600	7,200	40.0	34.6	6.0	-	57.5	50.8	60	60
EP036	14.4	2	14400	10800	60	51.9	6	F1/F2 F3/F4	82.5	72.4	90	80
EP042	4.8	1	4,800	3,600	20.0	17.3	6.0	-	32.5	29.1	35	30
EP042	9.6	1	9,600	7,200	40.0	34.6	6.0	-	57.5	50.8	60	60
EP042	14.4	2	14400	10800	60	51.9	6	F1/F2 F3/F4	82.5	72.4	90	80
EP048	4.8	1	4,800	3,600	20.0	17.3	6.0	-	32.5	29.1	35	30
EP048	9.6	1	9,600	7,200	40.0	34.6	6.0	-	57.5	50.8	60	60
EP048	14.4	2	14400	10800	60	51.9	6	F1/F2 F3/F4	82.5	72.4	90	80
EP048	19.2	2	19200	14000	80	69.2	6	F1/F2 F3/F4	107.5	94.0	110	100
EP060	4.8	1	4,800	3,600	20.0	17.3	7.6	-	34.5	31.1	35	35
EP060	9.6	1	9,600	7,200	40.0	34.6	7.6	-	59.5	52.8	60	60
EP060	14.4	2	14400	10800	60	51.9	7.6	F1/F2 F3/F4	84.5	74.4	90	80
EP060	19.2	2	19200	14000	80	69.2	7.6	F1/F2 F3/F4	109.5	96.0	110	100
EP070	4.8	1	4,800	3,600	20.0	17.3	7.6	-	34.5	31.1	35	35
EP070	9.6	1	9,600	7,200	40.0	34.6	7.6	-	59.5	52.8	60	60
EP070	14.4	2	14400	10800	60	51.9	7.6	F1/F2 F3/F4	84.5	74.4	90	80
EP070	19.2	2	19200	14000	80	69.2	7.6	F1/F2 F3/F4	109.5	96.0	110	100

* PLEASE NOTE: Electric heat is not available for horizontal-straight through airflow configuration. Use a Bosch flanged duct heater in this application.

Electrical Data

For Units with EH Option — Constant Airflow ECM Motor

Model	EH Rated kW	Stage	Heater Watts		Heater AMPS			Ciruit	MCA		MOP	
			240	208	240V	208V	Motor FLA (A)	Fuses	240V	208V	240V	208V
EP018	4.8	1	4,800	3,600	20.0	17.3	2.8	-	28.5	25.1	30	30
EP024	4.8	1	4,800	3,600	20.0	17.3	2.8	-	28.5	25.1	30	30
EP024	9.6	1	9,600	7,200	40.0	34.6	2.8	-	53.5	46.8	60	50
EP030	4.8	1	4,800	3,600	20.0	17.3	4.3	-	30.4	27.0	35	30
EP030	9.6	1	9,600	7,200	40.0	34.6	4.3	-	55.4	48.6	60	50
EP036	4.8	1	4,800	3,600	20.0	17.3	6.8	-	33.5	30.1	35	35
EP036	9.6	1	9,600	7,200	40.0	34.6	6.8	-	58.5	51.8	60	60
EP036	14.4	2	14,000	10,800	60.0	17.3	6.8	F1/F2 F3/F4	83.5	73.4	90	80
EP042	4.8	1	4,800	3,600	20.0	51.9	6.8	-	33.5	30.1	35	35
EP042	9.6	1	9,600	7,200	40.0	17.3	6.8	-	58.5	51.8	60	60
EP042	14.4	2	14,400	10,800	60	51.9	6.8	F1/F2 F3/F4	83.5	73.4	90	80
EP048	4.8	1	4,800	3,600	20.0	17.3	6.8	-	33.5	30.1	35	35
EP048	9.6	1	9,600	7,200	40.0	34.6	6.8	-	58.5	51.8	60	60
EP048	14.4	2	14,400	10,800	60	51.9	6.8	F1/F2 F3/F4	83.5	73.4	90	80
EP048	19.2	2	19200	14,000	80	69.2	6.8	F1/F2 F3/F4	108.5	95.0	110	100
EP060	4.8	1	4,800	3,600	20.0	17.3	9.1	-	36.4	33.0	40	35
EP060	9.6	1	9,600	7,200	40.0	34.6	9.1	-	61.4	54.6	70	60
EP060	14.4	2	14,400	10,800	60	51.9	9.1	F1/F2 F3/F4	86.4	76.3	90	80
EP060	19.2	2	19,200	14,000	80	69.2	9.1	F1/F2 F3/F4	111.4	97.9	120	100
EP070	4.8	1	4,800	3,600	20.0	17.3	9.1	-	36.4	33.0	35	35
EP070	9.6	1	9,600	7,200	40.0	34.6	9.1	-	61.4	54.6	70	60
EP070	14.4	2	14,400	10,800	60	51.9	9.1	F1/F2 F3/F4	86.4	76.3	90	80
EP070	19.2	2	19,200	14,000	80	69.2	9.1	F1/F2 F3/F4	111.4	97.9	120	199

* PLEASE NOTE: Electric heat is not available for horizontal-straight through airflow configuration. Use a Bosch flanged duct heater in this application.

