CA Model

Water Source Heat Pump

¾ to 1½ ton

The CA console provides high performing heating and cooling in a compact size when space and access is at a premium.

CA MODEL	UP TO 15.5 EER GLHP	UP TO 4.5 COP WSHP

Made in the U.S.A.

Commercial Sales Catalog
boschheatingandcooling.com

BOSCH
Invented for life

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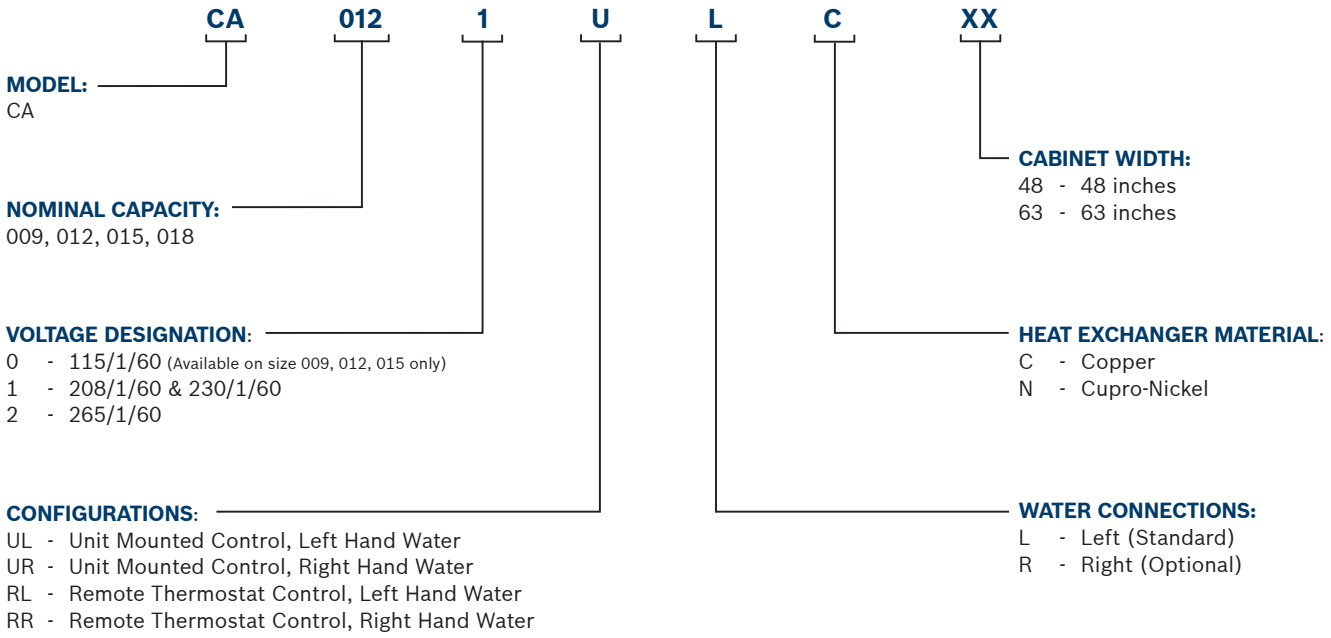
Model Nomenclature



Certified Performance Data

AHRI/ANSI 13256-1 Performance Data												
Model	GPM	Water Loop Heat Pump				Ground Water Loop Heat Pump				Ground Loop Heat Pump			
		Cooling 86˚F		Heating 68˚F		Cooling 86˚F		Heating 68˚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
CA009	2.0	8700	13.4	9500	4.5	10300	21.5	8000	3.9	9100	15.5	6000	3.2
CA012	3.0	11700	12.7	12600	4.3	13700	19.8	11000	3.8	12200	15.0	8500	3.2
CA015	4.0	14300	12.9	16700	4.5	16900	21.4	13900	3.8	14700	14.9	11000	3.2
CA018	5.0	16900	12.2	20800	4.3	20100	18.2	17500	3.6	17900	14.2	13900	3.2

Ratings based upon AHRI/ANSI 13256-1 with 3/8" washable mesh 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 CA 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.

Stainless Steel Drain Pan

Single Capacity Rotary Compressor

Schrader Charging Valves for Servicing

CA Model

The FHP console water source heat pumps are designed to provide heating and cooling in areas where space and access are limited. Utilize as a decentralized room terminal unit that are field connected to a closed-circuit piping loop within a structure. Typically these units are installed in perimeter zones and are ideal for installations where ducted systems are impractical. Office buildings, hotel/motels, schools and assisted living complexes are some of the popular applications these units are used.

Quality

The CA features as standard a heavy-gauge powder coat paint galvanized steel cabinet, a stainless steel drain pan to ensure long life and to help prevent corrosion the evaporator coils are protected with a electro type coating. 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

- Affordable comfort
- Simple installation and operation
- Low installation costs
- Lower operating costs
- Flexibility in designing and installation
- Energy efficiency
- Space savings
- Superior quality
- Quiet operation

Flexible Installation

Typically, the cabinet and chassis are installed together, but with the two-piece design, the chassis can be installed in a custom architectural cabinet. All units are available with a compact chassis designed with the same dimensions for all model sizes and with multiple configurations for water and controls flexibility. To add to ease of installation, CA models arrive Geothermal ready as a greener alternative to the boiler/tower systems application.

Quiet Operation

Noise reduction is a critical consideration of the unit's design which is why all CA Models utilize thermal and acoustical double isolated compressor with closed cell foam insulation below the compressor base to support sound attenuation. The compressor is mounted to the bottom of chassis with a 2 piece base pan to reduce noise transmission and vibration.

Serviceability

All units are designed to be serviced from the front of the unit by utilizing the removable slide out chassis (fan section, refrigeration unit with controls). The unit comes as a one piece "sloped top" cover with rigid steel discharge air grille and bottom return air filter rack for easy removal of washable mesh air filter. The electrical junction box (2" x 4") comes with a removable cover located on the Water Piping side (LH or RH) to facilitate field connections. Schrader valves for high and low pressure gauges are standard along with electrical box components are easily accessible for diagnosing and servicing the unit. These service friendly features benefit equipment owners with easier service access which saves time and money.

CA Model 009-018

- 5 Models from ¾ through 1½ tons
- Console unit configurations – 48" & 63" L cabinet
- Unit mounted control, left hand water
- Unit mounted control, right hand water
- Remote thermostat control, left hand water
- Remote thermostat control, right hand water

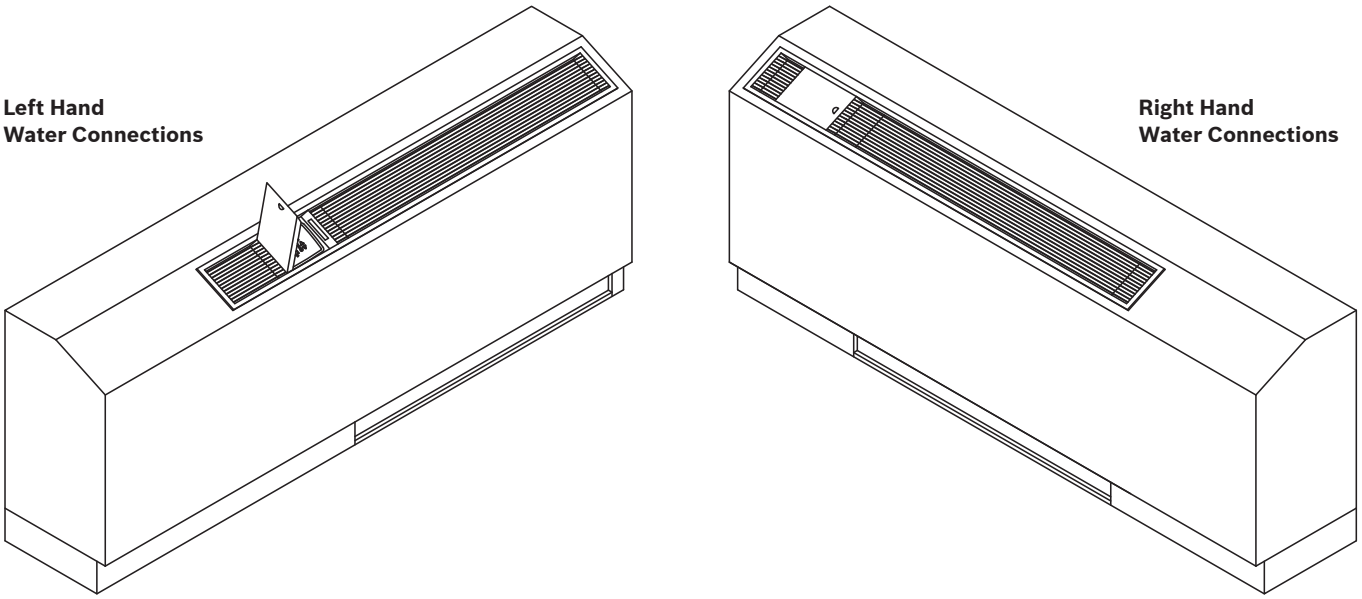


Figure 1

Interior View of Console Unit

Evaporator Coil (with Corrosion Resistant Coating)

Features, Functions and Benefits

Cabinet, Sub-base & Chassis

The CA console consists of three main components: the cabinet, sub-base and the chassis. The slope-top style, single-piece cabinetry is constructed with heavy-gauge "paint-grip" galvanized steel and finished with Powder coat beige paint finish. This allows for that professional appearance that is known from FHP products. The cabinet is mounted onto the sub-base and secured with metal screws for security. In addition, the Sub-base has a bracket that may be secured to the wall to provide stability. The sub-base is constructed of heavy-gauge painted steel. The chassis is of compact design and of the same dimensions for all model sizes. Both the compressor and coil compartments are thermally and acoustically insulated, and have removable steel cover plates giving double acoustical protection between the two compartments. All interior surfaces are lined with ½" thick, 1.5lb/cu ft density micromat multi-density, coated fiberglass insulation for thermal insulation and acoustical attenuation. Protection against corrosion is a feature with the CA Model. The stainless steel drain pan will last the lifetime of the unit while helping to resist corrosion and will avoid cracking and corrosion that may occur with inferior coated steel or plastic materials.

Filter and Blower Housing

Every CA comes equipped with a washable, reusable mesh-filter that provides air filtration from the base of the console. The blower fan is a three-speed high-efficiency PSC Motor that is direct connected by two double width, double inlet forward curved oversized centrifugal blower wheels that are selected for quiet operation, and balanced to minimize vibration. A removable inlet ring is a standard feature of the blower housing on all unit sizes. The removable inlet ring helps facilitate motor removal without having to remove the chassis. This allows less downtime while servicing the unit helping speed up recovery time and comfort levels.

Evaporator Coils

All CA evaporator coils are baked enamel coated with a corrosion resistant material. This epoxy coating protects against most airborne chemicals that can lead to accelerated corrosion and premature failure of the coil. All coatings are factory applied for total coil coverage and must pass the equivalent of a 1000-hour salt spray test.

Refrigerant Circuit

CA Models are designed using the optimum combination of rotary compressor, water and air coils to provide peak performance.

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. Cupro-nickel coils are available as an excellent option for applications where the water is of low quality.

Coax Coil

Four-way Reversing Valve

In geothermal applications where fluid temperatures can drop below the dew point of the surrounding air, the CA Models come geothermal ready with insulation standard on the coaxial heat exchangers. 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.

Refrigerant flow to the air coil is controlled by a thermal expansion valve (TXV) and is standard in all CA Models. These TXV's are designed to vary the flow of refrigerant depending on the load. TXV's provide unit optimization and a more stable control over a wider range of operating conditions. CA Models are rated to withstand 600 PSIG working refrigerant pressure and 400 PSIG working water pressure. 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.

Controls

There are two main choices when designating controllability for the CA console. There is either a factory installed unit mounted controller or a field supplied remote controller. In deciding which to choose for the project, one factor to consider is if the project entails a building automation system with DDC, if this is the case, the remote mounted controller is mandatory. For further explanation, the descriptions are to follow or contact the local sales office to receive a better understanding of the console controllability choices.

Unit Mounted Controller (UMC) *(referred to also as a console unit controller or CUC in the installation manual)*

Designed to enhance the unit operation with more flexibility, accurate control and operating modes the unit mounted controller provides an increased level of comfort in the conditioned space together with solid-state reliability and ease of operation. Familiar functionality of our proven UPM module are incorporated into the unit mounted controller for unit protection. Unit mounted controller are available on all console units except for remote controller/thermostat designation.

- **Tactile Touchpad** for temperature, fan and mode adjustment.
- **Digital Display** of temperature in either degrees Fahrenheit or Celsius.
- **LED Display** provides indication for unit operating mode as well as fan speed and fault indication for high or low pressure lockout.
- **Adjustable Temperature Set Point** from 60° F through 80° F (15.5° C through 26.7° C).
- **Adjustable Temperature Differential** between 1° F and 6° F (0.6° C and 3.3° C).

Unit Mounted Controller (UMC)

UPM Control Board

- **Selectable Options**
  - Manual/Automatic changeover
  - Fan speed – High or Low
  - Fan operation constant fan or cycling with compressor
- **Additional Features**
  - 5 minute anti short cycling delay
  - Random start
  - 90 second low pressure bypass timer prevents nuisance lockouts during cold winter start up
  - Intelligent reset allows the unit to automatically restart after 5 minutes if a fault is no longer active
  - Low fluid temperature cut out set at 40 deg F. Please see IOM for geothermal applications.

