EC Model & Split Systems

Water Source Heat Pump

6 to 30 ton

The EC Model, including Split Systems, provides the best combination of performance, comfort and one-of-a-kind features that satisfy the high demands of any commercial building.

EC MODEL | UP TO **24.5** EER GLHP | UP TO **5.6** COP WSHP

Made in the U.S.A.

Commercial Sales Catalog
fhp-mfg.com

BOSCH
Invented for life

Table of Contents

Model Nomenclature

EC 072 1 VT C F L T

MODEL:
EC

NOMINAL CAPACITY:
072, 096, 120, 150, 151, 180, 181, 210, 240, 242, 300, 360

VOLTAGE DESIGNATION:
1 - 208-230/1/60 *Available 072, 096 & 120VT*
3 - 208-230/3/60
4 - 460/3/60
5 - 575/3/60 *Unavailable 072*

CABINET CONFIGURATION:
VT - Vertical
HZ - Horizontal
CS - Condensing Section
AH - Horizontal Air Handling Section
AV - Vertical Air Handling Section

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

WATER CONNECTIONS:
F - Front
S - Side

RETURN AIR LOCATION:
L - Left *Available on Horizontal (HZ) units, sizes 072, 096, 120, 150, 180, 242*
R - Right *Available on Horizontal (HZ) units, sizes 180, 242*
B - Back *Available on Vertical (VT) units, sizes 072, 096, 120, 151, 181, 210, 240, 300, 360*
F - Front *Available on Vertical (VT) units, sizes 072, 096, 120, 151, 181, 210, 240, 300, 360*

SUPPLY AIR LOCATION:
T - Top
F - Front
R - Rear
S - Straight Thru
E - End Blow

Certified Performance Data

ASHRAE/AHRI/ISO 13256-1 – AHRI Certified												
Model	GPM	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
		Cooling 86˚F		Heating 68˚F		Cooling 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
EC072	16	72000	13.0	92000	4.5	80400	18.6	72400	3.8	75600	14.2	54800	3.2
EC096	21	96000	14.0	116000	4.8	116000	20.6	93200	4.2	104000	15.4	73600	3.5
EC120	28	124000	13.2	158000	4.4	134000	18.3	123000	3.9	127200	14.7	100000	3.2
PERFORMANCE IN ACCORDANCE WITH ARI/ISO 13256-1													
EC150	35	157000	16.0	181000	5.6	185000	24.0	140000	5.0	166000	17.9	107000	4.2
EC151	35	147000	16.0	181000	5.6	175000	24.0	140000	5.0	155000	17.9	107000	4.2
EC180	42	182000	14.2	204000	5.0	195000	20.0	156000	4.2	185000	15.4	118000	3.5
EC181	42	170000	14.2	204000	5.0	185000	20.0	156000	4.2	175000	15.4	118000	3.5
EC210	50	220000	14.6	270000	5.1	292000	22.5	204000	4.5	250000	17.2	152000	3.9
EC240	60	248000	14.4	315000	5.0	310000	21.1	250000	4.5	275000	16.0	180000	3.9
EC242	60	248000	14.4	315000	5.0	310000	21.1	250000	4.5	275000	16.0	180000	3.9
EC300	75	295000	13.0	376000	4.2	365000	18.8	300000	3.8	318000	14.0	222000	3.2
EC360	90	386000	14.8	435000	4.2	472000	22.0	342000	4.0	412000	16.4	252000	3.3

Ratings based upon AHRI/ANSI 13256-1 with 1" disposable filter

FHP Equipment

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

Bosch Thermotechnology Corp. is always on the forefront of product development and innovative design to optimize the performance of FHP units. Our products are designed and manufactured to the highest quality, reflecting the no-compromise standards for which FHP and Bosch are renowned in order to provide our customers with the highest level of satisfaction and comfort. The variety of options, energy efficiency, and uncompromising quality of all FHP products makes them the ideal choice for the commercial new construction market and the ease of designing into tight retrofit spaces of buildings.

FHP's engineering efforts have been focused on providing a greener world for future generations. Faced with today's tough environmental challenges and with global warming, Bosch Thermotechnology Corp. is more committed than ever to develop solutions which utilize sustainable energy sources in order to conserve our planet's resources. With our heat pumps, you not only will save money on energy bills but also help create a better world.

The EC Model water-to-air heat pump is the result of our almost 40+ years of research and development experience in the US heat pump market. It is the most flexible geothermal technology available today, designed for reliability, reducing installation costs and provide the building with comfort and the cost savings expected from FHP.

About Bosch Thermotechnology Corp. in North America

Bosch Thermotechnology Corp. is a leading source of high quality heating and cooling systems in North America. The company offers tankless, point-of-use water heaters, solar thermal systems, Bosch and Buderus conventional and condensing boilers, heat pump water heaters, Bosch and FHP geothermal heat pumps as well as controls and accessories for every product line. Bosch Thermotechnology Corp. is committed to reinventing energy efficiency by offering smart products that work together as integrated systems, which enhance quality of life in an ultra efficient and environmentally friendly manner.

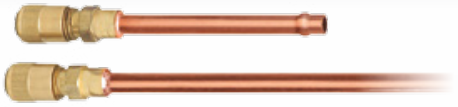
Proven and Tested Technologies

FHP heat pumps are made by highly trained and skilled workers in the FHP factory based in Fort Lauderdale, Florida. They are manufactured with rigorous standards and factory testing ensuring trustworthy operation over the life of the unit. Bosch's ISO 9001 and ISO 14001 certified facilities provide consistent quality in every unit built.

Made in the U.S.A.

Drain Pan

High-Density Compressor Blankets (Optional)



Schrader Charging Valves for Servicing

EC Model

EC Model water-to-air heat pumps provide the best combination of performance and efficiency available. Safety devices are built into each unit to provide the maximum system protection possible.

Quality

The EC features as standard an anti-corrosive G90 galvanized steel cabinet and stainless steel drain pan to ensure long life. To help prevent formicary corrosion, evaporator coils with DuoGuard™ coil protection system can be applied as an option. Rigorous factory testing helps to ensure no hassles from the start while FHP's 40+ years of experience in designing heat pumps is your assurance of the highest quality product.

Advantages of FHP Technology

- Optimum comfort
- Two single-step compressors for 2-stage operation
- Field configurable supply air
- Simple installation and operation
- Low installation costs
- Lower operating costs
- Flexibility in designing and installation
- Energy efficiency
- Superior quality
- Quiet operation

Flexible Installation

All units are available in horizontal and vertical configurations. Additional options of return air and supply air are offered as standard, providing configuration flexibility. For ease of installation, hanging supports are provided. All horizontal units are equipped with angle or box section supports for hanging the unit. Field supplied spring or rubber isolation must be installed to isolate the unit from the building structure.

Quiet Operation

All panels are insulated with ½" thick, 1.5 lb./cu. ft. dual-density fiberglass insulation for both thermal insulation and noise reduction. Noise reduction is a critical consideration of the unit's design. For vibration isolation, all compressors are mounted on rubber grommets. Compressor rubber isolators are necessary in preventing vibration transmission from the compressor to the unit cabinet and duct work. Vertical cabinets have an insulated divider panel between the blower compartment and the compressor section to minimize the transmission of compressor noise, and to permit operational service testing without air bypass.

For additional sound attenuation, high-density compressor blankets and fiber free closed cell foam insulation are available as options on all EC Models.

Serviceability

All units are designed to be serviced from the front of the unit. Schrader valves for the high and low pressure gauges are standard, along with easily accessible electrical box components, allow diagnosing and servicing the unit a simple task. Insulated bulkheads in all EC Models separate the compressor section from the blower section, allowing the unit to be serviced easily during operation.

Sizable panels are removable to facilitate servicing of 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. These service friendly features benefit equipment owners with easier service access which saves time and money.

Large EC Models 072-360

- 12 Models from 6 through 30 tons
- All units are designed with dual refrigeration circuits for staged operation. Horizontal unit sizes 120, 180 and 242 have dual blower assemblies. Vertical unit sizes 210 to 360 have dual blower assemblies.
- Units are available in both horizontal and vertical configurations depending on size. Additionally, several options of return and supply air are offered as standard, providing configuration flexibility.

Unit Configurations

EC072-181 Vertical Single Blower Large Commercial Units

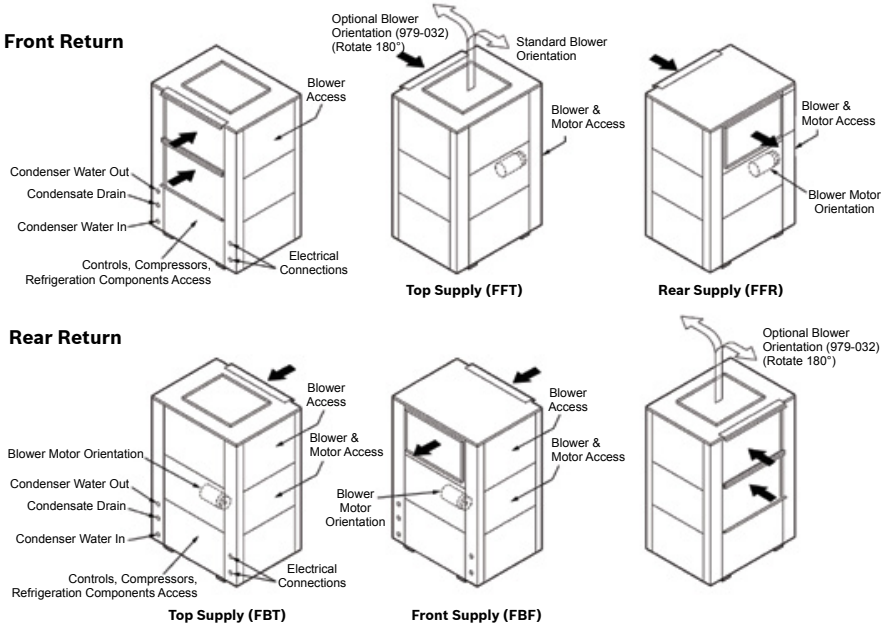


Figure 1

EC210-360 Vertical Dual Blower Large Commercial Units

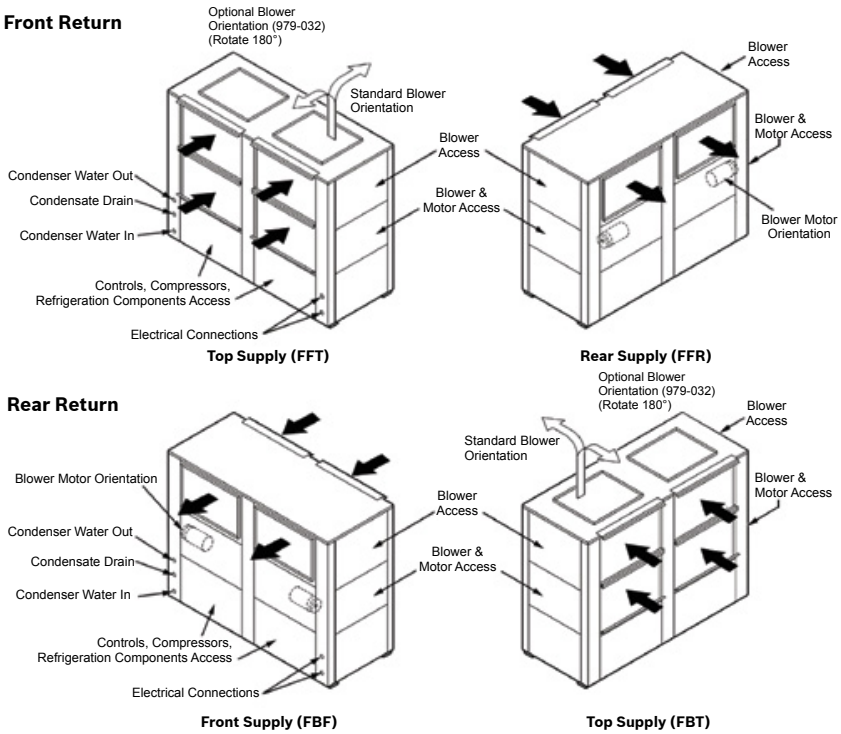
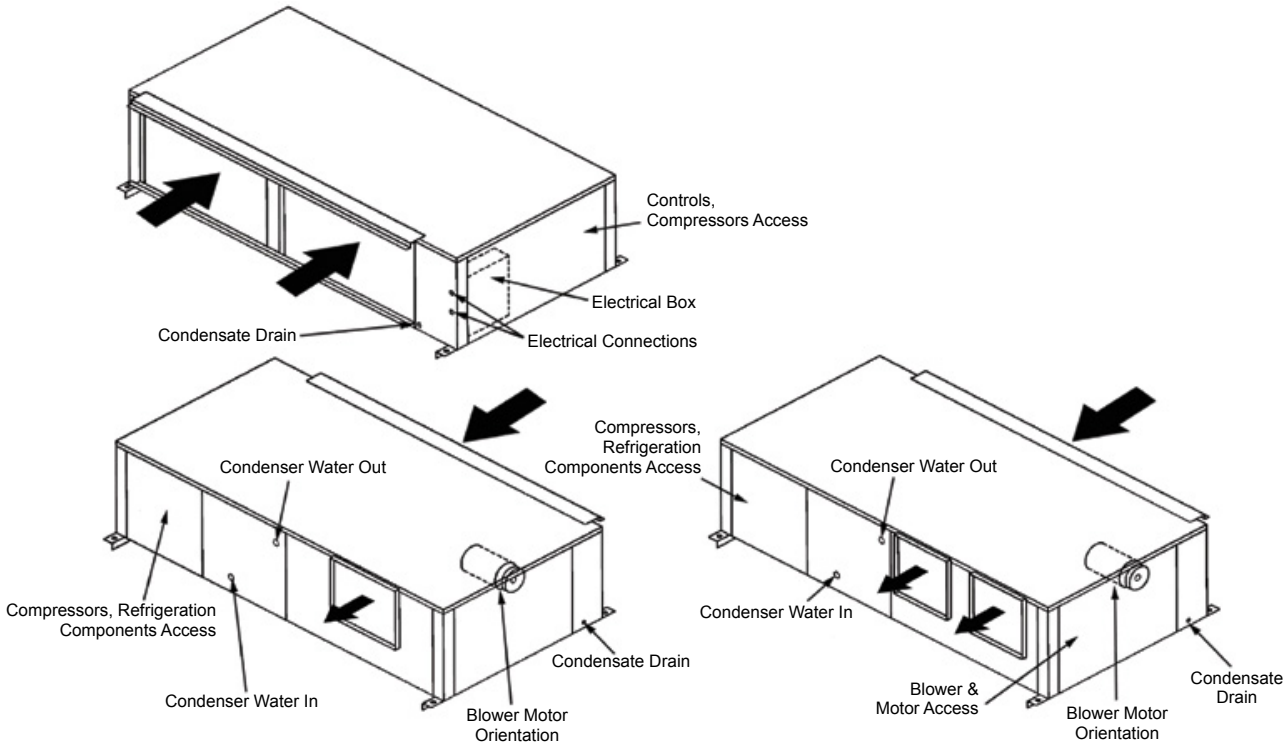


Figure 2

Unit Configurations

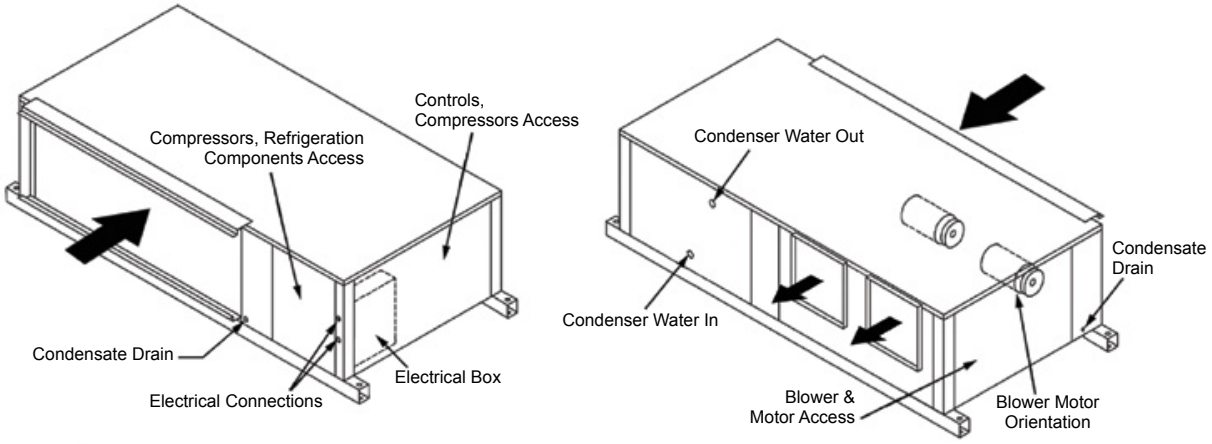
EC072-150 Horizontal Large Commercial Units



072, 096 & 150 (SLS Only) **120 (SLS Only)**

Figure 3

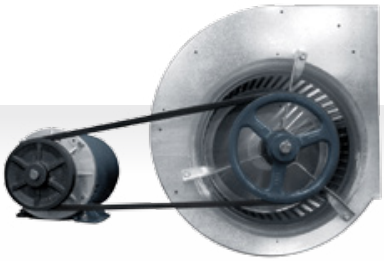
EC180-242 Horizontal Large Commercial Units



EC180 & EC242 (SLS)

Figure 4

2" 4-Sided Filter Rack Option



Belt Drive, and Motor

Flow Proving Switch (Fluid Differential Pressure Switch)

Features, Functions and Benefits

Cabinet

The EC Model cabinetry is constructed using heavy-gauge, G90 galvanized steel. This type of steel provides superior corrosion protection for units installed indoors.

All interior surfaces are lined with ½" thick, 1.5 lb./cu. ft. dual-density, fiberglass insulation for thermal insulation and acoustical attenuation. This insulation is non-combustible, non-hydroscopic and does not support fungal growth. The unit insulation also meets NFPA 90A and 90B for fire protection, UL 181 for erosion, and is certified to meet the GreenGuard™ Indoor Air Quality Standard for Low Emitting Products.

Protection against corrosion is a feature in the Large EC Model. A stainless steel drain pan will last the lifetime of the unit and resist corrosion and cracking that may occur with painted steel, galvanized steel or plastic materials.

Filter Racks and Options

Two-sided filter racks accommodating a 1" filter are standard on all EC units. A two-sided 2" filter rack is optional to accommodate a nominal 1" or a 2" thick filter. Four sided filter racks are available as an option and 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" construction filter.

Blower and Motor

All fan assemblies are belt-driven double width, double inlet (DWDI), forward curved, and precisely balanced to ensure smooth operation. The blower housing and fan wheels are designed for quiet, low velocity operation, which helps keep high frequency fan wheel noise to a minimum. The fan motors are 1725 or 3450 RPM, 56 frame sealed ball bearing type, permanently lubricated and have thermal overload protection.

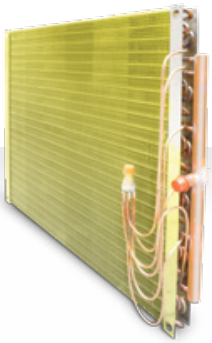
Evaporator Coil and DuoGuard™ (Option)

Air handling sections come standard with a copper tube aluminum fin evaporator coil. Available as an option is the DuoGuard™ evaporator coil protection system. DuoGuard™ Protection® - Tin Electro-Plated Copper Tubing with High-Tech Polymer Coated Aluminum Fins will aid in protecting the evaporator coil from most forms of corrosive elements in the airstream. The tin plating provides a best-in-class protection of the copper tubing from formicary corrosion while the fin coating provides protection against salt spray and other corrosive elements. DuoGuard™ protected coils are able to exceed 1000 hours salt spray per ASTM standard B-117.

Refrigerant Circuit

EC Models are designed using the optimum combination of compressor and coils to provide peak performance.

Heavy-duty heat pump compressors are used in all units. Scroll or reciprocating compressors offer optimum performance for each unit size.



DuoGuard™ Evaporator Coil Protection (Optional)

Variable Frequency Drive (Optional)

Scroll and Reciprocating Compressors

Refrigerant to water heat exchangers are coaxial tube-in-tube type providing a robust construction, ensuring 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 the fluid temperatures can drop below the dew point of the surrounding air, condensation will occur. To combat this, insulation applied to the refrigerant piping and water coils is standard on horizontal units and optionally available on vertical units to prevent sweating.

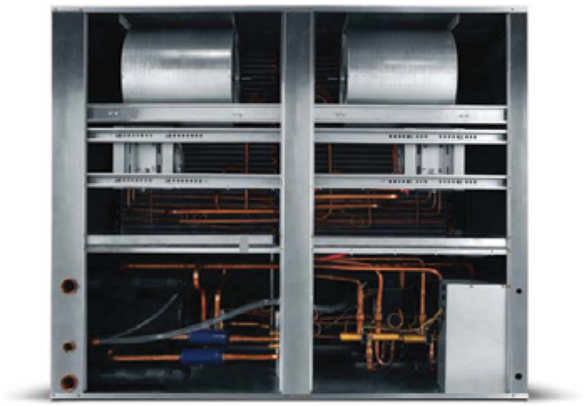
Air coils are state of the art, employing lanced fin and rifled tubing for maximum heat transfer. Large face areas result in lower face velocity reducing sound while ensuring high latent heat removal for maximum dehumidification in the cooling mode. A pilot operated four-way reversing valve in the refrigeration circuit allows the unit to operate in either the heating or cooling mode. All FHP 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.

Thermal Expansion Valves come standard on the EC and 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.

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

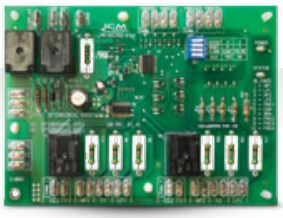
Schrader service valves are standard on the high and low pressure lines of all units, allowing connection of gauges for service diagnostics and to evacuate, reclaim or recharge refrigerant into the system. Optional Schrader valves are available for connection to field installed water regulating valves.



(Panels removed for internal view of the EC Model)

Coax Coil

Four-way Reversing Valve



UPM Control Board

Unit Protection Module (UPM)

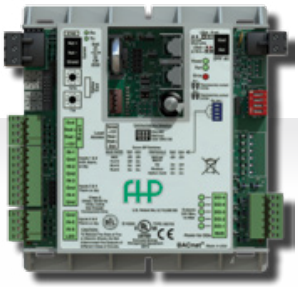
Each EC Model is built in the factory with a Unit Protection Module (UPM) that controls the unit operation and monitors the safety controls that protect the unit. The UPM interfaces with the thermostat or human-machine interface (HMI). The main purpose of the UPM is to protect the compressor by monitoring the different states of switches and sensors. This module provides time delays and protects the unit against freezing of the water-to-refrigerant and air-to-refrigerant heat exchangers as well as condensate overflow. This level of protection helps provide the piece of mind that comes with offering an FHP product to the customer.

UPM Control Board Features

- **Condensate Overflow Protection**—The UPM controller continuously monitors the drain pan for high condensate water level, and if this exceeds normal operating levels, the compressor operation is interrupted to protect against drain pan overflow.
- **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 (2-Stage)**—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 - High Pressure (2-stage)
  4 Blinks - Low Pressure (2-stage)
  5 Blinks - Low Fluid Temperature
  6 Blinks - Condensate Overflow
  7 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.



DDC Control Board

RS Base DDC Sensor

RS Plus DDC Sensor

RS Pro DDC Sensor

DDC Controls (Option)

The optional FHP 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 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, 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.

BACview® Hand Held Diagnostic Tool

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

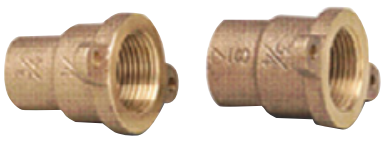
* DDC Zone Sensors available through Applications Special Handling Sheet. When the Zone Sensors (ZS) are available as a standard option they will replace the Room Sensors (RS).

Additional Features

- Condensate overflow protection sensor factory mounted in the drain pan of the unit.
- Belt driven
- TXV
- Dual refrigerant freeze protection on air coil and water-coil
- 75VA transformer
- All horizontal units include an integral angle iron frame with mounting holes facilitating the suspending of the unit from the ceiling.

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.



Water Connectors

Additional Options

- 100VA transformer
- Waterside economizer with 3 way valve and controls
- Hot water or chilled water coil
- Inverter duty motor
- Relays - EMS, blower monitor, compressor monitor, and pump/valve
- Phase monitor
- Pump/valve relay
- Boilerless control
- Flow proving switch
- Fire alarm relay/dual power
- Wire to 208V
- Extended range w/ Schrader valve
- 1/2" Closed cell foam insulation
- Variable frequency drive for fan motors
- Take-Apart construction
- 100% outside air
- Rotate blower

Take-Apart Construction

To make installations possible into buildings where all that is available are standard-sized doorways and elevators, the take-apart option is the natural choice. This type of unit is shipped fully assembled with the air handling and condensing sections capable of being field-separated for rigging into the space. The refrigerant circuit is separated into two parts, capped, sealed tight, and charged with nitrogen. The installer will be responsible for reassembling the sections, connecting the refrigerant circuit, charging the unit and wiring the unit motor. Allow for an increase of 3" of height on top of catalog dimensions.

Energy Management Switch (EMS)

This switch allows you to connect to an energy management system that can turn the unit off and on. Energy management systems are commonly used by individual commercial entities to monitor, measure, and control their electrical building loads. Energy management systems can be used to centrally control devices like HVAC units and lighting systems across multiple commercial applications sites.

