Product Catalog

Premium High Efficiency Water-Source Heat Pumps

Each Withair® Heat Pump installed, one more step towards a greener tomorrow !

Withair Group (China) Limited
Withair (Nanjing) Industries Co., Ltd

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Digit 5. H: Horizontal type, V: Vertical type
Digit 6. Fixed frequency compressor: default, I: inverter compressor
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Model W01R2 – 0.8 to 40 tons — 50/60 Hz

The W01R2 **Water-Source Heat Pumps (Water to Air System)** is Withair's most advanced water source comfort solution designed to meet these requirements. Withair® achieves higher efficiency, reduced sound, improved indoor air quality and high reliability through variable speed compressor and fan technology.

Withair® Water Source Heat Pump System is one of the most efficient, environmentally-friendly systems available for heating and cooling buildings. High-efficiency, self-contained units are available in a variety of sizes and configurations and can be placed in virtually any location within a building. Each water source heat pump system responds only to the heating or cooling load of the individual zone it serves. This permits an excellent comfort level for occupants, better control of energy use for building owners, and lower seasonal operating costs.

Withair® Commercial Water Source Heat Pumps can be applied to geothermal closed-circuit or open-well loops, or on a traditional boiler/tower loop system. These systems offer benefits ranging from low cost installation to the highest energy efficiency available in the market today.

With one of the broadest portfolios of heat-pump systems of any manufacturer, Withair® has a water-source heat pump system to meet the needs of virtually any building—and deliver efficient performance.

In a Withair® water-source heat pump system, one of the most important measures of performance is efficient operation—which is why we're proud that our top-performing variable speed water-source heat pump units can reach up to 40 EER and save up to 60 percent on energy costs.

Performance, efficiency and a wide variety of configurations. It's a combination that's a perfect fit for nearly any building including yours.

A heat-pump system to meet the needs of virtually any building!

Horizontal & Vertical Water-Source Heat Pumps -

A product that delivers superior comfort and performance while reducing operating cost

Model W01R2 – 0.8 to 40 tons

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Withair's design incorporates system advantages such as:

* Integrated Controls

- Fully mounted, wired, programmed and tested controls

* Reliability

- Part load operation reduces cyclic operation
- Fewer on/off cycles reduce stress of the components
- Every unit is factory run tested in both cooling and heating cycle

* Ultra-low Noise

- Insulated compressor enclosure for quiet design
- Variable speed fan and compressor reduce sound levels at lower load conditions
- Advanced fan system uses less energy to produce more airflow with minimal sound

* Flexibility

- Units support both boiler/cooling tower and ground source heat exchanger applications
- Supply and return airflow configuration flexibility
- Adjustable supply minimum and maximum airflow settings

* Higher Efficiency

- Exceeds ASHRAE 90.1-2016 standards for efficiency
- Efficiency increases as the system unloads with EER values up to 40 (ground loop) at part load operation

* Superior Indoor Air Quality

- Foil faced insulation for cleanability
- Cleanable dual sloped non-corrosive drain pan to reduce microbial growth
- Full array of filter options including MERV 8 and MERV 13 to meet LEED EQ Credit 5

* Comfort

- Variable speed compressor varies the capacity to match the load requirements in the zone
- PSC motor and ECM motor varies supply airflow for superior comfort control

The Building Owner

- High efficiency units reduce energy consumption/operating costs and can contribute to earning points toward LEED® certification.
- Open Choices control feature gives you the flexibility to select standalone thermostat operation or easy, low cost integration with the BAS of your choice using an add-on communication module.
- R-410A refrigerant has no ozone depletion potential or phase out date, helping to minimize environmental impact and protect against refrigerant availability issues over the economic life of your equipment investment.
- Large fan wheel, quiet compressor selections and low vibration design promote quiet operation.
- Double-sloped polymer drain pan and optional closed cell insulation promote superior indoor air quality.
- Durable construction promotes long life, reliable operation.

The Engineer

- Boiler/tower or geothermal unit selections provide flexibility in designing the system that best meets the performance and budget requirements of your project.
- Multiple configurations reduce design time and cost by allowing you to avoid obstructions and use minimum ductwork.
- Multiple features and options (ECM motor, desuperheater, hot gas reheat, integral electric heat, painted cabinet) give you the flexibility to select units that closely match application requirements.

Installing Contractor / Service Personnel

- Small footprint design makes it easier to meet space requirements of new construction and replacement applications.
- Flush FTP water fittings save time in making water connections using one wrench.
- Factory-installed filter rack saves time and expense to field-install a filter rack.
- External LED status lights allow quick troubleshooting – no need to open up the unit.
- Easy access to the unit compressor (2-sides), fan section (1-side), motor (1-side) and unit controls (front access).
- A removable orifice ring allows the blower and motor to be removed without removing the blower housing or disconnecting the unit from the ductwork.

Compressors

The unit's design includes a wide variety of compressor motors to accommodate dedicated voltages and tonnage sizes. The small units have rotary & scroll compressor design. In big units, dual circuit designs of the horizontal & vertical models feature scroll compressors. The compressors are highly efficient and incorporate external vibration isolators and thermal overload protection.

These different styles allow Withair® to provide the voltage variations along with noise reduction required in today's applications.

Co-axial Water-to-Refrigerant Coil

Designed for maximum heat transfer at normal and low water flow rates with minimum pressure drop. The inside tube is deeply fluted to enhance heat transfer and minimize fouling.

The copper seamless tubing is a tube within a tube design. The inner-water tube contains a deep fluted curve to enhance heat transfer and minimize fouling and scaling. It is available in either copper coil. The outer refrigerant gas tube is made from steel material. The coil is leak tested to assure there is no cross leakage between the water tube and the refrigerant gas (steel tube) coil. Co-axial heat exchangers are more tolerant to freeze rupture.

A cupronickel heat exchanger is available as a selectable option.

Drain Pan

The unit drain pan is composed of polymer material. The pan is positively sloped to comply with ASHRAE 62 for (IAQ) indoor air quality conformity. Optional stainless steel drain pans are also available. Access to the drain pan is provided through two access panels for cleaning purposes.

Blower Motor

For Variable speed models, the supply-air (blower) motor is an ECM variable speed motor with thermal overload protection.

For standard models, the supply-air (blower) motor is a multispeed motor with internal thermal overload protection. The motor bearings are permanently lubricated and sealed. The motor is isolated from the fan housing using rubber isolators to minimize vibration transmission. See fan performance tables for static ranges. All motors are factory wired to the option selected. A high, medium, and low speed tap is provided for field modification on most voltages. The speed tap modification can be made in the control box of the unit. Serviceability to the motor is made through either of the two air-side access doors for the horizontal configuration, and through one air-side access door on vertical configuration. The motor and blower wheel are removable by an orifice ring mounted to the fan housing.

Cabinet Description

The cabinet design contains a platform utilizing similar parts and assemblies throughout the product line. It is constructed of heavy gauge, galvanized metal for maximum durability and corrosive resistive exterior.

For small models, refrigeration circuitry is accessed through the cabinet front. In addition, water-in/out connection, drain connection and high/low voltage hook-up is accomplished at the 45° chamfered corners on the front-side of the equipment.

For big units, hanging the horizontal configuration is accomplished through the robust metal stiffeners located beneath the unit. Optional vibration isolators are available to help decrease sound vibration during equipment operation.

The standard unit is constructed of unpainted G-60 galvanized steel, with the smallest possible footprint. Optional painted cabinet is ideal for aesthetic requirements of residential applications.

Air-Side Filter

The air-side filter incorporates a 1-inch thick (nominal) or 2-inch thick (nominal), MERV 8 or MERV 13 disposable filter option.
Accessory filters are also available in 4-inch (nominal) thickness for MERV 8 and MERV 13. These filters include an average synthetic dust weight tolerance of approximately 75%. This dust holding capability includes a colorless, odorless adhesive to retain dirt particles within the filter media after fiber contact.

Air to Refrigerant Coil

The air-to-refrigerant heat exchanger is constructed of staggered copper tubes with die-formed corrugated lanced aluminum fins. The fins are then mechanically bonded to the tubes through expansion.
The coil is placed internal of the unit design for the horizontal model to provide an optional dual filtration application. With dual filtration to the unit, maintenance to the filter is significantly less than with a single filtration system. This design also offers maximum flexibility of the supply and return air configurations.
The maximum working pressure for the coils is 650 psig. It is designed for maximum capacity with an additional benefit of physical unit size reduction.
Coil specifications may be found in the General Data section of this catalog.

Blower Housing

The blower housing is constructed of non-corrosive galvanized steel.
For small direct drive units, a factory-mounted orifice ring is provided for ease of motor serviceability.
For big units, the housing is a double wide/double inlet, forward curved wheel moved by an integral horsepower motor with sealed bearings.

Expansion Valve

The refrigerant flow metering is made through the thermal expansion valve (TXV). It allows the unit to operate with an entering fluid temperature from 25 to 110℉(-3.9 to 43.3 ℃) and entering air temperatures from 55 to 86℉(12.8 to 30 ℃). The valve is designed to meter refrigerant flow through the circuitry to achieve desired heating or cooling.
Unlike capillary-tube assemblies, the expansion valve device allows the exact amount of refrigerant required to meet the coil load demands. This precise metering by the TXV increases the efficiency of the unit and eliminates the need for a water regulating valve.

Hanging Device

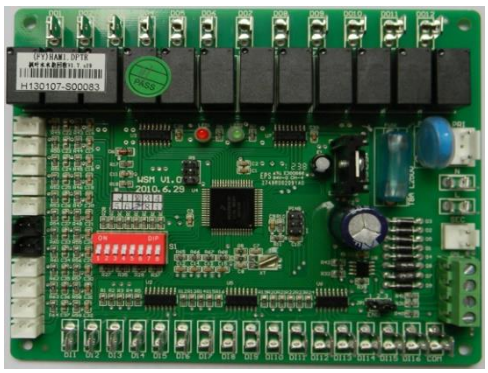
The hanging bracket resides in the chamfered corner of the horizontal small unit. This partially-concealed bracket design eliminates added height, width, or length to the product. The brackets are factory mounted to shorten job installation requirements. The small unit is shown to the left. The structural integrity of the design helps assure no bracket deflection or unit bowing from the unit's weight. Isolation for the hanging bracket is provided with a neoprene rubber grommet design.
The grommets are a separately ordered accessory on the big models. This isolation device helps prevent sound vibration from reaching the structural support members of the building during compressor start and stop. The hanging channel for the horizontal big unit runs the length of the equipment.

Motorized Water Valve

The two-position motorized water valve is installed on the return line of the water loop system between the loop and the loop’s pump module.
This two-position isolation device is less expensive and a very effective alternative to the water regulating valve. When the compressor begins running, the two-position valve will open, allowing water to flow through the unit. As the compressor shuts down, the valve slowly closes off. The main purpose of the motorized valve is to shut-off the flow of water through the unit when the unit is off, thus reducing water consumption. The two-position motorized valve is fast opening to prevent compressor trip-out, and slow closing to prevent water hammer.

Electrical and Control Box

The control box houses the major operating electrical controls including the control circuit board, transformer, compressor relay and fan relay. Each component can be accessed easily for service or replacement.