Remote Mounted Control (RMC)

This feature provides the flexibility to connect a variety of different remote mounted controllers to a low voltage terminal strip within the console unit. The type of controller could be as simple as manual change-over, single-stage thermostat to a DDC to meet the design requirements of the project. To aid in these efforts, there is a full line-up of thermostats & controls available as accessories at Bosch.

Unit Protection Module (UPM)

When selecting the remote mounted controller, the CA console 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 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** – Two LED indicators are provided as follows:

DDC Control Board

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 Fault
2 Blinks - Low Pressure Fault
3 Blinks - Condenser Freeze Condition
4 Blinks - Condensate Overflow Fault
5 Blinks - Brownout Fault
6 Blinks - Evaporator Freeze 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 Controls (Option)

The optional 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

ZS Base
DDC Zone Sensor (ZS)

ZS Plus
DDC Zone Sensor (ZS)

ZS Pro
DDC Zone Sensor (ZS)

DDC Room Sensors

To complement the controller, FHP 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.

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.

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. This zone sensor offers a basic look and blends into most decors.

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

- Temperature sensor
- Temperature and relative humidity sensor

BACview® Hand Held
Diagnostic Tool

Additional Features

- 40VA transformer
- Slope top cabinet
- Fresh air damper
- TXV
- Dual refrigerant freeze sensor (with RMC)
- Condensate overflow safety (with RMC)
- Extended range compatible
- Remote reset at thermostat
- Fault LED indication
- 4 Way reversing valve
- LH/RH water piping connections

TXV Valve

Additional Options

- 75VA transformer
- 1/2" FPT fittings
- Multiple water piping connections
- Extended cabinet length - 63" L
- Motorized fresh air damper
- EMS relay
- Blower monitor relay (with RMC)
- Compressor monitor relay
- Pump/valve relay
- Wire to 208V (voltage -1 only)
- Non-fused disconnect switch

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.

Accessories

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". A variety of hose kits are available depending on the job requirement.

Kit 1 - Hoses only either 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.

Hose Kit

Systems

The CA 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 dehumidifies air by evaporating the liquid refrigerant. The cooling cycle is completed when the refrigerant flows as a low pressure gas through the reversing valve and back to the suction side of the compressor. Cool dehumidified air is circulated to the space maintaining comfort conditions.

Heating Mode

During the heating mode, the high pressure refrigerant gas is pumped from the compressor to the air-to-refrigerant heat exchanger coil via the reversing valve. In the air-to-refrigerant heat exchanger coil, the heat is removed by the air that passes over the coil surface, and the hot gas condenses into a liquid.

The heated air is ducted to the space and provides heating for the building. The refrigerant liquid then flows through a metering device to the water-to-refrigerant heat exchanger. 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.

Water-to-Air Heat Pump Cycle — Cooling

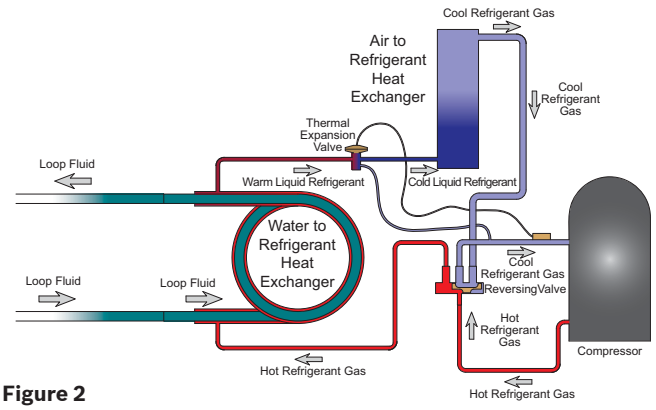


Figure 2

Water-to-Air Heat Pump Cycle — Heating

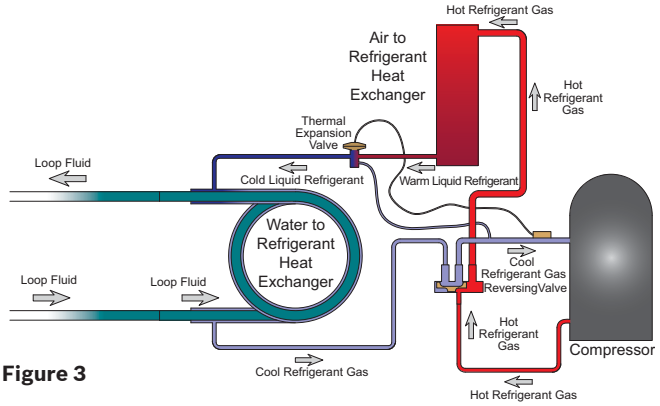


Figure 3

Typical Installations

Unit Location

Any mechanical device will, at some point in time require servicing and repair.With this in mind suffi-cient space must be provided around the unit for service personnel to perform mainte¬nance 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.

Typical Unit Installation

The CA console is found in a variety of buildings; most common are hotels, motels, schools, assisted living facilities, office buildings and virtually any place where comfort heating or cooling is desired in a small area. Before installing the unit, examine each pipe, fitting and valve; remove any dirt or debris found on or in these components. Use care when installing the system components to avoid damage to the cabinet finish or chassis. Make sure the unit's washable filter is clean and installed in the subbase. Also make sure that the filter clip is in place

Supply and Return Piping

The following items should be adhered to in addition to applicable piping codes.

- A drain valve at the base of each riser to enable proper flushing of the system at startup and during servicing.
- Shut-off/Isolation ball valves at the supply and return connections and unions at each unit to permit proper flow balancing and unit servicing.
- Strainers at the inlet of each circulating pump.

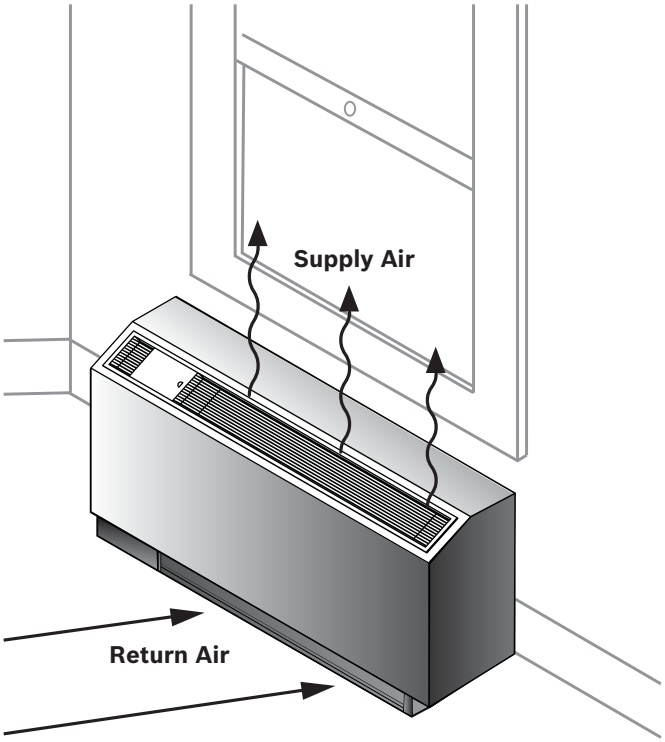


Figure 4

- Use of teflon tape on threaded pipe fittings to eliminate water leaks and insure against air entering the system.
- Flexible hose connections between the unit and the rigid system to eliminate the possibility of vibration transmission through the piping.
- Insulation is not normally required on supply and return piping for boiler tower installations except in unheated sections or outdoor runs.
- Insulation is required for closed-loop geo-thermal installations as loop temperatures may fall below the dew point and can even fall below the freezing point of water during heating season.

Condensate Piping

Console units are designed with a blow-through configuration in the air handling section. This means that there is positive pressure at the unit drain pan and thus trapping is not required. Condensate is routed from the drain pan via a 5/8" non-pressure rated vinyl hose that is located below the supply and return water connections. Though horizontal runs of condensate piping are usually too short to pose problems, horizontal runs should be pitched at least 1 inch for every 10 feet of piping. Avoid low spots or unpitched piping, as these areas can collect sediment and eventually block condensate flow. Always inspect both internal and external condensate piping for kinks that could block condensate flow.

Operating Limits

The CA consoles 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.

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 18 to 21.

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—CA Model

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

*Antifreeze solution is required at these fluid temperatures.

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)
CA009	1.3	0.98	2.25
	1.5	1.26	2.91
	2.0	2.11	4.87
	2.5	3.16	7.29
	3.0	4.39	10.13
CA012	1.5	1.26	2.91
	2.0	2.11	4.87
	2.5	3.16	7.29
	3.0	4.39	10.1
	4.0	7.36	17.0
CA015	2.5	1.08	2.50
	3.0	1.50	3.47
	3.5	1.98	4.58
	4.0	2.52	5.82
	5.0	3.77	8.70
CA018	2.5	1.08	2.50
	3.0	1.50	3.47
	4.0	2.52	5.82
	5.0	3.77	8.70
	6.0	5.24	12.1

NOTE: All values based upon pure water at EWT 70°F

Capacity Data

CA009 (275 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1	0.6 (1.5)	75/63	9.8	7.3	11.1	0.43	22.5	30	0.7 (1.6)	60	5.9	4.2	0.51	3.4
			80/67	10.4	7.6	11.8	0.43	24.1			70	5.9	4.0	0.55	3.1
			85/71	11.1	7.8	12.5	0.43	25.7			80	5.8	3.7	0.59	2.9
	2	2.3 (5.2)	75/63	10.3	7.5	11.5	0.37	28.0		2.4 (5.6)	60	6.5	4.8	0.52	3.7
			80/67	11.0	7.8	12.2	0.36	30.6			70	6.4	4.4	0.56	3.4
			85/71	11.8	8.0	13.0	0.35	33.6			80	6.2	4.1	0.60	3.0
	3	4.7 (10.8)	75/63	10.5	7.6	11.6	0.34	30.5		4.9 (11.6)	60	6.7	5.0	0.52	3.8
			80/67	11.2	7.9	12.4	0.33	33.7			70	6.6	4.6	0.56	3.4
			85/71	12.0	8.1	13.2	0.32	37.4			80	6.4	4.3	0.61	3.1
60	1	0.6 (1.4)	75/63	9.4	7.1	10.7	0.49	19.1	40	0.7 (1.6)	60	6.8	5.1	0.52	3.9
			80/67	10.0	7.4	11.4	0.49	20.3			70	6.7	4.8	0.57	3.5
			85/71	10.6	7.6	12.1	0.49	21.6			80	6.6	4.5	0.61	3.2
	2	2.2 (5)	75/63	9.9	7.3	11.1	0.43	23.1		2.3 (5.4)	60	7.5	5.8	0.53	4.1
			80/67	10.5	7.6	11.9	0.42	25.0			70	7.4	5.4	0.58	3.7
			85/71	11.2	7.8	12.6	0.41	27.1			80	7.2	5.0	0.63	3.4
	3	4.5 (10.5)	75/63	10.0	7.4	11.3	0.41	24.7		4.7 (11.2)	60	7.8	6.0	0.54	4.3
			80/67	10.7	7.7	12.0	0.40	27.1			70	7.6	5.7	0.59	3.8
			85/71	11.5	7.9	12.8	0.39	29.7			80	7.4	5.3	0.64	3.4
70	1	0.6 (1.4)	75/63	8.9	6.9	10.4	0.55	16.3	50	0.6 (1.5)	60	8.0	6.2	0.5	4.3
			80/67	9.5	7.2	11.0	0.55	17.3			70	7.9	5.9	0.6	3.9
			85/71	10.1	7.4	11.7	0.55	18.3			80	7.7	5.5	0.6	3.5
	2	2.1 (4.9)	75/63	9.4	7.1	10.8	0.49	19.2		2.3 (5.2)	60	8.8	7.0	0.6	4.6
			80/67	10.0	7.4	11.5	0.48	20.7			70	8.6	6.5	0.6	4.1
			85/71	10.7	7.7	12.2	0.48	22.3			80	8.4	6.1	0.7	3.7
	3	4.4 (10.1)	75/63	9.5	7.2	10.9	0.47	20.4		4.7 (10.8)	60	9.1	7.3	0.6	4.7
			80/67	10.2	7.5	11.6	0.46	22.2			70	8.9	6.8	0.6	4.2
			85/71	10.9	7.7	12.3	0.45	24.1			80	8.6	6.3	0.7	3.8
80	1	0.6 (1.4)	75/63	8.5	6.7	10.0	0.61	14.0	60	0.6 (1.4)	60	9.0	7.2	0.6	4.7
			80/67	9.0	7.0	10.6	0.61	14.8			70	8.9	6.8	0.6	4.2
			85/71	9.6	7.2	11.3	0.61	15.6			80	8.7	6.4	0.7	3.8
	2	2 (4.7)	75/63	8.9	6.9	10.4	0.55	16.2		2.2 (5)	60	9.9	8.1	0.6	5.0
			80/67	9.5	7.2	11.0	0.55	17.4			70	9.7	7.6	0.6	4.5
			85/71	10.2	7.5	11.7	0.55	18.6			80	9.5	7.1	0.7	4.0
	3	4.2 (9.8)	75/63	9.1	7.0	10.5	0.53	17.1		4.5 (10.5)	60	10.3	8.4	0.6	5.2
			80/67	9.7	7.3	11.2	0.53	18.4			70	10.0	7.9	0.6	4.6
			85/71	10.4	7.5	11.9	0.52	19.9			80	9.8	7.4	0.7	4.1
85	1	0.6 (1.3)	75/63	8.2	6.6	9.9	0.64	13.0	70	0.6 (1.4)	60	10.1	8.2	0.6	5.1
			80/67	8.8	6.9	10.5	0.64	13.7			70	9.9	7.8	0.6	4.5
			85/71	9.3	7.2	11.1	0.65	14.5			80	9.7	7.4	0.7	4.1
	2	2 (4.6)	75/63	8.7	6.8	10.2	0.58	14.9		2.1 (4.9)	60	11.1	9.2	0.6	5.5
			80/67	9.3	7.1	10.8	0.58	15.9			70	10.8	8.7	0.7	4.8
			85/71	9.9	7.3	11.5	0.58	17.1			80	10.6	8.2	0.7	4.3
	3	4.2 (9.6)	75/63	8.8	6.9	10.3	0.56	15.6		4.4 (10.1)	60	11.6	9.7	0.6	5.7
			80/67	9.4	7.2	11.0	0.56	16.8			70	11.2	9.1	0.7	5.0
			85/71	10.1	7.4	11.6	0.56	18.1			80	10.9	8.5	0.7	4.4
90	1	0.6 (1.3)	75/63	8.0	6.5	9.7	0.67	12.0	80	0.6 (1.4)	60	11.2	9.3	0.6	5.5
			80/67	8.5	6.8	10.3	0.67	12.7			70	10.9	8.8	0.7	4.9
			85/71	9.1	7.0	10.9	0.68	13.4			80	10.7	8.3	0.7	4.4
	2	2 (4.6)	75/63	8.4	6.7	10.0	0.61	13.7		2 (4.7)	60	12.4	10.5	0.6	6.0
			80/67	9.0	7.0	10.6	0.61	14.7			70	12.0	9.9	0.7	5.3
			85/71	9.6	7.2	11.3	0.61	15.6			80	11.7	9.3	0.7	4.7
	3	4.1 (9.5)	75/63	8.5	6.8	10.1	0.60	14.3		4.2 (9.8)	60	12.8	11.0	0.6	6.2
			80/67	9.2	7.0	10.8	0.59	15.4			70	12.5	10.3	0.7	5.4
			85/71	9.8	7.3	11.4	0.59	16.5			80	12.1	9.7	0.7	4.8
100	1	0.6 (1.3)	75/63	7.5	6.3	9.3	0.73	10.4							
			80/67	8.0	6.6	9.9	0.73	10.9							
			85/71	8.5	6.9	10.4	0.74	11.5							
	2	1.9 (4.4)	75/63	7.9	6.5	9.6	0.68	11.6							
			80/67	8.4	6.8	10.2	0.68	12.4							
			85/71	9.0	7.0	10.8	0.68	13.2							
	3	4 (9.2)	75/63	8.0	6.5	9.7	0.66	12.1							
			80/67	8.6	6.8	10.3	0.66	13.0							
			85/71	9.2	7.1	11.0	0.66	13.9							
110	1	0.5 (1.2)	75/63	7.1	6.2	8.9	0.79	8.9							
			80/67	7.5	6.4	9.5	0.80	9.4							
			85/71	8.0	6.6	10.0	0.81	9.9							
	2	1.9 (4.3)	75/63	7.4	6.3	9.2	0.75	9.9							
			80/67	7.9	6.5	9.8	0.75	10.5							
			85/71	8.4	6.8	10.4	0.75	11.2							
	3	3.9 (8.9)	75/63	7.5	6.3	9.3	0.73	10.2							
			80/67	8.0	6.6	9.9	0.74	10.9							
			85/71	8.6	6.9	10.5	0.74	11.7							