Blower Performance

Standard Motor – PSC for 007-012, ECM Constant Torque for 015-070

Model	Available External Static Pressure (inches of Water)												
	Motor Speed	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2
EP007	High	430	420	390	360	335	310	260	-	-	-	-	-
	Medium	420	390	365	335	310	270	-	-	-	-	-	-
	Low	370	360	340	315	285	245	-	-	-	-	-	-
EP009	High	430	420	390	360	335	310	260	-	-	-	-	-
	Medium	420	390	365	335	310	270	-	-	-	-	-	-
	Low	370	360	340	315	285	245	-	-	-	-	-	-
EP012	High	450	435	415	400	385	360	330	305	-	-	-	-
	Medium	425	405	385	375	360	335	310	-	-	-	-	-
	Low	390	380	365	350	335	315	290	-	-	-	-	-
EP015	High	710	685	650	610	575	545	460	370	-	-	-	-
	Medium	530	510	480	445	405	360	-	-	-	-	-	-
	Low	430	410	370	335	290	245	-	-	-	-	-	-
EP018	High	730	700	660	615	580	545	505	460	-	-	-	-
	Medium	615	575	540	500	460	420	-	-	-	-	-	-
	Low	540	510	480	445	405	360	-	-	-	-	-	-
EP024	High	975	945	910	880	855	825	790	750	-	-	-	-
	Medium	905	885	855	825	790	755	700	650	-	-	-	-
	Low	725	700	670	640	585	530	-	-	-	-	-	-
EP030	High	1225	1195	1170	1140	1110	1075	1010	940	745	-	-	-
	Medium	1110	1075	1045	1015	985	955	915	880	700	-	-	-
	Low	955	925	890	860	825	790	750	715	685	-	-	-
EP036	High	1440	1420	1400	1380	1345	1315	1240	1165	1005	845	-	-
	Medium	1340	1315	1290	1270	1245	1225	1180	1135	990	845	-	-
	Low	1190	1165	1140	1115	1090	1065	1040	1020	915	810	-	-
EP042	High	1645	1635	1610	1585	1560	1535	1510	1485	1460	1430	-	-
	Medium	1455	1425	1400	1375	1345	1320	1290	1260	1225	1190	-	-
	Low	1220	1190	1160	1130	1100	1070	1015	955	895	830	-	-
EP048	High	1840	1820	1795	1775	1745	1720	1695	1670	1645	1615	-	-
	Medium	1655	1635	1610	1585	1560	1535	1510	1485	1460	1430	-	-
	Low	1455	1425	1400	1375	1345	1320	1290	1260	1225	1190	-	-
EP060	High	2225	2195	2165	2135	2105	2075	2045	2015	1980	1945	1900	1850
	Medium	2070	2045	2015	1990	1960	1925	1895	1870	1840	1810	1685	1600
	Low	1815	1785	1755	1725	1695	1665	1630	1595	1555	1515	1425	-
EP070	High	2560	2520	2480	2440	2400	2360	2320	2275	2245	2210	2150	2050
	Medium	2440	2400	2360	2320	2280	2245	2200	2155	2120	2085	2000	1900
	Low	1920	1880	1835	1795	1745	1695	1655	1615	1570	1520	1425	-

NOTE: Default setting from factory is medium speed. Low or high speed is field selectable.

Blower Performance

ECM Constant Airflow

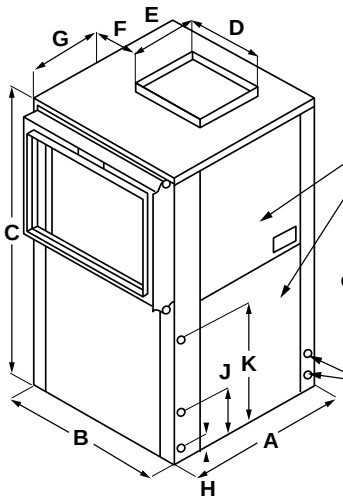
Model	Available External Static Pressure (inches of Water)												
	Motor Speed	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2
EP015	+	575	575	575	575	575	575	575	575	-	-	-	-
	Normal	500	500	500	500	500	500	500	500	-	-	-	-
	-	425	425	425	425	425	425	425	425	-	-	-	-
EP018	+	745	745	745	745	745	745	745	745	-	-	-	-
	Normal	650	650	650	650	650	650	650	650	-	-	-	-
	-	555	555	555	555	555	555	555	555	-	-	-	-
EP024	+	1095	1095	1095	1095	1095	1095	1095	1095	1095	-	-	-
	Normal	950	950	950	950	950	950	950	950	950	-	-	-
	-	810	810	810	810	810	810	810	810	810	-	-	-
EP030	+	1150	1150	1150	1150	1150	1150	1150	1150	1150	-	-	-
	Normal	1000	1000	1000	1000	1000	1000	1000	1000	1000	-	-	-
	-	850	850	850	850	850	850	850	850	850	-	-	-
EP036	+	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	-	-
	Normal	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	-	-
	-	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	-	-
EP042	+	1610	1610	1610	1610	1610	1610	1610	1610	1610	1610	-	-
	Normal	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	-	-
	-	1190	1190	1190	1190	1190	1190	1190	1190	1190	1190	-	-
EP048	+	1840	1840	1840	1840	1840	1840	1840	1840	1840	1840	-	-
	Normal	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	-	-
	-	1360	1360	1360	1360	1360	1360	1360	1360	1360	1360	-	-
EP060	+	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
	Normal	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
	-	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	-
EP070	+	2415	2415	2415	2415	2415	2415	2415	2415	2415	2415	2415	2415
	Normal	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
	-	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	-