Flow Proving Switch (DPS)

The function of the flow proving 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. The switch is piped between the water entering and leaving connections. Should the pressure drop fall below set value, the switch will open de-energizing the DPS relay, thereby stopping the compressor. The blower operation will not be affected by this option.

Hot Gas Reheat

Hot gas reheat (HGR) 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.

Typically a HGR unit can be controlled by wall mounted thermostat and humidistat device(s) to control temperature and humidity. Today another simple one-piece solution commonly marketed by third party vendors as a “thermidistat” (humidity/temperature) may be utilized as well as DDC Remote Sensor options. By utilizing a humidistat in addition to the thermostat, we are able to monitor the humidity levels in the space as well. The HGR 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 or hot water 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

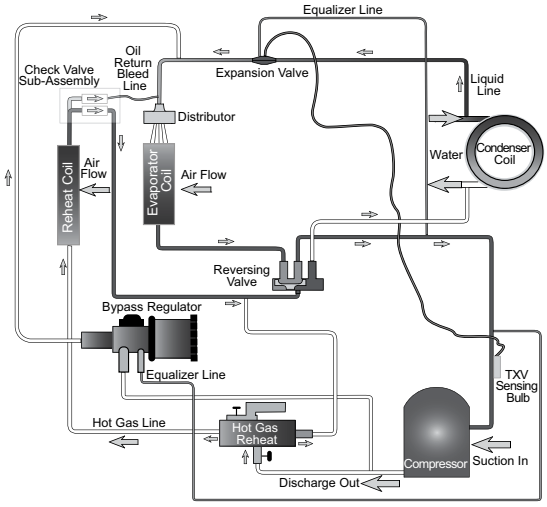


Figure 5

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 5).

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.

Sequence of Operation - Modulating Hot Gas Reheat (MHGRH)

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. The reheat coil raises the air stream temperature to a specified temperature (adjustable) and reduces relative humidity; delivering neutral air to the space. 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 psychrometric chart diagram (Figure 8). 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 costs. Control of the hot gas modulation is by the wall mounted thermostat or the unit mounted DDC. A separate controller is used to control the unit itself.

Hot Gas Reheat Control Options

There are several ways to control heat pumps with hot gas reheat. You should choose the means that best suits your specific application. Please refer to the Hot Gas Reheat wiring diagrams 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 Bosch Thermotechnology Corp. 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. For a unit requiring a field-installed water regulating valve, the optional factory installed Water Regulating Schrader Valve Assembly should be included with the unit to allow for proper control.

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 2° 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 structures shell loss load.

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

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 heating and cooling loads or a unit sized for heating that has a much lower cooling load, 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.

100% Outside Air

The EC Model is capable of providing 100% fresh outside air to most commercial buildings. The purpose is to deliver the make-up air dehumidified or reheated per the design requirements for space temperature, humidity and not to burden the recirculating units. This requires factory options, modulating hot gas reheat and hot gas bypass in order to protect the unit and deliver dehumidified neutral air temperatures to the space. In addition, a special drive package typically is required that would consists of a smaller fan blower and motor HP. By doing this the airflow is reduced in these types of applications for better dehumidification. Typically, a unit will deliver 350-400 CFM/ton. In a 100% outside air application, that ratio will be reduced to 120-200 CFM/ton. Lastly, if there is a requirement for reverse cycle heating on the project, contact the applications engineering department for further details.

Waterside Economizer

Examples of 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.

▸Hot Water Heating or Chilled Water Cooling

The standard Waterside Economizer package is fully piped and wired internal to the unit. In special applications, the coil internal economizer piping an diverting valve can be designed out and removed, enabling the coil to be connected to an external hot or chilled fluid supply.

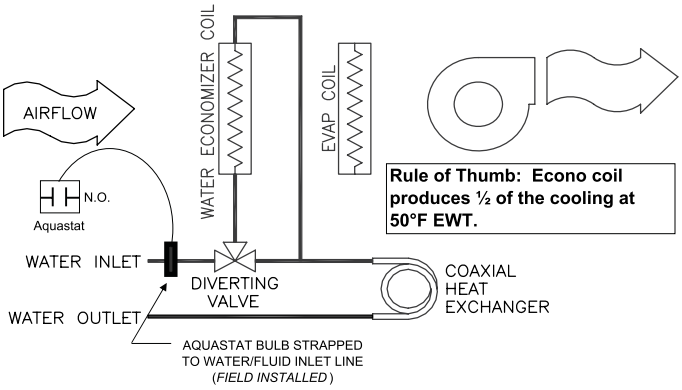


Figure 6

Sequence Of Operation

(Utilizing 2 Stage Cool, 2 Stage Heat Thermostat)

Cooling Mode On a call for cooling from the space sensor the following sequence is initiated: The "G" terminal energizes the blower relay, powering the blower motor. The "O" terminal energizes the reversing valve coil, setting the heat pump in the cooling mode and energizing the economizer relay "ER", if the loop water is below the set point of the aquastat and switch "AQS" is closed.. The normally closed contacts of ER open and the normally open contacts of ER close. The motorized ball valve will be de-energized in the bypass mode, routing water directly to the water to refrigerant heat exchanger. On a rise in space temperature Y1 will close, energizing the MBVR if the temperature of the water is below the aquastat setpoint.

This will energize the motorized ball valve in the economizer mode, diverting water first through the economizer coil then the water to refrigerant heat exchanger in series. Should the space temperature continue to rise, Y2 will be energized allowing mechanical cooling. If at any time the water temperature rises above the aquastat set point the motorized ball valve will be energized in the bypass mode and fluid will bypass the economizer coil.

Heating Mode On a call for heating from the space sensor the sequence of operation is identical to the above with the exception of the reversing valve and economizer relay are not energized, locking the motorized ball valve in the bypass mode.

Pre-heating coils can also be supplied by a hydronic boiler loop or a dedicated water-to-water heat pump for pre-heating outside air. In this application the coil only is utilized without the valve package and associated controls. Field installed pumping means, piping systems, and associated controls are required. (Consult factory for heating coil capacity data).

Fluid Flow

Fluid flow through heat pumps equipped with waterside economizer coils is directed by the use of a single three way motorized ball valve. Flow is either through the waterside economizer coil and then through the condenser or through the condenser only. When applying these units to a variable speed pumping system a field provided means of positive flow shut-off is required. (Re: A positive shut-off solenoid valve located down stream of the heat pump. See Figure 3).

Aquastat

The aquastat controller is mounted to the heat pump electrical control box. All electrical control wiring is factory installed. The controller is supplied with an external range adjustment and screwdriver slot. Actual range is -30° to 100°F and requires field setting. The remote bulb stored inside the heat pump for shipping requires field mounting.

(Figure 7) Care should be taken not to dent or deform this sensitive remote bulb. A dent or deformation will change the calibration and cause the control to cycle at a temperature lower than the selected setting.

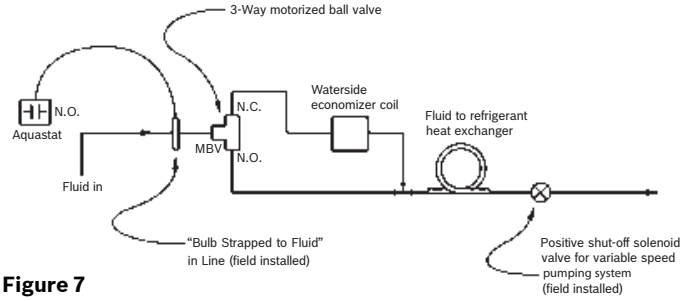


Figure 7

Air Side Pressure Drop

The air side pressure drops shown on the waterside economizer performance tables is considered as additional heat pump external static pressure. Refer to Bosch Select Tools selection software for blower performance and to determine if the unit requires an oversized drive package.

Thermostats

Hose Kit

Psychrometric Chart

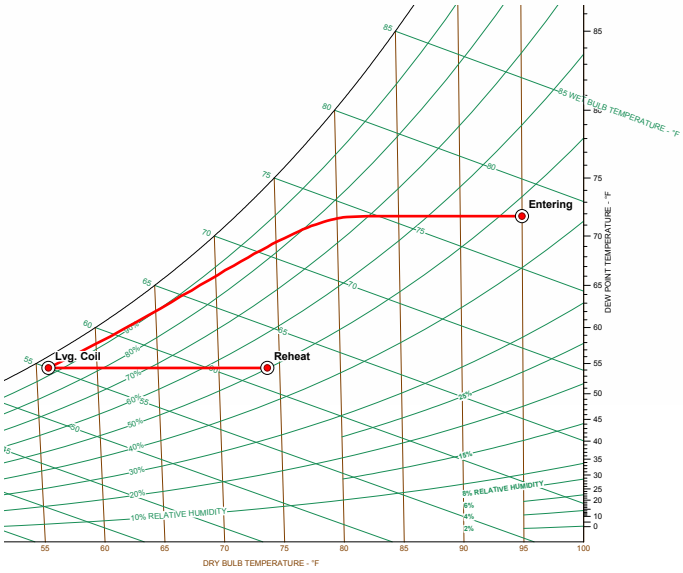


Figure 8

Accessories

Thermostats

The EC Model control may be as simple as having a lone multi-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 Bosch.

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. 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 1 ¼" – 2". A variety of hose kits are available depending on the job requirement.

Kit 1 - Hoses only either 12", 24" or 36" long.

Kit 2 - Hose kit 1 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 2 with an 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 3 with 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 3 with a 24V, 2-position solenoid valve. 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 4 with a 24V, 2-position solenoid valve.

Hose kit options are available in the accessories section of the BST selection software.

Systems

The EC Model 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 or parking lots. 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. Field-installed water regulating valves may be required.

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 de-humidifies 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. 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.

Typical Unit Installation

Water-to-Air Heat Pump Cycle — Cooling

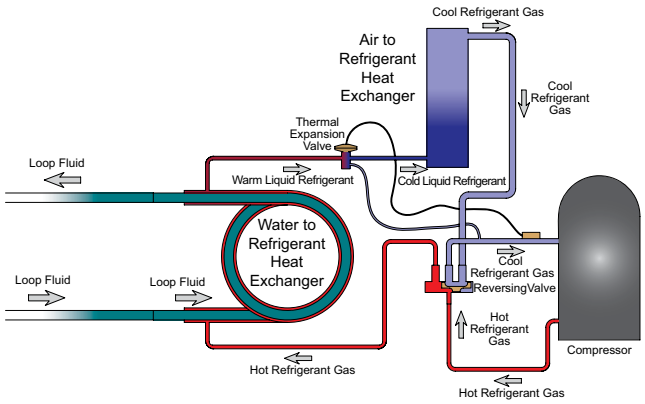


Figure 9

Water-to-Air Heat Pump Cycle — Heating

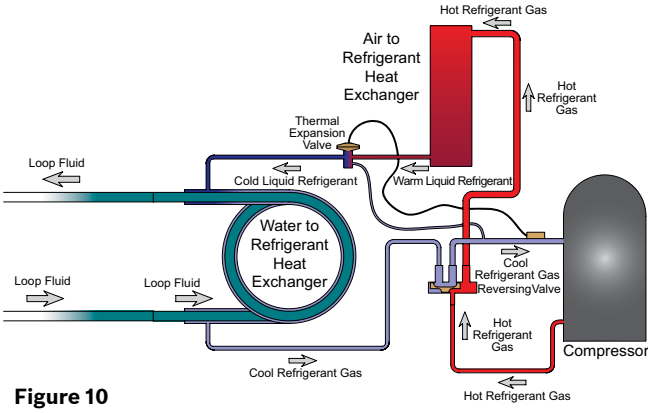


Figure 10

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 Unit Installation

Large Vertical units are typically installed in a mechanical room. If installed in a 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 compartment for service.

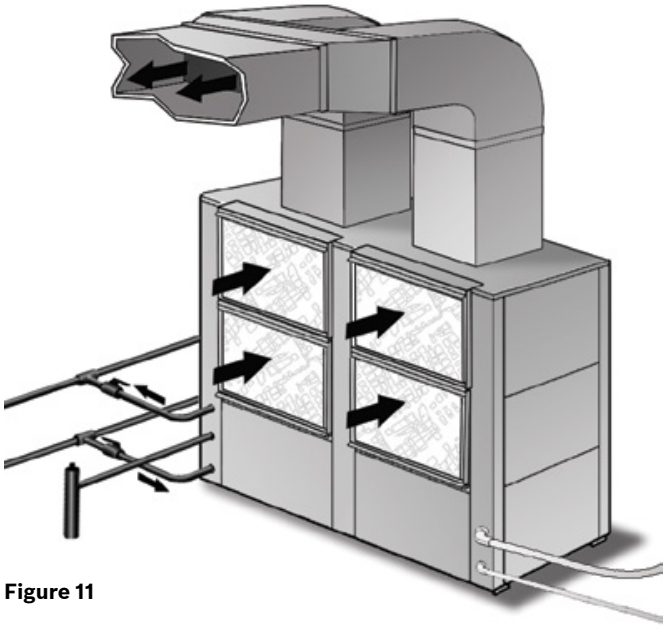


Figure 11

Typical Unit Installation

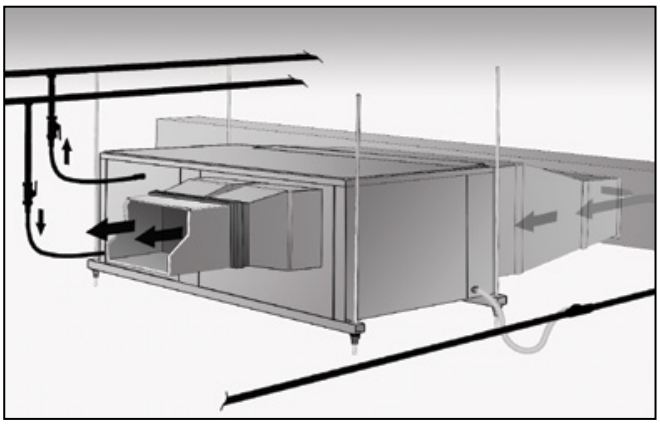


Figure 12

Horizontal Unit Installation

Large horizontal units are supplied with angle of box section supports for suspension. Field supplied hanging rods, spring or rubber isolators should be used to isolate the unit from the building structure to prevent vibration transmission to the building. 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 24" 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

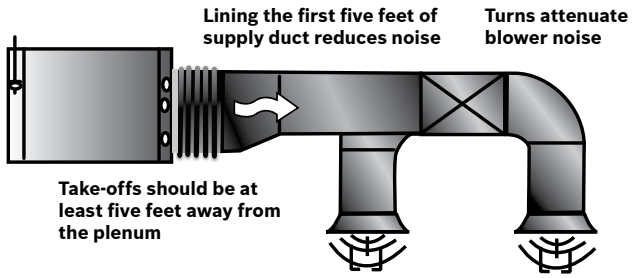


Figure 13 **Supply Air Ducting**

Sound is becoming an increasingly important factor in all HVAC installations. The EC 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.

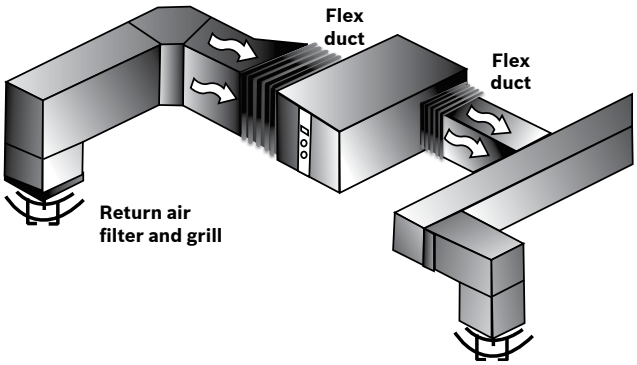


Figure 14 **Return Air Ducting**

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.

In highly sound sensitive locations, the designer should consider utilizing a split system from Bosch Thermotechnology Corp. In this design, the condensing section is located away from the sound sensitive area. Refrigerant piping connects the FHP air unit in the sound sensitive area to the FHP condensing section, which contains the compressor and coaxial water coil. Ask your FHP representative for information.

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.

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.

All EC Models provide a standard FPT condensate drain connection installed in the unit (reference install manual for exact diameter based on capacity of 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.

EC Split Systems 072-360

- Horizontal 6 tons through 12.5 tons
- Vertical 6 tons through 30 tons
- All the excellent features, functions and benefits that are encompassed in the EC package unit are available for the EC split system along with increased flexibility in installation and availability of applications.

Condensing Section **Air Handling Section**

Increased Flexibility for Installation

The EC Split condensing section can be placed remotely up to a equivalent 75 feet from the air handler section which allows for the unit installation to be in locations where space is limited. Additionally, this orientation allows installing the condensing section, which is the major contributor to noise and vibration, to be away from occupied areas. Multiple condensing units may be centrally located to facilitate servicing.

The location of the EC Split air handlers can be concealed within a variety of areas inside the building where it will connect to air and ventilation ducts to deliver comfortable air. Air handling sections are available in vertical or horizontal configurations from 6 tons through 12.5 tons for horizontal a/h and 6 tons through 30 tons for vertical a/h so there is a unit to meet your every need.

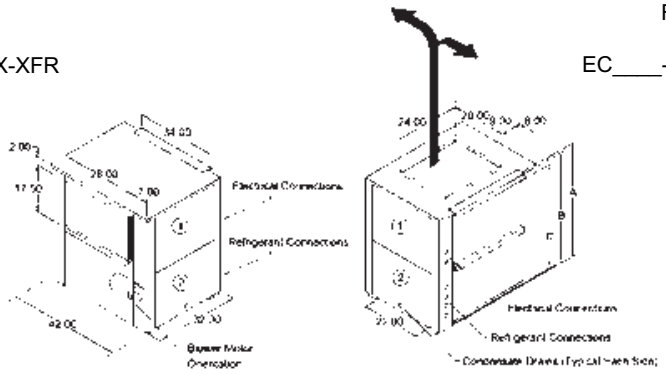
NOTE: Extended performance data for the EC Split can be calculated by deducting 3% from the EC package unit performance, i.e. increase power consumption and decrease total capacity and efficiency by 3%. Field installed performance will depend on installation details and operating conditions.

Unit Configurations

EC072-360 Split Systems Vertical Air Handler

Front Return
Rear Supply
EC____-__AVX-XFR

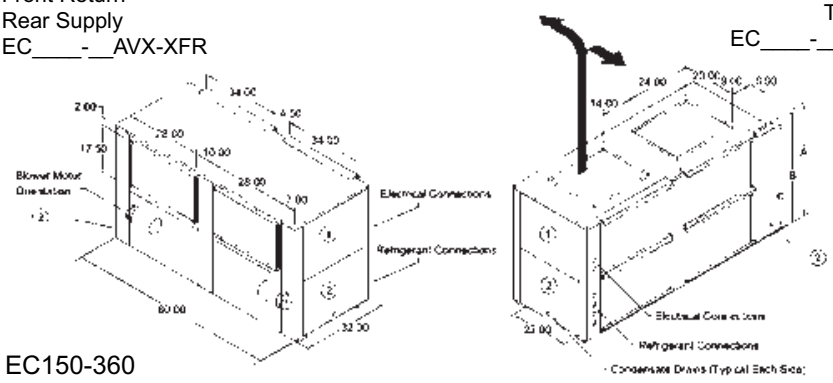
Front Return
Top Supply
EC____-__AVX-XFT



EC072-120

Front Return
Rear Supply
EC____-__AVX-XFR

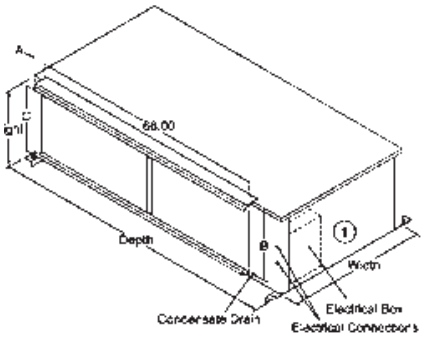
Front Return
Top Supply
EC____-__AVX-XFT

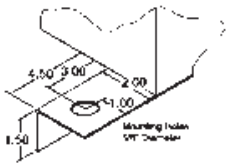


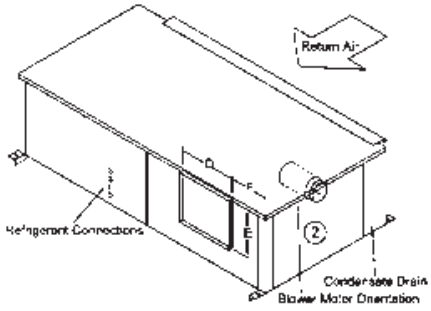
EC150-360

Figure 15

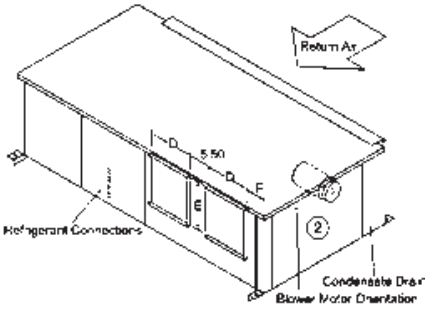
EC072-150 Split Systems Horizontal Air Handler





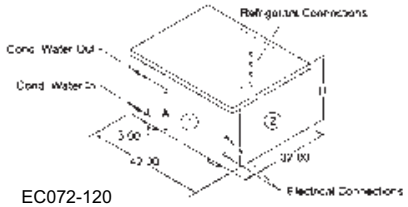


EC072, 096 & 150 (SLS Only)



EC120 (SLS Only)

EC072-360 Split Systems Condensing Section



EC072-120

EC150-360

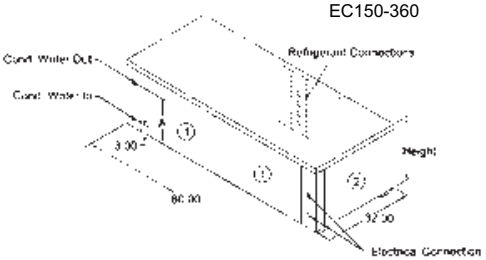


Figure 16

Operating Limits

EC 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.

Equipment Selection

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. Bosch Thermotechnology Corp. 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 28 to 39.

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.

Unit Operating Limits—EC Model

Operating Limits – Cooling & Heating	Standard Unit	Extended Range Option
Cooling		
Minimum ambient air temperature	50	50
Maximum ambient air temperature	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	50	50
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.