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.

Subject to change without prior notice.

Capacity Data

CA009 (300 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1	0.6 (1.5)	75/63	9.9	7.6	11.3	0.5	21.8	30	0.7 (1.6)	60	5.9	4.3	0.5	3.4
			80/67	10.6	7.9	11.9	0.5	23.3			70	5.9	4.0	0.5	3.1
			85/71	11.2	8.2	12.6	0.5	24.8			80	5.8	3.7	0.6	2.9
	2	2.3 (5.2)	75/63	10.5	7.9	11.7	0.4	27.0		2.4 (5.6)	60	6.5	4.8	0.5	3.7
			80/67	11.2	8.1	12.4	0.4	29.5			70	6.4	4.5	0.6	3.4
			85/71	11.9	8.4	13.2	0.4	32.3			80	6.3	4.2	0.6	3.0
	3	4.7 (10.8)	75/63	10.7	7.9	11.8	0.4	29.4		4.9 (11.6)	60	6.8	5.0	0.5	3.8
			80/67	11.4	8.2	12.6	0.4	32.5			70	6.6	4.7	0.6	3.4
			85/71	12.2	8.5	13.4	0.3	35.9			80	6.5	4.4	0.6	3.1
60	1	0.6 (1.4)	75/63	9.5	7.4	10.9	0.5	18.6	40	0.7 (1.6)	60	6.9	5.1	0.5	3.9
			80/67	10.1	7.7	11.6	0.5	19.7			70	6.8	4.8	0.6	3.5
			85/71	10.7	7.9	12.2	0.5	21.0			80	6.7	4.5	0.6	3.2
	2	2.2 (5)	75/63	10.0	7.7	11.3	0.4	22.4		2.3 (5.4)	60	7.6	5.8	0.5	4.2
			80/67	10.7	7.9	12.0	0.4	24.2			70	7.4	5.5	0.6	3.7
			85/71	11.4	8.2	12.7	0.4	26.3			80	7.3	5.1	0.6	3.4
	3	4.5 (10.5)	75/63	10.2	7.7	11.4	0.4	24.0		4.7 (11.2)	60	7.9	6.1	0.5	4.3
			80/67	10.9	8.0	12.2	0.4	26.3			70	7.7	5.7	0.6	3.8
			85/71	11.6	8.3	12.9	0.4	28.7			80	7.5	5.3	0.6	3.5
70	1	0.6 (1.4)	75/63	9.0	7.2	10.5	0.6	15.9	50	0.6 (1.5)	60	8.1	6.3	0.6	4.3
			80/67	9.6	7.5	11.2	0.6	16.8			70	8.0	5.9	0.6	3.9
			85/71	10.2	7.8	11.8	0.6	17.8			80	7.8	5.6	0.7	3.5
	2	2.1 (4.9)	75/63	9.5	7.4	10.9	0.5	18.7		2.3 (5.2)	60	8.9	7.0	0.6	4.6
			80/67	10.2	7.7	11.6	0.5	20.2			70	8.7	6.6	0.6	4.1
			85/71	10.9	8.0	12.3	0.5	21.7			80	8.5	6.1	0.7	3.7
	3	4.4 (10.1)	75/63	9.7	7.5	11.1	0.5	19.9		4.7 (10.8)	60	9.2	7.3	0.6	4.7
			80/67	10.4	7.8	11.8	0.5	21.6			70	9.0	6.9	0.6	4.2
			85/71	11.1	8.1	12.5	0.5	23.5			80	8.7	6.4	0.7	3.8
80	1	0.6 (1.4)	75/63	8.6	7.0	10.2	0.6	13.7	60	0.6 (1.4)	60	9.1	7.3	0.6	4.7
			80/67	9.1	7.3	10.8	0.6	14.5			70	9.0	6.8	0.6	4.2
			85/71	9.7	7.6	11.4	0.6	15.3			80	8.8	6.5	0.7	3.8
	2	2 (4.7)	75/63	9.0	7.2	10.5	0.6	15.8		2.2 (5)	60	10.1	8.2	0.6	5.1
			80/67	9.6	7.5	11.2	0.6	16.9			70	9.8	7.7	0.6	4.5
			85/71	10.3	7.8	11.9	0.6	18.2			80	9.6	7.2	0.7	4.0
	3	4.2 (9.8)	75/63	9.2	7.3	10.7	0.6	16.7		4.5 (10.5)	60	10.4	8.5	0.6	5.2
			80/67	9.8	7.6	11.3	0.5	17.9			70	10.1	8.0	0.6	4.6
			85/71	10.5	7.8	12.0	0.5	19.4			80	9.9	7.5	0.7	4.1
85	1	0.6 (1.3)	75/63	8.3	7.0	10.0	0.7	12.7	70	0.6 (1.4)	60	10.2	8.3	0.6	5.1
			80/67	8.9	7.2	10.6	0.7	13.4			70	10.0	7.9	0.6	4.6
			85/71	9.4	7.5	11.2	0.7	14.2			80	9.8	7.4	0.7	4.1
	2	2 (4.6)	75/63	8.8	7.1	10.3	0.6	14.6		2.1 (4.9)	60	11.3	9.4	0.6	5.6
			80/67	9.4	7.4	11.0	0.6	15.6			70	11.0	8.8	0.7	4.9
			85/71	10.0	7.7	11.6	0.6	16.7			80	10.7	8.3	0.7	4.4
	3	4.2 (9.6)	75/63	8.9	7.2	10.4	0.6	15.3		4.4 (10.1)	60	11.7	9.8	0.6	5.8
			80/67	9.6	7.5	11.1	0.6	16.4			70	11.4	9.2	0.7	5.1
			85/71	10.2	7.8	11.8	0.6	17.7			80	11.1	8.6	0.7	4.5
90	1	0.6 (1.3)	75/63	8.1	6.9	9.8	0.7	11.8	80	0.6 (1.4)	60	11.3	9.4	0.6	5.6
			80/67	8.6	7.1	10.4	0.7	12.4			70	11.0	8.9	0.7	4.9
			85/71	9.2	7.4	11.0	0.7	13.1			80	10.8	8.4	0.7	4.4
	2	2 (4.6)	75/63	8.5	7.0	10.1	0.6	13.4		2 (4.7)	60	12.5	10.6	0.6	6.1
			80/67	9.1	7.3	10.8	0.6	14.3			70	12.2	10.0	0.7	5.4
			85/71	9.7	7.6	11.4	0.6	15.3			80	11.9	9.4	0.7	4.8
	3	4.1 (9.5)	75/63	8.7	7.1	10.2	0.6	14.0		4.2 (9.8)	60	13.0	11.1	0.6	6.3
			80/67	9.3	7.4	10.9	0.6	15.1			70	12.6	10.5	0.7	5.5
			85/71	9.9	7.7	11.6	0.6	16.2			80	12.3	9.9	0.7	4.9
100	1	0.6 (1.3)	75/63	7.6	6.7	9.4	0.7	10.2							
			80/67	8.1	7.0	10.0	0.8	10.7							
			85/71	8.6	7.2	10.6	0.8	11.3							
	2	1.9 (4.4)	75/63	8.0	6.8	9.7	0.7	11.4							
			80/67	8.6	7.1	10.3	0.7	12.2							
			85/71	9.1	7.4	10.9	0.7	12.9							
	3	4 (9.2)	75/63	8.1	6.8	9.8	0.7	11.9							
			80/67	8.7	7.1	10.4	0.7	12.7							
			85/71	9.3	7.5	11.1	0.7	13.6							
110	1	0.5 (1.2)	75/63	7.1	6.4	9.0	0.8	8.8							
			80/67	7.6	6.7	9.6	0.8	9.3							
			85/71	8.1	7.0	10.2	0.8	9.7							
	2	1.9 (4.3)	75/63	7.5	6.6	9.3	0.8	9.7							
			80/67	8.0	6.9	9.9	0.8	10.4							
			85/71	8.5	7.1	10.5	0.8	11.0							
	3	3.9 (8.9)	75/63	7.6	6.6	9.4	0.8	10.1							
			80/67	8.1	7.0	10.0	0.8	10.7							
			85/71	8.7	7.2	10.6	0.8	11.5							

Extended Range - Anti-freeze required

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

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

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the 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.