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

The control system offers a microprocessor based unit controller and its features as follows:

- Safety lockout
- Random start delay
- LED diagnostic display
- Low pressure switch bypass
- Silent reversing valve operation
- High and low voltage protection
- Condensate overflow protection
- Compressor anti-short protection
- Built-in shutdown from a remote signal
- Water temperature identification function
- Powerful function, compatible with various operating modes
- Built-in night setback and night setup operation from a remote signal
- Two hours override operation from a push button on the wall thermostat
- Options: automatic reset, startup delay, fan interlock, lockout alarm and dry contacts.

R410A Environmentally Friendly Refrigerant

Refrigerant is chlorine-free HFC with zero ODP (Ozone Depletion Potential). Very low GWP (Global Warming Potential).

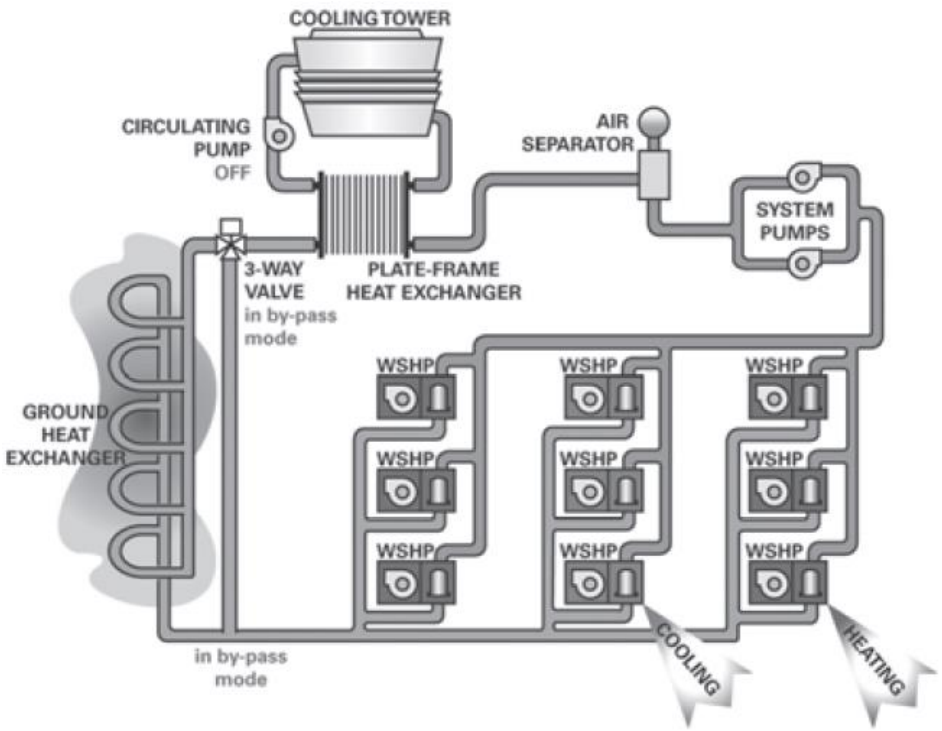
RoHS

R410A
environmental
refrigerant

Optional Waterside Economizer System

If the water-source system design contains an economizing coil option, the moderate temperature loop water circulated through a core water source system can provide an inexpensive means to satisfy room comfort without operating the water source heat pump's compressor.

During economizer mode, fluid enters the unit, and passes by a water temperature sensing bulb. This temperature sensing bulb determines whether the two position, three-way valve will direct the water through the waterside economizing coil, and to the heat pump condenser, or through the condenser only. If the water temperature is 55℉(12.8℃) or less, fluid will flow into the economizing coil, while simultaneously halting mechanical operation of the compressor. Mechanical cooling will continue on a call for second stage from the thermostat.



Quality Supply Chain ——Strong cooperation and creating good quality

1. Compressors

HITACHI Inspire the Next · Copeland · MITSUBISHI HEAVY INDUSTRIES LTD. · Panasonic ideas for life · GMCC

2. Refrigerant accessories

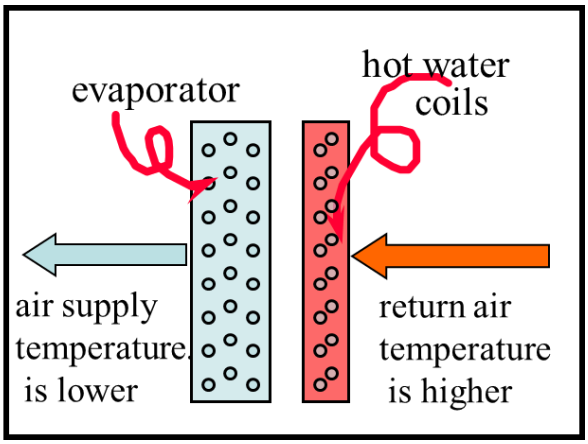
Danfoss · castel · SANHUA · ALCO CONTROLS · EMERSON Climate Technologies

3.Electric parts

Schneider Electric · SIEMENS · ABB · CHINT · CAREL

Hot Water Coils

The hot water coil placed in the air-facing (return air inlet) place, feel the return air temperature, completely eliminate the cold air directly blowing;



Sound Package

Sound attenuating compressor blankets are available.

Cooling Only

Units are available for those applications requiring no heating from the WSHP

Waterside Economizer System

Units are available for those applications requiring no heating from the WSHP

Electric Heat

Integral electric heat coil provides supplemental or emergency heat when conditions require.

Extended-range Package

An extended-range package is available on all heat pumps to allow heating and cooling operation down to -5℃(23℉) leaving water temperature.

2-Way Motorized Isolation Valve

Control valve can be factory-installed or field-installed to handle variable speed pumping requirements. Both standard and high cut-off pressure valves are available as option.

Hot Gas Reheat Coil

Optional coil provides superior humidity control for occupant comfort. Uses expelled heat from the refrigeration cycle and redirects it through an isolated circuit in the evaporator section. For every 10° F of temperature rise across the hot gas reheat coil there is approximately a 20% drop in the discharge air relative humidity (%Rh).
A wall-mounted humidistat must be used in conjunction with the unit to measure and adjust the humidity set point in the space.

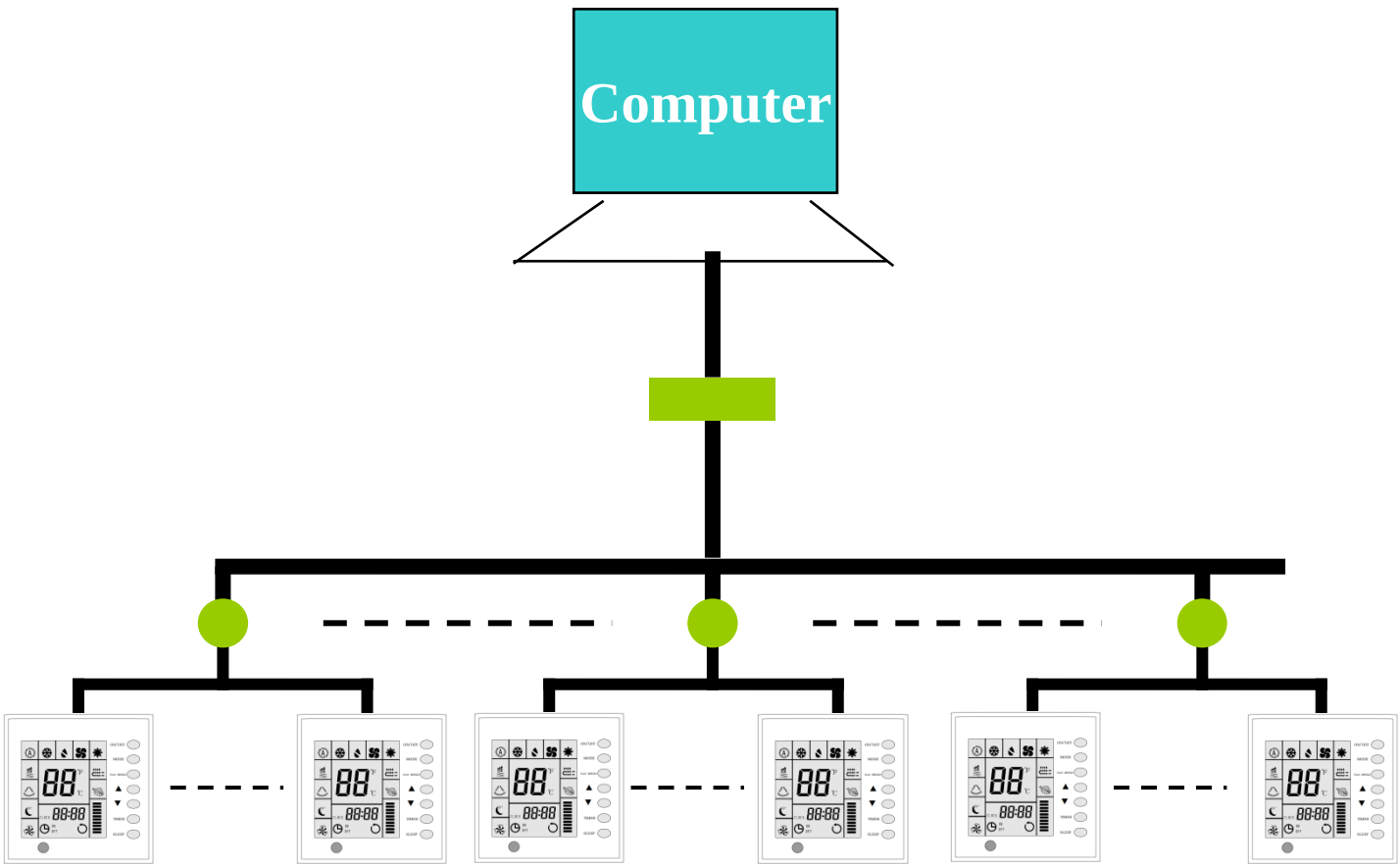
BACnet® Communication Module

Controller can accept a plug-in BACnet communication module to provide network communications and added functionality to easily integrate with an existing BAS. The communication module can be factory- or field-installed and is tested with all logic required to monitor and control the unit.
It is designed to be linked with a centralized building automation system (BAS) through a BACnet communications network for centralized scheduling and management of multiple heat pumps.

MODBUS RS-485 communication protocol

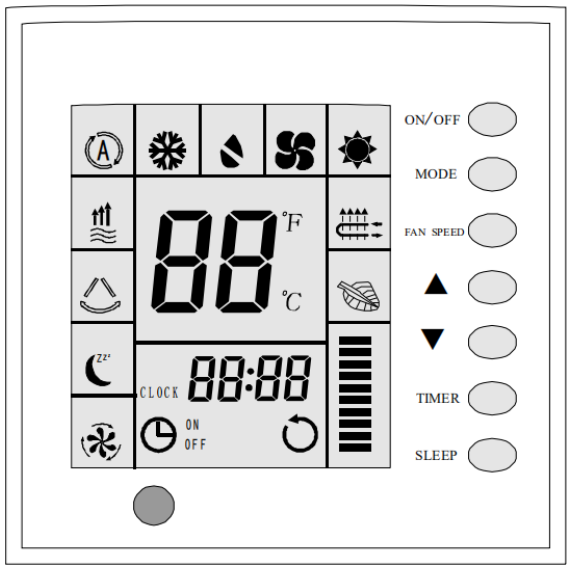
RS485 communication interface is provided, which is connected with the main control and sub-control platform to realize low-cost automation of buildings.