Antifreeze Correction Data

Antifreeze Correction							
Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Correction Factor EWT 30 °F
		Avg. Water Temp 90 °F			Avg. Water Temp 30 °F		
		Total Cap.	Sens. Cap	Power	Htg. Cap	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	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

Waterside Pressure Drop

Model	GPM	Pressure Drop (PSIG)	Pressure Drop (ft of H2O)
EC072	10	2.6	6.0
	12	3.6	8.3
	14	4.8	11.0
	16	6.1	14.0
	18	7.5	17.3
EC096	12	2.5	5.7
	14	3.3	7.5
	18	5.1	11.8
	21	6.8	15.6
	24	8.6	19.8
EC120	16	2.1	4.9
	20	3.1	7.3
	24	4.4	10.1
	28	5.8	13.3
	32	7.3	16.9
EC150	20	1.4	3.3
	25	2.1	4.9
	30	3.0	6.8
	35	3.9	9.0
	50	7.4	17.1
EC151	20	1.4	3.3
	25	2.1	4.9
	30	3.0	6.8
	35	3.9	9.0
	50	7.4	17.1
EC180	22	1.7	3.9
	27	2.5	5.7
	32	3.3	7.7
	42	5.4	12.5
	52	8.0	18.4
EC181	22	1.7	3.9
	27	2.5	5.7
	32	3.3	7.7
	42	5.4	12.5
	52	8.0	18.4
EC210	30	2.6	5.9
	40	4.3	9.9
	50	6.4	14.9
	60	8.9	20.6
	70	11.8	27.2
EC240	30	1.6	3.7
	40	2.7	6.2
	50	4.0	9.3
	60	5.6	12.9
	75	8.3	19.2
EC242	30	1.6	3.7
	40	2.7	6.2
	50	4.0	9.3
	60	5.6	12.9
	75	8.3	19.2
EC300	40	2.7	6.2
	50	4.0	9.3
	60	5.6	12.9
	75	8.3	19.2
	85	10.4	24.1
EC360	50	3.7	8.5
	70	6.7	15.5
	80	8.5	19.7
	90	10.6	24.4
	100	12.8	29.5

NOTE: Based on 70° F pure entering water

Capacity Data

EC072 (2300 CFM) Horizontal & Vertical Configurations

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	2.3 (5.3)	75/63	81.4	61.2	93.8	4.0	20.3	30	2.6 (6.1)	60	49.2	36.4	3.7	3.9
			80/67	87.5	63.5	100.1	4.0	21.9			70	46.9	33.3	3.9	3.5
			85/71	93.8	65.6	106.6	4.0	23.6			80	44.5	30.1	4.1	3.2
	12	3.9 (8.9)	75/63	83.6	62.0	95.7	3.8	21.8		4.4 (10.2)	60	51.2	38.2	3.8	4.0
			80/67	90.0	64.4	102.2	3.8	23.7			70	48.7	34.9	4.0	3.6
			85/71	96.6	66.5	109.0	3.7	25.8			80	46.2	31.5	4.1	3.3
	18	8.0 (18.5)	75/63	85.9	62.9	97.6	3.7	23.5		9.2 (21.1)	60	53.5	40.3	3.9	4.1
			80/67	92.6	65.3	104.4	3.6	25.8			70	50.8	36.7	4.1	3.7
			85/71	99.6	67.5	111.5	3.5	28.4			80	47.9	33.2	4.2	3.3
60	9	2.2 (5.1)	75/63	77.0	58.9	90.1	4.4	17.5	40	2.5 (5.9)	60	57.5	43.9	4.0	4.2
			80/67	82.8	61.3	96.2	4.4	18.8			70	55.2	40.6	4.2	3.8
			85/71	88.8	63.5	102.4	4.4	20.2			80	52.7	37.3	4.4	3.5
	12	3.7 (8.6)	75/63	79.0	59.9	91.8	4.2	18.7		4.3 (9.8)	60	60.0	46.2	4.1	4.3
			80/67	85.1	62.2	98.1	4.2	20.2			70	57.5	42.7	4.3	3.9
			85/71	91.5	64.4	104.7	4.2	22.0			80	54.8	39.1	4.5	3.6
	18	7.7 (17.9)	75/63	81.2	60.8	93.6	4.0	20.1		8.8 (20.4)	60	62.9	48.8	4.2	4.4
			80/67	87.6	63.2	100.2	4.0	21.9			70	60.1	45.0	4.4	4.0
			85/71	94.2	65.7	106.9	3.9	23.9			80	57.2	41.2	4.6	3.6
70	9	2.1 (5.0)	75/63	72.2	57.2	86.0	4.8	15.1	50	2.3 (5.3)	60	68.3	53.7	4.3	4.6
			80/67	77.8	59.3	92.0	4.8	16.2			70	65.6	50.0	4.6	4.2
			85/71	83.6	61.6	98.1	4.8	17.3			80	63.1	46.2	4.9	3.8
	12	3.6 (8.3)	75/63	74.2	57.8	87.7	4.6	16.0		3.9 (8.9)	60	71.2	56.5	4.4	4.7
			80/67	80.1	60.2	93.9	4.6	17.3			70	68.4	52.5	4.7	4.3
			85/71	86.1	62.5	100.2	4.6	18.7			80	65.6	48.4	5.0	3.9
	18	7.5 (17.3)	75/63	76.2	58.8	89.3	4.5	17.1		8.0 (18.5)	60	74.6	59.5	4.5	4.9
			80/67	82.3	61.4	95.7	4.4	18.6			70	71.6	55.4	4.8	4.4
			85/71	88.8	63.4	102.4	4.4	20.2			80	68.5	50.8	5.1	4.0
80	9	2.1 (4.8)	75/63	67.5	54.9	82.0	5.2	13.0	60	2.2 (5.1)	60	78.3	62.9	4.6	5.0
			80/67	72.7	57.4	87.7	5.2	13.9			70	75.7	59.1	4.9	4.5
			85/71	78.1	59.9	93.5	5.3	14.9			80	73.0	54.9	5.2	4.1
	12	3.5 (8.1)	75/63	69.2	55.8	83.5	5.0	13.7		3.7 (8.6)	60	81.8	66.3	4.7	5.1
			80/67	74.8	58.1	89.5	5.1	14.8			70	78.9	62.2	5.0	4.6
			85/71	80.6	60.5	95.6	5.1	15.9			80	76.1	57.7	5.3	4.2
	18	7.2 (16.7)	75/63	71.1	56.4	85.1	4.9	14.6		7.7 (17.9)	60	85.8	70.0	4.8	5.3
			80/67	76.9	59.2	91.2	4.9	15.7			70	82.6	65.5	5.1	4.8
			85/71	82.9	61.8	97.5	4.9	17.1			80	79.4	60.8	5.4	4.3
85	9	2.0 (4.7)	75/63	64.9	54.2	79.8	5.4	12.1	70	2.1 (5.0)	60	88.5	72.6	4.8	5.4
			80/67	70.1	56.4	85.5	5.4	12.9			70	85.8	68.4	5.2	4.9
			85/71	75.4	58.7	91.3	5.5	13.8			80	82.9	64.2	5.5	4.4
	12	3.4 (7.9)	75/63	66.7	54.5	81.4	5.2	12.7		3.6 (8.3)	60	92.6	76.5	4.9	5.5
			80/67	72.1	57.2	87.2	5.3	13.7			70	89.6	72.0	5.3	5.0
			85/71	77.6	59.8	93.1	5.3	14.7			80	86.3	67.4	5.6	4.5
	18	7.1 (16.5)	75/63	68.5	55.3	82.9	5.1	13.4		7.5 (17.3)	60	97.2	80.9	5.0	5.7
			80/67	74.1	58.2	88.9	5.1	14.5			70	93.7	75.9	5.4	5.1
			85/71	80.2	60.2	95.3	5.1	15.7			80	90.2	70.9	5.7	4.6
90	9	2.0 (4.7)	75/63	62.6	52.9	77.8	5.6	11.3	80	2.1 (4.8)	60	98.9	82.5	5.0	5.8
			80/67	67.5	55.2	83.3	5.6	12.0			70	95.9	78.0	5.4	5.2
			85/71	72.6	57.7	88.9	5.7	12.7			80	92.8	73.4	5.8	4.7
	12	3.4 (7.8)	75/63	64.1	53.6	79.1	5.4	11.8		3.5 (8.1)	60	103.6	87.0	5.1	5.9
			80/67	69.3	56.1	84.9	5.5	12.6			70	100.2	82.1	5.5	5.3
			85/71	74.9	58.4	90.9	5.5	13.5			80	96.7	77.0	5.9	4.8
	18	7.0 (16.2)	75/63	65.8	54.2	80.6	5.3	12.4		7.2 (16.7)	60	108.7	92.0	5.2	6.2
			80/67	71.4	56.7	86.7	5.3	13.4			70	104.9	86.6	5.6	5.5
			85/71	77.1	59.7	92.6	5.3	14.4			80	101.0	81.1	6.0	5.0
100	9	2.0 (4.5)	75/63	57.9	49.5	73.7	5.9	9.8							
			80/67	62.4	52.3	78.9	6.0	10.4							
			85/71	67.2	56.0	84.3	6.1	11.0							
	12	3.3 (7.6)	75/63	59.3	50.2	75.0	5.8	10.2							
			80/67	64.0	54.3	80.3	5.9	10.9							
			85/71	69.1	56.4	86.0	6.0	11.5							
	18	6.8 (15.7)	75/63	60.8	50.8	76.2	5.7	10.7							
			80/67	65.7	54.9	81.8	5.8	11.4							
			85/71	71.1	57.1	87.7	5.8	12.2							
110	9	1.9 (4.4)	75/63	52.8	47.5	69.3	6.2	8.5							
			80/67	57.2	50.0	74.4	6.4	8.9							
			85/71	61.6	52.3	79.5	6.5	9.4							
	12	3.2 (7.4)	75/63	54.1	48.0	70.4	6.2	8.8							
			80/67	58.7	50.6	75.7	6.3	9.3							
			85/71	63.3	53.1	81.1	6.4	9.9							
	18	6.6 (15.3)	75/63	55.5	48.7	71.7	6.1	9.2							
			80/67	60.3	51.2	77.1	6.2	9.8							
			85/71	65.2	53.7	82.6	6.3	10.4							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC096 (2800 CFM) Horizontal & Vertical Configurations

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	12	2.6 (6.0)	75/63	106.9	77.7	122.9	5.0	21.2	30	3.0 (6.9)	60	73.2	54.0	5.6	3.9
			80/67	113.9	80.0	130.3	5.1	22.5			70	71.0	49.3	6.1	3.4
			85/71	121.3	82.1	138.0	5.1	23.9			80	69.2	45.5	6.7	3.0
	16	4.4 (10.1)	75/63	109.3	78.7	124.7	4.7	23.1		5.0 (11.6)	60	75.4	55.8	5.6	3.9
			80/67	116.7	81.1	132.3	4.7	24.7			70	73.2	51.3	6.2	3.5
			85/71	124.4	83.2	140.3	4.7	26.3			80	71.3	47.2	6.8	3.1
	24	9.1 (21.1)	75/63	111.9	79.7	126.5	4.4	25.3		10.4 (24.1)	60	77.9	58.3	5.7	4.0
			80/67	119.6	82.2	134.4	4.4	27.2			70	75.7	53.6	6.2	3.6
			85/71	127.7	84.3	142.7	4.4	29.3			80	73.8	49.7	6.9	3.2
60	12	2.5 (5.8)	75/63	102.6	75.6	120.0	5.6	18.3	40	2.9 (6.7)	60	80.5	60.7	5.7	4.1
			80/67	109.4	78.0	127.2	5.6	19.4			70	78.9	56.7	6.3	3.7
			85/71	116.5	79.9	134.7	5.7	20.5			80	77.7	53.1	7.0	3.3
	16	4.2 (9.8)	75/63	104.9	76.7	121.6	5.3	19.8		4.8 (11.2)	60	83.4	63.6	5.8	4.2
			80/67	112.1	79.0	129.0	5.3	21.1			70	81.7	59.8	6.4	3.8
			85/71	119.4	81.6	136.6	5.3	22.5			80	80.1	55.9	7.0	3.3
	24	8.8 (20.3)	75/63	107.4	77.7	123.3	5.0	21.5		10.1 (23.2)	60	87.0	66.9	5.9	4.3
			80/67	114.8	80.1	131.0	5.0	23.1			70	85.2	62.9	6.5	3.9
			85/71	122.5	82.8	138.9	4.9	24.8			80	84.1	58.5	7.1	3.5
70	12	2.4 (5.7)	75/63	98.2	73.6	117.1	6.2	15.8	50	2.6 (6.0)	60	91.7	71.3	6.0	4.5
			80/67	104.6	76.2	123.9	6.3	16.7			70	90.5	67.7	6.6	4.0
			85/71	111.4	78.0	131.1	6.3	17.6			80	89.3	64.1	7.3	3.6
	16	4.1 (9.5)	75/63	100.4	74.6	118.5	5.9	17.0		4.4 (10.1)	60	95.3	74.6	6.1	4.6
			80/67	107.1	77.3	125.6	5.9	18.1			70	93.9	71.0	6.7	4.1
			85/71	114.3	79.1	133.1	6.0	19.2			80	92.6	67.1	7.4	3.7
	24	8.5 (19.7)	75/63	102.7	75.6	120.1	5.6	18.3		9.1 (21.1)	60	99.6	78.8	6.1	4.8
			80/67	109.8	78.4	127.4	5.6	19.6			70	97.7	74.4	6.8	4.2
			85/71	117.3	80.3	135.2	5.6	21.0			80	96.3	70.5	7.5	3.8
80	12	2.4 (5.5)	75/63	93.5	71.7	114.1	6.9	13.5	60	2.5 (5.8)	60	102.5	81.5	6.2	4.8
			80/67	99.7	73.9	120.8	7.0	14.3			70	101.2	77.7	6.9	4.3
			85/71	106.1	76.2	127.6	7.0	15.1			80	100.0	74.0	7.6	3.9
	16	4.0 (9.2)	75/63	95.6	72.6	115.4	6.6	14.5		4.2 (9.8)	60	107.0	85.8	6.3	5.0
			80/67	102.2	74.8	122.4	6.6	15.4			70	105.4	81.7	7.0	4.4
			85/71	108.7	77.8	129.2	6.6	16.4			80	104.0	77.6	7.7	4.0
	24	8.2 (19.0)	75/63	97.8	73.7	116.8	6.3	15.6		8.8 (20.3)	60	112.0	90.6	6.4	5.1
			80/67	104.7	76.0	124.0	6.3	16.7			70	110.1	86.1	7.1	4.6
			85/71	111.6	78.8	131.2	6.3	17.8			80	108.1	81.3	7.8	4.1
85	12	2.3 (5.4)	75/63	91.1	70.8	112.6	7.3	12.5	70	2.4 (5.7)	60	114.2	92.5	6.4	5.2
			80/67	97.2	72.8	119.3	7.3	13.3			70	112.7	88.4	7.1	4.6
			85/71	103.2	75.7	125.7	7.4	14.0			80	111.1	84.3	7.9	4.1
	16	3.9 (9.0)	75/63	93.2	71.6	113.9	7.0	13.4		4.1 (9.5)	60	119.3	97.5	6.5	5.3
			80/67	99.6	73.7	120.7	7.0	14.3			70	117.4	93.0	7.2	4.8
			85/71	106.1	76.2	127.6	7.0	15.1			80	115.6	88.4	8.0	4.2
	24	8.1 (18.7)	75/63	95.4	72.6	115.2	6.6	14.4		8.5 (19.7)	60	125.1	103.1	6.7	5.5
			80/67	102.1	74.7	122.3	6.6	15.4			70	122.7	98.0	7.4	4.9
			85/71	108.9	77.3	129.5	6.6	16.4			80	120.5	92.9	8.1	4.4
90	12	2.3 (5.3)	75/63	88.7	69.8	111.2	7.7	11.6	80	2.4 (5.5)	60	126.1	104.0	6.7	5.5
			80/67	94.5	72.3	117.5	7.7	12.2			70	124.2	99.4	7.4	4.9
			85/71	100.6	74.2	124.1	7.8	12.9			80	122.3	94.7	8.2	4.4
	16	3.9 (8.9)	75/63	90.7	70.7	112.4	7.3	12.4		4.0 (9.2)	60	131.9	109.4	6.8	5.7
			80/67	96.8	73.2	118.9	7.4	13.1			70	129.4	104.2	7.5	5.1
			85/71	103.1	75.7	125.6	7.4	13.9			80	127.1	98.9	8.3	4.5
	24	8.1 (18.5)	75/63	92.8	71.5	113.7	7.0	13.3		8.2 (19.0)	60	138.5	115.7	6.9	5.9
			80/67	99.2	74.1	120.4	7.0	14.1			70	135.4	110.0	7.6	5.2
			85/71	106.0	76.1	127.6	7.0	15.1			80	132.5	104.1	8.4	4.6
100	12	2.2 (5.1)	75/63	83.8	67.7	108.5	8.5	9.9							
			80/67	89.2	70.3	114.4	8.5	10.4							
			85/71	94.7	72.7	120.4	8.6	11.0							
	16	3.7 (8.6)	75/63	85.9	68.1	109.7	8.2	10.5							
			80/67	91.4	71.1	115.7	8.2	11.2							
			85/71	97.2	73.6	121.9	8.2	11.8							
	24	7.8 (17.9)	75/63	87.8	68.9	110.8	7.8	11.2							
			80/67	93.9	71.5	117.2	7.8	12.0							
			85/71	100.1	74.0	123.8	7.9	12.7							
110	12	2.2 (5.0)	75/63	78.8	65.2	106.1	9.4	8.4							
			80/67	83.9	67.7	111.7	9.5	8.9							
			85/71	88.7	70.7	117.0	9.5	9.3							
	16	3.6 (8.4)	75/63	80.6	65.9	106.9	9.1	8.9							
			80/67	85.7	68.9	112.5	9.1	9.4							
			85/71	91.2	71.5	118.4	9.1	10.0							
	24	7.5 (17.4)	75/63	82.5	66.8	107.9	8.7	9.4							
			80/67	88.1	69.3	113.9	8.8	10.1							
			85/71	93.6	72.4	119.8	8.8	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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC120 (4000 CFM) Horizontal & Vertical Configurations

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	15	2.0 (4.6)	75/63	132.0	99.0	153.8	6.7	19.6	30	2.3 (5.3)	60	88.8	63.1	7.4	3.5
			80/67	141.2	102.2	163.7	6.8	20.7			70	88.0	59.3	8.2	3.2
			85/71	150.7	105.1	173.7	6.9	21.9			80	87.7	55.5	9.1	2.8
	20	3.3 (7.7)	75/63	134.9	100.3	156.1	6.4	21.0		3.8 (8.8)	60	92.1	66.1	7.5	3.6
			80/67	144.5	103.4	166.3	6.5	22.2			70	90.8	61.8	8.2	3.2
			85/71	154.4	106.4	176.7	6.6	23.5			80	90.3	58.1	9.1	2.9
	30	6.9 (16.0)	75/63	138.0	101.2	158.6	6.1	22.4		7.9 (18.3)	60	96.0	69.6	7.5	3.7
			80/67	148.0	104.7	169.0	6.2	23.9			70	94.1	65.0	8.3	3.3
			85/71	158.3	107.8	179.9	6.2	25.4			80	93.1	60.6	9.2	3.0
60	15	1.9 (4.4)	75/63	126.7	96.2	149.9	7.3	17.3	40	2.2 (5.1)	60	101.1	74.8	7.6	3.9
			80/67	135.6	99.6	159.4	7.4	18.3			70	100.1	70.7	8.4	3.5
			85/71	144.7	102.7	169.0	7.5	19.3			80	99.2	66.5	9.3	3.1
	20	3.2 (7.5)	75/63	129.5	97.4	152.0	7.0	18.4		3.7 (8.5)	60	105.4	78.7	7.7	4.0
			80/67	138.7	100.8	161.8	7.1	19.6			70	104.0	74.4	8.5	3.6
			85/71	148.2	104.0	171.8	7.1	20.8			80	102.6	69.8	9.4	3.2
	30	6.7 (15.5)	75/63	132.4	98.6	154.2	6.7	19.7		7.6 (17.7)	60	110.5	83.2	7.8	4.1
			80/67	142.0	102.1	164.4	6.8	21.0			70	108.6	78.5	8.6	3.7
			85/71	151.9	105.5	174.7	6.8	22.4			80	106.5	73.4	9.4	3.3
70	15	1.9 (4.3)	75/63	121.0	93.6	146.0	8.0	15.1	50	2.0 (4.6)	60	117.9	90.7	8.0	4.3
			80/67	129.7	96.9	155.1	8.1	16.0			70	116.4	86.6	8.8	3.9
			85/71	138.1	100.8	164.1	8.1	17.0			80	115.1	81.6	9.6	3.5
	20	3.1 (7.2)	75/63	123.7	94.8	147.9	7.7	16.1		3.3 (7.7)	60	122.9	95.4	8.1	4.5
			80/67	132.5	98.6	157.1	7.7	17.1			70	120.4	90.4	8.8	4.0
			85/71	141.5	102.1	166.6	7.8	18.2			80	119.3	85.6	9.7	3.6
	30	6.5 (15.0)	75/63	126.5	95.9	149.9	7.4	17.2		6.9 (16.0)	60	128.7	100.5	8.2	4.6
			80/67	135.6	99.9	159.4	7.4	18.4			70	125.4	94.9	8.9	4.1
			85/71	145.1	103.4	169.3	7.4	19.6			80	123.9	89.9	9.8	3.7
80	15	1.8 (4.2)	75/63	115.3	90.9	142.1	8.8	13.1	60	1.9 (4.4)	60	133.4	105.5	8.2	4.7
			80/67	123.3	94.8	150.7	8.9	13.9			70	131.6	100.6	9.1	4.3
			85/71	131.6	98.2	159.5	8.9	14.8			80	129.9	95.5	9.9	3.8
	20	3.0 (7.0)	75/63	117.8	92.0	143.8	8.5	13.9		3.2 (7.5)	60	139.5	111.1	8.4	4.9
			80/67	126.4	95.5	152.8	8.5	14.9			70	137.0	105.8	9.2	4.4
			85/71	134.8	99.5	161.8	8.5	15.8			80	134.3	100.1	10.0	3.9
	30	6.3 (14.5)	75/63	120.5	93.1	145.6	8.1	14.9		6.7 (15.5)	60	146.5	117.2	8.5	5.1
			80/67	129.4	96.8	154.9	8.1	15.9			70	143.4	111.2	9.3	4.5
			85/71	138.5	100.2	164.5	8.1	17.0			80	139.7	105.0	10.1	4.0
85	15	1.8 (4.1)	75/63	112.1	90.0	140.1	9.2	12.2	70	1.9 (4.3)	60	149.4	121.2	8.5	5.1
			80/67	120.3	93.1	148.8	9.3	13.0			70	147.6	116.0	9.4	4.6
			85/71	128.0	97.5	156.9	9.3	13.7			80	145.4	110.5	10.3	4.2
	20	3.0 (6.9)	75/63	114.6	91.0	141.6	8.9	12.9		3.1 (7.2)	60	156.9	127.7	8.7	5.3
			80/67	123.1	94.3	150.6	8.9	13.8			70	153.9	121.8	9.5	4.8
			85/71	131.6	97.7	159.6	8.9	14.7			80	151.3	115.8	10.4	4.3
	30	6.2 (14.2)	75/63	117.2	92.2	143.3	8.5	13.8		6.5 (15.0)	60	165.1	134.7	8.8	5.5
			80/67	125.8	95.9	152.4	8.5	14.8			70	161.5	128.1	9.6	4.9
			85/71	135.0	99.0	161.9	8.5	15.8			80	158.1	121.4	10.5	4.4
90	15	1.7 (4.0)	75/63	109.3	88.2	138.4	9.7	11.3	80	1.8 (4.2)	60	166.9	137.7	8.9	5.5
			80/67	117.0	91.9	146.7	9.7	12.0			70	164.0	131.8	9.7	5.0
			85/71	124.5	96.3	154.7	9.8	12.7			80	161.3	126.0	10.6	4.5
	20	2.9 (6.8)	75/63	111.7	89.3	139.9	9.3	12.0		3.0 (7.0)	60	175.0	145.0	9.0	5.7
			80/67	119.6	93.4	148.3	9.3	12.8			70	171.6	139.1	9.8	5.1
			85/71	127.9	96.9	157.0	9.4	13.7			80	168.3	132.6	10.7	4.6
	30	6.1 (14.0)	75/63	114.2	90.4	141.4	9.0	12.7		6.3 (14.5)	60	184.3	153.0	9.1	5.9
			80/67	122.7	94.1	150.4	9.0	13.7			70	180.1	145.5	10.0	5.3
			85/71	131.2	98.1	159.2	9.0	14.6			80	176.1	138.0	10.9	4.8
100	15	1.7 (3.9)	75/63	102.8	86.4	134.5	10.7	9.6							
			80/67	110.5	89.6	142.9	10.7	10.3							
			85/71	117.7	94.1	150.5	10.8	10.9							
	20	2.8 (6.6)	75/63	105.3	86.6	136.1	10.3	10.2							
			80/67	112.6	91.3	143.8	10.3	10.9							
			85/71	120.5	95.6	152.1	10.3	11.7							
	30	5.9 (13.6)	75/63	107.6	87.6	137.4	9.9	10.9							
			80/67	115.4	92.2	145.5	9.9	11.6							
			85/71	123.8	95.5	154.3	9.9	12.5							
110	15	1.6 (3.8)	75/63	96.9	83.0	131.7	11.8	8.2							
			80/67	103.9	86.8	139.3	11.8	8.8							
			85/71	110.8	90.9	146.7	11.9	9.3							
	20	2.8 (6.4)	75/63	99.0	84.0	132.8	11.4	8.7							
			80/67	106.3	87.8	140.5	11.4	9.3							
			85/71	113.6	92.0	148.3	11.4	10.0							
	30	5.7 (13.2)	75/63	101.1	84.9	133.9	11.0	9.2							
			80/67	108.7	88.8	141.9	11.0	9.9							
			85/71	116.3	93.5	149.7	11.0	10.6							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC150 (5000 CFM) Horizontal & Vertical Configurations