Vertical Unit Dimensions

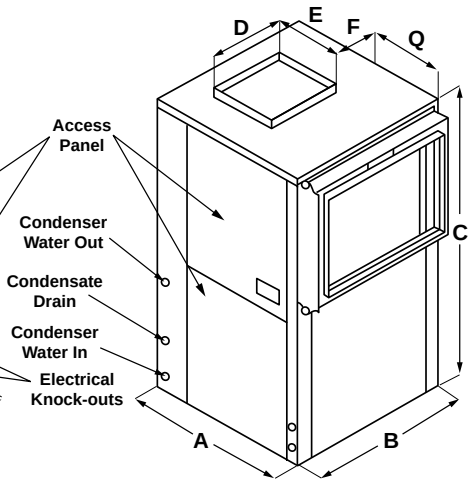
Model EP Water Source Heat Pump

Model	A	B	C	D	E	F	G	H	J	K	M	N	P	Q	Condenser Water Connections	Recommended Replacement Nominal Filter Size
	Width	Depth	Height	Discharge Depth	Discharge Width	Cabinet Edge to Discharge	Left Side to Discharge	Water In	Bottom to Condensate Drain	Water Out	R/A Duct Width	R/A Duct Flange Height	Filter Rack Height	Right Side to Discharge		
EP007	21.75	21.75	32.75	11.75	7.75	5.00	8.50	2.25	8.00	13.75	18.00	13.00	15.00	8.50	3/4" FPT	15 x 20 x 1
EP009	21.75	21.75	32.75	11.75	7.75	5.00	8.50	2.25	8.00	13.75	18.00	13.00	15.00	8.50	3/4" FPT	15 x 20 x 1
EP012	21.75	21.75	32.75	11.75	7.75	5.00	8.50	2.62	7.50	12.50	18.00	16.00	18.00	8.50	3/4" FPT	18 x 20 x 1
EP015	21.75	21.75	39.25	13.75	13.75	4.00	6.12	2.25	7.50	12.25	18.00	18.00	20.00	4.00	3/4" FPT	20 x 20 x 1
EP018	21.75	21.75	39.25	13.75	13.75	4.00	6.12	2.25	7.50	12.25	18.00	18.00	20.00	4.00	3/4" FPT	20 x 20 x 1
EP024	21.75	26.25	47.25	13.75	15.75	6.25	4.87	2.50	8.75	15.00	22.00	22.00	24.00	4.00	3/4" FPT	24 x 24 x 1
EP030	24.25	33.50	47.25	15.75	15.75	8.87	7.00	2.50	8.50	14.50	28.00	22.00	24.00	4.00	1" FPT	24 x 30 x 1
EP036	24.25	33.50	47.25	15.75	15.75	8.87	7.00	2.50	8.50	14.50	28.00	22.00	24.00	4.00	1" FPT	24 x 30 x 1
EP042	26.25	33.50	58.25	17.75	17.75	7.87	6.75	3.25	8.50	13.25	28.00	30.00	32.00	4.00	1" FPT	16 x 30 x 1 (2)
EP048	26.25	33.50	58.25	17.75	17.75	7.87	6.75	3.25	8.50	13.25	28.00	30.00	32.00	4.00	1" FPT	16 x 30 x 1 (2)
EP060	26.25	33.50	66.25	17.75	17.75	7.87	7.00	3.25	8.50	13.25	28.00	38.00	40.00	4.00	1" FPT	20 x 30 x 1 (2)
EP070	26.25	33.50	66.25	17.75	17.75	7.87	7.25	4.25	10.00	17.00	28.00	38.00	40.00	3.00	1" FPT	20 x 30 x 1 (2)

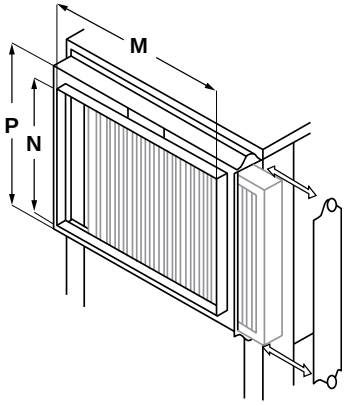
Note: All dimensions in inches unless otherwise noted. All dimensions within +-0.125". Specifications subject to change without notice.