Capacity Data

CA012 (475 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1.5	1.3 (3.1)	75/63	12.8	10.6	14.6	0.6	22.4	30	1.4 (3.3)	60	7.9	5.6	0.7	3.4
			80/67	13.6	11.0	15.5	0.6	23.8			70	7.8	5.2	0.7	3.1
			85/71	14.4	11.4	16.3	0.6	25.3			80	7.7	4.8	0.8	2.9
	2.5	3.4 (7.8)	75/63	13.2	10.8	15.0	0.5	25.9		3.5 (8.4)	60	8.4	6.0	0.7	3.6
			80/67	14.1	11.2	15.9	0.5	27.9			70	8.2	5.6	0.7	3.2
			85/71	15.0	11.6	16.8	0.5	30.1			80	8.1	5.2	0.8	3.0
	3.5	6.2 (14.3)	75/63	13.4	10.9	15.1	0.5	27.6		6.4 (15.3)	60	8.6	6.2	0.7	3.7
			80/67	14.3	11.3	16.0	0.5	30.1			70	8.4	5.8	0.7	3.3
			85/71	15.3	11.7	17.0	0.5	32.8			80	8.2	5.4	0.8	3.0
60	1.5	1.3 (3)	75/63	12.2	10.4	14.2	0.6	19.0	40	1.3 (3.2)	60	9.0	6.6	0.7	3.8
			80/67	13.0	10.8	15.0	0.6	20.1			70	8.8	6.2	0.8	3.4
			85/71	13.8	11.2	15.8	0.6	21.3			80	8.7	5.8	0.8	3.1
	2.5	3.3 (7.5)	75/63	12.6	10.5	14.5	0.6	21.4		3.4 (8.1)	60	9.6	7.2	0.7	4.0
			80/67	13.5	11.0	15.4	0.6	23.0			70	9.4	6.7	0.8	3.6
			85/71	14.3	11.3	16.3	0.6	24.7			80	9.2	6.3	0.8	3.2
	3.5	6 (13.8)	75/63	12.8	10.6	14.6	0.6	22.6		6.2 (14.8)	60	9.9	7.5	0.7	4.1
			80/67	13.7	11.1	15.5	0.6	24.5			70	9.6	7.0	0.8	3.7
			85/71	14.6	11.4	16.5	0.6	26.5			80	9.4	6.5	0.8	3.3
70	1.5	1.3 (2.9)	75/63	11.6	10.2	13.7	0.7	16.2	50	1.3 (3.1)	60	10.5	8.0	0.7	4.3
			80/67	12.3	10.5	14.5	0.7	17.1			70	10.3	7.5	0.8	3.9
			85/71	13.1	10.9	15.3	0.7	18.0			80	10.1	7.1	0.8	3.5
	2.5	3.2 (7.3)	75/63	12.0	10.3	14.0	0.7	18.0		3.4 (7.8)	60	11.1	8.7	0.7	4.5
			80/67	12.8	10.8	14.8	0.7	19.2			70	10.8	8.1	0.8	4.0
			85/71	13.6	11.2	15.7	0.7	20.5			80	10.6	7.6	0.9	3.6
	3.5	5.8 (13.3)	75/63	12.2	10.3	14.2	0.6	18.8		6.2 (14.3)	60	11.4	9.0	0.7	4.6
			80/67	13.0	10.8	15.0	0.6	20.2			70	11.2	8.4	0.8	4.1
			85/71	13.8	11.2	15.9	0.6	21.7			80	10.9	7.8	0.9	3.7
80	1.5	1.2 (2.8)	75/63	11.0	9.9	13.3	0.8	13.8	60	1.3 (3)	60	11.8	9.3	0.7	4.7
			80/67	11.7	10.3	14.1	0.8	14.6			70	11.5	8.8	0.8	4.2
			85/71	12.4	10.7	14.8	0.8	15.4			80	11.3	8.2	0.9	3.8
	2.5	3.1 (7.1)	75/63	11.4	10.1	13.5	0.7	15.2		3.3 (7.5)	60	12.6	10.1	0.7	5.0
			80/67	12.1	10.5	14.4	0.8	16.2			70	12.3	9.5	0.8	4.4
			85/71	12.9	10.9	15.2	0.8	17.2			80	12.0	8.9	0.9	4.0
	3.5	5.6 (12.9)	75/63	11.5	10.2	13.6	0.7	15.8		6 (13.8)	60	13.0	10.5	0.7	5.1
			80/67	12.3	10.5	14.5	0.7	16.9			70	12.6	9.9	0.8	4.6
			85/71	13.1	11.0	15.3	0.7	18.0			80	12.3	9.2	0.9	4.1
85	1.5	1.2 (2.8)	75/63	10.7	9.8	13.0	0.8	12.8	70	1.3 (2.9)	60	13.1	10.7	0.7	5.2
			80/67	11.4	10.2	13.8	0.8	13.5			70	12.9	10.1	0.8	4.6
			85/71	12.1	10.6	14.6	0.9	14.2			80	12.6	9.5	0.9	4.1
	2.5	3 (6.9)	75/63	11.0	9.9	13.3	0.8	14.0		3.2 (7.3)	60	14.1	11.6	0.7	5.5
			80/67	11.8	10.3	14.1	0.8	14.9			70	13.7	10.9	0.8	4.9
			85/71	12.5	10.8	14.9	0.8	15.8			80	13.4	10.3	0.9	4.3
	3.5	5.5 (12.7)	75/63	11.2	10.0	13.4	0.8	14.5		5.8 (13.3)	60	14.5	12.1	0.8	5.7
			80/67	11.9	10.4	14.2	0.8	15.4			70	14.1	11.4	0.8	5.0
			85/71	12.7	10.9	15.0	0.8	16.5			80	13.7	10.7	0.9	4.4
90	1.5	1.2 (2.7)	75/63	10.4	9.6	12.8	0.9	11.9	80	1.2 (2.8)	60	14.6	12.1	0.8	5.7
			80/67	11.1	10.0	13.6	0.9	12.5			70	14.3	11.5	0.8	5.0
			85/71	11.7	10.5	14.3	0.9	13.1			80	14.0	10.8	0.9	4.5
	2.5	3 (6.8)	75/63	10.7	9.8	13.0	0.8	12.9		3.1 (7.1)	60	15.6	13.1	0.8	6.0
			80/67	11.4	10.2	13.9	0.8	13.7			70	15.2	12.4	0.8	5.3
			85/71	12.2	10.6	14.7	0.8	14.5			80	14.9	11.7	0.9	4.7
	3.5	5.4 (12.5)	75/63	10.8	9.9	13.1	0.8	13.3		5.6 (12.9)	60	16.1	13.7	0.8	6.2
			80/67	11.6	10.2	14.0	0.8	14.2			70	15.7	12.9	0.8	5.4
			85/71	12.4	10.7	14.8	0.8	15.1			80	15.3	12.1	0.9	4.8
100	1.5	1.1 (2.6)	75/63	9.8	9.3	12.3	1.0	10.2							
			80/67	10.4	9.7	13.1	1.0	10.8							
			85/71	11.0	10.2	13.8	1.0	11.3							
	2.5	2.9 (6.6)	75/63	10.0	9.5	12.6	0.9	10.9							
			80/67	10.7	9.9	13.3	0.9	11.6							
			85/71	11.4	10.4	14.1	0.9	12.3							
	3.5	5.3 (12.1)	75/63	10.0	9.3	12.6	0.9	10.9							
			80/67	10.9	10.0	13.4	0.9	12.0							
			85/71	11.6	10.4	14.2	0.9	12.7							
110	1.5	1.1 (2.6)	75/63	9.1	9.0	11.9	1.0	8.7							
			80/67	9.7	9.4	12.6	1.1	9.2							
			85/71	10.3	9.9	13.3	1.1	9.7							
	2.5	2.8 (6.4)	75/63	9.4	9.1	12.1	1.0	9.3							
			80/67	10.0	9.6	12.8	1.0	9.8							
			85/71	10.7	10.0	13.6	1.0	10.4							
	3.5	5.1 (11.8)	75/63	9.4	9.0	12.1	1.0	9.3							
			80/67	10.1	9.7	12.9	1.0	10.1							
			85/71	10.8	10.1	13.6	1.0	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.

Capacity Data

CA012 (520 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	1.5	1.3 (3.1)	75/63	12.9	11.1	14.9	0.6	21.5	30	1.4 (3.3)	60	7.9	5.6	0.7	3.3
			80/67	13.7	11.6	15.7	0.6	22.8			70	7.9	5.2	0.8	3.1
			85/71	14.5	12.1	16.6	0.6	24.2			80	7.7	4.9	0.8	2.8
	2.5	3.4 (7.8)	75/63	13.4	11.4	15.2	0.5	24.7		3.5 (8.4)	60	8.4	6.0	0.7	3.5
			80/67	14.3	11.8	16.1	0.5	26.7			70	8.2	5.6	0.8	3.2
			85/71	15.2	12.3	17.1	0.5	28.7			80	8.1	5.2	0.8	2.9
	3.5	6.2 (14.3)	75/63	13.6	11.5	15.4	0.5	26.3		6.4 (15.3)	60	8.7	6.3	0.7	3.6
			80/67	14.5	11.9	16.3	0.5	28.7			70	8.5	5.9	0.8	3.2
			85/71	15.4	12.4	17.3	0.5	31.1			80	8.3	5.4	0.8	2.9
60	1.5	1.3 (3)	75/63	12.3	11.0	14.4	0.7	18.3	40	1.3 (3.2)	60	9.1	6.7	0.7	3.7
			80/67	13.1	11.4	15.3	0.7	19.4			70	8.9	6.3	0.8	3.4
			85/71	13.9	11.8	16.1	0.7	20.5			80	8.8	5.8	0.8	3.1
	2.5	3.3 (7.5)	75/63	12.8	11.2	14.8	0.6	20.6		3.4 (8.1)	60	9.7	7.2	0.7	3.9
			80/67	13.6	11.5	15.7	0.6	22.1			70	9.4	6.8	0.8	3.5
			85/71	14.5	12.0	16.5	0.6	23.7			80	9.2	6.3	0.9	3.2
	3.5	6 (13.8)	75/63	13.0	11.2	14.9	0.6	21.7		6.2 (14.8)	60	10.0	7.5	0.7	4.0
			80/67	13.8	11.6	15.8	0.6	23.5			70	9.7	7.0	0.8	3.6
			85/71	14.7	12.1	16.7	0.6	25.3			80	9.5	6.6	0.9	3.2
70	1.5	1.3 (2.9)	75/63	11.7	10.7	14.0	0.7	15.7	50	1.3 (3.1)	60	10.5	8.1	0.7	4.2
			80/67	12.5	11.1	14.8	0.8	16.6			70	10.4	7.6	0.8	3.8
			85/71	13.2	11.5	15.6	0.8	17.5			80	10.1	7.1	0.9	3.4
	2.5	3.2 (7.3)	75/63	12.1	10.9	14.3	0.7	17.4		3.4 (7.8)	60	11.2	8.7	0.7	4.4
			80/67	12.9	11.3	15.2	0.7	18.6			70	10.9	8.2	0.8	3.9
			85/71	13.7	11.8	16.0	0.7	19.8			80	10.7	7.6	0.9	3.6
	3.5	5.8 (13.3)	75/63	12.3	11.0	14.4	0.7	18.2		6.2 (14.3)	60	11.5	9.1	0.7	4.5
			80/67	13.1	11.5	15.3	0.7	19.5			70	11.2	8.5	0.8	4.0
			85/71	14.0	11.9	16.2	0.7	20.9			80	11.0	7.9	0.9	3.6
80	1.5	1.2 (2.8)	75/63	11.1	10.4	13.5	0.8	13.5	60	1.3 (3)	60	11.9	9.4	0.7	4.6
			80/67	11.8	10.8	14.3	0.8	14.2			70	11.6	8.9	0.8	4.2
			85/71	12.6	11.3	15.1	0.8	14.9			80	11.4	8.3	0.9	3.7
	2.5	3.1 (7.1)	75/63	11.5	10.6	13.8	0.8	14.8		3.3 (7.5)	60	12.7	10.2	0.8	4.9
			80/67	12.3	11.0	14.7	0.8	15.7			70	12.4	9.6	0.8	4.4
			85/71	13.0	11.5	15.5	0.8	16.7			80	12.1	9.0	0.9	3.9
	3.5	5.6 (12.9)	75/63	11.6	10.7	13.9	0.8	15.3		6 (13.8)	60	13.1	10.6	0.8	5.1
			80/67	12.4	11.1	14.8	0.8	16.4			70	12.7	10.0	0.8	4.5
			85/71	13.3	11.5	15.6	0.8	17.5			80	12.4	9.3	0.9	4.0
85	1.5	1.2 (2.8)	75/63	10.8	10.3	13.3	0.9	12.5	70	1.3 (2.9)	60	13.2	10.8	0.8	5.1
			80/67	11.5	10.7	14.1	0.9	13.2			70	13.0	10.2	0.8	4.6
			85/71	12.2	11.2	14.9	0.9	13.8			80	12.7	9.6	0.9	4.1
	2.5	3 (6.9)	75/63	11.2	10.4	13.6	0.8	13.6		3.2 (7.3)	60	14.2	11.7	0.8	5.4
			80/67	11.9	10.9	14.4	0.8	14.5			70	13.8	11.1	0.8	4.8
			85/71	12.7	11.4	15.2	0.8	15.4			80	13.5	10.4	0.9	4.3
	3.5	5.5 (12.7)	75/63	11.3	10.5	13.7	0.8	14.1		5.8 (13.3)	60	14.6	12.2	0.8	5.6
			80/67	12.1	10.9	14.5	0.8	15.0			70	14.3	11.5	0.8	4.9
			85/71	12.9	11.5	15.3	0.8	16.0			80	13.9	10.8	0.9	4.4
90	1.5	1.2 (2.7)	75/63	10.5	10.1	13.1	0.9	11.6	80	1.2 (2.8)	60	14.7	12.2	0.8	5.6
			80/67	11.2	10.5	13.8	0.9	12.2			70	14.4	11.6	0.8	5.0
			85/71	11.9	11.0	14.6	0.9	12.8			80	14.1	10.9	0.9	4.4
	2.5	3 (6.8)	75/63	10.8	10.3	13.3	0.9	12.6		3.1 (7.1)	60	15.7	13.3	0.8	6.0
			80/67	11.6	10.7	14.1	0.9	13.4			70	15.4	12.6	0.9	5.3
			85/71	12.3	11.2	14.9	0.9	14.1			80	15.0	11.8	0.9	4.7
	3.5	5.4 (12.5)	75/63	11.0	10.3	13.4	0.8	13.0		5.6 (12.9)	60	16.3	13.8	0.8	6.2
			80/67	11.7	10.8	14.2	0.8	13.8			70	15.8	13.0	0.9	5.4
			85/71	12.5	11.2	15.1	0.8	14.7			80	15.4	12.3	0.9	4.8
100	1.5	1.1 (2.6)	75/63	9.9	9.8	12.6	1.0	10.0							
			80/67	10.5	10.3	13.3	1.0	10.5							
			85/71	11.2	10.7	14.1	1.0	11.0							
	2.5	2.9 (6.6)	75/63	10.2	9.9	12.8	1.0	10.7							
			80/67	10.8	10.5	13.6	1.0	11.3							
			85/71	11.6	10.9	14.4	1.0	12.0							
	3.5	5.3 (12.1)	75/63	10.2	9.8	12.9	1.0	10.6							
			80/67	11.0	10.5	13.7	0.9	11.7							
			85/71	11.7	10.9	14.5	0.9	12.4							
110	1.5	1.1 (2.6)	75/63	9.3	9.3	12.2	1.1	8.6							
			80/67	9.8	9.8	12.9	1.1	9.1							
			85/71	10.4	10.4	13.6	1.1	9.5							
	2.5	2.8 (6.4)	75/63	9.5	9.5	12.4	1.0	9.1							
			80/67	10.1	10.1	13.1	1.0	9.6							
			85/71	10.8	10.6	13.8	1.1	10.2							
	3.5	5.1 (11.8)	75/63	9.5	9.5	12.4	1.0	9.1							
			80/67	10.2	10.1	13.1	1.0	9.9							
			85/71	10.9	10.6	13.9	1.0	10.5							

Extended Range - Anti-freeze required

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

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

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the 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.