- The unique networked centralized control system can control more than 30,000 units.
- Strong anti-interference ability, transmission distance up to 1000 meters.



Wall-mounted Thermostat

The automatic changeover thermostat has fan ON/AUTO operation, system ON/OFF operation, digital temperature display, 2 stage electric heater display, and the thermostat can be controlled remotely. Remote controller with thermostat as option.



Water Flow Switch

The water flow switch will shut off the unit when the water flow is smaller than limit value to protect the system operation.

Flexible Water Hose Kits

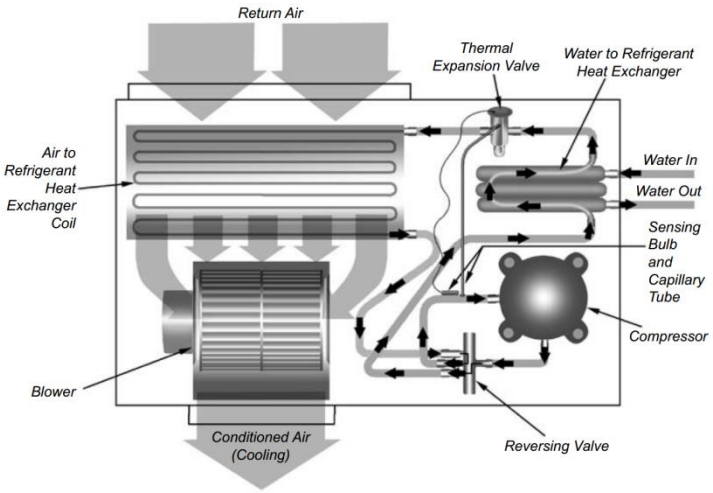
Flexible water hose kits are available in ¾ inch and 1 inch diameters, 60cm and 90cm long. Each hose is constructed of braided stainless steel and has NPT steel fittings with a swivel at one end. Hoses are rated at minimum 1550kPa

Cooling and Heating Refrigeration Cycles

Cooling Refrigeration Cycle

When the wall thermostat calls for COOLING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the water-to-refrigerant heat exchanger.

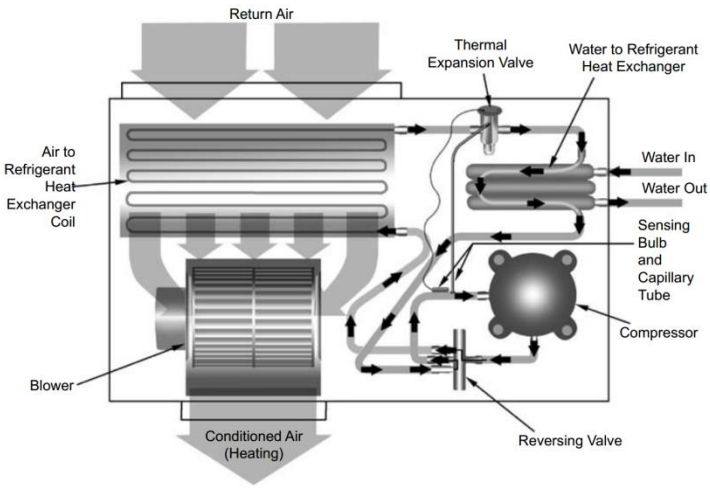
There, the heat is removed by the water, and the hot gas condenses to become a liquid. The liquid then flows through a thermal expansion valve to the air-to-refrigerant heat exchanger coil. The liquid then evaporates and becomes a gas, at the same time absorbing heat and cooling the air passing over the surfaces of the coil. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.



Heating Refrigeration Cycle

When the wall thermostat calls for HEATING, the reversing valve directs the flow of the refrigerant, a hot gas, from the compressor to the air-to-refrigerant heat exchanger coil.

There, the heat is removed by the air passing over the surfaces of the coil and the hot gas condenses and becomes a liquid. The liquid then flows through a thermal expansion valve to the water-to-refrigerant heat exchanger. The liquid then evaporates and becomes a gas, at the same time absorbing heat and cooling the water. The refrigerant then flows as a low pressure gas through the reversing valve and back to the suction side of the compressor to complete the cycle.

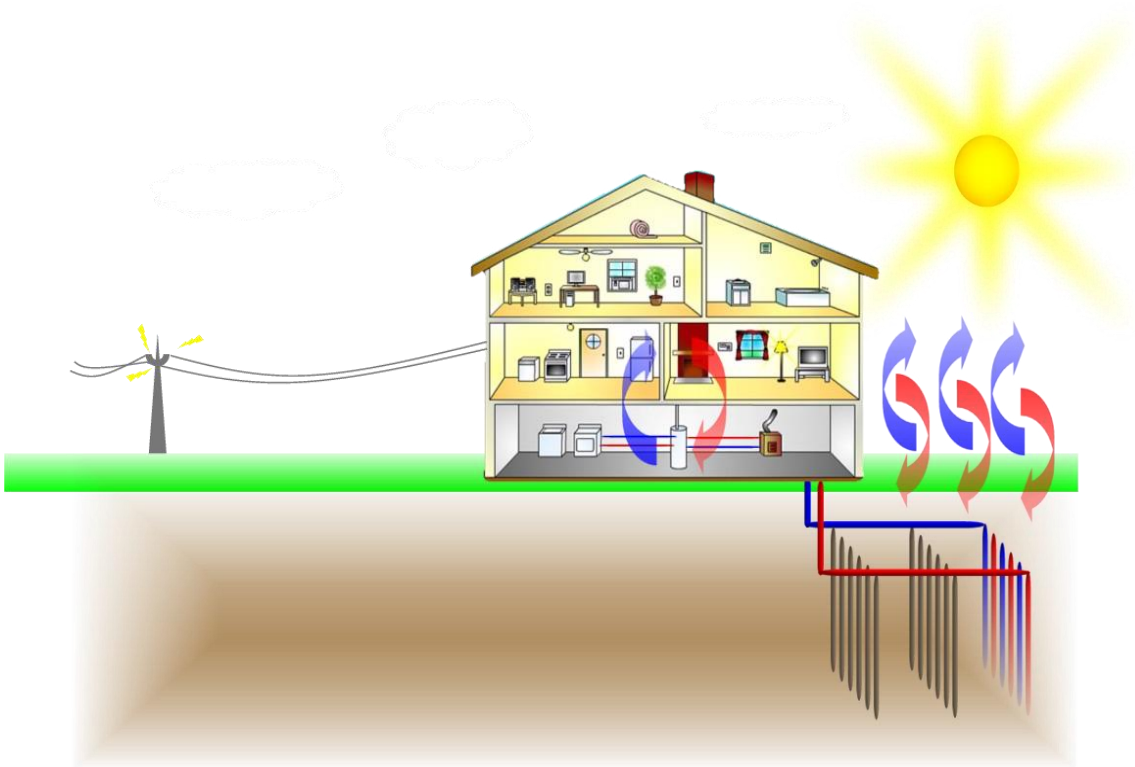


Water-source heat pump systems are used to provide comfort in a wide range of building types and climates. The system utilizes energy-conserving, heat-recovery capabilities to transfer heat from one area to another to meet individual zone requirements. When used with system design and control strategies, these high-performance systems reduce operating costs for the building owner and improving occupant comfort.

Heat pump units are available in many different configurations and the design simplicity can be adapted to suit almost any building plan. The vertical and horizontal water-source heat pump system is versatile for installation in a boiler/cooling tower applications, as well as ground source (geothermal) applications.

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

Withair® continues to enhance the application of Geothermal and other WSHP systems to help your buildings work better. Superior Withair® design makes our units among the quietest and most efficient on the market. A Withair® water source heat pump is easy to access and service components; meets high indoor air quality standards; offers quiet operation; and higher operating efficiencies to reduce total cost of ownership. Efficient systems for lighting, plumbing, and comfort can significantly reduce the operating expense of doing business. The extra high efficiency units provide energy savings that not only contribute to lowering the life cycle cost, but also reduce the waste impact on the environment.

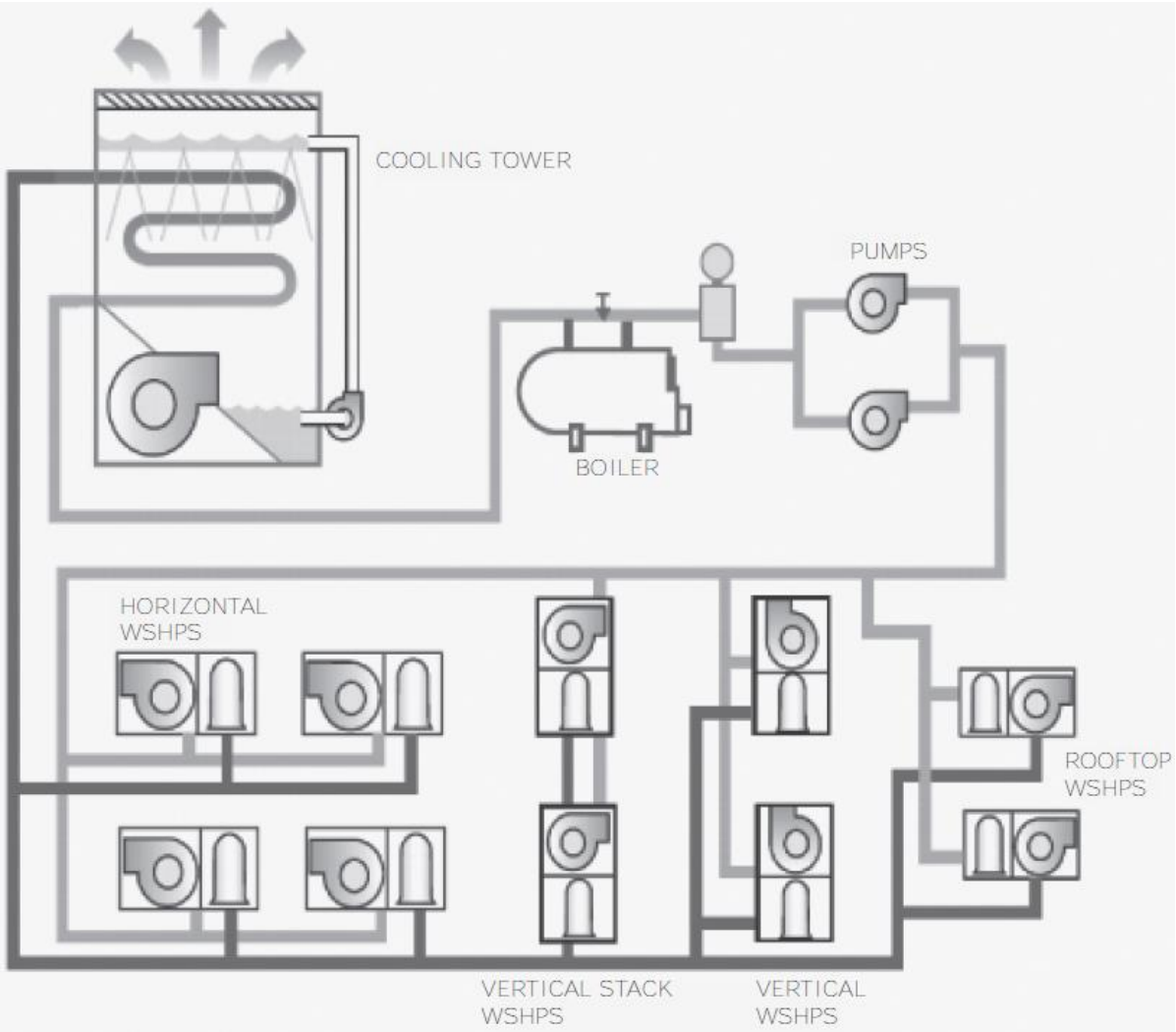


Cooling Tower/Boiler Applications

A “Cooling Tower/Boiler” application uses a simple two-pipe water circulating system that adds heat, removes heat or transfers rejected heat to other units throughout the building. The water temperature for heating is generally maintained between 65~70℉(18.3~21.1℃) and is usually provided by a natural gas or electric boiler located in a mechanical room.