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	18.8	1.4 (3.2)	75/63	159.4	124.0	183.4	7.3	21.7	30	1.6 (3.6)	60	102.1	75.4	7.5	4.0
			80/67	169.7	128.0	194.3	7.4	22.9			70	99.9	70.1	8.3	3.5
			85/71	180.4	132.1	205.6	7.5	24.2			80	97.9	64.9	9.2	3.1
	25	2.3 (5.3)	75/63	162.8	125.1	186.2	7.0	23.2		2.6 (6.0)	60	105.6	78.6	7.6	4.1
			80/67	173.5	129.3	197.4	7.1	24.5			70	102.9	73.1	8.4	3.6
			85/71	184.3	134.2	208.7	7.1	25.9			80	100.6	67.5	9.2	3.2
	37.6	4.8 (11.0)	75/63	166.3	126.5	189.0	6.7	24.9		5.4 (12.6)	60	109.3	82.1	7.6	4.2
			80/67	177.4	130.8	200.6	6.7	26.3			70	106.4	76.3	8.4	3.7
			85/71	188.6	135.8	212.3	6.8	27.9			80	103.4	70.1	9.3	3.3
60	18.8	1.3 (3.0)	75/63	152.8	120.8	178.3	8.0	19.1	40	1.5 (3.5)	60	115.1	88.3	7.7	4.4
			80/67	162.8	125.0	188.8	8.0	20.2			70	112.8	82.5	8.5	3.9
			85/71	172.8	130.3	199.3	8.1	21.3			80	110.7	77.0	9.4	3.5
	25	2.2 (5.1)	75/63	156.0	122.1	180.8	7.7	20.3		2.5 (5.8)	60	119.3	91.9	7.8	4.5
			80/67	166.1	127.1	191.4	7.7	21.6			70	116.6	86.2	8.6	4.0
			85/71	177.0	130.9	202.8	7.7	22.9			80	114.1	80.5	9.5	3.5
	37.6	4.6 (10.6)	75/63	159.2	124.0	183.2	7.3	21.7		5.2 (12.1)	60	124.2	96.4	7.9	4.6
			80/67	169.9	128.6	194.4	7.4	23.1			70	121.1	90.3	8.6	4.1
			85/71	181.2	132.4	206.2	7.4	24.5			80	118.2	84.3	9.5	3.6
70	18.8	1.3 (2.9)	75/63	145.6	115.5	172.8	8.7	16.7	50	1.4 (3.2)	60	132.5	104.8	8.0	4.9
			80/67	155.5	122.4	183.2	8.8	17.7			70	129.8	99.0	8.8	4.3
			85/71	165.2	127.5	193.4	8.8	18.7			80	127.5	93.2	9.7	3.9
	25	2.1 (4.9)	75/63	148.7	116.9	175.1	8.4	17.7		2.3 (5.3)	60	137.1	109.5	8.1	5.0
			80/67	158.9	123.7	185.8	8.4	18.9			70	134.2	103.3	8.9	4.4
			85/71	169.1	128.9	196.4	8.4	20.0			80	131.5	97.1	9.8	4.0
	37.6	1.2 (10.3)	75/63	151.9	121.1	177.5	8.1	18.9		4..8 (11.0)	60	142.9	114.5	8.1	5.2
			80/67	162.5	125.1	188.6	8.1	20.1			70	138.2	107.7	8.9	4.5
			85/71	173.1	130.2	199.6	8.1	21.4			80	135.4	100.9	9.8	4.0
80	18.8	2.1 (2.9)	75/63	138.5	112.6	167.7	9.6	14.5	60	1.3 (3.0)	60	148.8	120.9	8.2	5.3
			80/67	147.9	119.4	177.7	9.6	15.4			70	146.0	114.9	9.0	4.8
			85/71	157.3	124.8	187.6	9.6	16.3			80	143.3	108.6	9.9	4.2
	25	4.3 (4.8)	75/63	141.5	116.2	169.9	9.2	15.4		2.2 (5.1)	60	154.8	126.5	8.3	5.5
			80/67	151.3	120.8	180.1	9.2	16.4			70	151.4	120.2	9.0	4.9
			85/71	161.3	125.2	190.6	9.2	17.5			80	148.2	113.5	10.0	4.4
	37.6	1.2 (9.9)	75/63	144.7	114.4	172.2	8.9	16.3		4.6 (10.6)	60	161.5	132.5	8.3	5.7
			80/67	154.5	122.7	182.4	8.9	17.5			70	157.6	125.7	9.1	5.1
			85/71	165.2	126.6	193.5	8.9	18.7			80	153.2	118.5	10.0	4.5
85	18.8	2.0 (2.8)	75/63	135.1	110.4	165.5	10.0	13.5	70	1.3 (2.9)	60	165.6	137.8	8.4	5.8
			80/67	144.2	118.0	175.1	10.1	14.3			70	162.4	131.4	9.2	5.2
			85/71	153.5	122.7	185.0	10.1	15.2			80	160.1	125.2	10.1	4.7
	25	2.0 (4.7)	75/63	137.9	111.7	167.4	9.7	14.3		2.1 (4.9)	60	173.2	144.6	8.5	6.0
			80/67	147.2	119.8	177.1	9.7	15.2			70	169.3	137.7	9.2	5.4
			85/71	157.1	124.3	187.4	9.7	16.2			80	165.8	130.9	10.1	4.8
	37.6	4.2 (9.8)	75/63	140.8	115.9	169.4	9.3	15.1		4.4 (10.3)	60	181.0	151.6	8.5	6.2
			80/67	150.7	120.6	179.7	9.3	16.2			70	176.6	144.1	9.3	5.6
			85/71	160.7	126.0	190.0	9.3	17.3			80	172.5	136.6	10.2	5.0
90	18.8	1.2 (2.8)	75/63	131.4	108.8	163.1	10.5	12.5	80	1.2 (2.9)	60	183.7	155.7	8.6	6.3
			80/67	140.2	113.9	172.4	10.6	13.3			70	180.0	148.8	9.4	5.6
			85/71	149.6	117.8	182.3	10.6	14.1			80	176.7	142.3	10.3	5.0
	25	2.0 (4.6)	75/63	134.2	110.0	164.9	10.1	13.2		2.1 (4.8)	60	192.3	163.5	8.7	6.5
			80/67	143.3	115.1	174.5	10.2	14.1			70	187.3	156.4	9.5	5.8
			85/71	153.0	122.5	184.6	10.2	15.0			80	183.3	149.0	10.4	5.2
	37.6	4.0 (9.6)	75/63	137.0	111.2	166.8	9.8	14.0		4.3 (9.9)	60	201.2	171.6	8.8	6.7
			80/67	146.5	119.6	176.6	9.8	15.0			70	196.2	163.1	9.5	6.0
			85/71	156.3	124.5	186.8	9.7	16.0			80	191.5	154.7	10.4	5.4
100	18.8	1.2 (2.7)	75/63	124.1	105.4	158.7	11.6	10.7							
			80/67	132.6	110.2	167.8	11.7	11.4							
			85/71	141.3	115.3	177.0	11.7	12.1							
	25	1.9 (4.5)	75/63	126.6	106.6	160.2	11.2	11.3							
			80/67	135.3	112.1	169.3	11.2	12.0							
			85/71	144.8	115.8	179.2	11.3	12.9							
	37.6	4.0 (9.3)	75/63	129.1	108.3	161.6	10.8	11.9							
			80/67	138.3	113.3	171.2	10.8	12.8							
			85/71	148.1	117.2	181.3	10.8	13.7							
110	18.8	1.1 (2.6)	75/63	116.2	102.7	154.5	12.9	9.0							
			80/67	124.5	107.5	163.3	13.0	9.6							
			85/71	132.9	112.3	172.2	13.0	10.2							
	25	1.9 (4.4)	75/63	118.7	103.8	155.7	12.5	9.5							
			80/67	127.4	108.0	164.9	12.5	10.2							
			85/71	136.2	112.6	174.1	12.5	10.9							
	37.6	3.9 (9.1)	75/63	121.1	104.8	157.0	12.1	10.0							
			80/67	130.2	109.1	166.4	12.1	10.8							
			85/71	139.1	114.7	175.6	12.0	11.6							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC151 (5000 CFM) Horizontal & Vertical Configurations

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	18.8	1.4 (3.2)	75/63	155.7	119.3	179.6	7.3	21.4	30	1.6 (3.6)	60	103.6	76.4	7.6	4.0
			80/67	166.2	127.1	190.7	7.4	22.6			70	101.4	71.2	8.4	3.5
			85/71	176.2	131.3	201.3	7.4	23.7			80	99.5	66.0	9.3	3.1
	25	2.3 (5.3)	75/63	160.0	123.9	183.2	7.0	22.9		2.6 (6.0)	60	107.1	79.6	7.7	4.1
			80/67	169.9	128.6	193.7	7.0	24.2			70	104.5	74.2	8.5	3.6
			85/71	180.3	132.9	204.6	7.1	25.5			80	102.3	68.8	9.3	3.2
	37.6	4.8 (11.0)	75/63	163.2	125.9	185.7	6.7	24.5		5.4 (12.6)	60	110.9	83.3	7.7	4.2
			80/67	174.0	129.5	197.1	6.7	25.9			70	108.1	77.6	8.5	3.7
			85/71	184.6	134.5	208.2	6.7	27.4			80	105.5	71.8	9.4	3.3
60	18.8	1.3 (3.0)	75/63	149.5	120.4	174.9	8.0	18.8	40	1.5 (3.5)	60	116.6	89.4	7.8	4.4
			80/67	158.9	124.6	184.9	8.0	19.8			70	114.4	83.8	8.6	3.9
			85/71	168.6	129.3	195.0	8.1	20.9			80	112.4	78.6	9.5	3.5
	25	2.2 (5.1)	75/63	152.9	121.4	177.6	7.6	20.0		2.5 (5.8)	60	121.0	93.2	7.9	4.5
			80/67	162.5	126.0	187.7	7.7	21.2			70	118.4	87.7	8.7	4.0
			85/71	172.3	131.3	198.0	7.7	22.4			80	116.1	82.1	9.5	3.6
	37.6	4.6 (10.6)	75/63	156.2	122.8	180.2	7.3	21.3		5.2 (12.1)	60	126.0	97.9	7.9	4.6
			80/67	166.3	127.2	190.8	7.3	22.7			70	123.1	91.9	8.7	4.1
			85/71	176.8	131.7	201.8	7.4	24.0			80	120.3	86.1	9.6	3.7
70	18.8	1.3 (2.9)	75/63	142.9	117.8	170.0	8.7	16.4	50	1.4 (3.2)	60	134.3	106.4	8.1	4.9
			80/67	151.3	119.4	178.8	8.7	17.3			70	131.8	100.8	8.9	4.4
			85/71	161.6	126.2	189.7	8.8	18.4			80	129.5	95.1	9.7	3.9
	25	2.1 (4.9)	75/63	145.6	118.7	171.9	8.4	17.4		2.3 (5.3)	60	139.2	111.2	8.1	5.0
			80/67	155.5	123.5	182.3	8.4	18.5			70	136.3	105.2	8.9	4.5
			85/71	165.4	127.5	192.7	8.4	19.7			80	133.2	99.0	9.8	4.0
	37.6	4.4 (10.3)	75/63	148.7	120.0	174.3	8.0	18.5		4.8 (11.0)	60	145.0	116.4	8.2	5.2
			80/67	158.6	124.2	184.7	8.0	19.7			70	141.6	110.0	9.0	4.6
			85/71	168.9	128.6	195.3	8.1	21.0			80	137.7	103.3	9.9	4.1
80	18.8	1.2 (2.9)	75/63	134.4	110.6	163.5	9.5	14.1	60	1.3 (3.0)	60	150.9	122.6	8.3	5.3
			80/67	147.4	110.6	177.3	9.6	15.4			70	148.0	116.6	9.1	4.8
			85/71	152.6	116.8	182.8	9.6	15.9			80	145.4	110.6	10.0	4.3
	25	2.1 (4.8)	75/63	137.9	113.3	166.1	9.2	15.0		2.2 (5.1)	60	156.7	128.4	8.3	5.5
			80/67	148.0	120.0	176.7	9.2	16.1			70	153.5	122.0	9.1	4.9
			85/71	153.9	126.0	183.0	9.2	16.7			80	150.5	115.5	10.0	4.4
	37.6	4.3 (9.9)	75/63	141.2	113.9	168.7	8.8	16.0		4.6 (10.6)	60	163.7	134.5	8.4	5.7
			80/67	150.8	121.0	178.7	8.8	17.1			70	159.8	127.6	9.2	5.1
			85/71	161.3	125.7	189.6	8.8	18.3			80	156.2	120.7	10.1	4.5
85	18.8	1.2 (2.8)	75/63	131.3	110.6	161.6	10.0	13.1	70	1.3 (2.9)	60	168.0	139.5	8.5	5.8
			80/67	139.0	116.7	169.8	10.0	13.9			70	164.8	133.1	9.3	5.2
			85/71	147.1	119.0	178.3	10.1	14.6			80	161.9	127.0	10.2	4.7
	25	2.0 (4.7)	75/63	134.0	114.1	163.4	9.6	13.9		2.1 (4.9)	60	175.3	146.5	8.6	6.0
			80/67	146.6	110.8	176.6	9.7	15.2			70	171.6	139.5	9.4	5.4
			85/71	152.0	116.9	182.3	9.7	15.7			80	168.1	132.6	10.3	4.8
	37.6	4.2 (9.8)	75/63	139.5	111.1	168.1	9.3	15.0		4.4 (10.3)	60	183.4	153.7	8.7	6.2
			80/67	147.3	119.8	176.2	9.3	15.9			70	179.0	146.1	9.5	5.5
			85/71	156.9	124.4	186.3	9.3	16.9			80	174.9	138.5	10.4	4.9
90	18.8	1.2 (2.8)	75/63	127.9	108.2	159.4	10.5	12.2	80	1.2 (2.9)	60	186.2	157.4	8.7	6.3
			80/67	135.4	114.4	167.5	10.5	12.9			70	182.6	150.5	9.5	5.6
			85/71	144.0	117.4	176.5	10.6	13.6			80	179.1	143.5	10.4	5.0
	25	2.0 (4.6)	75/63	130.3	110.1	160.9	10.1	12.9		2.1 (4.8)	60	194.6	165.4	8.8	6.5
			80/67	139.4	117.1	170.4	10.1	13.8			70	189.9	158.1	9.6	5.8
			85/71	152.3	101.4	184.1	10.2	15.0			80	185.9	150.6	10.5	5.2
	37.6	4.2 (9.6)	75/63	133.0	108.7	162.8	9.8	13.6		4.3 (9.9)	60	203.8	173.6	8.9	6.7
			80/67	145.7	110.7	176.0	9.8	14.9			70	198.7	165.2	9.7	6.0
			85/71	151.2	116.9	181.7	9.7	15.5			80	194.1	156.7	10.6	5.4
100	18.8	1.2 (2.7)	75/63	120.3	105.0	154.8	11.6	10.4							
			80/67	128.3	109.4	163.3	11.6	11.0							
			85/71	134.9	113.9	170.4	11.7	11.6							
	25	1.9 (4.5)	75/63	122.8	106.2	156.3	11.2	11.0							
			80/67	130.8	111.3	164.7	11.2	11.7							
			85/71	136.5	120.5	170.7	11.2	12.2							
	37.6	4.0 (9.3)	75/63	125.5	107.2	157.9	10.8	11.6							
			80/67	134.0	111.9	166.8	10.8	12.4							
			85/71	140.8	121.3	173.9	10.8	13.1							
110	18.8	1.1 (2.6)	75/63	112.5	101.6	150.7	12.9	8.7							
			80/67	119.9	106.3	158.6	13.0	9.3							
			85/71	128.2	110.3	167.4	13.0	9.9							
	25	1.9 (4.4)	75/63	115.1	102.3	152.1	12.5	9.2							
			80/67	123.1	107.2	160.5	12.5	9.8							
			85/71	130.9	112.0	168.8	12.5	10.5							
	37.6	3.9 (9.1)	75/63	117.5	103.4	153.3	12.1	9.7							
			80/67	125.7	107.9	161.9	12.1	10.4							
			85/71	132.9	116.0	169.4	12.0	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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC180 (6000 CFM) Horizontal & Vertical Configurations

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	22.6	1.9 (4.4)	75/63	183.3	141.0	212.4	8.8	20.8	30	2.2 (5.0)	60	120.7	86.9	9.6	3.7
			80/67	194.9	146.4	224.5	8.9	22.0			70	118.4	81.4	10.4	3.3
			85/71	207.0	151.0	237.2	8.9	23.1			80	116.3	75.8	11.4	3.0
	30	3.2 (7.3)	75/63	186.8	142.8	215.0	8.5	22.0		3.6 (8.4)	60	124.1	90.0	9.6	3.8
			80/67	198.9	147.8	227.7	8.5	23.4			70	121.2	84.3	10.5	3.4
			85/71	211.5	152.3	240.8	8.6	24.7			80	118.8	78.0	11.4	3.1
	45	6.6 (15.2)	75/63	190.5	144.2	218.0	8.1	23.4		7.5 (17.4)	60	127.9	93.6	9.7	3.9
			80/67	203.1	149.2	231.0	8.2	24.9			70	124.7	87.6	10.5	3.5
			85/71	216.2	153.6	244.6	8.2	26.5			80	121.8	80.7	11.5	3.1
60	22.6	1.8 (4.2)	75/63	175.9	138.1	206.6	9.5	18.5	40	2.1 (4.9)	60	134.9	100.6	9.8	4.0
			80/67	187.3	143.0	218.6	9.6	19.5			70	132.4	94.9	10.7	3.6
			85/71	198.8	148.4	230.8	9.7	20.5			80	130.2	88.9	11.6	3.3
	30	3.1 (7.1)	75/63	179.4	139.5	209.3	9.2	19.5		3.5 (8.1)	60	139.3	104.7	9.9	4.1
			80/67	191.2	144.4	221.6	9.2	20.7			70	136.6	98.7	10.7	3.7
			85/71	203.1	150.1	234.1	9.3	21.9			80	133.8	92.3	11.7	3.4
	45	6.4 (14.7)	75/63	183.0	140.9	212.1	8.8	20.7		7.3 (16.8)	60	144.4	109.3	9.9	4.3
			80/67	195.2	145.8	224.8	8.9	22.0			70	141.2	102.9	10.8	3.8
			85/71	207.8	151.0	237.9	8.9	23.4			80	137.8	95.9	11.8	3.4
70	22.6	1.8 (4.1)	75/63	168.4	134.4	201.1	10.4	16.3	50	1.9 (4.4)	60	154.0	119.7	10.1	4.5
			80/67	179.3	139.6	212.7	10.4	17.2			70	152.2	113.6	10.9	4.1
			85/71	190.4	145.4	224.4	10.5	18.1			80	149.2	107.3	12.0	3.7
	30	3.0 (6.8)	75/63	171.7	135.9	203.6	10.0	17.2		3.2 (7.3)	60	159.7	124.4	10.1	4.6
			80/67	182.8	141.9	215.2	10.0	18.2			70	156.1	118.3	11.0	4.2
			85/71	194.5	146.8	227.5	10.1	19.3			80	153.5	111.6	12.0	3.8
	45	6.1 (14.2)	75/63	174.9	138.0	205.9	9.6	18.2		6.6 (15.2)	60	165.5	129.7	10.2	4.8
			80/67	186.6	143.4	218.1	9.7	19.3			70	161.2	123.3	11.1	4.3
			85/71	198.9	148.4	230.8	9.7	20.5			80	158.1	116.2	12.1	3.8
80	22.6	1.7 (4.0)	75/63	160.4	131.7	195.4	11.3	14.3	60	1.8 (4.2)	60	172.7	137.9	10.3	4.9
			80/67	171.1	136.5	206.7	11.3	15.1			70	169.8	131.6	11.2	4.5
			85/71	181.6	142.3	217.9	11.4	15.9			80	167.1	125.1	12.2	4.0
	30	2.9 (6.6)	75/63	163.5	133.2	197.5	10.9	15.0		3.1 (7.1)	60	179.4	143.6	10.4	5.1
			80/67	174.6	137.9	209.2	10.9	16.0			70	175.9	136.7	11.3	4.6
			85/71	185.8	143.2	221.1	11.0	16.9			80	172.3	130.1	12.2	4.1
	45	5.9 (13.7)	75/63	166.9	134.2	200.0	10.5	15.9		6.4 (14.7)	60	186.5	149.9	10.5	5.2
			80/67	178.0	140.0	211.7	10.5	16.9			70	182.4	142.4	11.4	4.7
			85/71	190.1	144.3	224.3	10.6	18.0			80	176.7	134.7	12.3	4.2
85	22.6	1.7 (3.9)	75/63	156.4	130.1	192.6	11.7	13.3	70	1.8 (4.1)	60	193.2	157.8	10.6	5.4
			80/67	166.9	134.6	203.9	11.8	14.1			70	189.7	150.9	11.5	4.9
			85/71	177.2	140.5	214.8	11.9	14.9			80	186.3	144.0	12.5	4.4
	30	2.8 (6.5)	75/63	159.5	131.4	194.7	11.4	14.0		3.0 (6.8)	60	200.5	164.0	10.7	5.5
			80/67	170.4	136.1	206.2	11.4	14.9			70	196.5	156.5	11.6	5.0
			85/71	181.0	142.2	217.5	11.5	15.8			80	192.2	149.3	12.6	4.5
	45	5.9 (13.5)	75/63	162.6	132.9	196.9	11.0	14.8		6.1 (14.2)	60	208.9	171.4	10.8	5.7
			80/67	173.9	137.5	208.7	11.0	15.8			70	204.2	163.2	11.7	5.1
			85/71	185.3	143.0	220.6	11.1	16.8			80	199.7	154.9	12.7	4.6
90	22.6	1.7 (3.9)	75/63	152.6	127.5	190.2	12.3	12.4	80	1.7 (4.0)	60	212.9	177.4	10.9	5.8
			80/67	162.5	133.5	200.8	12.3	13.2			70	208.9	169.7	11.8	5.2
			85/71	173.0	138.1	212.0	12.4	13.9			80	205.1	161.9	12.8	4.7
	30	2.8 (6.4)	75/63	155.5	129.0	192.1	11.9	13.1		2.9 (6.6)	60	222.7	185.5	11.0	5.9
			80/67	166.1	134.2	203.3	11.9	13.9			70	217.9	178.6	11.9	5.4
			85/71	176.5	140.3	214.3	12.0	14.7			80	213.3	170.5	12.9	4.9
	45	5.8 (13.3)	75/63	158.6	130.4	194.2	11.5	13.8		5.9 (13.7)	60	232.4	194.0	11.1	6.1
			80/67	169.5	135.6	205.6	11.5	14.7			70	227.0	184.8	12.0	5.5
			85/71	180.6	141.1	217.3	11.6	15.6			80	221.7	175.6	13.0	5.0
100	22.6	1.6 (3.7)	75/63	144.4	123.9	185.0	13.4	10.8							
			80/67	154.0	129.4	195.3	13.5	11.4							
			85/71	163.9	134.5	205.9	13.6	12.1							
	30	2.7 (6.2)	75/63	147.2	125.2	186.7	13.0	11.3							
			80/67	157.2	130.7	197.3	13.1	12.0							
			85/71	167.5	135.9	208.3	13.1	12.8							
	45	5.6 (12.9)	75/63	150.0	126.4	188.5	12.6	11.9							
			80/67	160.2	132.8	199.2	12.6	12.7							
			85/71	171.1	137.3	210.7	12.7	13.5							
110	22.6	1.6 (3.6)	75/63	135.9	120.2	179.9	14.7	9.3							
			80/67	144.8	126.5	189.5	14.7	9.8							
			85/71	154.2	131.8	199.6	14.8	10.4							
	30	2.6 (6.0)	75/63	138.5	121.4	181.5	14.3	9.7							
			80/67	147.8	127.7	191.3	14.3	10.4							
			85/71	157.6	133.0	201.7	14.3	11.0							
	45	5.4 (12.5)	75/63	141.1	122.5	183.0	13.9	10.2							
			80/67	150.8	128.9	193.2	13.9	10.9							
			85/71	161.3	133.5	204.2	13.9	11.6							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC181 (6000 CFM) Horizontal & Vertical Configurations

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	22.6	1.9 (4.4)	75/63	176.9	137.6	207.7	9.3	18.9	30	2.2 (5.0)	60	123.3	88.1	10.0	3.6
			80/67	187.9	142.9	219.3	9.4	20.0			70	121.0	82.8	10.7	3.3
			85/71	200.0	146.8	232.0	9.5	21.1			80	118.7	77.4	11.6	3.0
	30	3.2 (7.3)	75/63	180.4	139.2	210.5	9.0	20.0		3.6 (8.4)	60	126.8	91.4	10.0	3.7
			80/67	191.9	144.5	222.5	9.0	21.2			70	123.8	85.8	10.8	3.4
			85/71	204.2	149.1	235.3	9.1	22.5			80	121.6	80.2	11.7	3.1
	45	6.6 (15.2)	75/63	183.1	140.4	212.5	8.7	21.1		7.5 (17.4)	60	130.8	95.2	10.0	3.8
			80/67	195.1	145.4	224.9	8.7	22.4			70	127.3	89.3	10.8	3.5
			85/71	208.9	150.2	239.2	8.7	24.0			80	124.1	82.7	11.7	3.1
60	22.6	1.8 (4.2)	75/63	169.2	134.8	201.7	10.1	16.8	40	2.1 (4.9)	60	137.7	102.2	10.1	4.0
			80/67	180.1	139.7	213.2	10.1	17.8			70	135.2	96.7	10.9	3.6
			85/71	191.4	144.7	225.1	10.2	18.8			80	132.5	90.8	11.8	3.3
	30	3.1 (7.1)	75/63	172.6	136.3	204.3	9.7	17.8		3.5 (8.1)	60	142.2	106.4	10.2	4.1
			80/67	183.7	141.9	216.0	9.8	18.8			70	139.4	100.6	11.0	3.7
			85/71	195.5	146.7	228.3	9.8	19.9			80	136.2	94.5	11.9	3.4
	45	6.4 (14.7)	75/63	176.3	137.4	207.3	9.4	18.8		7.3 (16.8)	60	147.4	111.3	10.2	4.2
			80/67	188.3	142.1	219.7	9.4	20.0			70	144.3	105.1	11.0	3.8
			85/71	200.3	147.4	232.2	9.4	21.2			80	140.3	98.3	11.9	3.4
70	22.6	1.8 (4.1)	75/63	160.5	131.9	194.9	10.9	14.8	50	1.9 (4.4)	60	157.1	121.6	10.3	4.5
			80/67	169.2	140.5	204.1	10.9	15.5			70	154.5	116.3	11.2	4.1
			85/71	180.9	136.6	216.6	11.0	16.4			80	151.9	109.6	12.1	3.7
	30	3.0 (6.8)	75/63	166.9	127.5	200.6	10.5	15.8		3.2 (7.3)	60	162.7	126.5	10.4	4.6
			80/67	175.7	137.7	209.9	10.6	16.6			70	159.2	120.3	11.2	4.2
			85/71	186.8	142.9	221.6	10.6	17.6			80	156.3	113.8	12.2	3.8
	45	6.1 (14.2)	75/63	168.1	134.2	200.9	10.2	16.5		6.6 (15.2)	60	168.7	131.9	10.5	4.7
			80/67	179.8	138.7	213.1	10.2	17.6			70	163.5	124.8	11.3	4.2
			85/71	191.3	144.1	225.1	10.2	18.7			80	160.2	117.6	12.2	3.8
80	22.6	1.7 (4.0)	75/63	152.7	127.7	189.4	11.8	13.0	60	1.8 (4.2)	60	175.9	140.0	10.6	4.9
			80/67	161.8	128.8	199.2	11.8	13.7			70	172.8	133.5	11.4	4.4
			85/71	168.9	145.3	206.8	11.9	14.2			80	170.0	127.0	12.4	4.0
	30	2.9 (6.6)	75/63	155.8	129.0	191.6	11.4	13.7		3.1 (7.1)	60	182.6	145.8	10.7	5.0
			80/67	163.2	139.7	199.4	11.4	14.3			70	179.0	138.9	11.5	4.6
			85/71	176.0	134.7	213.0	11.5	15.3			80	174.5	131.8	12.5	4.1
	45	5.9 (13.7)	75/63	157.6	127.9	192.6	11.0	14.3		6.4 (14.7)	60	189.8	152.3	10.7	5.2
			80/67	167.8	139.9	203.2	11.1	15.2			70	185.6	144.8	11.6	4.7
			85/71	176.6	148.9	212.4	11.1	16.0			80	180.2	136.8	12.6	4.2
85	22.6	1.7 (3.9)	75/63	148.6	125.8	186.6	12.2	12.1	70	1.8 (4.1)	60	196.2	159.9	10.8	5.3
			80/67	157.6	126.8	196.2	12.3	12.8			70	192.6	153.0	11.7	4.8
			85/71	166.7	133.5	205.9	12.4	13.5			80	189.2	146.0	12.7	4.4
	30	2.8 (6.5)	75/63	151.9	126.6	189.0	11.9	12.8		3.0 (6.8)	60	203.9	166.3	10.9	5.5
			80/67	160.9	128.2	198.6	11.9	13.5			70	199.7	158.7	11.8	5.0
			85/71	168.4	144.7	206.4	12.0	14.1			80	195.4	151.5	12.8	4.5
	45	5.9 (13.5)	75/63	155.0	128.0	191.2	11.5	13.5		6.1 (14.2)	60	212.4	174.0	11.1	5.6
			80/67	162.6	138.8	199.1	11.5	14.1			70	207.6	165.7	11.9	5.1
			85/71	175.9	133.2	213.1	11.6	15.2			80	202.9	157.3	12.9	4.6
90	22.6	1.7 (3.9)	75/63	142.7	122.6	182.0	12.8	11.2	80	1.7 (4.0)	60	216.6	179.5	11.1	5.7
			80/67	149.9	137.3	189.7	12.8	11.7			70	212.5	171.8	12.0	5.2
			85/71	162.3	130.9	203.0	12.9	12.6			80	208.6	164.0	13.0	4.7
	30	2.8 (6.4)	75/63	147.7	124.8	186.0	12.4	11.9		2.9 (6.6)	60	226.2	187.9	11.3	5.9
			80/67	153.9	137.5	192.7	12.4	12.4			70	220.2	180.2	12.2	5.3
			85/71	165.5	133.7	205.0	12.5	13.2			80	215.6	171.9	13.1	4.8
	45	5.8 (13.3)	75/63	150.5	126.5	187.9	12.0	12.5		5.9 (13.7)	60	236.0	196.7	11.4	6.1
			80/67	159.9	127.7	197.8	12.1	13.3			70	230.5	187.4	12.3	5.5
			85/71	167.6	144.3	205.9	12.1	13.9			80	225.1	178.2	13.3	5.0
100	22.6	5.8 (3.7)	75/63	135.8	119.9	178.1	13.9	9.8							
			80/67	141.0	134.0	183.8	13.9	10.1							
			85/71	159.6	107.1	203.7	14.1	11.3							
	30	2.7 (6.2)	75/63	138.8	121.3	180.1	13.5	10.3							
			80/67	147.9	127.6	189.8	13.6	10.9							
			85/71	151.1	140.3	193.3	13.6	11.1							
	45	5.6 (12.9)	75/63	141.4	122.9	181.7	13.1	10.8							
			80/67	150.3	124.1	191.2	13.2	11.4							
			85/71	159.5	131.0	200.9	13.2	12.1							
110	22.6	1.6 (3.6)	75/63	127.3	116.1	173.1	15.2	8.4							
			80/67	136.9	119.5	183.4	15.2	9.0							
			85/71	136.7	135.6	183.5	15.2	9.0							
	30	2.6 (6.0)	75/63	129.6	118.1	174.3	14.8	8.8							
			80/67	138.7	123.5	183.9	14.8	9.4							
			85/71	140.8	136.9	186.4	14.8	9.5							
	45	5.4 (12.5)	75/63	132.4	118.7	176.1	14.4	9.2							
			80/67	140.7	120.6	184.9	14.4	9.8							
			85/71	156.2	106.7	201.2	14.5	10.8							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC210 (7000 CFM) Horizontal & Vertical Configurations