Left Hand Return (FLT)

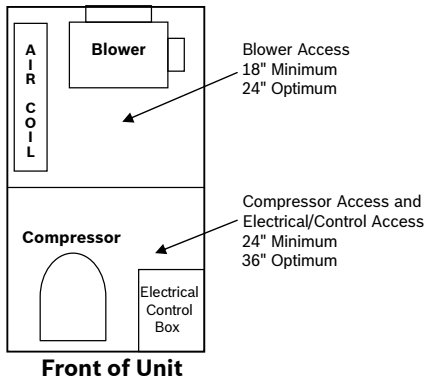


Right Hand Return (FRT)



Return Air (Filter) View

Service Clearances



Front of Unit

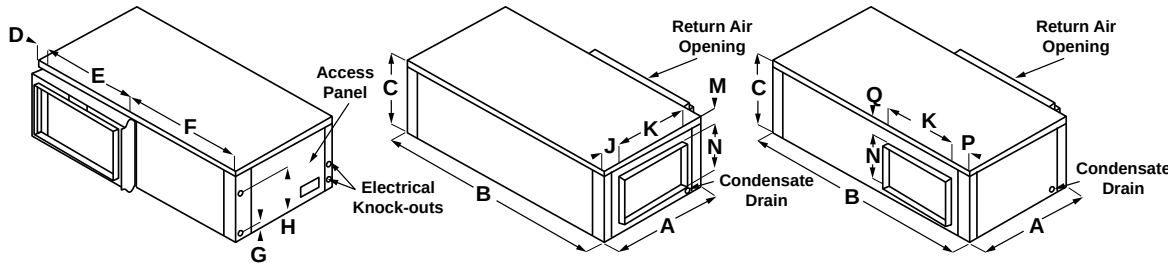
Horizontal Unit Dimensions

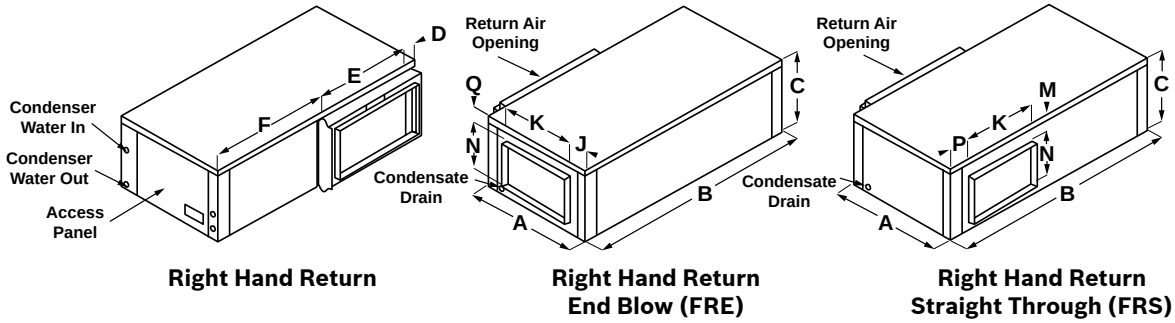
Model EP Water Source Heat Pump

Model	A	B	C	D	E	F	G	H	J	K	M	N	P	Q	R	T	Condenser Water Connections	Recommended Replacement Nominal Filter Size
	Width	Depth	Height	Cab End to Filter Rack	R/A Duct Width	Cab Front to Filter Rack	Water In	Water Out	Side to Discharge	Discharge Width	Top to Discharge (FLE & FRS)	Discharge Height	End to Discharge	Top to Discharge (FRE & FLS)	Filter Rack Height	R/A Duct Flange Height		
EP007	21.75	43.25	16.75	0.50	20.25	22.25	2.25	13.87	3.50	11.75	4.62	7.75	3.50	4.62	15.00	13.00	3/4" FPT	15 x 20 x 1
EP009	21.75	43.25	16.75	0.50	20.25	22.25	2.25	13.87	3.50	11.75	4.62	7.75	3.50	4.62	15.00	13.00	3/4" FPT	15 x 20 x 1
EP012	22.25	45.25	19.75	0.62	20.25	24.25	2.50	12.50	3.62	11.75	7.12	7.75	3.62	4.75	18.00	16.00	3/4" FPT	18 x 20 x 1
EP015	22.25	45.25	19.75	1.62	20.25	23.25	2.50	12.50	2.75	13.75	3.12	13.75	2.75	2.87	18.00	16.00	3/4" FPT	18 x 20 x 1
EP018	22.25	45.25	19.75	1.62	20.25	23.25	2.50	12.50	2.75	13.75	3.12	13.75	2.75	2.87	18.00	16.00	3/4" FPT	18 x 20 x 1
EP024	26.25	54.75	22.00*	1.25	30.25	23.00	2.62	15.12	3.75	13.75	2.12	15.75	3.75	4.25	20.12	18.00	3/4" FPT	20 x 30 x 1
EP030	30.25	68.25	22.00*	2.00	35.00	31.25	2.50	13.25	4.50	15.75	4.00	15.75	4.50	2.25	20.12	18.00	1" FPT	20 x 34.5 x 1
EP036	30.25	68.25	22.00*	2.00	35.00	31.25	2.50	13.25	4.50	15.75	4.00	15.75	4.50	2.25	20.12	18.00	1" FPT	20 x 34.5 x 1
EP042	30.25	79.00	22.00*	0.75	48.25	29.62	2.75	13.25	4.50	17.75	2.25	17.75	4.50	2.12	20.12	18.00	1" FPT	20 x 24 x 1 (2)
EP048	30.25	79.00	22.00*	0.75	48.25	29.62	2.75	13.25	4.50	17.75	2.25	17.75	4.50	2.12	20.12	18.00	1" FPT	20 x 24 x 1 (2)
EP060	30.25	89.25	22.00*	1.87	56.25	31.00	2.62	13.25	4.50	17.75	2.25	17.75	4.50	2.12	20.12	18.00	1" FPT	20 x 28 x 1 (2)
EP070	30.25	89.25	22.00*	1.87	56.25	31.00	5.75	17.75	4.87	17.75	2.62	17.75	4.87	1.75	20.12	18.00	1" FPT	20 x 28 x 1 (2)