Subject to change without prior notice.

Capacity Data

CA015 (450 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2	0.8 (1.8)	75/63	16.3	12.3	18.8	0.8	21.2	30	0.8 (1.9)	60	10.4	7.3	0.9	3.3
			80/67	17.4	12.7	19.9	0.8	22.7			70	10.2	6.8	1.0	3.0
			85/71	18.5	13.0	21.1	0.8	24.3			80	10.2	6.3	1.1	2.8
	3	1.6 (3.7)	75/63	16.8	12.5	19.1	0.7	23.8		1.7 (4)	60	10.9	7.7	0.9	3.4
			80/67	18.0	12.9	20.3	0.7	25.9			70	10.7	7.2	1.0	3.1
			85/71	19.2	13.3	21.5	0.7	28.1			80	10.6	6.7	1.1	2.9
	4	2.7 (6.2)	75/63	17.1	12.6	19.3	0.7	25.5		2.8 (6.7)	60	11.2	8.0	0.9	3.5
			80/67	18.2	13.0	20.5	0.7	27.8			70	11.0	7.5	1.0	3.2
			85/71	19.5	13.4	21.7	0.6	30.5			80	10.8	6.9	1.1	2.9
60	2	0.7 (1.7)	75/63	15.6	12.0	18.2	0.9	17.9	40	0.8 (1.9)	60	11.9	8.7	1.0	3.6
			80/67	16.6	12.3	19.3	0.9	19.1			70	11.7	8.2	1.0	3.3
			85/71	17.7	12.7	20.5	0.9	20.4			80	11.5	7.6	1.1	3.0
	3	1.6 (3.6)	75/63	16.1	12.2	18.6	0.8	19.9		1.6 (3.8)	60	12.5	9.3	1.0	3.8
			80/67	17.2	12.6	19.7	0.8	21.4			70	12.3	8.7	1.1	3.4
			85/71	18.3	12.9	20.9	0.8	23.1			80	12.1	8.1	1.1	3.1
	4	2.6 (6)	75/63	16.3	12.3	18.7	0.8	21.0		2.7 (6.5)	60	12.9	9.6	1.0	3.9
			80/67	17.4	12.7	19.9	0.8	22.8			70	12.6	9.0	1.1	3.5
			85/71	18.6	13.0	21.1	0.8	24.7			80	12.4	8.4	1.1	3.2
70	2	0.7 (1.7)	75/63	14.8	11.6	17.7	1.0	15.2	50	0.8 (1.8)	60	13.8	10.5	1.0	4.1
			80/67	15.9	12.0	18.8	1.0	16.2			70	13.6	9.9	1.1	3.7
			85/71	16.9	12.5	19.8	1.0	17.2			80	13.4	9.3	1.2	3.3
	3	1.5 (3.5)	75/63	15.3	11.8	18.0	0.9	16.7		1.6 (3.7)	60	14.5	11.2	1.0	4.3
			80/67	16.3	12.2	19.1	0.9	17.9			70	14.2	10.5	1.1	3.8
			85/71	17.4	12.6	20.2	0.9	19.2			80	13.9	9.8	1.2	3.4
	4	2.5 (5.8)	75/63	15.5	11.9	18.2	0.9	17.5		2.7 (6.2)	60	14.9	11.5	1.0	4.3
			80/67	16.6	12.3	19.3	0.9	18.9			70	14.6	10.8	1.1	3.9
			85/71	17.7	12.8	20.5	0.9	20.4			80	14.3	10.1	1.2	3.5
80	2	0.7 (1.6)	75/63	14.1	11.3	17.2	1.1	13.0	60	0.7 (1.7)	60	15.6	12.1	1.0	4.5
			80/67	15.0	11.7	18.2	1.1	13.8			70	15.3	11.5	1.1	4.0
			85/71	16.0	12.1	19.2	1.1	14.7			80	15.0	10.8	1.2	3.6
	3	1.5 (3.4)	75/63	14.5	11.5	17.4	1.0	14.1		1.6 (3.6)	60	16.4	12.9	1.0	4.7
			80/67	15.5	11.9	18.5	1.0	15.1			70	16.0	12.2	1.1	4.2
			85/71	16.5	12.3	19.6	1.0	16.2			80	15.7	11.4	1.2	3.7
	4	2.4 (5.6)	75/63	14.7	11.6	17.6	1.0	14.8		2.6 (6)	60	16.9	13.4	1.0	4.8
			80/67	15.7	11.9	18.7	1.0	15.9			70	16.5	12.6	1.1	4.2
			85/71	16.8	12.4	19.8	1.0	17.0			80	16.1	11.8	1.2	3.8
85	2	0.7 (1.6)	75/63	13.7	11.1	16.9	1.1	12.1	70	0.7 (1.7)	60	17.4	13.9	1.0	4.9
			80/67	14.6	11.5	17.9	1.1	12.8			70	17.0	13.1	1.2	4.3
			85/71	15.6	11.9	18.9	1.1	13.6			80	16.7	12.4	1.3	3.9
	3	1.4 (3.3)	75/63	14.1	11.3	17.2	1.1	13.0		1.5 (3.5)	60	18.4	14.9	1.1	5.1
			80/67	15.1	11.7	18.2	1.1	13.9			70	18.0	14.0	1.2	4.5
			85/71	16.1	12.2	19.3	1.1	14.9			80	17.5	13.2	1.3	4.0
	4	2.4 (5.5)	75/63	14.3	11.3	17.3	1.1	13.6		2.5 (5.8)	60	18.9	15.4	1.1	5.2
			80/67	15.3	11.8	18.4	1.1	14.5			70	18.5	14.5	1.2	4.6
			85/71	16.3	12.3	19.5	1.0	15.6			80	18.0	13.6	1.3	4.1
90	2	0.7 (1.6)	75/63	13.3	11.0	16.6	1.2	11.2	80	0.7 (1.6)	60	19.2	15.7	1.1	5.3
			80/67	14.2	11.3	17.6	1.2	11.9			70	18.8	15.0	1.2	4.7
			85/71	15.1	11.8	18.6	1.2	12.5			80	18.5	14.1	1.3	4.2
	3	1.4 (3.3)	75/63	13.7	11.1	16.9	1.1	12.0		1.5 (3.4)	60	20.3	16.9	1.1	5.6
			80/67	14.6	11.6	17.9	1.1	12.8			70	19.9	16.0	1.2	4.9
			85/71	15.6	11.9	19.0	1.1	13.7			80	19.5	15.1	1.3	4.4
	4	2.4 (5.5)	75/63	13.9	11.2	17.0	1.1	12.5		2.4 (5.6)	60	21.0	17.5	1.1	5.7
			80/67	14.8	11.6	18.0	1.1	13.4			70	20.5	16.5	1.2	5.0
			85/71	15.9	12.0	19.1	1.1	14.3			80	20.0	15.6	1.3	4.5
100	2	0.7 (1.5)	75/63	12.5	10.6	16.1	1.3	9.6							
			80/67	13.4	11.1	17.0	1.3	10.2							
			85/71	14.2	11.5	18.0	1.3	10.8							
	3	1.4 (3.2)	75/63	12.9	10.7	16.3	1.3	10.3							
			80/67	13.8	11.2	17.3	1.3	10.9							
			85/71	14.7	11.6	18.3	1.3	11.6							
	4	2.3 (5.3)	75/63	13.0	10.8	16.4	1.2	10.6							
			80/67	14.0	11.2	17.4	1.2	11.3							
			85/71	14.9	11.7	18.4	1.2	12.1							
110	2	0.6 (1.5)	75/63	11.7	10.3	15.5	1.4	8.3							
			80/67	12.5	10.7	16.4	1.4	8.7							
			85/71	13.3	11.1	17.3	1.4	9.2							
	3	1.3 (3.1)	75/63	12.0	10.4	15.7	1.4	8.8							
			80/67	12.8	10.8	16.6	1.4	9.3							
			85/71	13.7	11.3	17.6	1.4	9.9							
	4	2.2 (5.1)	75/63	12.2	10.5	15.8	1.3	9.0							
			80/67	13.0	10.9	16.8	1.4	9.6							
			85/71	14.0	11.3	17.8	1.4	10.3							

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.

Subject to change without prior notice.