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	26.2	2.1 (4.9)	75/63	233.5	175.0	272.3	12.0	19.5	30	2.4 (5.6)	60	153.3	111.1	11.9	3.8
			80/67	248.9	180.3	289.0	12.2	20.4			70	152.2	104.7	13.0	3.4
			85/71	264.8	185.7	306.1	12.4	21.3			80	150.3	99.0	14.3	3.1
	35	3.6 (8.3)	75/63	238.7	177.0	276.4	11.5	20.8		4.1 (9.5)	60	158.5	116.3	12.0	3.9
			80/67	254.8	186.8	293.6	11.7	21.9			70	156.4	109.5	13.1	3.5
			85/71	271.5	192.6	311.4	11.8	22.9			80	154.9	103.4	14.4	3.2
	52.6	7.5 (17.3)	75/63	244.2	179.2	280.6	10.9	22.4		8.6 (19.8)	60	164.9	122.2	12.1	4.0
			80/67	260.7	190.2	298.0	11.1	23.6			70	162.3	115.1	13.3	3.6
			85/71	278.6	195.2	317.0	11.2	24.8			80	160.7	108.6	14.5	3.3
60	26.2	2.1 (4.8)	75/63	224.5	170.5	265.7	13.0	17.3	40	2.4 (5.4)	60	171.9	128.7	12.3	4.1
			80/67	239.4	176.1	281.8	13.2	18.2			70	170.3	122.5	13.4	3.7
			85/71	254.1	182.9	297.6	13.4	19.0			80	169.5	116.2	14.7	3.4
	35	3.5 (8.0)	75/63	229.5	172.7	269.4	12.4	18.5		4.0 (9.2)	60	179.0	135.5	12.4	4.2
			80/67	244.6	179.5	285.6	12.6	19.4			70	176.7	128.9	13.6	3.8
			85/71	260.6	185.3	302.6	12.8	20.4			80	175.0	121.8	14.8	3.5
	52.6	7.2 (16.7)	75/63	234.8	174.8	273.5	11.9	19.8		8.3 (19.1)	60	187.4	143.3	12.6	4.4
			80/67	250.6	182.0	290.2	12.0	20.9			70	184.6	136.1	13.7	3.9
			85/71	267.3	187.9	308.0	12.2	22.0			80	181.9	128.5	15.0	3.6
70	26.2	2.0 (4.6)	75/63	215.1	166.1	258.9	14.0	15.3	50	2.1 (4.9)	60	198.9	154.3	12.9	4.5
			80/67	229.2	172.1	274.1	14.2	16.1			70	196.1	147.4	14.0	4.1
			85/71	243.8	177.6	289.9	14.4	16.9			80	194.2	140.4	15.3	3.7
	35	3.4 (7.8)	75/63	219.9	168.2	262.4	13.5	16.3		3.6 (8.3)	60	207.2	162.2	13.0	4.7
			80/67	234.7	174.3	278.2	13.7	17.2			70	204.2	154.7	14.2	4.2
			85/71	250.0	180.0	294.6	13.8	18.1			80	201.4	147.1	15.4	3.8
	52.6	7.0 (16.2)	75/63	224.6	171.3	265.7	12.9	17.4		7.5 (17.3)	60	216.9	171.1	13.2	4.8
			80/67	240.4	176.6	282.5	13.1	18.4			70	212.5	162.7	14.4	4.3
			85/71	256.5	182.6	299.6	13.2	19.4			80	208.9	154.4	15.6	3.9
80	26.2	1.9 (4.5)	75/63	205.2	161.9	251.9	15.2	13.5	60	2.1 (4.8)	60	223.8	177.9	13.4	4.9
			80/67	218.6	167.9	266.5	15.4	14.2			70	220.8	170.2	14.6	4.4
			85/71	232.1	174.7	281.2	15.6	14.9			80	217.9	162.5	15.8	4.0
	35	3.3 (7.5)	75/63	209.8	164.0	255.1	14.6	14.3		3.5 (8.0)	60	233.8	187.3	13.6	5.0
			80/67	223.5	171.0	269.9	14.8	15.1			70	230.0	179.0	14.8	4.6
			85/71	238.5	175.8	286.0	15.0	15.9			80	226.4	170.5	16.0	4.1
	52.6	6.8 (15.6)	75/63	214.6	166.0	258.5	14.1	15.3		7.2 (16.7)	60	245.5	198.0	13.9	5.2
			80/67	229.1	173.2	273.9	14.2	16.1			70	240.6	188.7	15.0	4.7
			85/71	244.4	179.3	290.2	14.3	17.1			80	235.5	179.1	16.3	4.2
85	26.2	1.9 (4.4)	75/63	200.1	159.6	248.5	15.8	12.6	70	2.0 (4.6)	60	249.9	202.7	14.0	5.3
			80/67	212.9	166.6	262.4	16.0	13.3			70	246.1	194.2	15.1	4.8
			85/71	226.8	171.3	277.5	16.2	14.0			80	242.4	185.5	16.4	4.3
	35	3.2 (7.4)	75/63	204.6	161.6	251.5	15.3	13.4		3.4 (7.8)	60	262.0	213.9	14.2	5.4
			80/67	218.4	167.7	266.4	15.4	14.2			70	257.3	204.5	15.4	4.9
			85/71	232.2	174.8	281.2	15.6	14.9			80	252.7	195.0	16.7	4.4
	52.6	6.7 (15.4)	75/63	209.4	163.6	254.8	14.7	14.3		7.0 (16.2)	60	275.5	226.2	14.5	5.6
			80/67	223.8	169.9	270.2	14.8	15.1			70	269.6	215.8	15.7	5.0
			85/71	238.8	175.8	286.2	14.9	16.0			80	263.9	205.2	17.0	4.6
90	26.2	1.9 (4.3)	75/63	194.9	157.5	245.0	16.5	11.8	80	1.9 (4.5)	60	277.4	228.9	14.6	5.6
			80/67	207.8	163.4	259.1	16.7	12.4			70	272.6	219.5	15.8	5.1
			85/71	220.9	169.3	273.4	16.9	13.1			80	268.4	210.5	17.1	4.6
	35	3.2 (7.3)	75/63	199.0	160.3	247.6	15.9	12.5		3.3 (7.5)	60	290.8	241.1	14.8	5.7
			80/67	212.4	166.6	262.0	16.1	13.2			70	285.0	230.6	16.0	5.2
			85/71	226.2	172.5	276.9	16.2	13.9			80	279.5	220.5	17.3	4.7
	52.6	6.6 (15.2)	75/63	203.6	162.2	250.7	15.3	13.3		6.8 (15.6)	60	306.6	255.6	15.2	5.9
			80/67	217.7	168.5	265.7	15.5	14.1			70	299.4	243.8	16.3	5.4
			85/71	232.6	173.7	281.7	15.6	14.9			80	292.5	232.3	17.6	4.9
100	26.2	1.8 (4.2)	75/63	184.2	153.8	238.2	18.0	10.3							
			80/67	196.2	160.1	251.4	18.2	10.8							
			85/71	208.5	166.1	264.9	18.4	11.4							
	35	3.1 (7.1)	75/63	188.3	155.7	240.7	17.4	10.9							
			80/67	201.2	161.2	254.7	17.5	11.5							
			85/71	213.6	168.8	268.0	17.7	12.1							
	52.6	6.4 (14.7)	75/63	192.8	156.9	243.6	16.8	11.5							
			80/67	205.8	164.0	257.6	16.9	12.2							
			85/71	219.4	170.4	272.1	17.0	12.9							
110	26.2	1.8 (4.1)	75/63	173.4	149.4	232.1	19.6	8.8							
			80/67	185.1	154.6	245.0	19.8	9.3							
			85/71	196.3	161.7	257.4	20.0	9.8							
	35	3.0 (6.9)	75/63	177.2	150.7	234.1	19.0	9.3							
			80/67	189.4	156.5	247.4	19.2	9.9							
			85/71	201.8	162.6	260.9	19.3	10.4							
	52.6	6.2 (14.3)	75/63	181.3	152.6	236.5	18.4	9.9							
			80/67	194.1	158.2	250.3	18.5	10.5							
			85/71	206.6	165.4	263.6	18.6	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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC240 (8000 CFM) Horizontal & Vertical Configurations

Cooling

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
50	30	1.7 (3.9)	75/63	269.0	198.4	312.2	13.2	20.3
			80/67	285.7	205.5	330.5	13.5	21.1
			85/71	303.4	210.6	350.1	13.9	21.8
	40	2.8 (6.5)	75/63	274.1	201.7	316.0	12.6	21.7
			80/67	291.9	207.8	335.4	12.9	22.6
			85/71	310.0	214.3	355.1	13.3	23.4
	60	5.9 (13.6)	75/63	280.0	204.0	320.5	12.0	23.3
			80/67	298.5	210.1	340.6	12.3	24.2
			85/71	317.1	217.3	360.8	12.6	25.2
60	30	1.6 (3.8)	75/63	258.3	194.5	304.2	14.3	18.0
			80/67	274.9	200.5	322.4	14.7	18.7
			85/71	291.9	206.1	341.2	15.0	19.4
	40	2.7 (6.3)	75/63	263.7	196.8	308.2	13.8	19.2
			80/67	281.0	202.8	327.1	14.1	20.0
			85/71	298.7	208.7	346.4	14.4	20.8
	60	5.7 (13.1)	75/63	269.3	199.1	312.5	13.2	20.5
			80/67	287.4	205.2	332.0	13.4	21.4
			85/71	305.8	211.4	352.0	13.7	22.3
70	30	1.6 (3.6)	75/63	247.5	189.5	296.4	15.6	15.9
			80/67	263.6	195.4	314.2	15.9	16.6
			85/71	279.8	201.6	332.0	16.3	17.2
	40	2.6 (6.1)	75/63	252.8	191.8	300.2	15.0	16.9
			80/67	269.1	198.9	318.0	15.3	17.6
			85/71	285.9	205.3	336.4	15.6	18.4
	60	5.5 (12.7)	75/63	258.3	193.9	304.2	14.4	18.0
			80/67	275.1	201.5	322.5	14.6	18.8
			85/71	292.8	207.9	341.7	14.9	19.7
80	30	1.5 (3.5)	75/63	236.5	184.3	288.9	17.0	13.9
			80/67	251.8	190.5	305.8	17.3	14.6
			85/71	266.8	198.1	322.4	17.6	15.2
	40	2.6 (5.9)	75/63	241.5	186.4	292.3	16.4	14.8
			80/67	257.5	192.9	309.8	16.6	15.5
			85/71	273.2	200.4	327.0	16.9	16.2
	60	5.3 (12.3)	75/63	246.7	188.5	296.0	15.7	15.7
			80/67	263.3	195.3	314.0	15.9	16.5
			85/71	279.9	202.8	331.9	16.2	17.3
85	30	1.5 (3.5)	75/63	230.5	182.5	284.7	17.7	13.0
			80/67	245.7	188.2	301.6	18.0	13.6
			85/71	260.4	195.5	317.9	18.3	14.2
	40	2.5 (5.8)	75/63	235.4	184.6	288.0	17.1	13.8
			80/67	250.8	191.5	304.9	17.3	14.5
			85/71	266.6	198.0	322.3	17.6	15.1
	60	5.2 (12.1)	75/63	240.4	186.9	291.4	16.4	14.6
			80/67	256.6	193.8	308.9	16.7	15.4
			85/71	273.6	199.2	327.5	16.9	16.2
90	30	1.5 (3.4)	75/63	224.9	179.2	281.4	18.5	12.1
			80/67	239.1	186.8	297.0	18.8	12.7
			85/71	254.5	194.1	314.1	19.1	13.3
	40	2.5 (5.7)	75/63	229.7	181.3	284.4	17.9	12.8
			80/67	244.6	188.8	300.7	18.1	13.5
			85/71	260.0	195.3	317.6	18.4	14.1
	60	5.2 (11.9)	75/63	234.6	183.4	287.6	17.2	13.6
			80/67	250.6	190.1	304.9	17.4	14.4
			85/71	266.2	198.0	322.0	17.7	15.1
100	30	1.4 (3.3)	75/63	212.3	176.0	273.4	20.3	10.5
			80/67	225.8	183.3	288.3	20.6	11.0
			85/71	240.1	190.5	304.2	20.9	11.5
	40	2.4 (5.6)	75/63	216.9	177.7	276.0	19.6	11.1
			80/67	232.4	184.1	293.1	19.9	11.7
			85/71	247.2	190.7	309.4	20.1	12.3
	60	5.0 (11.6)	75/63	221.8	178.9	279.2	18.9	11.7
			80/67	236.9	185.9	295.6	19.1	12.4
			85/71	253.0	193.5	313.1	19.3	13.1
110	30	1.4 (3.2)	75/63	200.4	170.9	267.0	22.3	9.0
			80/67	213.6	177.1	281.9	22.6	9.5
			85/71	226.8	184.0	296.6	22.9	9.9
	40	2.3 (5.4)	75/63	204.8	172.6	269.4	21.6	9.5
			80/67	219.0	178.0	285.0	21.8	10.0
			85/71	232.3	186.1	299.8	22.0	10.5
	60	4.9 (11.2)	75/63	209.6	173.1	272.4	20.9	10.0
			80/67	223.3	181.6	287.2	21.0	10.6
			85/71	237.5	189.5	302.6	21.2	11.2

Heating

Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
30	1.9 (4.5)	60	177.9	130.1	13.6	3.9
		70	175.6	122.6	14.9	3.5
		80	173.9	115.1	16.4	3.1
	3.2 (7.5)	60	184.3	135.7	13.7	4.0
		70	180.5	127.3	15.0	3.5
		80	178.7	119.3	16.5	3.2
	6.7 (15.5)	60	191.3	142.1	13.8	4.1
		70	186.7	132.9	15.1	3.6
		80	184.2	124.4	16.6	3.3
40	1.9 (4.3)	60	200.3	151.1	14.0	4.2
		70	197.6	143.4	15.4	3.8
		80	195.2	135.1	16.9	3.4
	3.1 (7.2)	60	208.1	158.2	14.2	4.3
		70	205.0	150.0	15.5	3.9
		80	201.7	141.1	17.1	3.5
	6.5 (15.0)	60	217.2	166.4	14.4	4.4
		70	213.5	157.5	15.7	4.0
		80	209.0	147.8	17.2	3.6
50	1.7 (3.9)	60	230.7	180.2	14.7	4.6
		70	227.7	172.4	16.1	4.2
		80	224.9	163.0	17.6	3.7
	2.8 (6.5)	60	240.0	188.4	14.9	4.7
		70	235.9	179.4	16.3	4.3
		80	232.5	170.1	17.8	3.8
	5.9 (13.6)	60	250.4	197.5	15.1	4.9
		70	244.0	187.2	16.5	4.3
		80	240.9	177.9	18.0	3.9
60	1.6 (3.8)	60	259.3	207.0	15.3	5.0
		70	255.5	197.8	16.7	4.5
		80	252.2	189.4	18.3	4.0
	2.7 (6.3)	60	270.4	216.9	15.6	5.1
		70	265.5	207.1	17.0	4.6
		80	260.3	196.6	18.5	4.1
	5.7 (13.1)	60	282.8	227.6	15.9	5.2
		70	277.2	216.6	17.3	4.7
		80	270.3	205.1	18.8	4.2
70	1.6 (3.6)	60	288.9	235.6	16.1	5.3
		70	284.4	225.6	17.5	4.8
		80	280.2	215.3	19.1	4.3
	2.6 (6.1)	60	302.6	246.9	16.4	5.4
		70	296.8	236.2	17.8	4.9
		80	291.6	225.0	19.4	4.4
	5.5 (12.7)	60	317.2	259.2	16.8	5.5
		70	310.5	246.8	18.2	5.0
		80	304.1	234.6	19.7	4.5
80	1.5 (3.5)	60	320.5	264.7	16.9	5.6
		70	315.0	253.6	18.3	5.0
		80	310.7	242.5	19.9	4.6
	2.6 (5.9)	60	336.2	278.0	17.3	5.7
		70	328.4	266.6	18.7	5.1
		80	323.3	255.1	20.3	4.7
	5.3 (12.3)	60	352.9	291.7	17.8	5.8
		70	345.0	278.0	19.2	5.3
		80	337.4	264.2	20.8	4.8

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC242 (8000 CFM) Horizontal & Vertical Configurations

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	30	1.7 (3.9)	75/63	262.0	195.2	305.2	13.2	19.9	30	1.9 (4.5)	60	177.8	130.2	13.5	3.9
			80/67	277.4	199.5	322.2	13.5	20.6			70	175.4	122.8	14.8	3.5
			85/71	296.0	207.6	342.5	13.9	21.4			80	173.5	115.3	16.2	3.1
	40	2.8 (6.5)	75/63	267.6	197.0	309.6	12.6	21.2		3.2 (7.5)	60	184.1	135.8	13.6	4.0
			80/67	283.5	201.8	326.9	12.9	22.0			70	180.4	127.4	14.9	3.6
			85/71	303.2	209.1	348.4	13.2	22.9			80	178.1	119.5	16.4	3.2
	60	5.9 (13.6)	75/63	273.3	199.3	313.9	12.0	22.7		6.7 (15.5)	60	191.1	142.2	13.7	4.1
			80/67	290.0	204.0	332.0	12.3	23.6			70	186.5	133.0	15.0	3.6
			85/71	309.8	212.8	353.4	12.6	24.6			80	183.7	124.6	16.5	3.3
60	30	1.6 (3.8)	75/63	251.6	190.6	297.4	14.3	17.6	40	1.9 (4.3)	60	200.1	151.2	13.9	4.2
			80/67	266.3	195.3	313.7	14.6	18.3			70	197.4	143.4	15.3	3.8
			85/71	284.4	203.4	333.5	15.0	19.0			80	194.9	135.2	16.8	3.4
	40	2.7 (6.3)	75/63	255.5	191.1	299.9	13.7	18.6		3.1 (7.2)	60	207.9	158.2	14.1	4.3
			80/67	273.7	199.5	319.7	14.0	19.5			70	204.8	150.0	15.5	3.9
			85/71	291.0	205.9	338.5	14.3	20.3			80	201.4	141.2	16.9	3.5
	60	5.7 (13.1)	75/63	261.0	193.3	304.1	13.1	19.9		6.5 (15.0)	60	217.0	166.4	14.3	4.5
			80/67	279.8	202.0	324.4	13.4	20.9			70	213.2	157.5	15.6	4.0
			85/71	298.0	208.3	344.0	13.7	21.8			80	208.7	147.8	17.1	3.6
70	30	1.6 (3.6)	75/63	239.7	183.6	288.5	15.5	15.4	50	1.7 (3.9)	60	230.5	180.1	14.6	4.6
			80/67	256.5	192.6	306.9	15.9	16.2			70	227.4	172.4	16.0	4.2
			85/71	272.4	198.8	324.4	16.2	16.8			80	224.5	163.0	17.5	3.8
	40	2.6 (6.1)	75/63	244.7	185.8	292.1	15.0	16.4		2.8 (6.5)	60	239.7	188.3	14.8	4.7
			80/67	262.2	194.9	311.0	15.2	17.2			70	235.6	179.3	16.2	4.3
			85/71	278.8	201.2	329.2	15.5	18.0			80	232.2	170.1	17.7	3.8
	60	5.5 (12.7)	75/63	250.1	187.9	296.0	14.4	17.4		5.9 (13.6)	60	250.0	197.3	15.0	4.9
			80/67	268.1	197.2	315.4	14.6	18.4			70	243.7	187.0	16.4	4.4
			85/71	286.0	202.6	334.9	14.9	19.2			80	240.5	177.8	17.9	3.9
80	30	1.5 (3.5)	75/63	229.7	181.1	282.0	16.9	13.6	60	1.6 (3.8)	60	258.9	206.9	15.3	5.0
			80/67	244.7	187.8	298.5	17.2	14.2			70	255.2	197.7	16.7	4.5
			85/71	259.3	195.8	314.6	17.5	14.8			80	251.7	189.2	18.2	4.1
	40	2.6 (5.9)	75/63	234.5	183.3	285.3	16.3	14.4		2.7 (6.3)	60	270.0	216.6	15.5	5.1
			80/67	250.2	190.0	302.4	16.6	15.1			70	265.1	206.9	16.9	4.6
			85/71	266.0	196.6	319.7	16.9	15.8			80	259.8	196.3	18.5	4.1
	60	5.3 (12.3)	75/63	239.5	185.4	288.7	15.7	15.2		5.7 (13.1)	60	282.4	227.3	15.8	5.2
			80/67	255.9	192.3	306.4	15.9	16.1			70	276.7	216.3	17.2	4.7
			85/71	272.6	198.7	324.6	16.2	16.9			80	269.8	204.8	18.7	4.2
85	30	1.5 (3.5)	75/63	224.0	178.7	278.2	17.7	12.7	70	1.6 (3.6)	60	288.5	235.3	16.0	5.3
			80/67	238.8	185.0	294.5	18.0	13.3			70	283.9	225.3	17.4	4.8
			85/71	253.7	191.4	311.1	18.3	13.9			80	279.7	215.1	19.0	4.3
	40	2.5 (5.8)	75/63	228.7	180.7	281.3	17.1	13.4		2.6 (6.1)	60	302.1	246.5	16.3	5.4
			80/67	244.0	187.5	298.1	17.3	14.1			70	296.2	235.8	17.8	4.9
			85/71	259.1	195.4	314.5	17.6	14.8			80	291.0	224.6	19.3	4.4
	60	5.2 (12.1)	75/63	233.6	182.8	284.6	16.4	14.2		5.5 (12.7)	60	316.5	258.6	16.7	5.6
			80/67	249.5	189.9	301.9	16.7	15.0			70	309.8	246.3	18.1	5.0
			85/71	265.9	196.3	319.7	16.9	15.8			80	303.4	234.1	19.7	4.5
90	30	1.5 (3.4)	75/63	218.2	176.1	274.5	18.5	11.8	80	1.5 (3.5)	60	319.9	264.2	16.9	5.6
			80/67	232.5	182.8	290.3	18.8	12.4			70	314.4	253.1	18.3	5.0
			85/71	247.1	189.1	306.6	19.1	13.0			80	310.1	243.2	19.9	4.6
	40	2.5 (5.7)	75/63	222.8	178.1	277.4	17.9	12.5		2.6 (5.9)	60	335.5	277.4	17.3	5.7
			80/67	237.8	184.7	293.9	18.1	13.1			70	327.7	266.1	18.7	5.1
			85/71	253.0	191.4	310.5	18.4	13.8			80	322.5	254.6	20.3	4.7
	60	5.2 (11.9)	75/63	227.6	180.2	280.6	17.2	13.2		5.3 (12.3)	60	352.1	291.0	17.8	5.8
			80/67	243.2	187.1	297.5	17.4	14.0			70	344.1	277.2	19.2	5.3
			85/71	259.1	193.7	314.8	17.6	14.7			80	336.5	263.5	20.7	4.8
100	30	1.4 (3.3)	75/63	206.7	171.2	267.8	20.3	10.2							
			80/67	219.9	177.9	282.4	20.5	10.7							
			85/71	239.7	171.9	304.3	20.9	11.5							
	40	2.4 (5.6)	75/63	210.7	174.0	269.9	19.6	10.7							
			80/67	224.9	179.8	285.5	19.8	11.4							
			85/71	237.6	184.1	299.6	20.0	11.9							
	60	5.0 (11.6)	75/63	214.9	176.7	272.2	18.9	11.4							
			80/67	230.5	180.7	289.3	19.1	12.1							
			85/71	245.7	187.3	305.8	19.3	12.7							
110	30	1.4 (3.2)	75/63	194.0	165.8	260.7	22.3	8.7							
			80/67	208.1	170.6	276.4	22.6	9.2							
			85/71	219.0	181.6	288.4	22.8	9.6							
	40	2.3 (5.4)	75/63	197.3	169.4	261.8	21.6	9.1							
			80/67	211.4	176.0	277.3	21.8	9.7							
			85/71	232.2	165.8	300.2	22.1	10.5							
	60	4.9 (11.2)	75/63	202.1	171.1	264.7	20.9	9.7							
			80/67	213.8	181.9	277.6	21.0	10.2							
			85/71	227.0	191.4	292.0	21.2	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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC300 (10000 CFM) Horizontal & Vertical Configurations