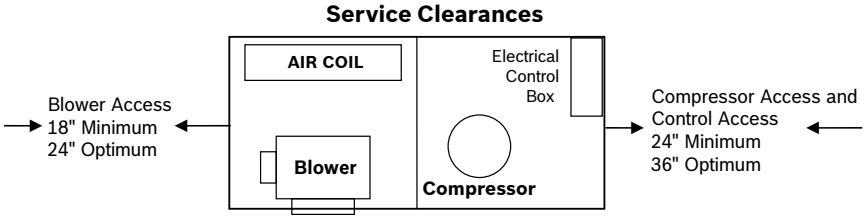
All dimensions within +-0.125". Specifications subject to change without notice.

*Total unit height is 22.75 with base rails for EP030-EP070





Service Clearances



Specification Guide

General

Furnish and install FHP water source heat pumps as indicated on the plans with capacities and characteristics as listed in the schedule with the specifications that follow. The units shall be manufactured in an ISO 9001:2000 certified facility.

Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing.

Horizontal & Vertical Water Source Heat Pumps

Units shall be designed to operate throughout the range of entering fluid temperature of 40°F to 110°F in the cooling mode and 50°F to 80°F in the heating mode (20°F to 80°F in the heating mode when equipped with the optional extended range package). All equipment shall be lower than a nominal capacity of 135,000 BTU/h of Total Cooling (TC) listed in the current ARI Applied Equipment Directory under the ARI Standard ARI ISO-13256-1, WLHP, GWHP, and GLHP Rating.

All equipment in this section must meet or exceed the national standard minimum Energy Efficiency Ratio (EER) and Coefficient of Performance (COP) as listed in ASHRAE 90.1 per the following:

ARI-ISO-13256-1, WLHP Rating (13.0 EER and 4.3 COP for units with a nominal cooling capacity of 17,000 BTU/h or larger – 12.2 EER and 4.3 COP for units with a nominal cooling capacity lower than 17,000 BTU/h).

For the ARI-ISO-13256-1, GLHP Rating a minimum 13.4 EER and 3.1 COP.

All units shall be listed with Intertek (ETL), Nationally Recognized Testing Laboratories (NRTL) or Canadian Standards Association (CSA). All units shall have ARI-13256-1 labels with ETL or NRTL or CSA or equivalent labels.

Standard Construction

Units shall have the air flow arrangement as shown on the plans. If units with these arrangements are not used, the contractor supplying the water source heat pumps is responsible for any extra costs incurred by other trades. Contractor must submit detailed mechanical drawings showing ductwork requirements and changes or relocation of any other mechanical or electrical system. If other arrangements make servicing difficult the contractor must provide access panels and clear routes to ease service. **The architect must approve all changes 10 days prior to bid.**

All units shall have stainless steel drain pans to comply with this project's Indoor Air Quality (IAQ) requirements. No exceptions will be allowed.

All water source heat pumps shall be fabricated from G-90 galvanized sheet metal for corrosion protection.

All interior surfaces are lined with ½" thick, 1.5lb./cubic foot dual density Micromat insulation for thermal insulation and acoustical attenuation (½" thick closed cell foam insulation is optional). Insulation must be non-combustible, non-hydroscopic and anti-fungal. Insulation must meet NFPA 90A and 90B for fire protection, UL181 erosion requirements, and be certified to meet GREENGUARD indoor air quality (IAQ) standards for low emitting products.

One blower access panel and two compressor compartment access panels shall be removable with supply and return air ductwork in place.

Unit shall be equipped with double compressor isolation. The unit shall have a floating base pan consisting of the compressor mounted on rubber grommets and a heavy gauge steel plate supported by a ½" (12 mm) thick, high density rubber pad on the base of the unit to prevent transmission of vibration to the structure.