Capacity Data

CA015 (500 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2	0.8 (1.8)	75/63	16.6	13.0	19.1	0.8	20.8	30	0.8 (1.9)	60	10.5	7.3	0.9	3.3
			80/67	17.7	13.4	20.3	0.8	22.3			70	10.4	6.9	1.0	3.0
			85/71	18.8	13.8	21.4	0.8	23.8			80	10.3	6.4	1.1	2.7
	3	1.6 (3.7)	75/63	17.1	13.2	19.5	0.7	23.4		1.7 (4)	60	11.0	7.8	1.0	3.4
			80/67	18.3	13.6	20.7	0.7	25.4			70	10.8	7.3	1.0	3.1
			85/71	19.5	14.0	21.9	0.7	27.5			80	10.8	6.7	1.1	2.8
	4	2.7 (6.2)	75/63	17.4	13.3	19.7	0.7	25.0		2.8 (6.7)	60	11.3	8.1	1.0	3.5
			80/67	18.6	13.7	20.9	0.7	27.3			70	11.1	7.5	1.0	3.1
			85/71	19.8	14.1	22.1	0.7	29.8			80	11.0	7.0	1.1	2.9
60	2	0.7 (1.7)	75/63	15.9	12.6	18.6	0.9	17.6	40	0.8 (1.9)	60	12.0	8.7	1.0	3.6
			80/67	16.9	13.0	19.7	0.9	18.8			70	11.8	8.2	1.1	3.3
			85/71	17.9	13.5	20.8	0.9	20.0			80	11.6	7.7	1.1	3.0
	3	1.6 (3.6)	75/63	16.3	12.8	18.9	0.8	19.5		1.6 (3.8)	60	12.7	9.4	1.0	3.8
			80/67	17.4	13.3	20.1	0.8	21.1			70	12.4	8.8	1.1	3.4
			85/71	18.6	13.7	21.2	0.8	22.7			80	12.2	8.2	1.2	3.1
	4	2.6 (6)	75/63	16.6	12.9	19.1	0.8	20.7		2.7 (6.5)	60	13.0	9.7	1.0	3.9
			80/67	17.7	13.4	20.3	0.8	22.4			70	12.8	9.1	1.1	3.5
			85/71	18.9	13.9	21.5	0.8	24.3			80	12.5	8.5	1.2	3.2
70	2	0.7 (1.7)	75/63	15.1	12.3	18.0	1.0	15.0	50	0.8 (1.8)	60	14.0	10.6	1.0	4.1
			80/67	16.1	12.8	19.1	1.0	16.0			70	13.8	10.0	1.1	3.7
			85/71	17.1	13.1	20.2	1.0	17.0			80	13.5	9.3	1.2	3.3
	3	1.5 (3.5)	75/63	15.5	12.4	18.4	0.9	16.5		1.6 (3.7)	60	14.7	11.3	1.0	4.2
			80/67	16.6	13.0	19.5	0.9	17.7			70	14.4	10.6	1.1	3.8
			85/71	17.7	13.4	20.6	0.9	18.9			80	14.1	9.9	1.2	3.4
	4	2.5 (5.8)	75/63	15.8	12.5	18.5	0.9	17.3		2.7 (6.2)	60	15.2	11.7	1.0	4.3
			80/67	16.9	13.1	19.7	0.9	18.6			70	14.8	11.0	1.1	3.9
			85/71	18.0	13.5	20.8	0.9	20.1			80	14.5	10.2	1.2	3.5
80	2	0.7 (1.6)	75/63	14.3	12.0	17.5	1.1	12.9	60	0.7 (1.7)	60	15.8	12.3	1.0	4.5
			80/67	15.3	12.4	18.5	1.1	13.7			70	15.5	11.6	1.1	4.0
			85/71	16.2	12.8	19.6	1.1	14.5			80	15.2	10.9	1.2	3.6
	3	1.5 (3.4)	75/63	14.7	12.1	17.8	1.1	14.0		1.6 (3.6)	60	16.6	13.1	1.0	4.7
			80/67	15.7	12.6	18.9	1.1	14.9			70	16.3	12.4	1.1	4.2
			85/71	16.8	13.0	19.9	1.1	16.0			80	15.9	11.6	1.2	3.7
	4	2.4 (5.6)	75/63	14.9	12.2	17.9	1.0	14.6		2.6 (6)	60	17.1	13.6	1.1	4.8
			80/67	16.0	12.7	19.0	1.0	15.6			70	16.7	12.8	1.2	4.2
			85/71	17.0	13.2	20.1	1.0	16.8			80	16.3	12.0	1.3	3.8
85	2	0.7 (1.6)	75/63	13.9	11.7	17.2	1.2	12.0	70	0.7 (1.7)	60	17.6	14.1	1.1	4.9
			80/67	14.8	12.3	18.2	1.2	12.7			70	17.2	13.3	1.2	4.3
			85/71	15.8	12.7	19.2	1.2	13.4			80	16.9	12.6	1.3	3.9
	3	1.4 (3.3)	75/63	14.3	12.0	17.5	1.1	12.9		1.5 (3.5)	60	18.6	15.1	1.1	5.1
			80/67	15.3	12.4	18.5	1.1	13.8			70	18.2	14.2	1.2	4.6
			85/71	16.3	12.9	19.6	1.1	14.7			80	17.8	13.4	1.3	4.1
	4	2.4 (5.5)	75/63	14.5	12.1	17.6	1.1	13.4		2.5 (5.8)	60	19.2	15.7	1.1	5.3
			80/67	15.5	12.5	18.7	1.1	14.4			70	18.7	14.8	1.2	4.7
			85/71	16.6	13.0	19.8	1.1	15.4			80	18.3	13.9	1.3	4.2
90	2	0.7 (1.6)	75/63	13.5	11.6	16.9	1.2	11.1	80	0.7 (1.6)	60	19.5	16.0	1.1	5.3
			80/67	14.4	12.1	17.9	1.2	11.7			70	19.1	15.3	1.2	4.7
			85/71	15.3	12.6	18.9	1.2	12.4			80	18.8	14.3	1.3	4.3
	3	1.4 (3.3)	75/63	13.9	11.7	17.2	1.2	11.9		1.5 (3.4)	60	20.6	17.1	1.1	5.6
			80/67	14.9	12.2	18.2	1.2	12.7			70	20.2	16.2	1.2	5.0
			85/71	15.8	12.7	19.3	1.2	13.5			80	19.7	15.3	1.3	4.4
	4	2.4 (5.5)	75/63	14.1	11.8	17.3	1.1	12.4		2.4 (5.6)	60	21.3	17.8	1.1	5.8
			80/67	15.1	12.3	18.4	1.1	13.3			70	20.8	16.8	1.2	5.1
			85/71	16.1	12.8	19.5	1.1	14.2			80	20.3	15.9	1.3	4.5
100	2	0.7 (1.5)	75/63	12.7	11.2	16.4	1.3	9.5							
			80/67	13.5	11.8	17.3	1.3	10.1							
			85/71	14.4	12.2	18.3	1.4	10.7							
	3	1.4 (3.2)	75/63	13.1	11.4	16.6	1.3	10.2							
			80/67	13.9	11.9	17.6	1.3	10.8							
			85/71	14.9	12.4	18.6	1.3	11.5							
	4	2.3 (5.3)	75/63	13.2	11.4	16.7	1.3	10.5							
			80/67	14.2	12.0	17.7	1.3	11.2							
			85/71	15.1	12.5	18.8	1.3	12.0							
110	2	0.6 (1.5)	75/63	11.8	10.9	15.8	1.4	8.2							
			80/67	12.6	11.4	16.7	1.5	8.7							
			85/71	13.5	11.9	17.6	1.5	9.1							
	3	1.3 (3.1)	75/63	12.2	11.0	16.0	1.4	8.7							
			80/67	13.0	11.5	16.9	1.4	9.2							
			85/71	13.9	12.0	17.9	1.4	9.8							
	4	2.2 (5.1)	75/63	12.4	11.1	16.1	1.4	9.0							
			80/67	13.2	11.6	17.1	1.4	9.6							
			85/71	14.2	12.1	18.1	1.4	10.2							

Extended Range - Anti-freeze required

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

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

Unit performance may be interpolated. Extrapolation is not allowed.

For conditions other than rating conditions provided, consult the 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.

Capacity Data

CA018 (475 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2.5	1.2 (2.7)	75/63	18.1	13.3	21.3	1.0	18.2	30	1.2 (2.9)	60	13.5	9.6	1.2	3.4
			80/67	19.3	13.7	22.4	1.0	19.8			70	13.3	9.0	1.2	3.1
			85/71	20.5	14.1	23.7	1.0	21.6			80	13.1	8.5	1.3	2.9
	4	2.7 (6.2)	75/63	18.6	13.5	21.8	1.0	18.6		2.8 (6.7)	60	14.3	10.3	1.2	3.5
			80/67	19.8	14.0	23.0	1.0	20.5			70	14.0	9.6	1.3	3.2
			85/71	21.1	14.3	24.3	0.9	22.6			80	13.8	9.0	1.4	2.9
	5	4 (9.3)	75/63	18.7	13.6	22.0	1.0	18.7		4.2 (10)	60	14.6	10.5	1.2	3.5
			80/67	20.0	14.0	23.2	1.0	20.6			70	14.3	9.9	1.3	3.2
			85/71	21.3	14.5	24.5	0.9	22.8			80	14.1	9.3	1.4	3.0
60	2.5	1.1 (2.6)	75/63	17.4	13.0	20.6	1.0	16.9	40	1.2 (2.8)	60	15.4	11.2	1.2	3.6
			80/67	18.6	13.4	21.7	1.0	18.2			70	15.2	10.6	1.3	3.3
			85/71	19.7	13.8	22.9	1.0	19.6			80	14.9	10.0	1.4	3.1
	4	2.6 (6)	75/63	17.9	13.2	21.0	1.0	17.7		2.7 (6.5)	60	16.3	12.0	1.3	3.8
			80/67	19.0	13.6	22.2	1.0	19.3			70	16.0	11.4	1.4	3.4
			85/71	20.3	14.0	23.4	1.0	21.1			80	15.8	10.7	1.5	3.1
	5	3.9 (9)	75/63	18.0	13.2	21.1	1.0	18.0		4 (9.6)	60	16.7	12.4	1.3	3.8
			80/67	19.2	13.7	22.3	1.0	19.6			70	16.4	11.7	1.4	3.5
			85/71	20.5	14.0	23.6	1.0	21.5			80	16.1	11.0	1.5	3.2
70	2.5	1.1 (2.5)	75/63	16.7	12.7	19.9	1.1	15.3	50	1.2 (2.7)	60	17.8	13.4	1.3	4.0
			80/67	17.8	13.1	21.1	1.1	16.3			70	17.5	12.7	1.4	3.6
			85/71	18.9	13.5	22.2	1.1	17.4			80	17.3	12.1	1.5	3.3
	4	2.5 (5.8)	75/63	17.1	12.9	20.3	1.1	16.2		2.7 (6.2)	60	18.6	14.1	1.3	4.0
			80/67	18.2	13.3	21.4	1.0	17.4			70	18.2	13.4	1.4	3.7
			85/71	19.4	13.7	22.6	1.0	18.8			80	18.0	12.7	1.6	3.4
	5	3.8 (8.7)	75/63	17.2	12.9	20.4	1.0	16.5		4 (9.3)	60	19.0	14.5	1.4	4.1
			80/67	18.4	13.4	21.6	1.0	17.8			70	18.7	13.7	1.5	3.7
			85/71	19.6	13.8	22.8	1.0	19.3			80	18.4	13.0	1.6	3.4
80	2.5	1 (2.4)	75/63	15.9	12.4	19.3	1.2	13.4	60	1.1 (2.6)	60	20.0	15.4	1.4	4.3
			80/67	17.0	12.7	20.5	1.2	14.3			70	19.7	14.7	1.5	3.9
			85/71	18.0	13.2	21.6	1.2	15.1			80	19.3	13.9	1.6	3.5
	4	2.4 (5.6)	75/63	16.3	12.5	19.6	1.1	14.3		2.6 (6)	60	20.8	16.2	1.4	4.4
			80/67	17.4	12.9	20.8	1.1	15.3			70	20.5	15.4	1.5	4.0
			85/71	18.5	13.4	21.9	1.1	16.4			80	20.1	14.6	1.6	3.6
	5	3.6 (8.4)	75/63	16.4	12.6	19.7	1.1	14.6		3.9 (9)	60	21.4	16.8	1.4	4.5
			80/67	17.5	13.0	20.9	1.1	15.7			70	21.0	15.9	1.5	4.0
			85/71	18.7	13.5	22.1	1.1	16.8			80	20.6	15.1	1.7	3.7
85	2.5	1 (2.4)	75/63	15.5	12.2	19.1	1.2	12.5	70	1.1 (2.5)	60	22.2	17.5	1.4	4.6
			80/67	16.5	12.6	20.1	1.2	13.3			70	21.9	16.7	1.6	4.1
			85/71	17.6	13.1	21.3	1.3	14.0			80	21.6	15.9	1.7	3.8
	4	2.4 (5.5)	75/63	15.9	12.4	19.3	1.2	13.4		2.5 (5.8)	60	23.2	18.5	1.4	4.7
			80/67	17.0	12.7	20.5	1.2	14.2			70	22.8	17.6	1.6	4.2
			85/71	18.1	13.2	21.6	1.2	15.2			80	22.5	16.7	1.7	3.8
	5	3.6 (8.3)	75/63	16.0	12.4	19.4	1.2	13.6		3.8 (8.7)	60	23.8	19.1	1.5	4.8
			80/67	17.1	12.8	20.6	1.2	14.6			70	23.4	18.1	1.6	4.3
			85/71	18.2	13.3	21.7	1.2	15.6			80	23.0	17.2	1.7	3.9
90	2.5	1 (2.3)	75/63	15.2	12.0	18.8	1.3	11.7	80	1 (2.4)	60	24.5	19.7	1.5	4.8
			80/67	16.1	12.5	19.9	1.3	12.3			70	24.2	18.8	1.6	4.4
			85/71	17.2	12.8	21.0	1.3	13.0			80	23.9	17.9	1.8	4.0
	4	2.4 (5.5)	75/63	15.5	12.1	19.0	1.2	12.4		2.4 (5.6)	60	25.7	20.7	1.5	5.0
			80/67	16.5	12.6	20.1	1.3	13.2			70	25.3	19.8	1.7	4.4
			85/71	17.6	13.0	21.3	1.3	14.0			80	24.9	18.8	1.8	4.0
	5	3.5 (8.2)	75/63	15.6	12.2	19.1	1.2	12.6		3.6 (8.4)	60	26.4	21.4	1.5	5.0
			80/67	16.7	12.6	20.2	1.2	13.5			70	25.9	20.4	1.7	4.5
			85/71	17.8	13.0	21.4	1.2	14.4			80	25.5	19.4	1.8	4.1
100	2.5	1 (2.3)	75/63	14.4	11.6	18.3	1.4	10.1							
			80/67	15.3	12.1	19.3	1.4	10.6							
			85/71	16.2	12.5	20.4	1.5	11.1							
	4	2.3 (5.3)	75/63	14.6	11.8	18.5	1.4	10.6							
			80/67	15.6	12.3	19.5	1.4	11.3							
			85/71	16.6	12.7	20.6	1.4	11.9							
	5	3.4 (7.9)	75/63	14.7	11.8	18.5	1.4	10.8							
			80/67	15.7	12.3	19.6	1.4	11.5							
			85/71	16.8	12.7	20.8	1.4	12.2							
110	2.5	1 (2.2)	75/63	13.5	11.3	17.7	1.6	8.7							
			80/67	14.4	11.8	18.7	1.6	9.1							
			85/71	15.3	12.1	19.8	1.6	9.5							
	4	2.2 (5.1)	75/63	13.8	11.4	17.9	1.5	9.1							
			80/67	14.7	11.9	18.9	1.5	9.6							
			85/71	15.6	12.4	20.0	1.5	10.1							
	5	3.3 (7.7)	75/63	13.8	11.3	17.9	1.5	9.0							
			80/67	14.8	11.8	19.0	1.5	9.7							
			85/71	15.8	12.4	20.1	1.5	10.3							

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.