Cooling

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
50	37.6	2.5 (5.9)	75/63	323.5	238.4	385.2	18.7	17.3
			80/67	343.9	244.4	407.6	19.1	18.0
			85/71	363.9	252.1	429.6	19.5	18.6
	50	4.2 (9.8)	75/63	330.2	241.3	390.3	18.1	18.3
			80/67	351.3	247.8	413.3	18.4	19.1
			85/71	372.5	254.5	436.4	18.8	19.8
	75	8.8 (20.3)	75/63	337.2	244.1	395.8	17.4	19.4
			80/67	359.0	251.2	419.3	17.7	20.3
			85/71	381.7	259.7	443.8	18.1	21.1
60	37.6	2.5 (5.7)	75/63	310.8	232.7	375.8	20.0	15.5
			80/67	330.5	239.0	397.5	20.5	16.2
			85/71	350.5	245.6	419.5	20.9	16.8
	50	4.1 (9.5)	75/63	317.4	235.6	380.7	19.3	16.4
			80/67	337.6	242.8	402.7	19.7	17.1
			85/71	357.9	250.5	424.8	20.1	17.8
	75	8.5 (19.6)	75/63	324.2	238.6	385.8	18.6	17.4
			80/67	345.5	245.1	408.8	19.0	18.2
			85/71	366.5	253.3	431.5	19.3	19.0
70	37.6	2.4 (5.5)	75/63	299.3	227.5	368.5	21.6	13.8
			80/67	316.3	233.8	387.3	22.0	14.4
			85/71	336.7	243.6	409.8	22.4	15.0
	50	4.0 (9.1)	75/63	305.7	230.2	373.0	20.9	14.7
			80/67	323.6	236.3	392.6	21.2	15.3
			85/71	344.7	246.5	415.6	21.6	16.0
	75	8.2 (19.0)	75/63	310.7	232.1	375.9	20.1	15.5
			80/67	330.6	240.3	397.5	20.4	16.2
			85/71	353.1	249.6	421.7	20.7	17.0
80	37.6	2.3 (5.3)	75/63	285.5	221.3	359.5	23.4	12.2
			80/67	302.1	226.9	377.9	23.7	12.7
			85/71	321.4	237.9	399.3	24.2	13.3
	50	3.8 (8.9)	75/63	289.9	223.2	361.6	22.5	12.9
			80/67	308.4	231.1	381.9	22.9	13.5
			85/71	329.1	240.8	404.5	23.3	14.1
	75	8.0 (18.4)	75/63	296.6	225.5	366.1	21.7	13.6
			80/67	317.1	235.9	388.4	22.1	14.4
			85/71	337.2	243.8	410.2	22.4	15.1
85	37.6	2.3 (5.2)	75/63	277.8	219.7	354.3	24.3	11.4
			80/67	295.4	227.3	373.9	24.7	12.0
			85/71	313.5	235.0	394.0	25.2	12.5
	50	3.8 (8.7)	75/63	282.8	219.8	357.0	23.5	12.1
			80/67	302.3	230.1	378.3	23.8	12.7
			85/71	321.6	236.5	399.7	24.2	13.3
	75	7.8 (18.1)	75/63	289.3	222.0	361.3	22.7	12.8
			80/67	309.3	232.9	383.0	23.0	13.5
			85/71	329.0	240.8	404.4	23.3	14.1
90	37.6	2.2 (5.1)	75/63	269.7	213.7	349.0	25.3	10.6
			80/67	287.8	224.3	369.2	25.8	11.2
			85/71	305.4	232.2	388.8	26.2	11.7
	50	3.7 (8.6)	75/63	275.6	216.2	352.7	24.5	11.3
			80/67	294.5	227.0	373.3	24.8	11.9
			85/71	313.0	234.8	393.7	25.2	12.4
	75	7.7 (17.8)	75/63	281.4	219.5	356.1	23.6	11.9
			80/67	301.4	229.7	377.7	24.0	12.6
			85/71	320.6	237.7	398.7	24.3	13.2
100	37.6	2.2 (5.0)	75/63	254.5	207.7	340.3	27.6	9.2
			80/67	272.5	217.1	360.3	28.0	9.7
			85/71	289.5	224.3	379.4	28.5	10.2
	50	3.6 (8.3)	75/63	261.1	208.3	344.5	26.7	9.8
			80/67	278.5	220.5	363.6	27.1	10.3
			85/71	295.6	230.0	382.4	27.4	10.8
	75	7.5 (17.3)	75/63	267.1	215.1	348.0	25.9	10.3
			80/67	285.1	223.2	367.5	26.1	10.9
			85/71	303.5	231.2	387.7	26.4	11.5
110	37.6	2.1 (4.8)	75/63	239.8	203.1	333.1	30.2	7.9
			80/67	255.9	212.4	351.2	30.6	8.4
			85/71	271.4	218.1	368.8	31.0	8.8
	50	3.5 (8.1)	75/63	244.8	205.7	335.5	29.3	8.4
			80/67	260.8	214.1	353.3	29.6	8.8
			85/71	277.7	217.1	372.1	30.0	9.3
	75	7.3 (16.8)	75/63	250.6	207.8	338.6	28.4	8.8
			80/67	267.0	217.5	356.4	28.6	9.3
			85/71	282.7	229.7	373.8	28.9	9.8

Heating

Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
30	2.9 (6.7)	60	228.9	162.0	18.9	3.6
		70	224.7	152.6	20.6	3.2
		80	222.5	143.0	22.5	2.9
	4.8 (11.2)	60	235.9	168.3	19.1	3.6
		70	231.0	158.4	20.8	3.3
		80	228.3	148.4	22.7	3.0
	10.0 (23.2)	60	243.9	175.3	19.3	3.7
		70	238.0	164.9	21.0	3.3
		80	234.7	154.2	22.8	3.0
40	2.8 (6.5)	60	255.5	186.6	19.6	3.8
		70	251.1	177.0	21.3	3.5
		80	247.4	166.3	23.2	3.1
	4.7 (10.8)	60	264.5	194.6	19.8	3.9
		70	260.4	184.1	21.5	3.6
		80	254.6	172.7	23.4	3.2
	9.7 (22.4)	60	274.9	203.6	20.0	4.0
		70	270.0	192.3	21.8	3.6
		80	262.6	179.0	23.7	3.3
50	2.5 (5.9)	60	291.1	221.2	20.5	4.2
		70	287.2	210.5	22.3	3.8
		80	283.8	199.6	24.3	3.4
	4.2 (9.8)	60	302.8	229.9	20.8	4.3
		70	296.5	219.1	22.5	3.9
		80	292.3	207.5	24.5	3.5
	8.8 (20.3)	60	314.4	239.7	21.1	4.4
		70	306.7	228.4	22.8	3.9
		80	301.5	215.7	24.8	3.6
60	2.5 (5.7)	60	325.6	253.2	21.4	4.5
		70	321.0	241.6	23.2	4.1
		80	316.8	229.9	25.3	3.7
	4.1 (9.5)	60	337.8	264.5	21.8	4.6
		70	332.2	252.0	23.6	4.1
		80	327.1	239.3	25.6	3.8
	8.5 (19.6)	60	353.4	275.0	22.1	4.7
		70	344.4	263.0	23.9	4.2
		80	338.1	249.2	25.9	3.8
70	2.4 (5.5)	60	363.2	287.7	22.5	4.7
		70	357.5	275.4	24.3	4.3
		80	352.9	261.0	26.3	3.9
	4.0 (9.1)	60	378.4	298.8	22.9	4.9
		70	371.5	285.9	24.7	4.4
		80	363.8	272.6	26.7	4.0
	8.2 (19.0)	60	394.8	312.2	23.3	5.0
		70	384.3	299.4	25.2	4.5
		80	376.7	284.2	27.2	4.1
80	2.3 (5.3)	60	401.6	322.7	23.6	5.0
		70	395.0	309.3	25.5	4.5
		80	388.7	295.7	27.6	4.1
	3.8 (8.9)	60	419.0	335.6	24.1	5.1
		70	410.9	321.6	26.0	4.6
		80	403.6	306.4	28.0	4.2
	8.0 (18.4)	60	435.3	353.6	24.6	5.2
		70	425.9	337.1	26.5	4.7
		80	416.9	320.3	28.5	4.3

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Capacity Data

EC360 (12000 CFM) Horizontal & Vertical Configurations

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	45	3.1 (7.1)	75/63	419.8	305.0	494.5	22.9	18.3	30	3.5 (8.1)	60	290.9	206.5	23.7	3.6
			80/67	446.2	313.2	523.6	23.4	19.1			70	287.2	194.9	25.9	3.3
			85/71	473.3	321.2	553.3	23.9	19.8			80	283.0	181.5	28.4	2.9
	60	5.1 (11.9)	75/63	428.5	308.8	501.6	22.1	19.4		5.9 (13.6)	60	300.5	215.3	23.9	3.7
			80/67	456.1	316.9	531.7	22.5	20.2			70	295.8	204.0	26.1	3.3
			85/71	484.3	324.8	562.5	23.0	21.1			80	291.2	189.2	28.6	3.0
	90	10.7 (24.7)	75/63	437.6	311.3	509.2	21.3	20.6		12.2 (28.2)	60	311.6	225.3	24.2	3.8
			80/67	466.0	320.7	540.0	21.7	21.5			70	306.5	211.8	26.3	3.4
			85/71	495.7	328.1	572.2	22.1	22.4			80	302.0	197.5	28.8	3.1
60	45	2.9 (6.8)	75/63	403.7	298.1	482.0	24.5	16.5	40	3.4 (7.8)	60	324.8	238.3	24.5	3.9
			80/67	429.3	306.1	510.3	25.0	17.2			70	320.6	225.8	26.7	3.5
			85/71	455.6	314.0	539.3	25.6	17.8			80	317.4	213.3	29.1	3.2
	60	5.0 (11.5)	75/63	412.4	300.4	488.8	23.7	17.4		5.7 (13.1)	60	337.0	249.6	24.8	4.0
			80/67	439.0	309.7	517.9	24.1	18.2			70	331.9	236.3	27.0	3.6
			85/71	466.4	317.7	547.9	24.6	19.0			80	327.4	223.4	29.4	3.3
	90	10.3 (23.8)	75/63	421.3	304.1	495.9	22.8	18.5		11.8 (27.2)	60	351.3	262.4	25.1	4.1
			80/67	449.0	313.4	526.0	23.2	19.4			70	345.2	248.0	27.3	3.7
			85/71	476.9	323.9	556.2	23.6	20.2			80	340.3	233.7	29.7	3.4
70	45	2.9 (6.6)	75/63	387.1	289.4	469.7	26.4	14.7	50	3.1 (7.1)	60	371.8	282.3	25.7	4.3
			80/67	411.8	298.4	497.0	26.9	15.3			70	366.7	269.2	27.9	3.9
			85/71	436.3	309.1	524.1	27.4	15.9			80	361.8	254.9	30.3	3.5
	60	4.8 (11.1)	75/63	395.4	293.0	475.9	25.5	15.5		5.1 (11.9)	60	385.9	295.5	26.0	4.4
			80/67	421.2	302.0	504.1	25.9	16.3			70	379.8	282.1	28.2	3.9
			85/71	446.7	313.0	532.1	26.3	17.0			80	373.8	266.2	30.7	3.6
	90	9.7 (23.1)	75/63	404.2	296.5	482.5	24.5	16.5		10.7 (24.7)	60	401.9	309.9	26.4	4.5
			80/67	430.9	305.7	511.6	24.9	17.3			70	394.2	297.1	28.6	4.0
			85/71	457.6	317.1	540.6	25.3	18.1			80	386.7	279.2	31.1	3.7
80	45	2.8 (6.4)	75/63	369.6	281.5	457.4	28.5	13.0	60	3.0 (6.8)	60	415.3	322.9	26.8	4.6
			80/67	392.9	292.3	483.2	29.0	13.6			70	409.1	308.1	29.0	4.1
			85/71	416.9	301.7	509.9	29.5	14.1			80	403.8	293.8	31.5	3.8
	60	4.7 (10.8)	75/63	377.7	284.9	463.0	27.5	13.7		5.0 (11.5)	60	432.1	338.5	27.2	4.7
			80/67	401.9	295.9	489.6	27.9	14.4			70	424.7	322.5	29.5	4.2
			85/71	427.7	303.6	518.0	28.4	15.1			80	418.1	307.9	32.0	3.8
	90	9.7 (22.3)	75/63	386.1	288.3	469.1	26.5	14.6		10.3 (23.8)	60	451.2	355.7	27.7	4.8
			80/67	411.3	299.7	496.5	26.9	15.3			70	442.3	338.2	29.9	4.3
			85/71	438.2	307.5	525.9	27.3	16.1			80	434.8	320.5	32.4	3.9
85	45	2.7 (6.3)	75/63	360.7	277.5	451.3	29.7	12.1	70	2.9 (6.6)	60	461.2	365.6	28.0	4.8
			80/67	383.3	288.9	476.4	30.2	12.7			70	454.0	349.5	30.3	4.4
			85/71	406.8	298.4	502.7	30.7	13.3			80	447.6	333.8	32.8	4.0
	60	4.6 (10.6)	75/63	368.6	280.9	456.7	28.7	12.9		4.8 (11.1)	60	481.0	383.8	28.5	4.9
			80/67	392.2	292.3	482.6	29.1	13.5			70	472.3	366.3	30.8	4.5
			85/71	416.9	301.8	509.8	29.5	14.1			80	464.2	348.6	33.4	4.1
	90	4.5 (22.0)	75/63	376.8	284.2	462.4	27.7	13.6		10.0 (23.1)	60	503.2	403.7	29.1	5.1
			80/67	401.4	296.0	489.2	28.0	14.3			70	492.8	384.4	31.4	4.6
			85/71	427.3	305.5	517.4	28.4	15.1			80	482.9	365.1	33.9	4.2
90	45	2.7 (6.2)	75/63	351.6	273.4	445.4	30.9	11.4	80	2.8 (6.4)	60	509.2	409.9	29.3	5.1
			80/67	374.2	283.4	470.6	31.4	11.9			70	500.7	392.4	31.7	4.6
			85/71	397.3	292.7	496.4	31.9	12.5			80	492.0	375.4	34.3	4.2
	60	4.5 (10.4)	75/63	359.3	276.7	450.4	29.9	12.0		4.7 (10.8)	60	531.9	430.8	30.0	5.2
			80/67	382.9	286.8	476.5	30.3	12.6			70	521.7	411.5	32.3	4.7
			85/71	407.0	296.4	503.1	30.7	13.3			80	512.0	392.1	34.9	4.3
	90	9.4 (21.6)	75/63	366.8	281.4	455.3	28.8	12.7		9.7 (22.3)	60	557.3	453.4	30.7	5.3
			80/67	391.9	290.4	482.7	29.2	13.4			70	545.1	432.0	33.1	4.8
			85/71	416.6	301.9	509.6	29.5	14.1			80	533.5	410.6	35.6	4.4
100	45	2.6 (6.0)	75/63	332.4	267.5	433.1	33.6	9.9							
			80/67	353.8	277.6	457.1	34.1	10.4							
			85/71	375.7	287.4	481.8	34.6	10.9							
	60	4.4 (10.1)	75/63	339.7	270.0	437.6	32.6	10.4							
			80/67	362.1	280.7	462.4	32.9	11.0							
			85/71	385.8	288.6	488.7	33.4	11.6							
	90	9.1 (21.0)	75/63	347.7	271.9	442.8	31.5	11.1							
			80/67	370.7	283.9	468.0	31.8	11.7							
			85/71	394.8	293.9	494.4	32.1	12.3							
110	45	2.5 (5.9)	75/63	313.6	257.8	422.8	36.8	8.5							
			80/67	334.0	268.3	445.8	37.2	9.0							
			85/71	354.6	277.8	469.2	37.7	9.4							
	60	4.3 (9.8)	75/63	320.5	260.9	426.5	35.6	9.0							
			80/67	341.3	273.0	449.7	36.0	9.5							
			85/71	362.9	283.0	473.8	36.4	10.0							
	90	8.8 (20.4)	75/63	327.4	264.0	430.5	34.5	9.5							
			80/67	349.8	274.1	455.0	34.8	10.1							
			85/71	372.0	286.0	479.5	35.1	10.6							

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 BST selection software.

Ratings below 40°F are with a methanol solution.

The results reported herein are estimates based on testing by FHP. Variations in the installation and operational environment may alter performance. Bosch disclaims all warranties, express and implied, that the performance will be as reported, including the warranty of merchantability and fitness for purpose. In addition, continuous research and development may result in a change to an appliances design and specifications, which Bosch may change without notice. Before purchase, confirm the design specifications of the appliance.

(under 10 tons)

Electrical Data

Belt Drive Motor

Model	Voltage Code	Voltage/ Ph/Hz	Voltage Min/Max	Compressor			Total Unit w/Belt Drive Motor				Compressor Services			
											Cold Wind Resistance			Run Capacitor (µF/V)
				Quantity	RLA	LRA	Motor Quantity	FLA	Min Circuit Amps	Max Fuse Amps	Single Phase R-C	Single Phase S-C	Three Phase Line-Line	
EC072	1	208-230/1/60	197/253	2	13.0	74	1	7	36.3	45	0.82	1.63	-	40/370*
	3	208-230/3/60	197/253	2	7.8	68	1	3.6	21.2	25	-	-	1.15	-*
	4	460/3/60	414/506	2	3.9	34	1	1.8	10.6	15	-	-	4.61	-*
EC096	1	208-230/1/60	197/253	2	15.7	84	1	8.4/9.8*	47.6/45.1*	50/60*	0.54	1.60	-	45/370*
	3	208-230/3/60	197/253	2	11.0	88	1	4.8/6.2*	29.5/31.0*	40/40*	-	-	0.93	-*
	4	460/3/60	414/506	2	5.4	44	1	2.4/3.1*	14.6/15.2*	15/20*	-	-	3.59	-*
	5	575/3/60	518/632	2	4.4	36	1	2.0/2.6*	11.9/12.5*	15/15*	-	-	5.68	-*
EC120	1	208-230/1/60	197/253	2	26.3	134	1	9.8	69.0	90	0.45	0.79	-	80/370*
	3	208-230/3/60	197/253	2	15.6	110	1	6.2/9.2*	41.3/44.3*	50/50*	-	-	0.68	-
	4	460/3/60	414/506	2	7.8	52	1	3.1/4.3*	20.6/21.9*	25/25*	-	-	3.20	-
	5	575/3/60	518/632	2	5.8	39	1	2.6/3.7*	15.7/16.8*	20/20*	-	-	5.33	-
EC150	3	208-230/3/60	197/253	2	19.2	136	1	9.2	52.4	70	-	-	0.60	-
	4	460/3/60	414/506	2	8.7	66	1	4.3	23.9	30	-	-	2.52	-
	5	575/3/60	518/632	2	6.9	55	1	3.7	19.2	25	-	-	3.74	-
EC151	3	208-230/3/60	197/253	2	19.2	136	1	9.2	52.4	70	-	-	0.60	-
	4	460/3/60	414/506	2	8.7	66	1	4.3	23.9	30	-	-	2.52	-
	5	575/3/60	518/632	2	6.9	55	1	3.7	19.2	25	-	-	3.74	-
EC180	3	208-230/3/60	197/253	2	22.4	149	2	6.2	62.8	80	-	-	0.56	-
	4	460/3/60	414/506	2	10.6	75	2	3.2	30.1	40	-	-	2.27	-
	5	575/3/60	518/632	2	7.7	54	2	2.6	22.5	30	-	-	3.56	-
EC181	3	208-230/3/60	197/253	2	22.4	149	1	12.2	62.6	80	-	-	0.56	-
	4	460/3/60	414/506	2	10.6	75	1	6.1	30.0	40	-	-	2.27	-
	5	575/3/60	518/632	2	7.7	54	1	5.4	22.7	30	-	-	3.56	-
EC210	3	208-230/3/60	197/253	2	29.5	195	2	4.8	76.0	100	-	-	0.40	-
	4	460/3/60	414/506	2	14.7	95	2	2.4	37.9	50	-	-	1.59	-
	5	575/3/60	518/632	2	12.2	80	2	2	31.5	40	-	-	2.55	-
EC240	3	208-230/3/60	197/253	2	30.1	225	2	6.2	80.1	110	-	-	0.35	-
	4	460/3/60	414/506	2	16.7	114	2	3.1	43.8	60	-	-	1.36	-
	5	575/3/60	518/632	2	12.2	80	2	2.6	32.6	40	-	-	2.55	-
EC242	3	208-230/3/60	197/253	2	30.1	225	2	6.2	80.1	110	-	-	0.35	-
	4	460/3/60	414/506	2	16.7	114	2	3.1	43.8	60	-	-	1.36	-
	5	575/3/60	518/632	2	12.2	80	2	2.6	32.6	40	-	-	2.55	-
EC300	3	208-230/3/60	197/253	2	48.1	245	2	9.2	126.6	150	-	-	0.28	-
	4	460/3/60	414/506	2	18.6	125	2	4.3	50.5	60	-	-	1.24	-
	5	575/3/60	518/632	2	14.7	100	2	3.7	40.5	50	-	-	1.88	-
EC360	3	208-230/3/60	197/253	2	55.8	340	2	12.2	150.0	200	-	-	0.21	-
	4	460/3/60	414/506	2	26.9	173	2	6.1	72.7	90	-	-	0.83	-
	5	575/3/60	518/632	2	23.7	132	2	5.4	64.1	80	-	-	1.27	-

NOTES: *First value is for vertical configurations and second value is for horizontals. Resistance value tolerance +/- 7%. All resistance values must be measured with compressor at room temperature.