All units shall have a factory installed four sided filter rack with access panel, capable of accepting either one or two inch filters. Units shall have a 1 inch thick, MERV 5 throwaway type glass fiber filter as standard. The filter rack shall incorporate a 1 inch duct flange. The contractor shall purchase one spare set of filters and replace the factory shipped construction filter upon completion of start-up.

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High Efficiency Filtration – Units shall include MERV 8 (sizes 007-070) or MERV 13 (sizes 015-070 with ECM Constant Airflow option).

Cabinets shall have separate knockouts for entrance of line voltage and low voltage control wiring.

Supply and return water connections shall be brass FPT fittings and shall be securely mounted flush to the cabinet allowing for connection to a flexible hose without the use of a back-up wrench. Water connections which protrude through the cabinet shall not be allowed.

Hanging brackets shall be provided as standard for horizontal units.

Condensate overflow protection sensor shall activate a circuit upon sensing when a high level of condensate water is in the drain pan resulting in a hard lockout in the unit.

Freeze protection sensors shall be provided on both sides of the refrigeration circuit. Sensors that measure water temperature shall not be allowed. (Refer to Solid State Safety Circuit section in this spec guide).

Fan and Motor Assembly

The blower housing shall feature a removable inlet ring to facilitate removal and servicing of the direct-drive centrifugal fan. The fan motor shall be isolated from the fan housing by torsionally flexible isolation.

The fan motor shall be a 3-speed, permanently lubricated, PSC type with thermal overload protection for the 7,000 BTU/h through 12,000 BTU/h units (EP007, EP009, and EP012). 15,000 to 70,000 Btu/Hr units (EP015-070) shall come supplied with a factory pre-programmed ultra efficient direct-drive, constant torque electrically commutated motor (ECM) for maximum efficiency and quiet operation. These motors shall feature three pre-programmed torque settings that can be changed in the field to meet air flow design requirements in specification. The 460V-3PHz-60Hz units with these motors must be able to operate without the need for a neutral wire for the motor. (A constant airflow ECM for selectable specified units is available as an optional motor on sizes 015-070.)

The fan and motor assembly must be capable of overcoming the external static pressures (ESP) as shown on the schedule. ESP rating of the unit shall be based on a wet coil. Ratings based on a dry coil will NOT be acceptable.

Refrigerant Circuit Components

Units shall use R-410A refrigerant. All units shall have a factory sealed and fully charged refrigerant circuit.

Hermetic compressor: Hermetic rotary, or scroll compressors shall be specifically designed for R-410A refrigerant, shall be thermally protected, and shall be located in an insulated compartment to minimize sound transmission.

Refrigerant metering shall be via thermal expansion valves (TXV) only.

Finned tube refrigerant-to-air heat exchanger not exceed 16 fins per inch. Refrigerant-to-air heat exchangers shall utilize enhanced aluminum fins and rifled copper tube construction rated to withstand 600 PSIG refrigerant working pressure. All air coils shall have non-ferrous aluminum end plates.

DuoGuard™ Coil Coating – A corrosion protection option for refrigerant to air heat exchangers that features tin plating of the copper tubing and coating of the aluminum fins with a protective film. The tin plating provides best in class protection of the copper tubing from formicary corrosion while the fin coating provides protection against salt spray and other corrosive elements. Duo Guard protected coils can exceed 1000 hours salt spray per ASTM standard B-117.

Coaxial (tube in tube) refrigerant to water heat exchanger. Refrigerant to water heat exchangers shall be of copper inner water tube and steel outer refrigerant tube design rated to withstand 600 PSIG working refrigerant pressure and 450 PSIG working water pressure. Shell & Tube style refrigerant to water heat exchangers shall be treated as pressure vessels and shall require refrigerant pressure relief valves piped to the exterior of the building. Brazed Plate water to refrigerant heat exchangers shall require additional centrifugal separators added to the supply water piping at each unit. Each separator

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shall have an automated clean out valve piped to a waste line. The contractor supplying water source heat pumps with Brazed Plate heat exchangers shall be responsible for any additional costs.

CuNI water coil – The refrigerant-to-water heat exchanger shall have inner tube constructed of Cupro-Nickel.

Refrigerant safety controls shall include both high and low pressure safety switches. Temperature sensors shall not replace these safety switches.

Access fittings (Schrader Valves) shall be factory installed on high and low pressure refrigerant lines to facilitate field service.

Electrical

A control box shall be located within the unit and shall contain a transformer, controls for the compressor, reversing valve and fan motor and shall have a terminal block for low voltage field wiring connections. The transformer shall be rated for a minimum 75VA. All units shall be name-plated for use with time delay fuses or Heating, Air Conditioning & Refrigeration (HACR) circuit breakers.

Option: Control transformer shall be rated for minimum 100VA.

Unit controls shall be 24 volts.

All transformers shall have a push button reset circuit breaker on the secondary power.