The condensing water temperature, during cooling months, is maintained between 86℉(30℃) and 95℉(35℃) and requires the use of a cooling tower to dissipate waste heat. Cooling towers can be located on the roof, or inside or adjacent to the building. This application can be the lowest cost of the loop options available.

In applications such as office buildings, heat generated by lights, people, and office equipment often results in the need to provide year-round cooling in the interior zones of the building. In these applications, the benefit of this heat recovery further reduces boiler energy use during the winter months.



Cooling Tower / Boiler Water-source Heat Pump System

Ground Source System

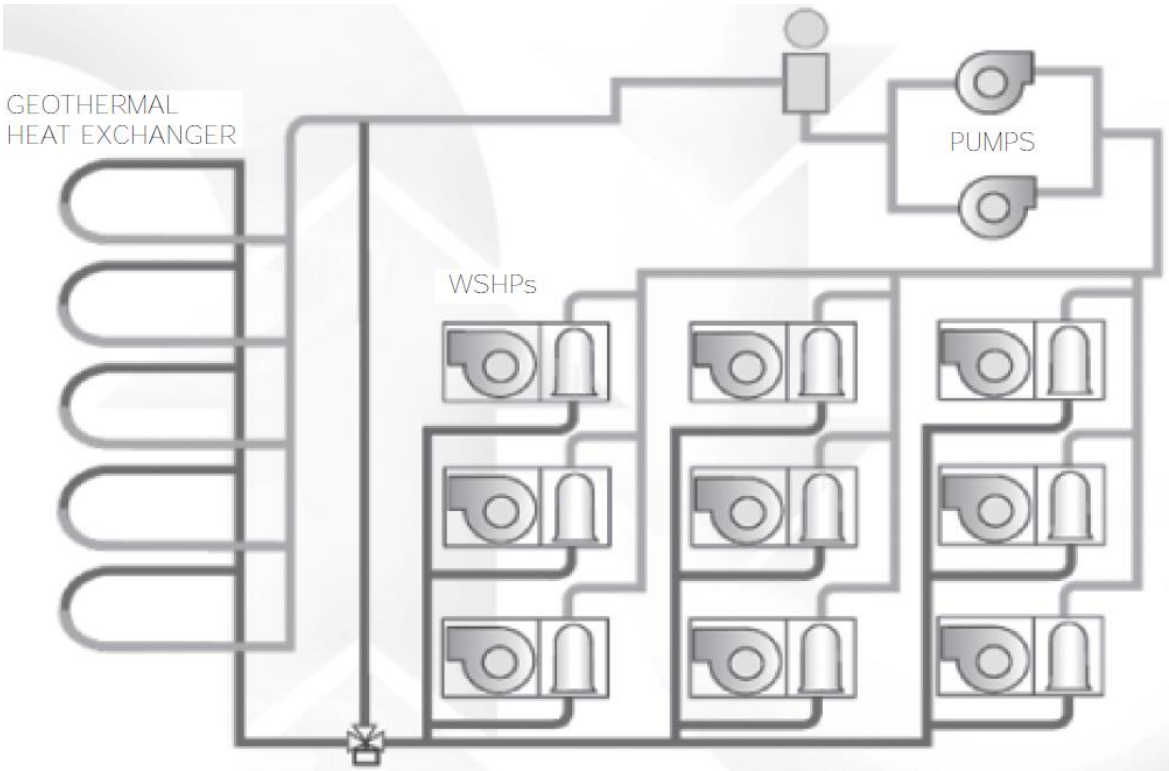
The advantages of a geothermal heat pump system can potentially minimize heating and cooling cost by 30 to 40%. In this application the cooling tower and boiler are replaced with a ground heat exchanger. The ground heat exchanger is a series of pipes buried in the earth.

The earth is used as an energy storage tank. Ground-source heat pump systems offer the potential for saving energy because they can reduce (or eliminate) the energy needed to operate a cooling tower and/or boiler. Eliminating the cooling tower has architectural and maintenance advantages, and eliminating the boiler frees up floor space in the building.

The fluctuating temperatures of fluid from the earth are more stable than air, allowing the equipment to operate at a lower discharge pressure and use fewer kilowatts. The constant earth temperature will heat or cool the fluid running through buried high density polyethylene pipe to provide heating and cooling to a building.

A geothermal loop can be installed either horizontally or vertically. Vertical loops require less overall land area to reject (i.e., sink) the excess heat from the building. Horizontal loops require trenches in the ground spanning a larger overall land area.

Although external piping is the responsibility of the installer and/or piping manufacturer, many electric utilities and rural electric cooperatives are offering monetary incentives to install geothermal systems. Utility companies offer the incentives because of reduced peak loads that flatten out their demand curve over time, and save them money. These savings are ultimately transferred to the consumer.



Ground Source Heat Pump System

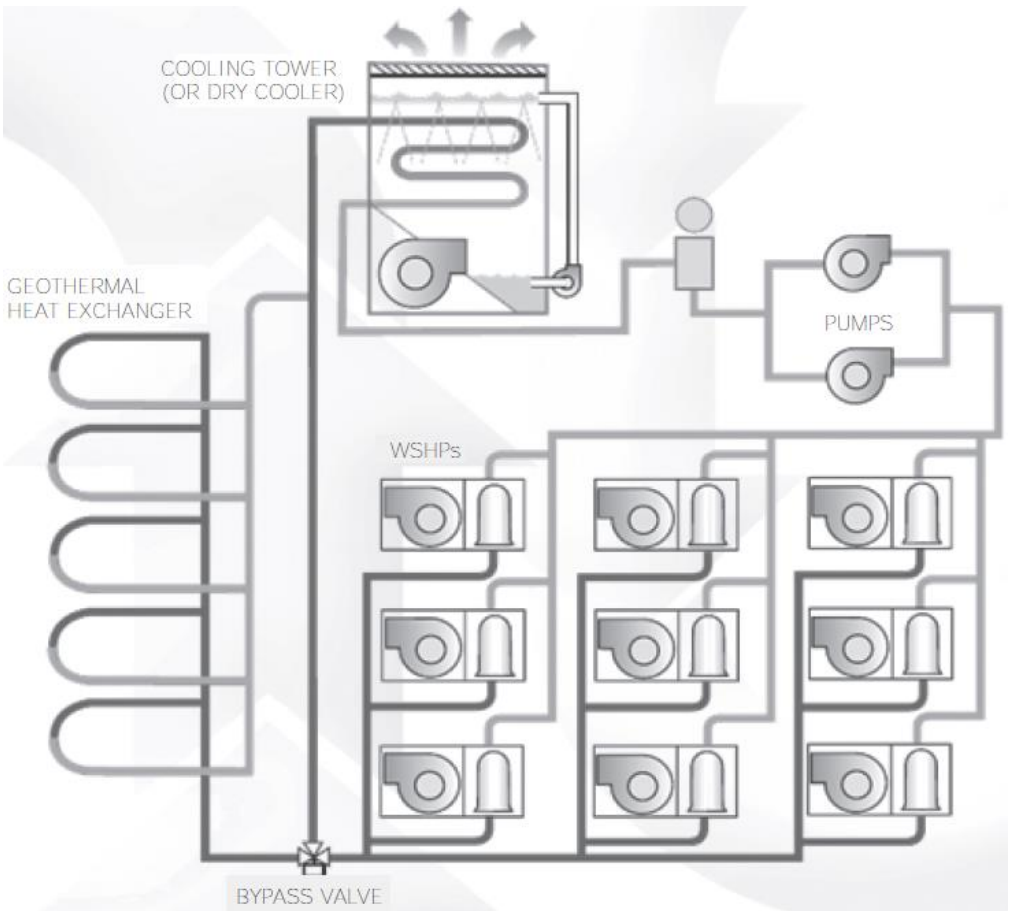
Hybrid Systems

Hybrid systems involve adding a small cooling tower or dry cooler to a ground source system that is installed in a cooling -dominated climate or adding a small boiler to a system in a heating dominated climate. In either case, the geothermal heat exchanger is sized based on the smaller of the two loads: for the total heat absorbed in a cooling-dominated climate or the total heat rejected in a heating-dominated climate. Then, a small cooling tower (or boiler) is added to reject (or add) the remaining heat.

A hybrid system may also be used in existing buildings with existing ground loops as additional rooms or buildings are added to the system. A cooling tower may be the solution to off-load the peak demand of the new building addition as an example. Other additions may include a requirement for fresh-air ventilation. A fresh-air, air handler, along with a water to water unit may be introduced to the closed loop system to allow tempered fresh-air into the building.

The buildings heating and cooling needs are not based off of one type of component, but perform harmonious of each other. Heat recovery from the loop itself can be shared with the other major components.

Hybrid systems can often make the system more economical, opening up the possibility to reap the potential energy savings.