Capacity Data

CA018 (520 CFM)

Cooling									Heating						
Entering Fluid Temp (°F)	Water Flow (GPM)	Pressure Drop PSI (FOH)	Entering Air Temp (db/wb) °F	Total Capacity (MBTUH)	Sensible Capacity (MBTUH)	Heat of Rejection (MBTUH)	Power Input (kW)	EER	Entering Fluid Temp (°F)	Pressure Drop PSI (FOH)	Entering Air Temp (°F)	Total Capacity (MBTUH)	Heat of Absorption (MBTUH)	Power Input (kW)	COP
50	2.5	1.2 (2.7)	75/63	18.4	14.0	21.7	1.0	17.7	30	1.2 (2.9)	60	13.7	9.6	1.2	3.4
			80/67	19.6	14.4	22.9	1.0	19.3			70	13.4	9.1	1.3	3.1
			85/71	20.8	14.9	24.1	1.0	21.0			80	13.3	8.5	1.4	2.8
	4	2.7 (6.2)	75/63	18.9	14.2	22.2	1.0	18.3		2.8 (6.7)	60	14.5	10.3	1.2	3.5
			80/67	20.1	14.6	23.4	1.0	20.0			70	14.2	9.7	1.3	3.2
			85/71	21.4	15.0	24.7	1.0	22.1			80	14.0	9.1	1.4	2.9
	5	4 (9.3)	75/63	19.0	14.2	22.4	1.0	18.4		4.2 (10)	60	14.8	10.6	1.2	3.5
			80/67	20.3	14.7	23.6	1.0	20.2			70	14.5	10.0	1.3	3.2
			85/71	21.6	15.1	25.0	1.0	22.3			80	14.2	9.3	1.4	2.9
60	2.5	1.1 (2.6)	75/63	17.7	13.7	21.0	1.1	16.5	40	1.2 (2.8)	60	15.6	11.3	1.3	3.6
			80/67	18.8	14.1	22.1	1.1	17.8			70	15.3	10.7	1.4	3.3
			85/71	20.0	14.6	23.3	1.0	19.1			80	15.1	10.1	1.5	3.0
	4	2.6 (6)	75/63	18.1	13.9	21.4	1.0	17.3		2.7 (6.5)	60	16.5	12.1	1.3	3.7
			80/67	19.3	14.3	22.6	1.0	18.8			70	16.2	11.5	1.4	3.4
			85/71	20.6	14.8	23.8	1.0	20.5			80	15.9	10.8	1.5	3.1
	5	3.9 (9)	75/63	18.3	13.9	21.6	1.0	17.5		4 (9.6)	60	16.9	12.5	1.3	3.8
			80/67	19.5	14.3	22.8	1.0	19.1			70	16.6	11.8	1.4	3.5
			85/71	20.8	14.9	24.0	1.0	20.9			80	16.3	11.1	1.5	3.2
70	2.5	1.1 (2.5)	75/63	16.9	13.4	20.3	1.1	14.9	50	1.2 (2.7)	60	18.0	13.5	1.3	3.9
			80/67	18.0	13.7	21.5	1.1	15.9			70	17.7	12.8	1.4	3.6
			85/71	19.2	14.2	22.6	1.1	17.0			80	17.5	12.2	1.5	3.3
	4	2.5 (5.8)	75/63	17.3	13.5	20.7	1.1	15.8		2.7 (6.2)	60	18.7	14.2	1.4	4.1
			80/67	18.5	13.9	21.9	1.1	17.0			70	18.4	13.5	1.5	3.7
			85/71	19.7	14.4	23.1	1.1	18.4			80	18.1	12.8	1.6	3.4
	5	3.8 (8.7)	75/63	17.5	13.6	20.8	1.1	16.1		4 (9.3)	60	19.2	14.7	1.4	4.1
			80/67	18.7	14.0	22.0	1.1	17.4			70	18.8	13.9	1.5	3.8
			85/71	19.9	14.4	23.2	1.1	18.9			80	18.6	13.2	1.6	3.4
80	2.5	1 (2.4)	75/63	16.2	13.0	19.7	1.2	13.1	60	1.1 (2.6)	60	20.2	15.6	1.4	4.3
			80/67	17.2	13.5	20.8	1.2	13.9			70	19.9	14.8	1.5	3.9
			85/71	18.3	13.8	22.0	1.2	14.8			80	19.5	14.1	1.6	3.5
	4	2.4 (5.6)	75/63	16.5	13.1	20.0	1.2	14.0		2.6 (6)	60	21.1	16.4	1.4	4.4
			80/67	17.6	13.6	21.2	1.2	15.0			70	20.7	15.6	1.5	4.0
			85/71	18.8	14.0	22.4	1.2	16.0			80	20.3	14.8	1.6	3.6
	5	3.6 (8.4)	75/63	16.7	13.2	20.1	1.2	14.3		3.9 (9)	60	21.6	17.0	1.4	4.5
			80/67	17.8	13.6	21.3	1.2	15.3			70	21.2	16.1	1.5	4.1
			85/71	19.0	14.1	22.5	1.2	16.5			80	20.8	15.2	1.7	3.7
85	2.5	1 (2.4)	75/63	15.8	12.8	19.4	1.3	12.3	70	1.1 (2.5)	60	22.4	17.7	1.4	4.6
			80/67	16.7	13.3	20.5	1.3	13.0			70	22.1	16.9	1.6	4.2
			85/71	17.8	13.8	21.6	1.3	13.7			80	21.8	16.1	1.7	3.8
	4	2.4 (5.5)	75/63	16.1	12.9	19.7	1.2	13.1		2.5 (5.8)	60	23.4	18.7	1.4	4.8
			80/67	17.2	13.5	20.8	1.2	13.9			70	23.1	17.8	1.6	4.3
			85/71	18.3	13.9	22.0	1.2	14.9			80	22.7	16.9	1.7	3.9
	5	3.6 (8.3)	75/63	16.2	13.0	19.8	1.2	13.3		3.8 (8.7)	60	24.1	19.3	1.5	4.8
			80/67	17.3	13.5	20.9	1.2	14.2			70	23.7	18.4	1.6	4.4
			85/71	18.5	13.9	22.1	1.2	15.3			80	23.3	17.5	1.7	3.9
90	2.5	1 (2.3)	75/63	15.4	12.6	19.2	1.3	11.4	80	1 (2.4)	60	24.7	20.0	1.5	4.9
			80/67	16.3	13.2	20.2	1.4	12.0			70	24.4	19.1	1.6	4.4
			85/71	17.3	13.6	21.3	1.4	12.7			80	24.1	18.2	1.8	4.0
	4	2.4 (5.5)	75/63	15.7	12.8	19.4	1.3	12.2		2.4 (5.6)	60	25.9	21.0	1.5	5.1
			80/67	16.7	13.2	20.5	1.3	12.9			70	25.5	20.1	1.6	4.5
			85/71	17.8	13.8	21.6	1.3	13.7			80	25.1	19.1	1.8	4.1
	5	3.5 (8.2)	75/63	15.8	12.8	19.5	1.3	12.4		3.6 (8.4)	60	26.7	21.7	1.5	5.1
			80/67	16.8	13.4	20.6	1.3	13.2			70	26.2	20.7	1.7	4.6
			85/71	18.0	13.9	21.8	1.3	14.1			80	25.8	19.7	1.8	4.1
100	2.5	1 (2.3)	75/63	14.5	12.3	18.6	1.5	9.9							
			80/67	15.4	12.8	19.6	1.5	10.4							
			85/71	16.4	13.2	20.8	1.5	10.9							
	4	2.3 (5.3)	75/63	14.9	12.4	18.8	1.4	10.4							
			80/67	15.8	12.9	19.9	1.4	11.0							
			85/71	16.9	13.4	21.0	1.4	11.7							
	5	3.4 (7.9)	75/63	14.9	12.5	18.9	1.4	10.6							
			80/67	15.9	13.0	20.0	1.4	11.3							
			85/71	17.0	13.5	21.1	1.4	12.0							
110	2.5	1 (2.2)	75/63	13.7	12.0	18.1	1.6	8.5							
			80/67	14.6	12.4	19.1	1.6	8.9							
			85/71	15.5	12.9	20.2	1.7	9.3							
	4	2.2 (5.1)	75/63	14.0	12.0	18.3	1.6	8.9							
			80/67	14.9	12.5	19.3	1.6	9.4							
			85/71	15.8	13.1	20.4	1.6	9.9							
	5	3.3 (7.7)	75/63	14.0	12.2	18.3	1.5	9.1							
			80/67	15.0	12.7	19.3	1.6	9.6							
			85/71	16.0	13.2	20.5	1.6	10.1							

Extended Range - Anti-freeze required

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

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

Unit performance may be interpolated. Extrapolation is not allowed.

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

Ratings below 40°F are with a methanol solution.

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Subject to change without prior notice.

Electrical Data

PSC Blower Motor

Model	Voltage Code	Rated Voltage	Voltage Min/Max	Compressor			Motor	Total Unit PSC Motor		Compressor Service		
										Cold Winding Resistance (Ω)		Run Capacitor (µF/V)
				Quantity	RLA	LRA	FLA	Min Circuit Amps	Max Fuse/ HACR	Single Phase: S-C	Single Phase: R-C	
CA009	0	115/1/60	104/126	1	7.0	45.6	2.1	10.9	15	3.48	0.71	35/240
	1	208-230/1/60	197/253	1	3.4	22.2	0.9	5.2	15	7.35	2.95	15/370
	2	265-277/1/60	239/291	1	2.9	18.8	0.7	4.3	15	10.74	4.27	10/440
CA012	0	115/1/60	104/126	1	9.6	58.4	1.3	13.3	20	3.15	0.58	35/370
	1	208-230/1/60	197/253	1	4.6	27.9	0.8	6.6	15	5.90	2.30	20/370
	2	265-277/1/60	239/291	1	3.8	22.2	0.8	5.6	15	8.70	3.47	15/440
CA015	0	115/1/60	104/126	1	12.7	63.0	1.3	17.2	25	N/A	N/A	40/370
	1	208-230/1/60	197/253	1	5.6	29.0	0.8	7.8	15	5.45	2.31	25/440
	2	265-277/1/60	239/291	1	4.6	20.0	0.8	6.6	15	7.39	3.58	15/440
CA018	1	208-230/1/60	197/253	1	7.4	33.0	0.8	10.1	15	3.05*	2.41*	35/370
	2	265-277/1/60	239/291	1	6.0	28.0	0.8	8.3	15	2.57*	3.26*	35/440

NOTE: * These values are reported at 167°F (75°C), not room temperature.
1. Resistance value tolerance +/- 7%. All resistance values must be measured with compressor at room temperature.

Blower Performance

Model	Available External Static Pressure (in. wc. Wet coil and filter included)														
	Fan Speed	Factory Setting	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20
CA009	High		300	-	-	-	-	-	-	-	-	-	-	-	-
	Low	X	275	-	-	-	-	-	-	-	-	-	-	-	-
CA012	High		520	-	-	-	-	-	-	-	-	-	-	-	-
	Low	X	475	-	-	-	-	-	-	-	-	-	-	-	-
CA015	High		500	-	-	-	-	-	-	-	-	-	-	-	-
	Low	X	450	-	-	-	-	-	-	-	-	-	-	-	-
CA018	High		520	-	-	-	-	-	-	-	-	-	-	-	-
	Low	X	475	-	-	-	-	-	-	-	-	-	-	-	-

Physical Data

CA Model Water Source Heat Pump

CA Model	CA009	CA012	CA015	CA018
Compressor Type (Qty 1)	Rotary	Rotary	Rotary	Rotary
Refrigeration Charge (oz)	20	20	30	32
Max Water Working Pressure (PSIG/kPa)	400/3100	400/3100	400/3100	400/3100
Number of Refrigeration Circuits	1	1	1	1
Evaporator Coil				
Coil Type	Tube-Fin	Tube-Fin	Tube-Fin	Tube-Fin
Air Coil Dimensions (H x L)	10x27	10x27	10x27	10x27
Row(s)	2	2	3	3
Motor & Blower				
Fan Motor Type/Speeds	PSC/2	PSC/2	PSC/2	PSC/2
Fan Motor (HP)	1/10	1/4	1/4	1/4
Blower Wheel Size (Dia. x W)	5.5 x 8 (2)	5.5 x 8 (2)	5.5 x 8 (2)	5.5 x 8 (2)
Water Connection Size				
Type	Tube / FPT Option	Tube / FPT Option	Tube / FPT Option	Tube / FPT Option
Size	5/8" / 1/2"	5/8" / 1/2"	5/8" / 1/2"	5/8" / 1/2"
Water Coil Type	Coaxial	Coaxial	Coaxial	Coaxial
Coaxial Coil Volume (gal)	0.08	0.08	0.16	0.16
Cabinet				
Standard Filter - 1/2" Washable Aluminum (H x L)	7 x 31-1/4 x 3/8	7 x 31-1/4 x 3/8	7 x 31-1/4 x 3/8	7 x 31-1/4 x 3/8
Weight - Operating (lbs)	131	138	144	144
Weight - Shipping (lbs)	151	158	164	164

Standard Length Unit Dimensions

CA Model Water Source Heat Pump

Model	A	B	C	D	E	F	G	H	J	K	M	N	O	P
	Width	Depth	Height	Control Door Width	Discharge Grille Width	Grille Edge to Door, Left Hand	Clearance to Unit Bottom	Sub-Base Depth	Cabinet End to Return Air, Left Hand	Return Air Width	Grille Edge to Door, Right Hand	Cabinet End to Return Air, Right Hand	Control Panel Width	Return Air to Chassis End, Left Hand
CA009	48.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	12.87	30.75	2.87	12.87	12.00	1.63
CA012	48.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	12.87	30.75	2.87	12.87	12.00	1.63
CA015	48.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	12.87	30.75	2.87	12.87	12.00	1.63
CA018	48.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	12.87	30.75	2.87	12.87	12.00	1.63

Model	Q	R	S	T	U	V	W	X	Y	Z		
	Power Switch Height from Sub-base, Left Hand	Condensate Height from Sub-base, Left Hand	Condensate Depth from Rear, Left Hand	Water Connection Height from Sub-base	Water Out Depth from Rear	Water In Depth from Rear	Return Air to Chassis End, Right Hand	Power Switch Height from Sub-base, Right Hand	Condensate Height from Sub-base, Right Hand	Condensate Depth from Front, Right Hand	Condenser Water Connections	Permanent Washable Filter Size
CA009	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA012	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA015	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA018	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37

NOTES: 1. All dimensions in inches unless otherwise noted. All dimensions within +-0.125". Specifications subject to change without notice.
2. Fresh Air Opening (In Sub-base Rear)
3. Caution! When installing unit in cold climates, an outside air damper must be provided to prevent possible condenser freeze-up.