Solid State Safety Circuit

All units shall have a solid-state Unit Protection Module (UPM) safety control circuit with the following features.

Anti-short cycle time delay on compressor operation (5 min. delay on break).

Random start on power up mode.

Brown out/surge/power interruption protection.

Low Pressure Switch 120 second bypass timer.

High refrigerant pressure shutdown.

Low refrigerant pressure shutdown.

Low water temperature shutdown. Freeze sensors shall monitor refrigerant temperature to the water coil in the heating mode and shall activate the lockout circuit when water temperature drops below either 15˚F or 35˚F depending on the selection. 15˚F is field selectable for installations utilizing antifreeze; see IOM for details.

Air coil freeze protection shutdown refrigerant coil in the cooling mode.

Condensate overflow protection: A condensate sensor shall activate the lockout circuit upon sensing a high level of condensate in the drain pan and immediately put the unit into a hard lockout. COP shall be standard on all units.

Alarm output which closes for either dry contact closure or 24 VAC remote fault indication. Alarm output is selectable for constant output for general alarm notification, or pulse output for annunciation of the specific fault alarm. Selectable reset of unit at thermostat or disconnect.

Activation of any safety device shall prevent compressor operation via a lockout circuit. The lockout circuit shall be reset at the thermostat or at the contractor supplied disconnect switch. Units which may be reset at the disconnect switch only shall not be acceptable. Refer to Solid State Safety Circuit section.

Automatic intelligent reset. Unit shall automatically reset after a safety shut down and restart the unit after the anti-short cycle timer and random start timer expire. Should subsequent faults re-occur within 60 minutes after reset, then a permanent lockout will occur. Reset attempts shall be selectable for either 2 or 4 tries. A condensate overflow will place the unit in an immediate hard lockout.

Ability to defeat time delays for servicing (reduces all time delays to 5 seconds for diagnostic work).

A light emitting diode (LED) to indicate safety alarms. The LED shall annunciate the following alarms:

High refrigerant pressure.

Low refrigerant pressure.

Low refrigerant temperature to the water coil in the heating operation

Low refrigerant temperature to the air coil in cooling operation.

High level of condensate in the drain pan.

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Brown out/surge/ power interruption.

The LED will display each fault condition as soon as the fault occurs. If a permanent lockout occurs, then the fault will be transmitted to the alarm circuit output terminals until the unit is reset. ETL listed, and RFI, ESD, and transient protected.

Safety devices include:

Low pressure cutout set at 40 PSIG (280 kPa) for loss of charge protection (freezestat and/or high discharge gas temperature sensor is not acceptable).

High pressure cutout control set at 600 PSIG (4125 kPa).

Low supply water temperature sensor protection which monitors refrigerant temperature that could result in water heat exchanger freezing.

Low air coil temperature sensor protection which monitors refrigerant temperature that could result in air heat exchanger freezing.

High level of condensate sensor that shuts off the compressor if the condensate drain pan fills with water.

On board voltage detection that disables the compressor control circuit if there are extreme variations exceeding +/- 10% in supply voltage.

Factory Installed Options:

Extra quiet sound package: Units above capacity of 18,000 Bth/hr. shall be provided with a compressor blanket.

Insulation: All units shall have ½" thick closed-cell foam insulation.

All units shall have a factory installed four sided filter rack with access panel and either 2" MERV 8 filter or MERV 13 pleated filter. (MERV 13 option available only on sizes 015-070 and with ECM Constant Airflow option).

Units that are in the capacity range of 15,000 BTU/h through 70,000 (EP015 – EP070) shall have a factory pre-programmed constant airflow ECM for premium motor fan efficiency and constant air delivery over a wide range of external static pressure.

Refrigerant to air coils shall have DuoGuard™ coating for enhanced protection against formicary and other forms of corrosion.

Copper tubes shall be tin coated and protective coated aluminum fins rated at 1,000 hour salt spray protection and salt fog testing by the American Society for Testing & Materials (ASTM B117) equivalent or better.

Cupro-Nickel Water Coil: the refrigerant to water heat exchanger shall be of cupro-nickel inner water tube construction.

Coaxial refrigerant to water heat exchanger shall be insulated to allow for geothermal applications.

All transformers shall be rated 100VA and shall have a push button reset circuit on the secondary power.

Hot Gas Reheat: Units as noted on the schedule shall be equipped with optional Hot Gas Reheat (HGRH). HGRH shall be either on/off control or modulating as noted in the specifications.

On/Off HGRH shall be controlled by a humidistat connected to the unit H terminal and shall start the unit in the reheat mode should the humidity be above setpoint once the thermostat control is satisfied. Cooling or heating requirements shall take precedent over HGRH.

Modulating Hot Gas Reheat (MHGRH) shall be active at all times. A 0 - 10 VDC signal from a sensor located in the unit discharge air supply shall modulate the hot gas valve to maintain an adjustable preset leaving air temperature to the conditioned space.

Passive Dehumidification can be achieved with the Constant Airflow ECM by reducing nominal airflow by 15%. This control feature lowers air coil temperature and prevents over-cooling of the space when in dehumidification mode.