Blower Motor Performance

Belt Drive Motor

Model	Motor Sheave	Rated Airflow	External Static Pressure (in wc Wet coil and filter included)											
			0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20
EC072	Closed	2,300	–	–	–	–	–	–	–	–	2420	2160	1900	1700
	Half Open		–	–	2980	2800	2610	2400	2100	1800	–	–	–	–
	Open		2780	2590	2350	2050	1780	–	–	–	–	–	–	–
EC096	Closed	2,800	–	–	–	–	–	–	–	2800	2650	2450	2300	2200
	Half Open		–	–	3480	3340	3230	3075	2880	2690	2555	2355	–	–
	Open		3110	2965	2835	2615	2460	2275	–	–	–	–	–	–
EC120	Closed	4,000	–	–	–	–	–	–	–	–	4400	4150	3830	3600
	Half Open		–	–	–	4660	4490	4240	3959	4600	3000	–	–	–
	Open		4680	4490	4270	4000	3700	3370	–	–	–	–	–	–
EC150	Closed	5,000	–	–	–	–	–	–	7120	6920	6530	6080	5660	5120
	Half Open		–	–	–	6860	6530	6120	5780	5380	4880	4090	–	–
	Open		6770	6300	5880	5430	4970	4340	3750	–	–	–	–	–
EC151	Closed	5,000	–	–	–	–	–	–	7120	6920	6530	6080	5660	5120
	Half Open		–	–	–	6860	6530	6120	5780	5380	4880	4090	–	–
	Open		6770	6300	5880	5430	4970	4340	3750	–	–	–	–	–
EC180	Closed	6,000	–	–	–	–	–	–	7200	6940	6560	6150	5710	5140
	Half Open		–	–	7200	6930	6580	6200	5800	5450	4920	–	–	–
	Open		6780	6350	5970	5540	5050	4510	–	–	–	–	–	–
EC181	Closed	6,000	–	–	–	–	–	–	7200	6940	6560	6150	5710	5140
	Half Open		–	–	7200	6930	6580	6200	5800	5450	4920	–	–	–
	Open		6780	6350	5970	5540	5050	4510	–	–	–	–	–	–
EC210	Closed	7,000	–	–	–	–	–	–	–	–	–	–	7800	7500
	Half Open		–	–	–	–	–	8600	8200	7600	6900	5240	–	–
	Open		8840	8400	8000	7560	7000	6400	–	–	–	–	–	–
EC240	Closed	8,000	–	–	–	–	–	–	–	–	9000	8800	8330	7660
	Half Open		–	–	–	–	9320	8980	8480	7900	7200	6000	–	–
	Open		9360	8980	8540	8000	7400	6740	–	–	–	–	–	–
EC242	Closed	8,000	–	–	–	–	–	–	–	–	–	–	8120	7500
	Half Open		–	–	–	–	–	–	8280	7700	7000	5800	–	–
	Open		–	–	8340	7800	7200	6540	–	–	–	–	–	–
EC300	Closed	10,000	–	–	–	–	10000	9650	9300	8950	8600	8200	–	–
	Half Open		–	10500	10100	9700	8900	8500	8100	–	–	–	–	–
	Open		9900	9100	8700	8300	–	–	–	–	–	–	–	–

Model	Motor Sheave	Rated Airflow	External Static Pressure (in wc Wet coil and filter included)											
			0.2	0.3	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2
EC360	Closed	12,000	–	–	–	–	–	–	–	–	–	–	12900	10800
	Half Open		–	–	–	–	–	13050	11850	10350	7500	–	–	–
	Open		12200	11575	10950	9600	7800	–	–	–	–	–	–	–

Physical Data

EC Model Water Source Heat Pump

EC Model	EC072	EC096	EC120	EC150	EC151	EC180
Compressor Type (Qty 2)	Reciprocating	Reciprocating	Scroll	Scroll	Scroll	Scroll
Refrigeration Charge (oz)	124	148	166	204	194	234
Max Water Working Pressure (PSIG/kPa)	450/3100	450/3100	450/3100	450/3100	450/3100	450/3100
Number of Refrigeration Circuits	2	2	2	2	2	2
Evaporator Coil						
Coil Type	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin
Air Coil Dimensions Vertical (H x L)	18 x 28 (2)	20 x 32.5 (2)	20 x 32.5 (2)	-	24 x 43 (2)	-
Air Coil Dimensions Horizontal (H x L)	18 x 28 (2)	20 x 32.5 (2)	20 x 32.5 (2)	24 x 65	-	24 x 65
Row(s)	3	3	3	3	3	3
Motor & Blower						
Fan Motor Type/Speeds	Belt Drive/1	Belt Drive/1	Belt Drive/1	Belt Drive/1	Belt Drive/1	Belt Drive/2
Fan Motor (HP x Qty)	1 x 1	1 1/2 x 1 (2 x 1 for HZ)	2 x 1 (3 x 1 for HZ)	3 x 1	3 x 1	2 x 2
Blower Wheel Size (Dia. x W x Qty)	12 x 12 x 1	12 x 12 x 1	12 x 9 x 2 for HZ 15 x 15 x 1 for VT	15 x 15 x 1	15 x 15 x 1	12 x 12 x 2
Water Coil						
Connection Type	FPT	FPT	FPT	FPT	FPT	FPT
Size	1"	1"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
Water Coil Type	Coaxial	Coaxial	Coaxial	Coaxial	Coaxial	Coaxial
Coil Volume (gal)	0.42	0.64	0.87	1.06	1.06	1.06
Vertical Cabinet						
Nominal size of Standard Filter - 1" (H x L)	20 x 34.5 (2)	20 x 34.5 (2)	20 x 34.5 (2)	-	24 x 24 (4)	-
Weight - Operating (lbs)	670	702	935	-	1050	-
Weight - Shipping (lbs)	715	752	980	-	1140	-
Horizontal Cabinet						
Nominal size of Standard Filter - 1" (H x L)	20 x 34.5 (2)	20 x 34.5 (2)	20 x 34.5 (2)	24 x 34 (2)	-	24 x 34 (2)
Weight - Operating (lbs)	670	702	935	1060	-	1530
Weight - Shipping (lbs)	715	752	980	1150	-	1620
EC Model	**EC181**	**EC210**	**EC240**	**EC242**	**EC300**	**EC360**
Compressor Type (Qty 2)	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Refrigeration Charge (oz)	224	260	290	290	290	576
Max Water Working Pressure (PSIG/kPa)	450/3100	450/3100	450/3100	450/3100	450/3100	450/3100
Number of Refrigeration Circuits	2	2	2	2	2	2
Evaporator Coil						
Coil Type	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin
Air Coil Dimensions Vertical (H x L)	24 x 43 (2)	20 x 32.5 (4)	20 x 32.5 (4)	-	20 x 32.5 (4)	30 x 32.5 (2)
Air Coil Dimensions Horizontal (H x L)	-	-	-	34 x 65	-	-
Row(s)	3	3	3	3	3	3
Motor & Blower						
Fan Motor Type/Speeds	Belt Drive/1	Belt Drive/2	Belt Drive/2	Belt Drive/2	Belt Drive/2	Belt Drive/2
Fan Motor (HP x Qty)	5 x 1	1 1/2 x 2	2 x 2	2 x 2	3 x 2	5 x 2
Blower Wheel Size (Dia. x W x Qty)	15 x 15 x 1	15 x 15 x 2	15 x 15 x 2	15 x 15 x 2	15 x 15 x 2	15 x 15 x 2
Water Coil						
Connection Type	FPT	FPT	FPT	FPT	FPT	FPT
Size	1 1/2"	2"	2"	2"	2"	2"
Water Coil Type	Coaxial	Coaxial	Coaxial	Coaxial	Coaxial	Coaxial
Coil Volume (gal)	1.06	3.04	3.40	3.40	3.40	3.31
Vertical Cabinet						
Nominal size of Standard Filter - 1" (H x L)	24 x 24 (4)	20 x 34.5 (4)	20 x 34.5 (4)	-	20 x 34.5 (4)	30 x 34.5 (4)
Weight - Operating (lbs)	1090	1090	1310	-	1530	1650
Weight - Shipping (lbs)	1180	1180	1400	-	1630	1750
Horizontal Cabinet						
Nominal size of Standard Filter - 1" (H x L)	-	-	-	17.25 x 34.5 (4)	-	-
Weight - Operating (lbs)	-	-	-	1655	-	-
Weight - Shipping (lbs)	-	-	-	1755	-	-

Horizontal Cabinet Corner Weights

Configuration			Left Hand Evaporator			
Model		Total	Left Front*	Right Front*	Left Back	Right Back
EC072	Lbs	670	147	274	137	112
	kg	305	67	125	62	51
EC096	Lbs	702	155	287	143	117
	kg	319	70	130	65	53
EC120	Lbs	935	206	382	191	156
	kg	425	94	174	87	71
EC150	Lbs	1060	233	434	216	177
	kg	482	106	197	98	80
EC180	Lbs	1530	337	626	312	255
	kg	695	153	285	142	116
EC242	Lbs	1655	365	677	337	276
	kg	752	166	308	153	125

* Front is control box end.

Vertical Unit Dimensions

EC072-120 Single Blower Large Vertical Water Source Heat Pump

Model	Width	Depth	Height	Distance Between Base Rails	Top Supply: Supply Depth	Top Supply: Supply Width	Top Supply: Front to Supply	Top Supply: Left Side to Supply	Rear Supply: Supply Height	Rear Supply: Supply Width	Rear Supply: Top to Supply	Rear Supply: Right Side to Supply	A	B	C	R/A Duct Width	D	E	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
													Water Out	Bottom to Condensate Drain	Water In		R/A Duct Flange Height	Filter Rack Height			
EC072	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00	14.75	8.50	2.75	34.00	38.00	40.00	1" FPT	3/4" FPT	20 x 34.5 (2)
EC096	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00	14.75	8.50	2.75	34.00	38.00	40.00	1" FPT	3/4" FPT	20 x 34.5 (2)
EC120	42.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	17.50	28.00	2.00	7.00	15.00	9.00	3.00	34.00	38.00	40.00	1 1/4" FPT	3/4" FPT	20 x 34.5 (2)

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

Service Access Access to:		
1	2	3
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

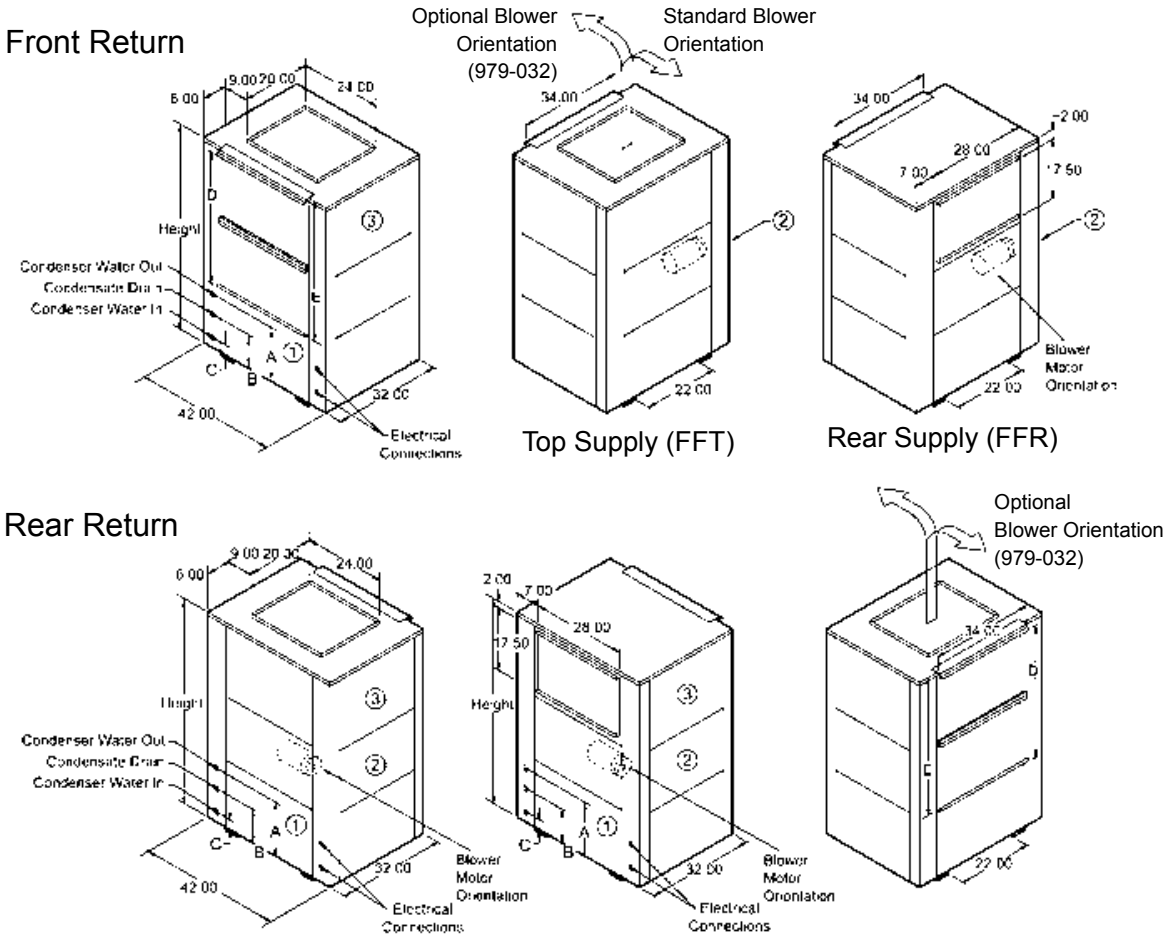


Figure 17

Vertical Unit Dimensions

EC151-181 Single Blower Large Vertical Water Source Heat Pump

Model	Width	Depth	Height	Distance Between Base Rails	Top Supply: Supply Depth	Top Supply: Supply Width	Top Supply: Front to Supply	Top Supply: Left Side to Supply	Rear Supply: Supply Height	Rear Supply: Supply Width	Rear Supply: Top to Supply	Rear Supply: Right Side to Supply	A	B	C	R/A Duct Width	D	E	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
													Water Out	Bottom to Condensate Drain	Water In		R/A Duct Flange Height	Filter Rack Height			
EC151	52.50	32.00	70.00	22.00	20.00	24.00	5.00	17.50	17.50	28.00	2.00	12.12	17.00	10.50	3.00	44.25	48.00	50.00	1 1/2" FPT	3/4" FPT	24 x 24 (4)
EC181	52.50	32.00	70.00	22.00	20.00	24.00	5.00	17.50	17.50	28.00	2.00	12.12	17.00	10.50	3.00	44.25	48.00	50.00	1 1/2" FPT	3/4" FPT	24 x 24 (4)

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

Service Access Access to:		
1	2	3
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

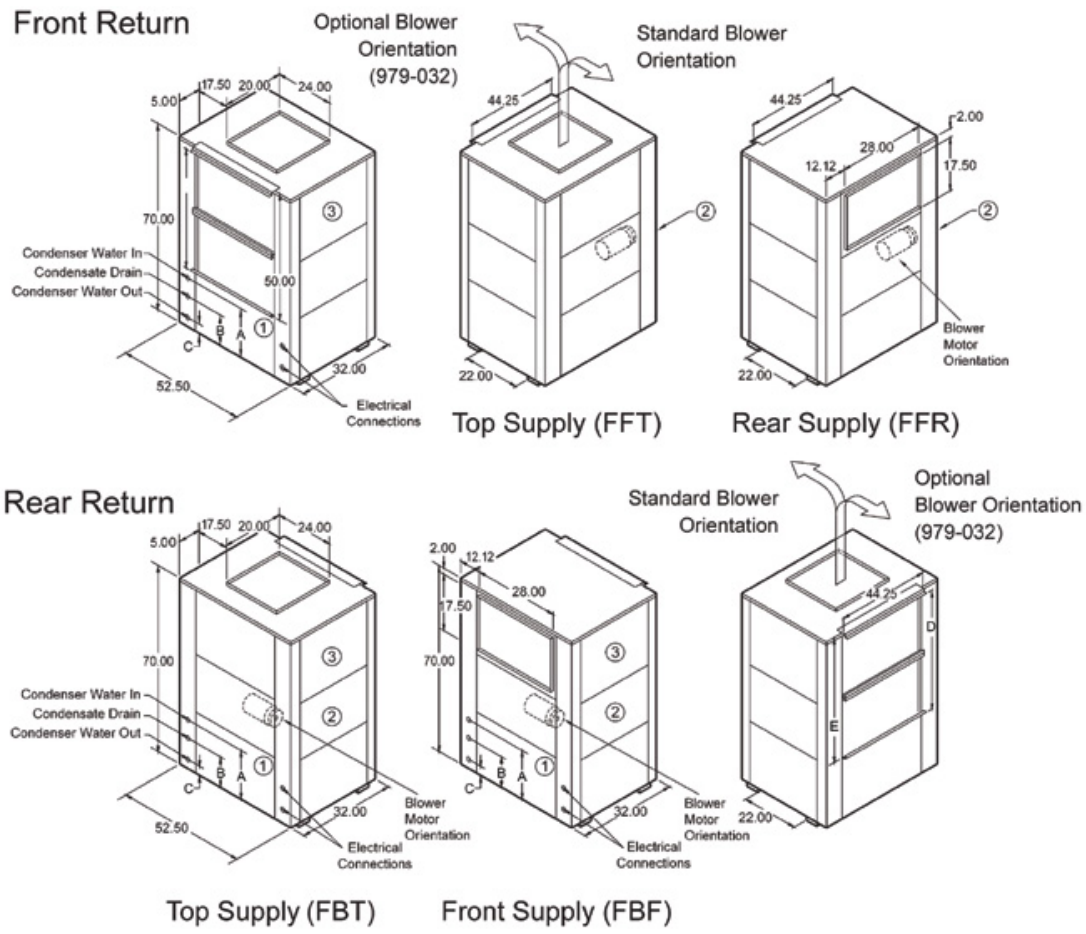


Figure 18

Vertical Unit Dimensions

EC210-360 Dual Blower Large Vertical Water Source Heat Pump

Model	Width	Depth	Height	Distance Between Base Rails	Top Supply: Supply Depth	Top Supply: Supply Width	Top Supply: Front to Supply	Top Supply: Left Side to Supply	Top Supply: Distance b/t Supply Ducts	Rear Supply: Supply Height	Rear Supply: Supply Width	Rear Supply: Top to Supply	Rear Supply: Right Side to Supply	Rear Supply: Distance b/t Supply Ducts	A	B	C	R/A Duct Width	Distance Between R/A Ducts	D	E	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
															Water Out	Bottom to Condensate Drain	Water In			R/A Duct Flange Height	Filter Rack Height			
EC210	80.00	32.00	62.00	22.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	18.00	8.75	2.75	34.00	4.50	40.00	38.00	2" FPT	1 1/4" FPT	20 x 34.5 (4)
EC240	80.00	32.00	66.50	22.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	18.00	8.75	2.75	34.00	4.50	40.00	38.00	2" FPT	1 1/4" FPT	20 x 34.5 (4)
EC300	80.00	32.00	66.50	22.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	18.00	8.75	2.75	34.00	4.50	40.00	38.00	2" FPT	1 1/4" FPT	20 x 34.5 (4)
EC360	80.00	32.00	86.50	22.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	17.00	9.00	3.50	34.00	4.50	60.00	58.00	2" FPT	1 1/4" FPT	30 x 34.5 (4)

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

Service Access Access to:		
1	2	3
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

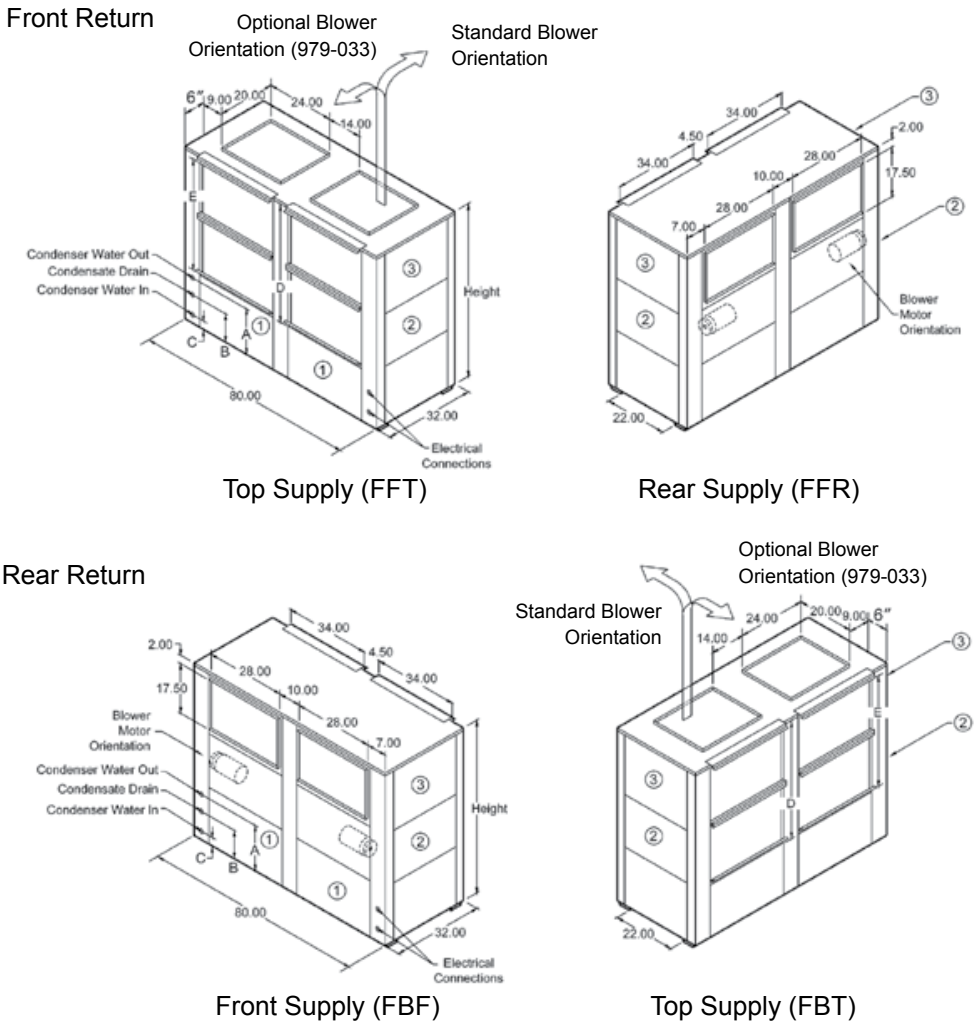


Figure 19

Horizontal Unit Dimensions

EC072-150 Large Horizontal Water Source Heat Pump

Model	Width	Depth	Height	A Cab End to Filter Rack	B Filter Rack Height	C R/A Duct Flange Height	R/A Duct Width	E Front to Water In	F Water In Height	G Front to Water Out	H Water Out Height	J Supply Width	K Supply Height	L Rear to Supply	M Distance b/t Supply Ducts	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
EC072	38.00	78.00	21.50	2.00	20.50	18.50	66.00	28.00	2.75	28.00	14.50	15.50	13.50	10.50	5.50	1" FPT	3/4" FPT	20 x 34.5 (2)
EC096	38.00	78.00	21.50	2.00	20.50	18.50	66.00	26.25	3.50	28.00	19.25	15.50	13.50	10.50	5.50	1" FPT	3/4" FPT	20 x 34.5 (2)
EC120	38.00	78.00	21.50	2.00	20.50	18.50	66.00	27.50	3.38	28.00	16.75	12.50	13.50	5.25	5.50	1 1/4" FPT	3/4" FPT	20 x 34.5 (2)
EC150	42.00	82.00	26.75	2.00	20.50	18.50	66.00	24.00	2.75	24.00	17.75	18.50	16.00	14.00	5.50	1 1/2" FPT	3/4" FPT	24 x 34 (2)

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

Service Access Access to:		
1	2	3
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

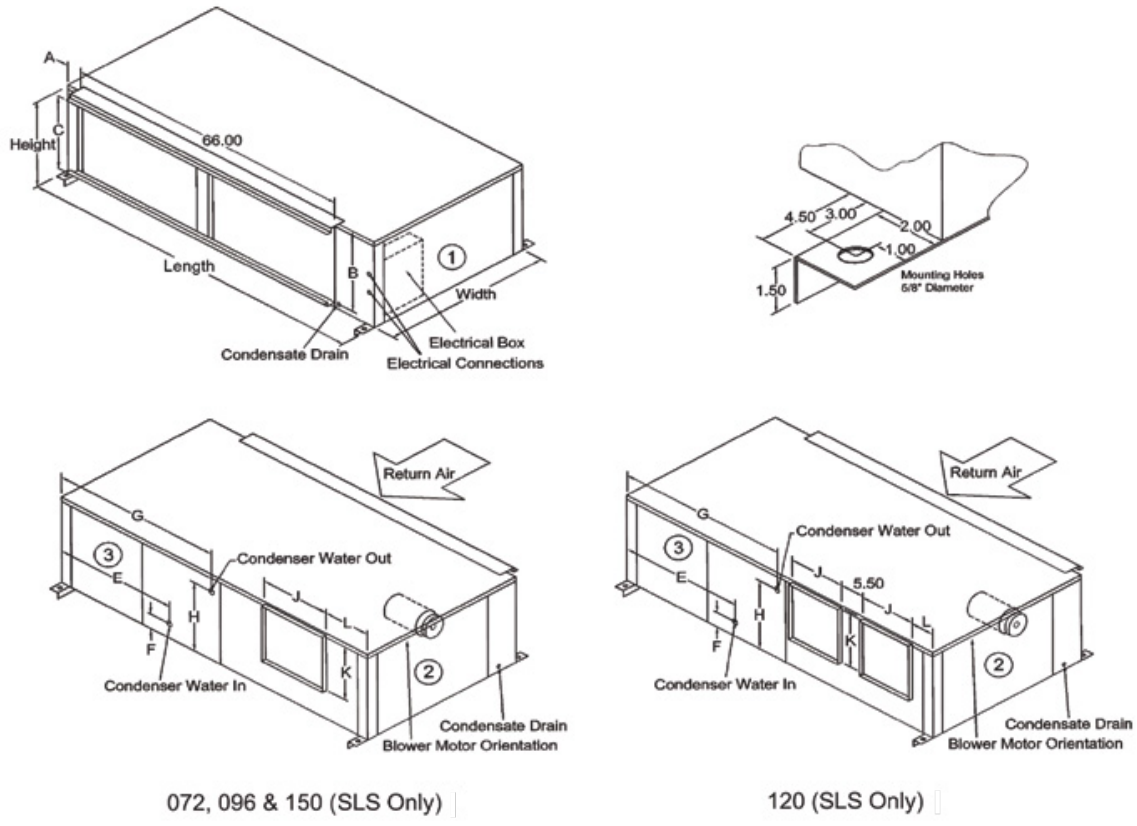


Figure 20

Horizontal Unit Dimensions

EC180-242 Large Horizontal Water Source Heat Pump

Model	Width	Depth	Height	A Cab End to Filter Rack	B Filter Rack Height	C R/A Duct Flange Height	R/A Duct Width	E Front to Water In	F Water In Height	G Front to Water Out	H Water Out Height	J Supply Width	K Supply Height	L Rear to Supply	M Distance b/t Supply Ducts	Condenser Water Connections	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
EC180	60.25	106.50	25.25	2.00	24.00	22.00	67.00	22.00	6.25	22.00	16.00	27.75	17.25	5.00	4.00	1 1/2" FPT	1 1/4" FPT	24 x 34 (2)
EC242	60.25	106.50	36.00	2.00	34.75	32.75	67.00	24.50	7.25	24.50	19.62	23.75	19.75	7.75	9.75	2" FPT	1 1/4" FPT	17.25 x 34.5 (4)