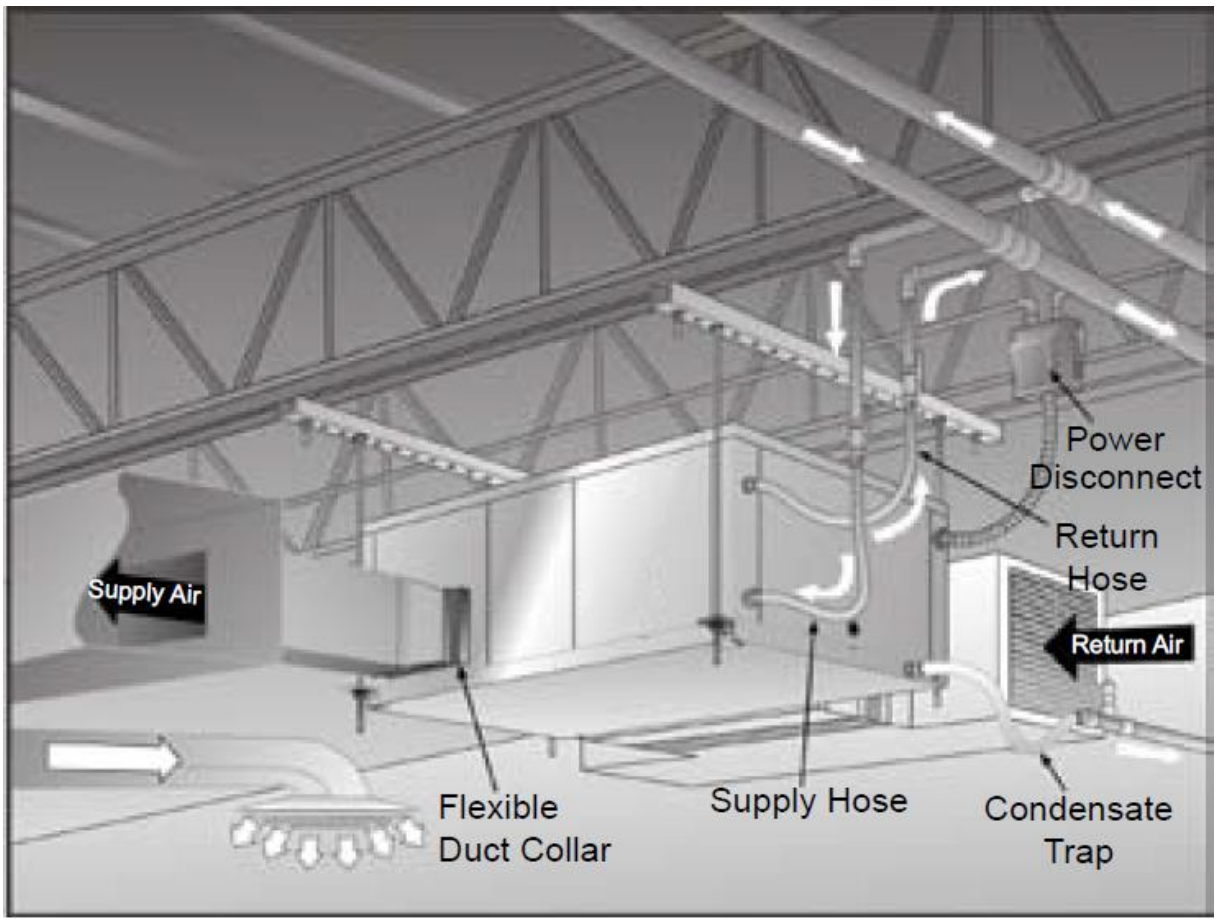
Hybrid Ground Source Heat Pump System

Typical Horizontal Unit Installation

WSHP Unit Location

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

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



Typical Ceiling Installation

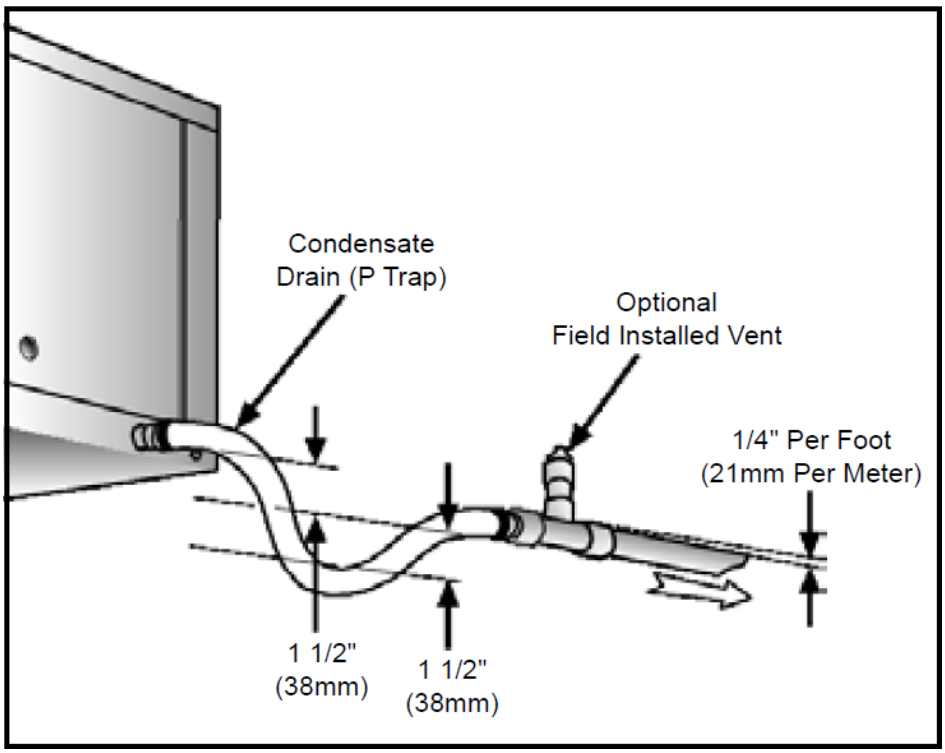
Typical Horizontal Unit Installation

Piping

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

Condensate Drain Piping

Condensate piping can be made of steel, copper or PVC pipe. In most cases, PVC pipe eliminates the need to wrap insulation around the pipe to prevent sweating. A threaded, factory supplied condensate fitting allows the connection of PVC, flexible hose or steel braided hose. The condensate piping must be trapped at the unit and pitched away from the unit not less than 1/4" per foot. A vent is required after the trap so that the condensate will drain away from the unit. The vent can also act as a clean out if the trap becomes clogged. To avoid having waste gases entering the building, the condensate drain should not be directly piped to a drain /waste/vent stack. See local codes for the correct application of condensate piping to drains.

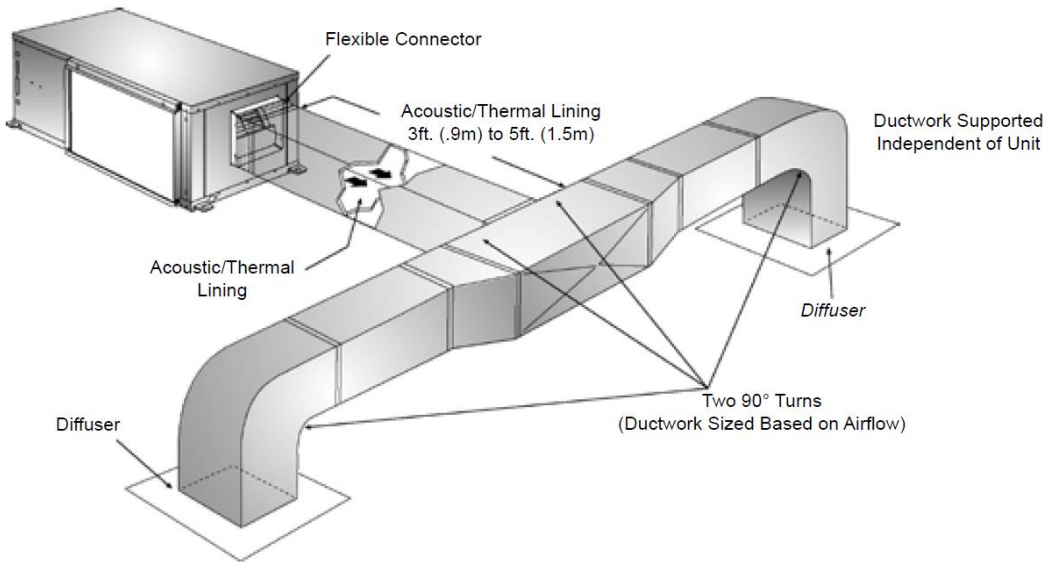


Typical Condensate Piping

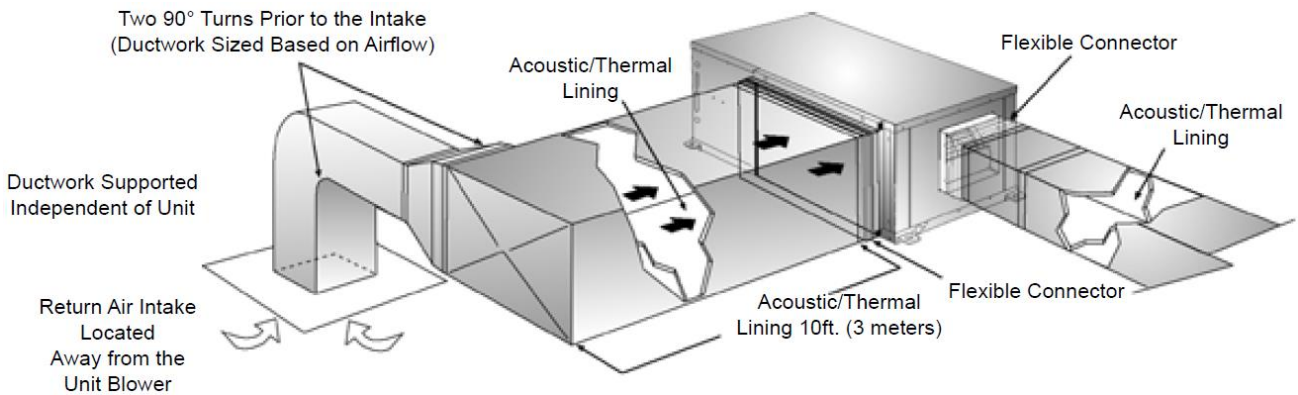
Ductwork and Sound Attenuation Considerations

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

As a general recommendation, duct interiors should have an acoustic / thermal lining at least 1/2 inch thick over the entire duct run. For maximum attenuation, line the last five diameters of duct before each register with a one-inch thick sound blanket. Elbows, tees and dampers can create turbulence or distortion in the airflow. Place a straight length of duct, 5 to 10 times the duct width, before the next fitting to smooth out airflow. Diffusers that are located in the bottom of a trunk duct can also produce noise. For this same reason, volume control dampers should be located several duct widths upstream from an air outlet.