Hot Gas Bypass**:** For units as noted on the schedule, supply each unit with a ETL listed and MEA listed modulating hot gas bypass valve with factory supplied and installed controls to prevent air coils from frost development by taking hot gas and bypassing the water coil and expansion device and reintroducing the hot gas into the refrigerant line

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prior to the air coil. The hot gas bypass valve shall maintain a minimum refrigerant suction pressure to allow for a light load cooling mode or a low entering air temperature.

Water Side Economizer: Water side economizer shall be completely installed at the factory, with an additional condensate drain pan, motorized 3 way valve, aqua stat, and all internal electric controls. Water side economizer shall be rated at 400 psi and UL listed for application with the heat pump. This option is externally mounted outside the unit.

Automatic Flow Control Valves: Units shall have internal automatic flow control valves set to 3.0 GPM for nominal to of refrigeration capacity.

Two-Position Water Valve: Units shall have internally piped and wired 2-position water solenoid valve to close off flow if unit cycles off.

Circulating Pump: The internal pump option is an internally mounted on/off circulating pump. The internal pump cannot be used in conjunction with the two position water valve.

Straight Cool: units shall only operate in cooling mode.

Heat Recovery Hot Water Kits: 208/230V-1Ph-60Hz and 208/230V-3Ph-60Hz units shall be equipped with factory installed internal heat recovery kit for domestic hot water production. This kit shall include an internally protected hot water circulation pump, copper double wall vented coaxial water-to-refrigerant heat exchanger, 140°F (60°C) hot water temperature limit switch and an on/off switch/ circuit breaker.

Flow Proving Switch: prevents unit operation if there is no fluid flow. This factory installed, internally mounted device shall be rated at 600 psi and disable the compressor if a lack of water-flow occurs.

DDC Controls: Unit shall be equipped with a factory installed DDC control capable of interfacing with BACnet™, Modbus, N2 or Lon works® (with optional card).

The controller shall be pre-programmed to control the unit and monitor the safety controls.

The unit shall be able to operate as a standalone or be integrated into the building management system.

A leaving water and leaving air sensor shall be installed in the unit.

Wall sensors shall be available for controlling zone temperature.

Unit mounted disconnect: A non fused factory mounted disconnect shall be installed on the unit.

Electric Heat: factory installed ETL listed electric heater packages shall be available for the units. Available only on vertical units and horizontal units with end blow configuration.

Relays shall be factory installed in the unit as follows:

EMS Relay for remote enabling of the unit.

Auxiliary pump/valve relay to enable a pump/valve operation when calling for compressor operation.

Compressor monitoring relay – provides a contact closure whenever the compressor contactor is energized.

Blower monitoring relay – provides a contact closure whenever the blower motor is energized.

Boilerless control shall activate an electric heater (internal or external unit) and disable compressor should water temperature drop below set point.

Includes a relay and splitting the power supply to the unit into a blower motor and control power supply and a compressor power supply. The relay (when energized) deactivates the compressor control circuit.

Wire transformer for 208V operation.

Phase loss and reversal protection shall be provided on the unit to protect the compressor from operating in reverse rotation on three phase units.

A comfort alert module shall be installed in the unit to assist in service diagnostics (sizes 024-070 only).

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Field Installed Options

All units shall be connected by hoses and have a maximum working pressure 400 PSI for sizes ½" – 1"and 300 PSI for sizes 1 ¼ – 2".

A variety of hose kits are available depending on the job requirement. Kits 2 through 6 include supply and return ported ball shut-off valves with P/T ports. Hose kit options are available in the accessories section of the BST selection software.

Kit 1 – Hose kit either 24" or 36" long.

Kit 2 – Hose kit with ball valves on the supply and return hoses. Valves shall have P/T ports to facilitate pressure and temperature readings.

Kit 3 – Hose kit with automatic flow control valve. The design flow rate is preset at the factory per the specified design conditions and shall automatically limit the flow to this value. This shall facilitate balancing of the fluid loop and allow each unit the required flow.

Kit 4 – Hose kit with an automatic flow control valve and a Y-strainer and blow down valve on the supply side. The filter screen is 20 mesh, 304 stainless steel. This shall prevent dirt and debris from entering the water coil.

Kit 5 – Hose kit with an automatic flow control valve and a 24V, 2-position solenoid valve on the return. This shall be used to shut off flow to the unit when there is not a call for heating or cooling. (Typically used with a VFD pumping.)

Kit 6 – Hose kit with an automatic flow control valve, Y-strainer/BD valve on the return. 24V, automatic flow valve, blow down valve and two position solenoid valve.

Thermostats

The unit control may be as simple as a single stage thermostat or the unit may have a DDC controller integrated into the building management system. All external low voltage control wiring is made to the thermostat terminal located in the unit electrical box. Thermostats may be manual change over, auto change over, programmable or non-programmable depending on the requirements of the project. A full line of thermostats are available from FHP Bosch as an accessory.

Notes

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