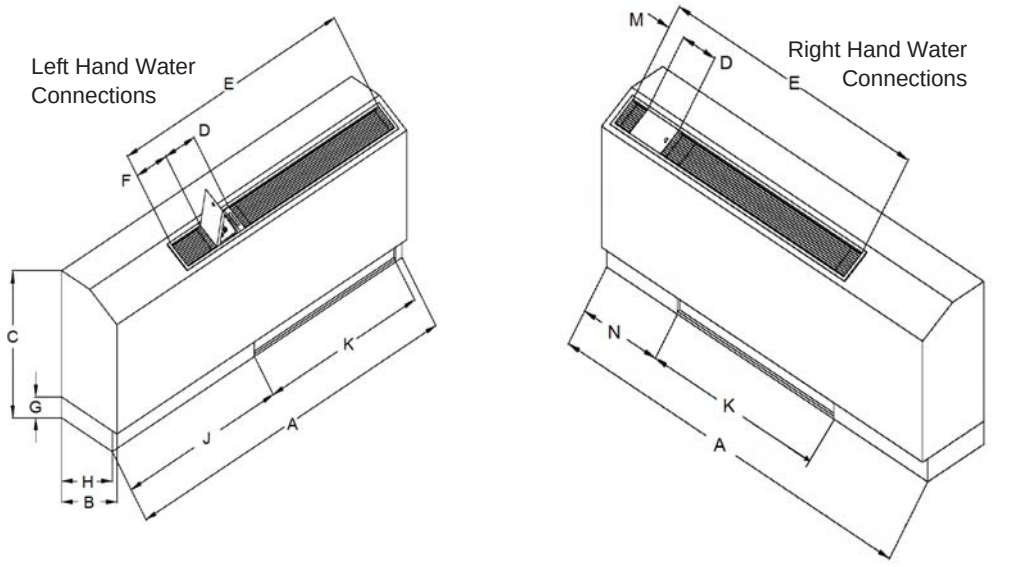


Figure 5

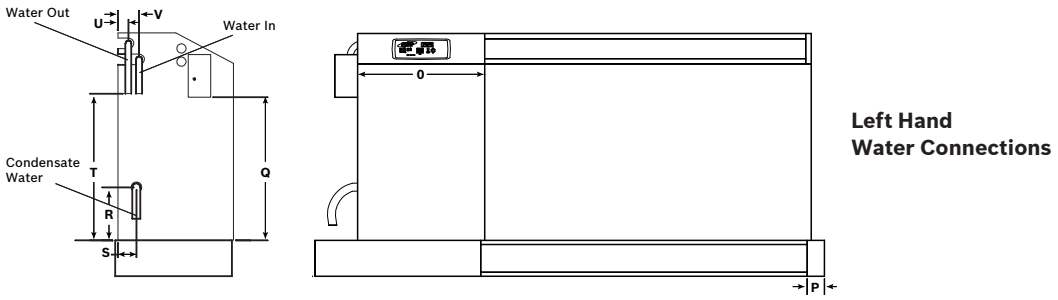
Extended Length Unit Dimensions

CA Model Water Source Heat Pump

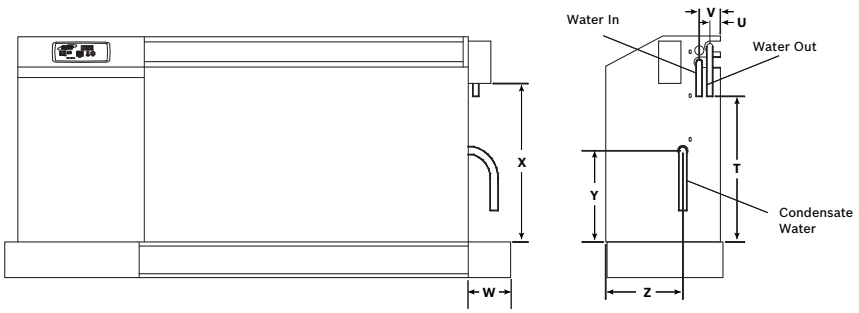
Model	A	B	C	D	E	F	G	H	J	K	M	N	O	P
	Width	Depth	Height	Control Door Width	Discharge Grille Width	Grille Edge to Door, Left Hand	Clearance to Unit Bottom	Sub-Base Depth	Cabinet End to Return Air, Left Hand	Return Air Width	Grille Edge to Door, Right Hand	Cabinet End to Return Air, Right Hand	Control Panel Width	Return Air to Chassis End, Left Hand
CA009	63.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	30.87	30.75	2.87	12.87	12.00	1.63
CA012	63.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	30.87	30.75	2.87	12.87	12.00	1.63
CA015	63.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	30.87	30.75	2.87	12.87	12.00	1.63
CA018	63.00	12.00	23.88	6.00	45.00	6.12	3.37	11.00	30.87	30.75	2.87	12.87	12.00	1.63

Model	Q	R	S	T	U	V	W	X	Y	Z	Condenser Water Connections	Permanent Washable Filter Size
	Power Switch Height from Sub-base, Left Hand	Condensate Height from Sub-base, Left Hand	Condensate Depth from Rear, Left Hand	Water Connection Height from Sub-base	Water Out Depth from Rear	Water In Depth from Rear	Return Air to Chassis End, Right Hand	Power Switch Height from Sub-base, Right Hand	Condensate Height from Sub-base, Right Hand	Condensate Depth from Front, Right Hand		
CA009	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA012	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA015	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37
CA018	13.50	5.00	1.75	13.75	1.00	2.00	4.00	15.00	8.69	7.31	5/8" tube	30.12 x 7 x 0.37

NOTES: 1. All dimensions in inches unless otherwise noted. All dimensions within +-0.125". Specifications subject to change without notice.
2. Fresh Air Opening (In Sub-base Rear)
3. Caution! When installing unit in cold climates, an outside air damper must be provided to prevent possible condenser freeze-up.



Left Hand Water Connections



Right Hand Water Connections

Figure 6

Guide Specifications

General

Units shall be performance certified to ISO standard 13256-1 for Water Loop Heat Pump, Ground Water Heat Pump and Ground Loop Heat Pump applications. All units shall be listed with Intertek (ETL), Nationally Recognized Testing Laboratories (NRTL) or Canadian Standards Association (CSA). All units shall have ARI-13256-1 labels with ETL or NRTL or CSA or equivalent labels. Each unit shall be run tested at the factory. Each unit shall be pallet mounted and stretch wrapped.

Units shall be designed to operate throughout the range of entering fluid temperature of 50°F to 110°F in the cooling mode and 30°F to 80°F in the heating mode (extended range allows for 20°F to 80°F in the heating mode). The units shall be manufactured in an ISO9001 certified facility.

Cabinetwork

Cabinetwork shall include two (2) separate integral assemblies: Cabinet and Sub-base. Cabinet shall be factory fabricated from heavy gauge “paint-grip” galvanized steel and finished with powder coat paint. Cabinet dimensions are in accordance with drawings and are manufactured for left or right water discharge piping. Cabinet shall be single-piece construction. Removal of the cabinet shall give complete side and front access to unit for routine servicing. The cabinet is mounted onto the sub-base and secured with two screws for security. A wall mounting bracket secured to the sub-base shall be provided. Air flow is bottom intake-top discharge. Cabinets will be factory fabricated specifically for left hand or right hand connections as specified. Cabinet shall be slope top style, flat top cabinet is not acceptable.

Sub-Base

Factory mounted 3-3/8" sub-base is constructed of heavy gauge painted steel. Cutouts are provided for floor connections and outside air. Includes integral filter mounts to support a bottom mount permanent, washable, aluminum mesh filter. Sub-base has a bracket that may be secured to the wall to provide stability.

Chassis

Chassis is of compact design and of the same dimensions for all model sizes. Dimensions must match details on drawings. Chassis mounts directly on support structures provided by the sub-base and shall be removable from the sub-base without dismantling the sub-base. Both compressor and coil compartments shall be thermally and acoustically insulated, and have removable steel cover plates giving double acoustical protection between the two compartments. Compressor is mounted to the bottom of chassis with a 2 piece base pan to reduce noise transmission and vibration. The compressor access panel shall have a closed cell foam insulation for extra quiet operation. Fiberglass insulation is not acceptable on compressor access panel. The stainless steel condensate drain pan shall be IAQ with positive double slope and be removable without disturbing the evaporator assembly for cleaning as needed.

Refrigerant Circuit

All units shall contain sealed R-410A refrigerant circuit including a hermetic compressor, finned tube refrigerant to air heat exchanger, four-way solenoid activated reversing valve, expansion valve refrigerant metering device and coaxial tube-in-tube water to refrigerant heat exchanger. Compressor shall be high efficiency designed for heat pump duty and mounted on vibration isolators. Fin-tube refrigerant-to-air exchanger shall be aluminum fin plate and copper tube construction rated to withstand 600 PSIG (4140 Kpa) refrigerant working pressure. Coils shall be baked enamel coated for protection against most airbourne chemicals. Water-to-refrigerant heat exchanger shall be constructed of a convoluted copper or cupro-nickel inner tube and steel outer tube with a designed refrigerant working pressure of 600 PSIG (4140 Kpa) and water side working pressure of no less than 400 PSIG (2750 Kpa). Four-way solenoid activated refrigerant reversing valve shall allow heating operation should the solenoid fail to function. All interconnecting tubing shall be copper. High and low pressure access shall be provided via schrader style ports.

Guide Specifications

Fan Motor Assembly

Unit blower is three-speed high efficiency PSC type. Motor is direct connected to two double width, double inlet forward curved oversized centrifugal blower wheels that are selected for quiet operation, and balanced to minimize vibration. Blower wheel access is through removable blower inlet rings. Motor and Blower assembly shall be removable without removing the chassis. Blower CFM is per scheduled data.

Electrical

Control circuit shall be 24 volt with direct sensing high and low pressure switches connected to a normally closed safety circuit. Line voltage control circuit and/or normally open safety switches are unacceptable. Compressor and blower motors shall be individually protected against current and/or heat overload. Standard control options shall be: a) Unit mounted CUC controller incorporating the following features: Tactile touchpad for temperature, fan and mode adjustment, Digital temperature display, LED display indicating unit operating mode as well as fan speed and fault indication, adjustable temperature set point and differential, Options for manual or automatic changeover, hi or low fan speed and constant or cycling fan operation or, b) Provisions for a remotely mounted thermostat. The control box will additionally have a compressor contactor, fan relay, solid state lock-out device and class-2 transformer. The lockout circuit shall include diagnostic LED's, anti short cycle time delay, random start time delay and low pressure bypass time delay. A low voltage terminal board is provided for NEC class-2 connection to units intended for remote thermostat connection only.

Power Connection

Units shall be provided with a factory mounted 2 x 4 junction box with removable cover on the same side as the water connections (left or right) for direct wire connection. This cover may be supplied with an optional non-fused power disconnect switch for servicing the unit. The unit shall operate with specified voltages 115v, 208/230v or 265v, single phase, 60 Hz supply current. Supply power ampacity and maximum fuse size are per electrical specifications marked on each unit's data plate.

Remote Thermostat

Console units capable of remote mounted controllers shall be field supplied with a 24 volt anticipating type wall thermostat. a) The thermostat shall be a manual changeover type with an OFF, HEAT, COOL selector switch and a FAN, AUTO selector switch. b) The thermostat shall be an auto changeover type with an OFF, AUTO selector switch and a FAN, AUTO selector switch. The Hi/Lo fan switch shall be unit mounted for fan speed control.

Cabinet Options

The unit shall be chassis only, chassis on sub-base, or chassis with sub-base and cabinet.

Piping Options

The unit shall be provided with factory installed supply and return water connection on right or left side. Supply and return water connections shall be a) 5/8" copper pipe for field connection of male or female pipe thread b) factory installed 1/2" FPT fitting for hose connection c) Factory supplied 1/2" FPT thread and field installed 1/2" x 12" stainless steel hose kit with an automatic flow control valve, ball valves with P/T ports, y-strainer with blow down valve.

Continuing engineering research results in steady improvements. Therefore, these ratings and specifications are subject to change without notice.

Notes

Notes

Notes

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