Suggested Supply Ducting



Suggested Return Ducting

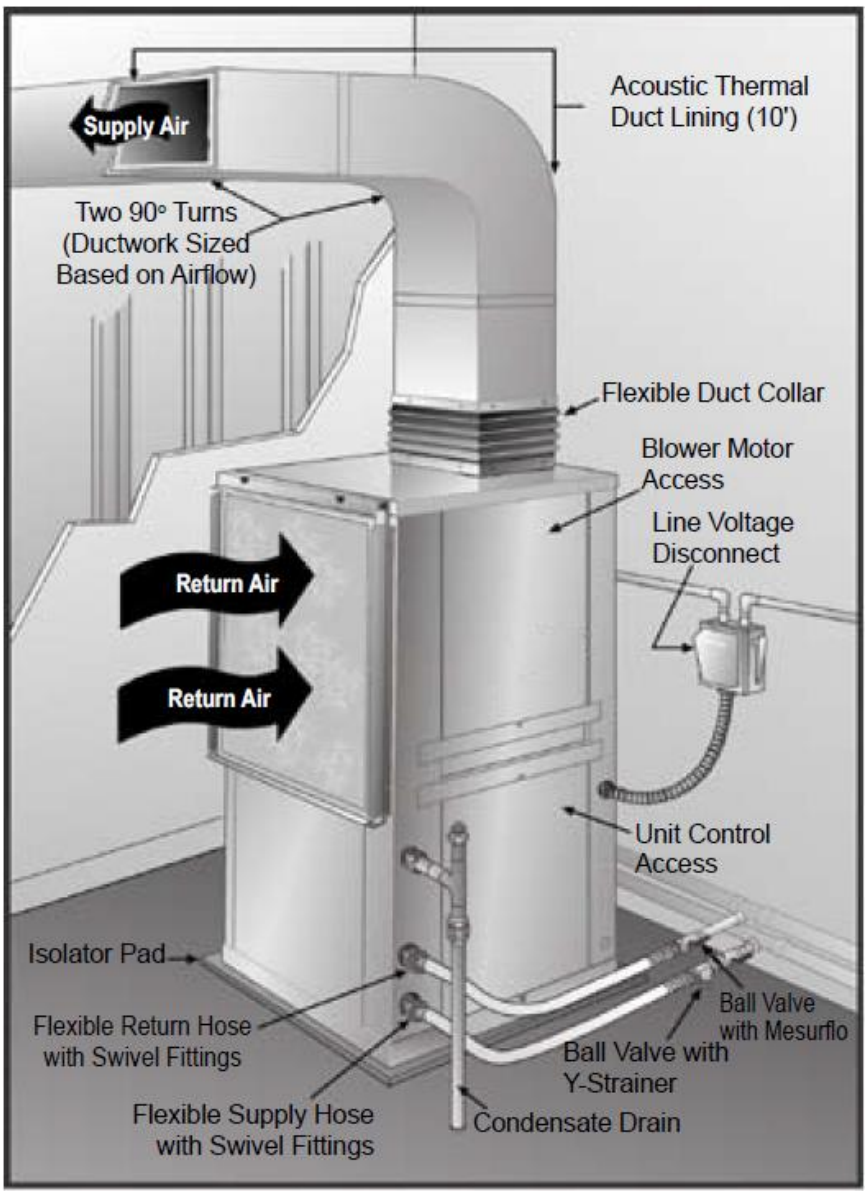
Typical Vertical Unit Installation

WSHP Unit Location

Locate a vertical unit to allow for easy removal of the filter and access panels. Allow a minimum of 18" (46cm) clearance on each side of the unit for service and maintenance access. Always be sure to leave at least one side of the filter rack unobstructed so that the service personnel will be able to slide the filter out.

Install a field supplied line voltage disconnect for branch circuit protection.

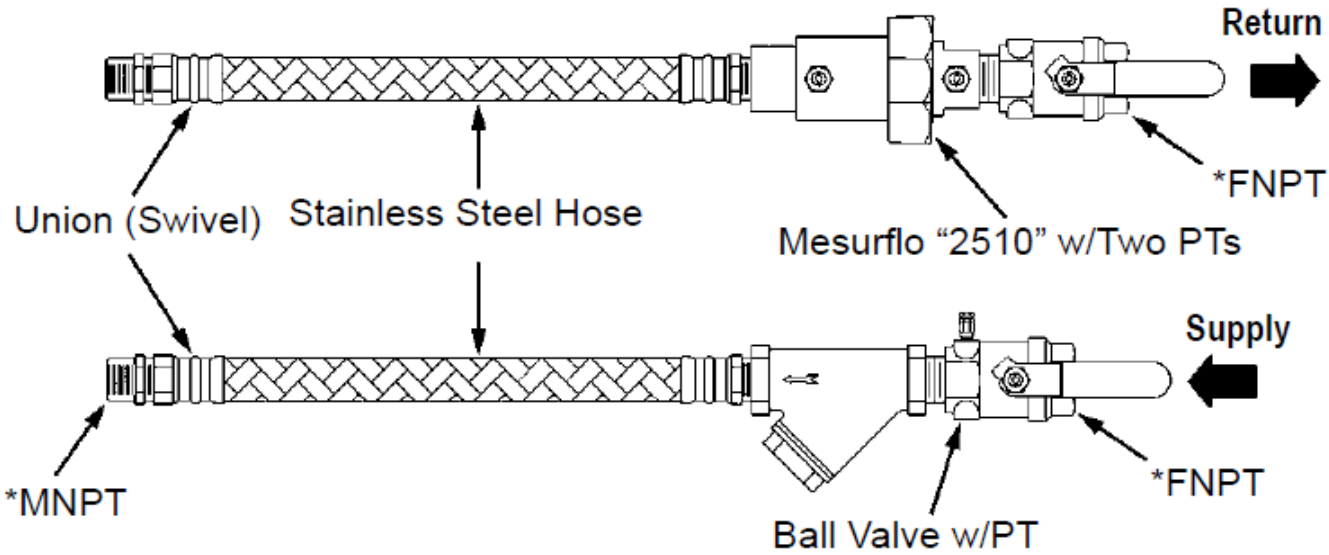
To reduce noise attenuation, install a 1/2 inch thick, field provided vibration pad below the vertical unit. This vibration pad should be equal to the overall foot-print size of the unit to provide sound dampening of the unit while in operation.



Typical Vertical Installation

Piping

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



Fire Rated Supply or Return Hoses

Condensate Drain Piping

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

To avoid having waste gases entering the building, the condensate drain should not be directly piped to a drain/waste/vent stack. See local codes for the correct application of condensate piping to drains.

Dedicated Outside Air System Application

Dedicated outside air systems (DOAS) make it easier to ensure proper ventilation airflow is delivered to the occupied space, can be simple to control and maintain, will provide improved indoor air quality, may result in system energy savings and can be implemented with little to no additional cost to the project. The primary function of a DOAS unit is to decouple the sensible and latent load of the ventilation air from the occupied space cooling and heating loads. This pre-conditioned air can be delivered directly to the space through a dedicated distribution system, or through the local space conditioning units and associated ductwork. Decoupling the ventilation load from the space load allows for downsizing of the local units and can result in little to no increase in overall system cost.

A decentralized DOAS system, using multiple smaller DOAS units, can provide additional first cost reductions and operational savings. Decentralized systems use smaller ductwork and shorter runs between the unit and the served space, requiring lower total fan energy compared to central DOAS systems. With decentralized systems the risk of a complete system failure is eliminated, and using multiple smaller units can be easier for retrofit projects with little space for ductwork.

WSHP Unit Location

Locate the equipment room away from sound sensitive areas. Whenever possible, isolate the equipment room from these areas by locating restrooms, utility rooms, stairwells, hallways, elevators, etc. around its perimeter. This allows not only isolation from radiated sound but provides the capability to route ductwork over less sensitive areas.

Acoustically seal the equipment room with a high quality, flexible material to prevent air and noise from escaping. Even a small leak compromises the acoustic performance of the installation. Design the equipment room door to seal tightly on a perimeter gasket.

Equipment room wall construction should be concrete block or offset, double stud. The decision depends on the critical nature of the application. Line the cavity with glass fiber insulation and use a double layer of wallboard on each side of the wall.

The floor must be structurally strong enough to support the unit with minimum deflection. Provide proper structural support to minimize sound and vibration transmission. Consider a concrete floor. Extra design consideration is required when installing on a wooden structure. Install unit level from front-to-back and side-to side.

Locate unit fresh air intakes away from building flue stacks, exhaust ventilators and areas containing automotive or other exhaust to prevent the possible introduction of contaminated air to the system. Intakes should have bird/insect screens and be located as close to the DOAS unit as possible to minimize duct static losses. The intake duct should include a motorized damper as close to the intake as possible. Allow enough space around the unit for service and maintenance clearance. Locate equipment room access doors in a manner that can assist in service access if needed.

Ductwork

Fan noise travels through the ductwork to occupied spaces; it likely is the most challenging to control. Careful duct design and routing practice is required. Avoid any abrupt change in duct size and sharp turns in the fan discharge. Avoid turns opposed to wheel rotation since they generate air turbulence and result in unwanted sound. The ASHRAE Applications Handbook discusses sound attenuation relevant to self-contained system applications. Advances in acoustical science allow for designing sound levels in each space if equipment sound power data is available.

Supply Duct

Extend a lined section of supply air duct at least 15 feet from the equipment room. Using round duct significantly reduces low frequency sound near the equipment room. If rectangular duct is used, keep the aspect ratio of the duct as small as possible. The large flat surfaces associated with large aspect ratios transmit sound to the space and increase the potential for duct generated noise such as oil canning. The maximum recommended supply air duct velocity is 2000 feet per minute.

Duct Protection

An adjustable duct high limit switch is standard equipment on all DOAS systems with VAV controls. This is of importance when using fast-acting, normally closed boxes. The switch is field adjustable; set it to meet the specific rating of the system ductwork.

Vibration Isolation

Make duct connections to the unit with a flexible connection. Though flexible piping and electrical connections are not required, pay attention to these areas to avoid vibration transmission from outside sources to the unit.

Piping

The water source heat pump unit is typically connected to the supply / return piping using a “reverse return” piping system which includes a flow control device so that flow requirements are met for each zone. A short, high pressure “flexible hose” is used to connect the unit to the building’s hard piping and acts as a sound attenuator for both the unit operating noise and hydronic pumping noise. One end of the hose has a swivel fitting to facilitate removal of the unit for replacement or service. Include supply and return shutoff valves in the design to allow removal of a unit without the need to shut down the entire heat pump system. The return valve may be used for balancing and will typically have a “memory stop” so that it can be reopened to the proper position for the flow required. Fixed flow devices are commercially available and can be installed to eliminate the need for memory stop shut off valves. Include Pressure /Temperature ports to allow the service technician to measure water flow and unit operation. Withair® has available optional hose kit combinations to better facilitate system flow balancing. These flexible hoses reduce vibration between the unit and the rigid piping system.
A minimum 20-mesh strainer installed in the supply piping is required.