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

Service Access Access to:		
1	2	3
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

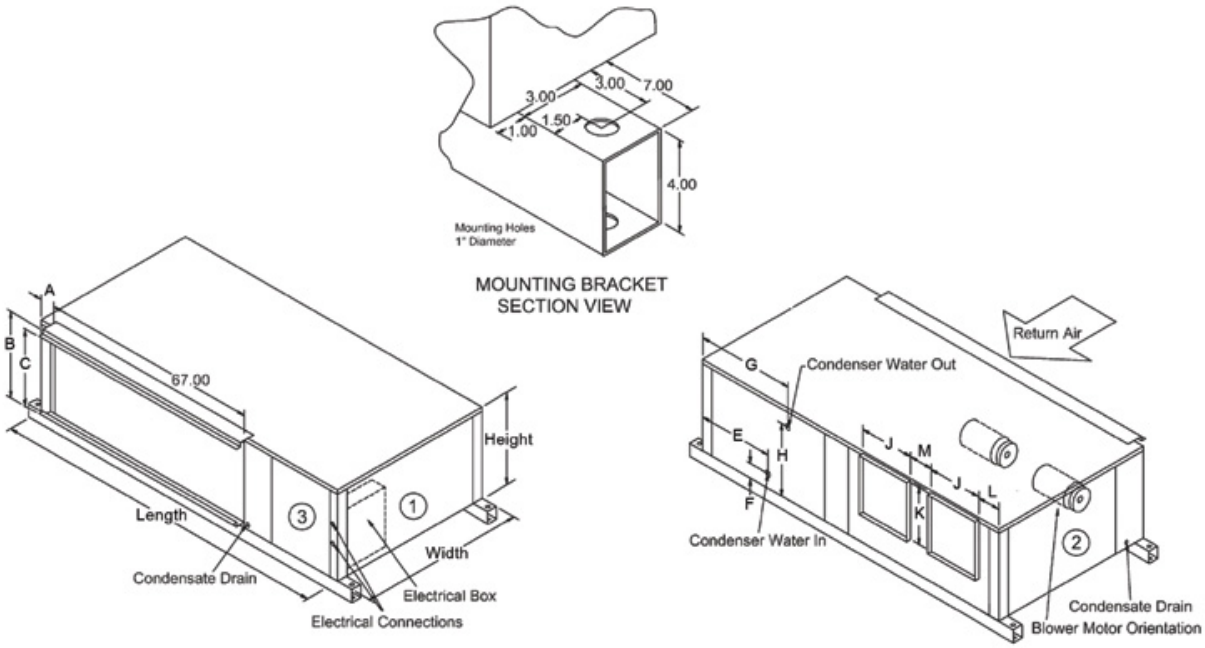


Figure 21

Condensing Section Unit Dimensions

Water Source Heat Pump

Model	Width	Depth	Height	A Water Out Height	Water In Height	Condenser Water Connections	Suction Line Diameter	Liquid Line Diameter
EC072	42.00	32.00	22.00	18.00	3.00	1" FPT	7/8"	1/2"
EC096	42.00	32.00	22.00	15.00	3.00	1" FPT	7/8"	1/2"
EC120	42.00	32.00	22.00	16.00	3.00	1 1/4" FPT	7/8"	1/2"
EC150	80.00	32.00	22.00	17.50	3.00	1 1/2" FPT	7/8"	5/8"
EC151	80.00	32.00	22.00	17.50	3.00	1 1/2" FPT	7/8"	5/8"
EC180	80.00	32.00	22.00	17.50	3.00	1 1/2" FPT	7/8"	5/8"
EC181	80.00	32.00	22.00	17.50	3.00	1 1/2" FPT	7/8"	5/8"
EC210	80.00	32.00	22.00	17.50	3.00	2" FPT	1 1/8"	7/8"
EC240	80.00	32.00	22.00	19.38	3.00	2" FPT	1 1/8"	7/8"
EC300	80.00	32.00	26.50	16.88	3.00	2" FPT	1 1/8"	7/8"
EC360	80.00	32.00	27.00	15.00	3.00	2" FPT	1 3/8"	7/8"

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

Service Access Access to:		
1	**2**	**3**
Controls, Compressors, Refrigeration Components	Blower & Motor	Blower

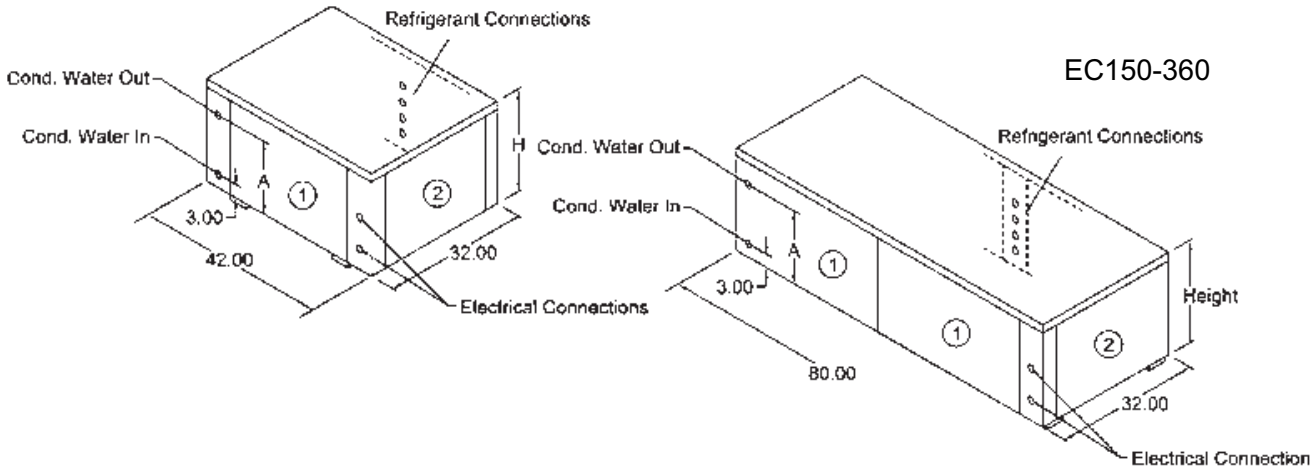


Figure 22

Vertical Air Handler Unit Dimensions

EC072-360 Split Systems Water Source Heat Pump

Model	Width	Depth	Distance Between Base Rails	A	B	C	Top Supply: Supply Depth	Top Supply: Supply Width	Top Supply: Front to Supply	Top Supply: Right Side to Supply	Top Supply: Distance b/t Supply Ducts	Rear Supply: Supply Height	Rear Supply: Supply Width	Rear Supply: Top to Supply	Rear Supply: Left Side to Supply	Rear Supply: Distance b/t Supply Ducts	R/A Duct Width	Distance Between R/A Ducts	Suction Line Diameter	Liquid Line Diameter	Condensate Drain Connection	Recommended Replacement Nominal Filter Size - 1" Thick
				Height	Filter Rack Height	R/A Duct Flange Height																
EC072	42.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	-	17.50	28.00	2.00	7.00	-	34.00	-	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC096	42.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	-	17.50	28.00	2.00	7.00	-	34.00	-	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC120	42.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	-	17.50	28.00	2.00	7.00	-	34.00	-	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC151	80.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	7/8"	5/8"	3/4" FPT	20 x 34.5 (4)
EC181	80.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	7/8"	5/8"	3/4" FPT	20 x 34.5 (4)
EC210	80.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	1 1/8"	7/8"	1 1/4" FPT	20 x 34.5 (4)
EC240	80.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	1 1/8"	7/8"	1 1/4" FPT	20 x 34.5 (4)
EC300	80.00	32.00	22.00	41.00	40.00	38.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	1 1/8"	7/8"	1 1/4" FPT	20 x 34.5 (4)
EC360	80.00	32.00	22.00	61.00	60.00	58.00	20.00	24.00	6.00	9.00	14.00	17.50	28.00	2.00	7.00	10.00	34.00	4.50	1 3/8"	7/8"	1 1/4" FPT	30 x 34.5 (4)

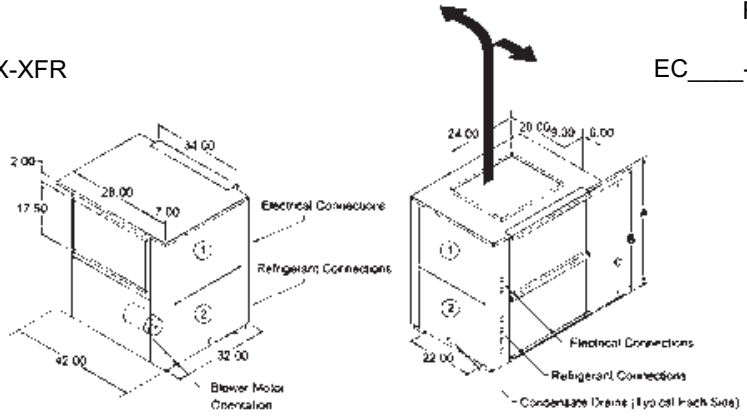
NOTE: All dimensions in inches unless otherwise noted. All dimensions within +-0.125". Specifications subject to change without notice.

Service Access Access to:
1
Controls, Compressors, Refrigeration Components
2
Blower & Motor
3
Blower

Front Return
Rear Supply
EC____-__AVX-XFR

Front Return
Top Supply
EC____-__AVX-XFT

EC072-120



Front Return
Rear Supply
EC____-__AVX-XFR

Front Return
Top Supply
EC____-__AVX-XFT

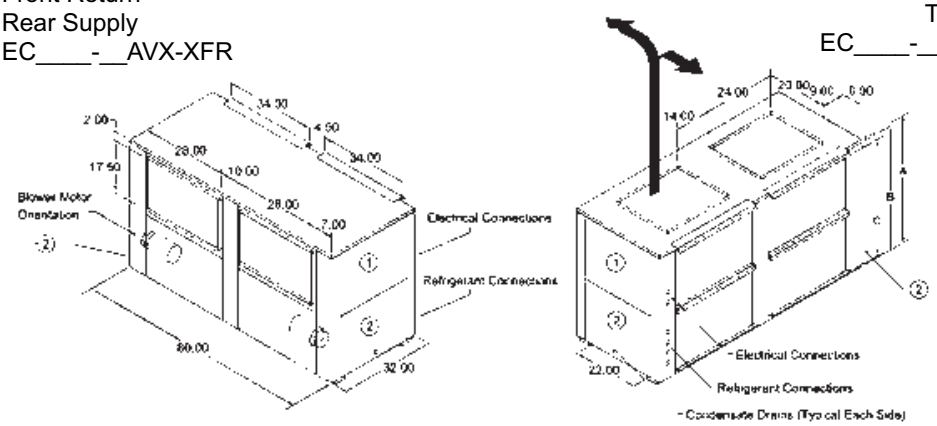


Figure 23

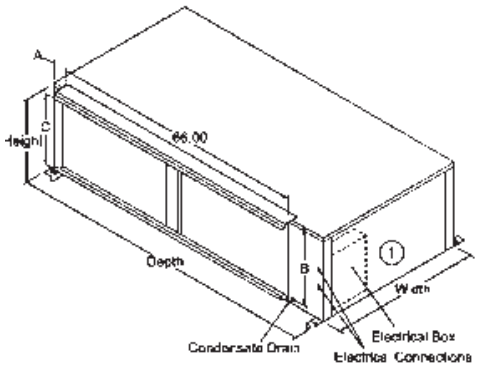
Horizontal Air Handler Unit Dimensions

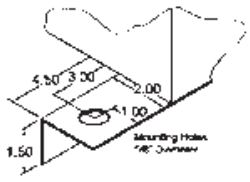
EC072-150 Split Systems Water Source Heat Pump

Model	Width	Depth	Height	A	B	C	D	E	F	Distance b/t Supply Ducts	R/A Duct Width	Suction Line Diameter	Liquid Line Diameter	Condenser Water Connections	Recommended Replacement Nominal Filter Size - 1" Thick
				Rear to R/A Duct	Filter Rack Height	Filter Rack Flange Height	Supply Depth	Supply Height	Front to Supply						
EC072	38.00	78.00	21.00	2.00	20.00	18.00	15.50	13.50	10.50	5.50	66.00	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC096	38.00	78.00	21.00	2.00	20.00	18.00	15.50	13.50	10.50	5.50	66.00	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC120	38.00	78.00	21.00	2.00	20.00	18.00	12.50	13.50	5.25	5.50	66.00	7/8"	1/2"	3/4" FPT	20 x 34.5 (2)
EC150	42.00	82.00	25.00	2.00	24.00	22.00	18.50	16.00	14.00	5.50	66.00	7/8"	5/8"	3/4" FPT	24 x 34 (2)

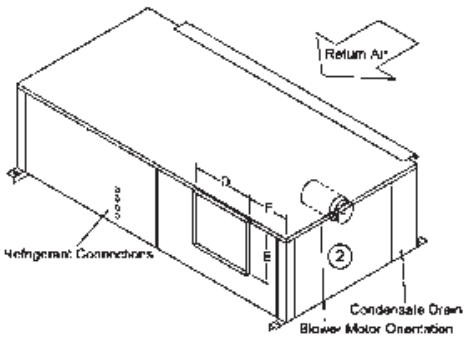
NOTE: All dimensions in inches unless otherwise noted. All dimensions within +-0.125". Specifications subject to change without notice.

Service Access Access to:
1
Controls, Compressors, Refrigeration Components
2
Blower & Motor
3
Blower





MOUNTING BRACKET SECTION VIEW



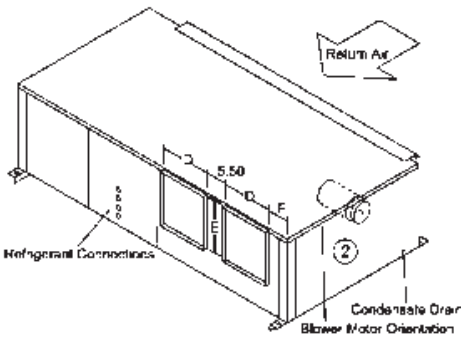


Figure 24

EC072, 096 & 150 (SLS Only)

EC120 (SLS Only)

Service Clearances

EC072 thru 181 Large Vertical

NOTE: * Blower motor and Blower housing access is required on BOTH SIDES of the unit

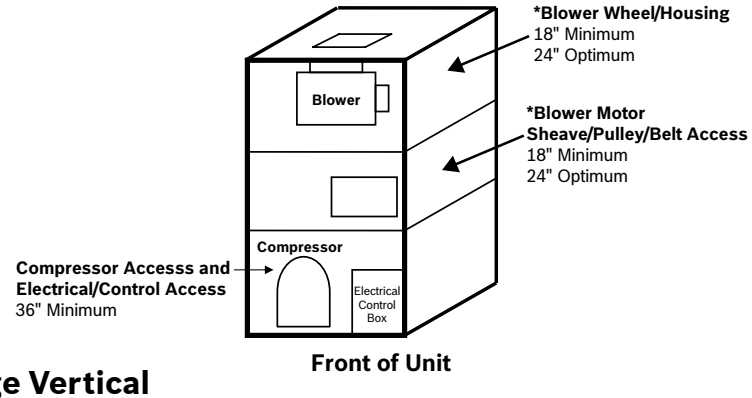


Figure 25

EC210 thru 360 Large Vertical

NOTE: * Blower motor and Blower housing access is required on BOTH SIDES of the unit

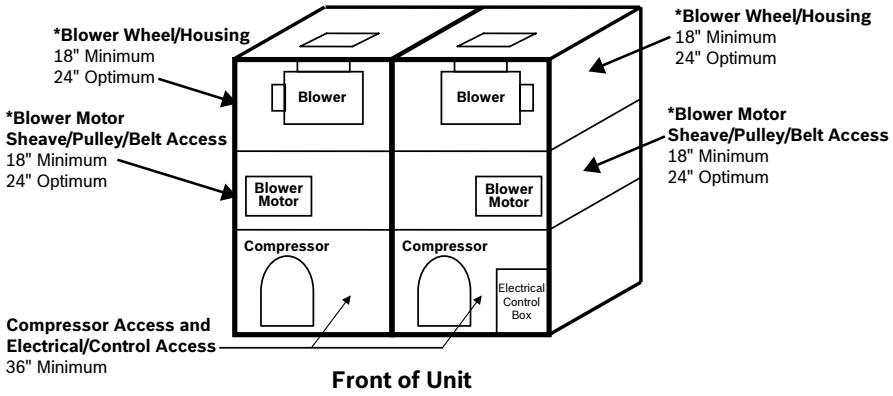


Figure 26

EC072 thru 150 Large Horizontal

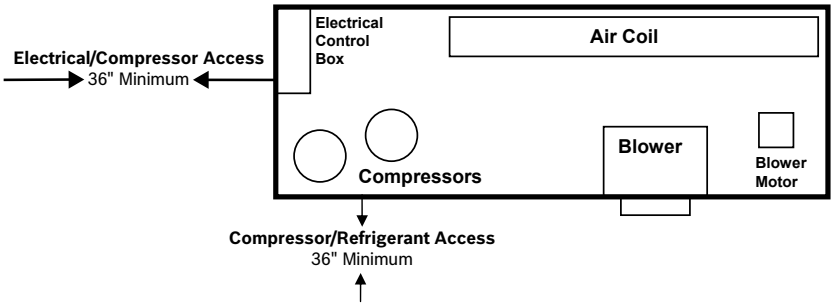
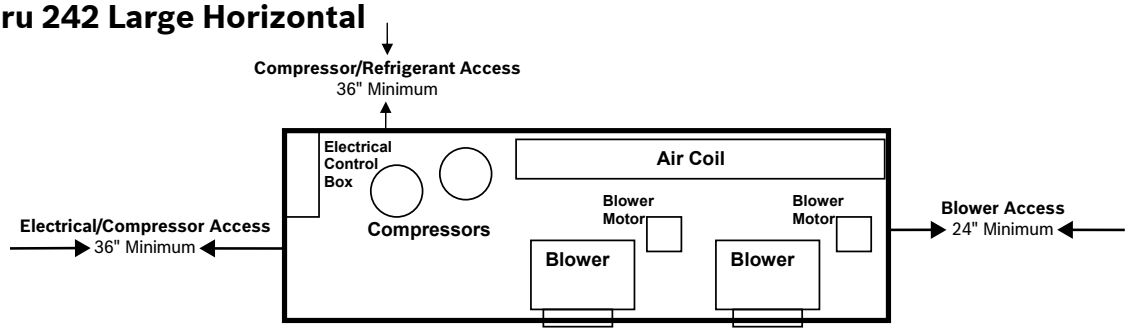


Figure 27

EC180 thru 242 Large Horizontal



NOTE: The local electric codes may require 36" or more clearance at all electrical control boxes.

Figure 28

Guide Specifications

General

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

Horizontal/Vertical Package and Split System Water Source Heat Pumps

Units shall be designed to operate throughout the range of entering fluid temperature of 50°F to 100°F in the cooling mode and 30°F to 80°F in the heating mode. Units shall have an operating range of 50°F to 110°F in the cooling mode and 25°F to 80°F in the heating mode when equipped with the optional extended range package. Equivalent units from other manufacturers can be proposed provided approval to bid is given 10 days prior to bid closing. All equipment with a nominal capacity of 135,000 BTUH Total Cooling or lower must be listed in the current AHRI Applied Equipment Directory under the AHRI Standard AHRI/ISO- 13256-1, WLHP, GWHP and GLHP certification points.

All equipment in this section must meet or exceed the DOE mandated minimum EER's and COP's as listed in ASHRAE 90.1.

Basic 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 and 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 IAQ requirements. Painted steel or plastic material shall not be permitted.

All water source heat pumps shall be fabricated from heavy-gauge sheet metal steel. All interior surfaces shall be lined with ½" thick, multi density acoustic insulation. Insulation within the air handling section shall not have any exposed edges. All insulation must meet NFPA 90A and be certified to meet the GreenGuard™ Indoor Air Quality Standard 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 compressors shall have rubber isolators to the prevent transmission of vibration to the structure.

All units shall have a factory installed two sided filter rack capable of accepting one inch filters. Units shall have a 1" thick throwaway type glass fiber filter as standard. The filter rack shall incorporate a 1" duct flange. The contractor shall purchase one spare set of filters and replace factory-shipped filters upon completion of start-up.

Cabinets shall have separate holes and knockouts for entrance of line voltage and low voltage control wiring. Supply and return water connections shall be copper 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.

Condensate overflow protection shall be provided as standard for horizontal and vertical package units.

Fan and Motor Assembly

The fan(s) shall be belt driven DWDI forward curved type with dynamically balanced wheel(s). The fan motor(s) shall be 1725 or 3450 RPM 56 frame sealed ball bearing type.

The motor(s) shall be permanently lubricated and have thermal overload protection.

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

Refrigerant Circuit

Units shall use R-410A refrigerant. Units that use R-22 refrigerant shall not be allowed.

All units shall have a factory sealed and fully charged refrigerant circuit with the following components:

Hermetic compressor: Hermetic reciprocating, or scroll compressors shall be specifically designed for R-410A refrigerant and shall be internally sprung (if reciprocating), externally isolated and with thermal overload protection.

Guide Specifications

Refrigerant metering thermal expansion valves.

Finned tube refrigerant to air heat exchanger. 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. DuoGuard protected coils can exceed 1000 hours salt spray per ASTM standard B-117.

Reversing valve. Reversing valves shall be four-way solenoid activated refrigerant valves which shall fail to the heating operation should the solenoid fail to function. Reversing valves which fail to the cooling operation shall not be allowed.

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 400 PSIG working water pressure. Shell and 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. The contractor supplying the water source heat pumps with Shell and Tube heat exchangers shall be responsible for any additional installation costs. Brazed Plate water to refrigerant heat exchangers shall require additional centrifugal separators added to the supply water piping at each unit. Each separator 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.

Cupro-nickel water coil – The refrigerant to water heat exchanger shall be of cupro-nickel inner water tube construction.

Safety controls including both a high pressure and low pressure switch shall be provided on both circuits. Temperature sensors shall not replace these safety switches. See the controls section of this specification for additional information.

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

Activation of any safety device shall prevent compressor operation via a lockout circuit, in the affected 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 below. A condensate alarm on package units shall prevent both compressors from operating.

Service valves on split system condensing sections must incorporate a Schrader service port 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 operation 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 HACR circuit breakers. Unit controls shall be 24 volts.

Solid State Safety Circuit

All package units and condensing sections shall have a solid-state UPM safety control circuit with the following features:

Freeze Protection: the standard freeze protection sensor shall be mounted close to the water coil to monitor refrigerant temperature between water coil and the thermal expansion valve for all horizontal and vertical package units. If the refrigerant temperature between the expansion device and water coil drops below or remains at 30˚F for 30 seconds, the controller shall shut down the compressor and enter into a soft lockout condition. This trip point can be changed to 15˚F by cutting the R17 and R77 resistors located above the DIP switch SW1 for applications that employ antifreeze. The freezestat may not provide protection in the case of loss of flow in the heating mode. A flow switch or pressure differential switch is recommended to prevent unit operation in case of loss of flow.

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.

Guide Specifications

Anti-short cycle time delay on compressor operation.

Random start on power up mode.

Brown out/Surge/Power Interruption protection.

Low Pressure Switch 120 second bypass timer.

Shutdown on high or low refrigerant pressure safety switch inputs, and shutdown for the optional freez-estat or high level condensate sensor.

Alarm output which closes for selectable dry contact closure or 24 VAC remote fault indication.

Alarm output selectable for constant output for general alarm notification, or pulse output for annunciation of the specific fault alarm.

Reset unit at thermostat or disconnect.

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 a fault re-occur within 60 minutes after reset, then a permanent lockout will occur. Reset attempts shall be selectable for either 2 or 4 tries. Condensate overflow shall put the unit into a hard lockout on the first fault .

Ability to defeat time delays for servicing.

A light emitting diode (LED) to indicate safety alarms shall be provided for each circuit. The LED shall annunciate the following alarms: high refrigerant pressure, low refrigerant pressure, low water temperature, a high level of condensate in the drain pan, or 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 LED will display the type of fault until the unit is reset.

UL listed, CUL listed, and RFI, ESD, and transient protected.

Options

Extra quiet construction: Optional compressor blankets shall be provided on units, for additional attenuation.

Hot Gas Reheat: Vertical or horizontal package 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 during the cooling mode. 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.

Hot Gas Bypass: For vertical or horizontal package units as noted on the schedule, supply each unit with a UL 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 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 cooling mode.

Water Differential Switch. Prevents unit operation if there is no fluid flow.

Water Side Economizer: water side economizer shall be completely installed at the factory, with condensate drain pan(s), 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 vertical or horizontal package heat pump.

Factory-installed control options: water differential pressure switch, phase loss and reversal protection.

Hose Kits

All units shall be connected with hoses. The hoses shall be either 2 or 3 feet long, braided stainless steel, fire rated hoses complete with adapters. Non fire rated hoses are not acceptable. Optional ball valves with P/T ports, flow controller, Y strainer and electric valve shall be included as specified in the schedule.

Notes

Notes

Notes

Bosch Thermotechnology Corp.
555 NW 65th Court, Fort Lauderdale, FL 33309
Phone: 866-642-3198 | Fax: 954-776-5529
fhp-mfg.com

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