Standard Unit Typical Installation

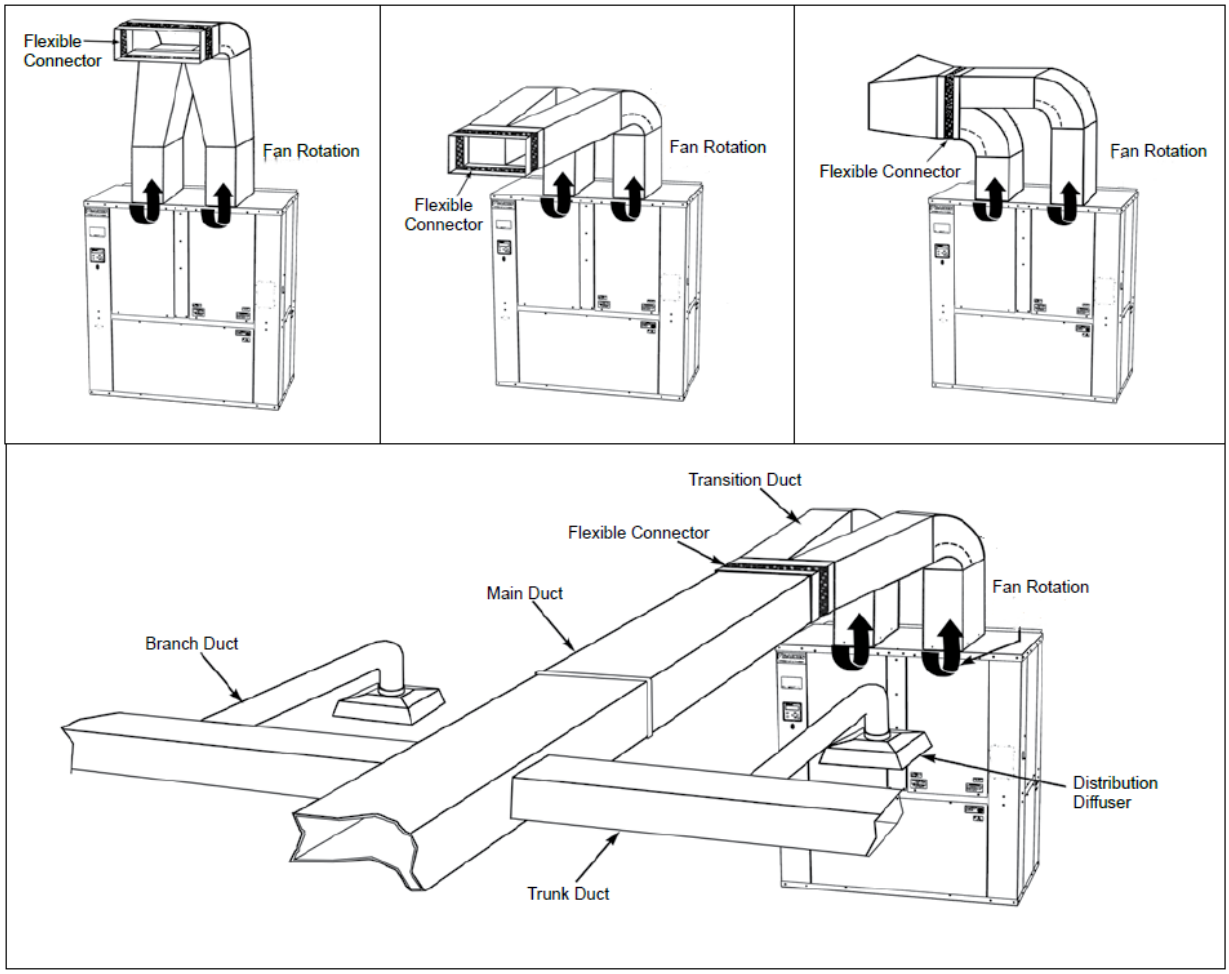
The DOAS WSHP should be installed in a mechanical room or large closet with sufficient room for service access. The preferred location would be close to an exterior wall to minimize the length of ductwork containing untreated outdoor air. The contractor should make sure that access has been provided including clearance for filter brackets, duct collars and fittings at water and electrical connections. It is recommended that the unit be installed in an equipment room close to an exterior wall to minimize duct static pressure. The entering air must be ducted to the unit and can be supplied directly from an outdoor air intake or from a separate energy recovery ventilator. It is recommended that the unit be located on vibration isolators to reduce any vibration.

Ductwork and Attenuation

All ductwork should conform to industry standards of good practice as described in ASHRAE Systems Guide. The discharge duct system will normally consist of a flexible connector, a transition piece to the final duct size, a short run of duct, an elbow without vanes and a trunk duct tee'd into branch ducts with discharge diffusers. Transition duct must not have angles totaling more than 30 degrees or severe loss of air performance can result.

Some units have multiple fan outlets. The preferred method for minimum static pressure loss would be individual ducts at each outlet connected to a larger main duct downstream.

For minimum noise transmission, the metal duct material should be internally lined with acoustic fibrous insulation. The ductwork should be laid out so that there is no line of sight between the conditioner discharge and the distribution diffusers.



Suggested Supply Ducting

Model W01R2-	Compressor type	No. of circuits	ESP (Pa)	Horizontal unit size	Vertical unit size	Weight (lbs/kg)		Water pipe (inch/DN)		Condensate pipe (inch/DN)	Tube material	Return bends	Working pressure (psig/MPa)	
				L*W*H (inch/mm)		Net	Gross	In	Out				Refrigerant	Water
028H(V)	Rotary	1	12	41*20*14 (1,050*500*520)	20*20*43 (520*500*1,100)	132.3/60	165.3/75	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
035H(V)	Rotary	1	20	41*20*14 (1,050*500*520)	20*20*43 (520*500*1,100)	143.3/65	176.4/80	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
045H(V)	Rotary	1	20	41*20*14 (1,050*500*520)	20*20*43 (520*500*1,100)	165.3/75	198.4/90	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
058H(V)	Rotary	1	20	41*20*14 (1,050*500*520)	20*20*43 (520*500*1,100)	187.4/85	220.5/100	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
072H(V)	Rotary	1	30	43*22*19 (1,100*560*485)	26*26*47 (650*650*1,200)	220.5/100	264.5/120	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
086H(V)	Rotary	1	30	43*22*19 (1,100*560*485)	26*26*47 (650*650*1,200)	242.5/110	286.6/130	3/4" (20)	3/4" (20)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
105H(V)	Rotary	2	50	51*27*21 (1,300*680*525)	28*28*56 (720*720*1,420)	286.6/130	352.7/160	1" (25)	1" (25)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
126H(V)	Rotary	2	50	51*27*21 (1,300*680*525)	28*28*56 (720*720*1,420)	330.7/150	396.8/180	1" (25)	1" (25)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
146H(V)	Scroll	2	50	55*27*21 (1,400*680*525)	30*30*61 (750*750*1,550)	396.8/180	485.0/220	1" (25)	1" (25)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
175H(V)	Scroll	2	80	57*27*26 (1,450*680*650)	31*31*65 (800*800*1,660)	529.1/240	617.3/280	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
210H(V)	Scroll	3	80	62*39*29 (1,580*1,000*730)	45*45*70 (1,150*1,150*1,780)	727.5/330	837.7/380	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
250H(V)	Scroll	3	120	62*39*29 (1,580*1,000*730)	45*45*70 (1,150*1,150*1,780)	837.7/380	948.0/430	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
300H(V)	Scroll	3	120	79*46*29 (2,000*1,180*730)	61*48*94 (1,560*1,220*2,390)	970.0/440	1,102.3/500	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
350H(V)	Scroll	3	120	79*46*29 (2,000*1,180*730)	61*48*94 (1,560*1,220*2,390)	1,080.3/490	1,234.6/560	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
400H(V)	Scroll	4	150	79*46*29 (2,000*1,180*730)	61*48*94 (1,560*1,220*2,390)	1,212.5/550	1,411.0/640	1-1/4" (32)	1-1/4" (32)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
520H(V)	Scroll	4	200	94*46*35 (2,380*1,180*880)	77*50*102 (1,950*1,270*2,580)	1,344.8/610	1,587.3/720	1-1/2" (40)	1-1/2" (40)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
680H(V)	Scroll	4	200	94*55*52 (2,380*1,400*1,330)	77*50*102 (1,950*1,270*2,580)	2,138.5/970	2,447.1/1,110	1-1/2" (40)	1-1/2" (40)	3/4" (20)	Copper	Copper	700/4.8	450/3.1
1400H(V)	Scroll	4	350	101*87*58 (2,560*2,203*1,476)	88*61*103 (2,240*1,560*2,620)	3,483.3/1,580	4,144.7/1,880	2" (50)	2" (50)	3/4" (20)	Copper	Copper	700/4.8	450/3.1

Note: All models specifications are subject to change without prior notice, please refer to nameplates for the most accurate specifications.

Water Source Heat Pumps with PSC Motors

Model W01R2			Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
			Cooling 86℉(30℃)		Heating 68℉(20℃)		Cooling 59℉(15℃)		Heating 50℉(10℃)		Cooling 77℉(25℃)		Heating 32℉(0℃)	
Unit size	Waterflow GPM (m^3/h)	Airflow CFM (m^3/h)	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP
028H(V)	2.26 (0.51)	300 (510)	9,400 (2,754)	15.26	11,400 (3,340)	4.82	10,700 (3,194)	24.29	9,300 (2,725)	4.51	9,900 (2,900)	18.23	7,100 (2,080)	3.81
035H(V)	2.94 (0.67)	400 (680)	11,800 (3,457)	15.45	14,200 (4,160)	5.54	13,400 (3,985)	24.21	11,700 (3,428)	4.64	12,400 (3,633)	18.85	8,800 (2,578)	3.93
045H(V)	3.8 (0.86)	500 (850)	15,200 (4,454)	16.11	18,500 (5,420)	5.01	17,200 (5,098)	23.85	15,000 (4,395)	4.33	15,900 (4,659)	19.00	11,400 (3,340)	3.86
058H(V)	5.25 (1.19)	600 (1,020)	19,500 (5,714)	16.23	23,900 (7,000)	5.25	22,200 (6,563)	23.29	19,200 (5,626)	4.45	20,400 (5,978)	18.41	14,500 (4,248)	3.75
072H(V)	6.45 (1.46)	800 (1,360)	24300 (7,120)	16.42	30,000 (8,790)	5.32	27,700 (8,175)	25.72	24000 (7,032)	4.31	25,500 (7,472)	19.37	18,200 (5,333)	3.65
086H(V)	7.8 (1.77)	900 (1,530)	29,000 (8,497)	15.95	35,800 (10,490)	5.56	33000 (9,757)	22.57	28,700 (8,410)	4.45	30,500 (8,936)	19.11	21,700 (6,358)	3.60
105H(V)	9.50 (2.15)	1,200 (2,039)	35,500 (10,402)	15.66	43,800 (12,833)	5.41	40,300 (11,896)	24.56	35,100 (10,285)	4.35	37,200 (10,900)	19.23	26,500 (7,765)	3.64
126H(V)	11.32 (2.57)	1,400 (2,379)	42,500 (12,453)	15.95	53,100 (15,558)	5.13	48,400 (16,269)	23.40	42,000 (12,306)	4.67	44,600 (13,068)	19.02	31,800 (9,318)	3.78
146H(V)	13.27 (3.01)	1,650 (2,803)	49,400 (14,474)	16.56	62,100 (18,195)	5.25	56,000 (16,525)	23.35	48,700 (14,270)	4.51	51,800 (15,178)	18.95	36,900 (10,812)	3.71
175H(V)	15.59 (3.54)	1,950 (3,313)	59,300 (17,375)	15.63	74,400 (21,800)	4.98	67,200 (19,807)	22.95	58,300 (17,082)	4.45	62,000 (18,166)	18.80	44,200 (12,950)	3.69
210H(V)	18.54 (4.21)	2,300 (3,908)	71,200 (20,862)	14.97	90,000 (26,370)	4.66	80,700 (23,762)	22.76	70,100 (20,540)	4.34	74,500 (21,828)	18.67	53,100 (15,558)	3.75
250H(V)	22.13 (5.03)	2,900 (4,927)	84,900 (24,876)	14.83	108,000 (31,644)	4.90	96,100 (28,275)	23.46	83,500 (24,466)	4.25	88,800 (26,018)	17.50	63,200 (18,518)	3.71
300H(V)	26.65 (6.05)	3,500 (5,947)	101,800 (29,827)	14.20	130,500 (38,236)	4.82	115,200 (33,900)	22.62	100,100 (29,330)	4.19	106,500 (31,205)	17.02	76,000 (22,268)	3.67
350H(V)	31.18 (7.08)	4,100 (6,966)	118,900 (34,838)	14.36	152,300 (44,623)	4.86	134,300 (39,525)	22.07	116,800 (34,222)	4.11	124,200 (36,390)	16.97	88,600 (25,960)	3.55
400H(V)	35.69 (8.11)	4,500 (7,646)	136,000 (39,848)	15.73	175,600 (51,450)	4.77	153,700 (45,210)	21.54	133,300 (39,057)	4.07	142,000 (41,606)	16.69	101,300 (29,681)	3.76
520H(V)	46.50 (10.56)	6,100 (10,364)	176,700 (51,773)	14.29	230,100 (67,420)	4.69	199,600 (58,717)	20.90	173,400 (50,806)	4.06	184,500 (54,058)	16.32	131,700 (38,588)	3.64
680H(V)	61.02 (13.86)	7,900 (13,422)	231,300 (67,771)	14.18	305,600 (89,540)	4.62	261,200 (76,795)	19.85	227,000 (66,511)	4.00	241,400 (70,730)	15.92	172,200 (50,455)	3.66
1400H(V)	115.45 (26.22)	15,600 (26,505)	477,000 (139,761)	13.65	641,200 (187,872)	4.56	538,400 (158,074)	18.77	468,100 (137,153)	4.00	498,100 (145,944)	15.76	355,500 (104,162)	3.55

Notes:
1. Rated in accordance ANSI/AHRI/ASHRAE/ISO13256-1 & GB/T19409-2003.
2. Test conditions are 80.6 ℉(27℃) DB/66.2 ℉(18.8℃) WB EAT in cooling and 68 ℉(20℃) DB/59 ℉(15℃) WB EAT in heating.
3. Entering liquid temperature in cooling is 86℉(30℃) for Water Loop, 77℉(25℃) for Ground Loop, and 59℉(15℃) for Ground Water.
4. Entering liquid temperature in heating is 68℉(20℃) for Water Loop, 32℉(0℃) for Ground Loop, and 50℉(10℃) for Ground Water.
5. EER = Energy Efficiency Ratio, COP = Coefficient of Performance.

Variable Speed WSHP with ECM Motors

Model W01R2-E				Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
				Cooling 86℉(30℃)		Heating 68℉(20℃)		Cooling 59℉(15℃)		Heating 50℉(10℃)		Cooling 77℉(25℃)		Heating 32℉(0℃)	
Unit size	Loading	Waterflow GPM (m^3/h)	Airflow CFM (m^3/h)	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP	Capacity Btu/hr (Watts)	EER Btu/hr/W	Capacity Btu/hr (Watts)	COP
028H(V)	Full	2.55 (0.58)	306 (520)	9,600 (2,813)	18.43	11,600 (3,399)	6.45	10,900 (3,194)	31.71	9,500 (2,784)	5.51	10,100 (2,960)	22.23	7,300 (2,139)	4.81
028H(V)	Part	2.55 (0.58)	206 (350)	5,300 (1,553)	23.75	6,400 (1,875)	8.62	6,100 (1,787)	48.22	5,200 (1,524)	6.55	5,800 (1,700)	36.62	4,200 (1,231)	5.62
035H(V)	Full	3.17 (0.72)	421 (715)	12,000 (3,516)	18.50	14,400 (4,219)	6.21	13,600 (3,985)	30.93	11,900 (3,487)	5.64	12,600 (3,692)	21.85	9,000 (2,637)	4.93
035H(V)	Part	3.17 (0.72)	274 (465)	6,800 (1,992)	23.60	8,200 (2,403)	8.33	7700 (2,256)	48.50	6,600 (1,934)	6.47	7,400 (2,168)	36.46	5,300 (1,553)	5.75
045H(V)	Full	4.05 (0.92)	536 (910)	15,400 (4,512)	18.40	18,700 (5,479)	6.19	17,400 (5,098)	31.45	15,200 (4,454)	5.33	16,100 (4,717)	22.00	11,600 (3,399)	4.86
045H(V)	Part	4.05 (0.92)	342 (580)	8,800 (2,578)	23.32	10,800 (3,165)	8.26	10000 (2,930)	48.13	8,500 (2,491)	6.36	9,600 (2,813)	35.24	6,900 (2,022)	5.68
058H(V)	Full	5.50 (1.25)	700 (1,190)	19,800 (5,801)	18.51	24,200 (7,090)	6.15	22,400 (6,563)	30.86	19,500 (5,714)	5.45	20,700 (6,065)	22.41	14,800 (4,336)	4.75
058H(V)	Part	5.50 (1.25)	462 (785)	11,400 (3,340)	23.54	13,900 (4,072)	8.20	12,900 (3,780)	48.47	11,000 (3,223)	6.67	12,400 (3,633)	35.32	8,900 (2,608)	5.56
072H(V)	Full	6.69 (1.52)	871 (1,480)	24600 (7,208)	18.46	30,300 (8,878)	6.16	27,900 (8,175)	30.55	24300 (7,120)	5.31	25,800 (7,559)	22.37	18,500 (5,421)	4.65
072H(V)	Part	6.69 (1.52)	565 (960)	13,530 (3,964)	23.46	16,700 (4,893)	8.31	15,300 (4,483)	47.91	13,000 (3,809)	6.39	14,700 (4,307)	35.25	10600 (3,106)	5.50
086H(V)	Full	8.15 (1.85)	1,036 (1,760)	29,400 (8,614)	18.35	36,200 (10,606)	6.65	33300 (9,757)	30.16	29,000 (8,497)	5.45	30,800 (9,025)	22.11	22,100 (6,475)	4.60
086H(V)	Part	8.15 (1.85)	665 (1,130)	16,700 (4,893)	23.29	20,700 (6,065)	8.64	19,000 (5,567)	47.72	16,200 (4,747)	6.42	18,200 (5,333)	34.98	13,100 (3,838)	5.45
105H(V)	Full	9.91 (2.25)	1,266 (2,150)	35,900 (10,519)	18.45	44,200 (12,950)	6.73	40,600 (11,896)	29.91	35,400 (10,372)	5.35	37,600 (11,017)	22.23	26,900 (7,882)	4.54
105H(V)	Part	9.91 (2.25)	824 (1,400)	20,500 (6,006)	23.53	25,300 (7,413)	8.42	23,200 (6,798)	47.30	19,700 (5,772)	6.25	22,300 (6,534)	35.12	15,900 (4,659)	5.36
126H(V)	Full	11.71 (2.66)	1,513 (2,570)	43,000 (12,599)	18.44	53,400 (15,646)	6.46	48,700 (16,269)	29.27	42,400 (12,423)	5.67	45,000 (13,185)	22.02	32,200 (9,435)	4.48
126H(V)	Part	11.71 (2.66)	1,000) (1,700)	24,300 (7,120)	23.47	30,200 (8,849)	8.23	27,500 (8,058)	45.85	23,400 (6,856)	6.47	26,400 (7,735)	34.86	18,900 (5,538)	5.30
146H(V)	Full	13.74 (3.12)	1,772 (3,010)	49,900 (14,621)	18.25	62,400 (18,283)	6.27	56,400 (16,525)	28.66	49,100 (14,386)	5.51	52,200 (15,295)	21.95	37,300 (10,929)	4.41
146H(V)	Part	13.74 (3.12)	1,154 (1,960)	27,500 (8,058)	22.90	34,400 (10,080)	8.22	31100 (9,112)	44.32	26,400 (7,735)	6.36	29,900 (8,761)	34.67	21,400 (6,270)	5.24
175H(V)	Full	16.07 (3.65)	2,119 (3,600)	59,800 (17,521)	18.14	74,800 (21,916)	6.17	67,600 (19,807)	28.25	58,800 (17,228)	5.45	62,500 (18,313)	21.80	44,700 (13,097)	4.39
175H(V)	Part	16.07 (3.65)	1,389 (2,360)	33,500 (9,816)	22.84	41,900 (12,277)	7.91	37,900 (11,105)	43.67	32,200 (9,435)	6.22	36,400 (10,665)	35.64	26,100 (7,647)	5.22
210H(V)	Full	19.02 (4.32)	2,543 (4,320)	71,700 (21,008)	18.10	90,400 (26,487)	5.97	81,100 (23,762)	28.02	70,600 (20,686)	5.34	75,000 (21,975)	21.67	53,600 (15,705)	4.35
210H(V)	Part	19.02 (4.32)	1,701 (2,890)	40,600 (11,896)	22.71	51,200 (15,000)	7.76	45,900 (13,449)	42.99	38,900 (11,398)	6.56	44,100 (12,921)	34.52	31,600 (9,259)	5.16
250H(V)	Full	22.63 (5.14)	3,178 (5,400)	85,400 (25,022)	18.06	108,500 (31,790)	5.75	96,500 (28,275)	27.74	84,000 (24,612)	5.25	89,300 (26,165)	21.50	63,800 (18,693)	4.31
250H(V)	Part	22.63 (5.14)	2,066 (3,510)	48,700 (14,269)	22.57	61,900 (18,137)	7.54	55,100 (16,144)	42.63	46,700 (13,683)	6.28	52,900 (15,500)	34.11	37,800 (11,075)	5.10
300H(V)	Full	27.17 (6.17)	3,826 (6,500)	102,400 (30,000)	17.67	131,100 (38,412)	5.67	115,700 (33,900)	27.19	100,700 (29,505)	5.19	107,100 (31,380)	21.02	76,600 (22,444)	4.27
300H(V)	Part	27.17 (6.17)	2,449 (4,160)	58,100 (17,023)	21.86	74,400 (21,800)	7.52	65,700 (19,250)	42.00	55,700 (16,320)	6.12	63,100 (18,488)	33.67	45,100 (13,214)	5.00
350H(V)	Full	31.71 (7.20)	4,414 (7,500)	119,500 (35,014)	17.26	153,000 (44,829)	5.53	134,900 (39,525)	26.82	117,400 (34,398)	5.11	124,900 (36,596)	20.97	89,300 (26,165)	4.25
350H(V)	Part	31.71 (7.20)	2,869 (4,875)	65,800 (19,280)	21.54	84,300 (24,700)	7.45	75,300 (22,063)	41.75	63,900 (18,722)	6.02	72,400 (21,213)	33.45	51,800 (15,177)	5.21
400H(V)	Full	36.24 (8.23)	4,826 (8,200)	136,600 (40,024)	17.11	176,300 (51,656)	5.42	154,300 (45,210)	25.26	134,200 (39,321)	4.97	142,800 (41,840)	20.69	102,100 (29,915)	4.36
400H(V)	Part	36.24 (8.23)	3,040 (5,166)	77,200 (22,620)	21.23	99,600 (29,183)	7.33	87,200 (25,550)	40.54	73,900 (21,653)	5.95	83,800 (24,554)	33.00	59,900 (17,551)	5.32
520H(V)	Full	47.07 (10.69)	6,357 (10,800)	177,500 (52,000)	16.95	230,800 (67,625)	5.36	200,400 (58,717)	24.78	174,300 (51,070)	4.86	185,500 (54,352)	20.32	132,600 (38,852)	4.24
520H(V)	Part	47.07 (10.69)	4,261 (7,240)	97,700 (28,626)	20.96	127,100 (37,240)	7.10	110,400 (32,347)	39.67	93,600 (27,425)	5.84	106,100 (31,087)	32.64	75,800 (22,210)	5.27
680H(V)	Full	61.60 (13.99)	8,240 (14,000)	232,100 (68,000)	16.85	306,400 (89,775)	5.30	262,100 (76,795)	23.55	227,900 (66,775)	4.81	242,600 (71,082)	19.76	173,300 (50,777)	4.16
680H(V)	Part	61.60 (13.99)	5,386 (9,150)	127,700 (37,416)	20.72	168,600 (49,400)	6.89	144,200 (42,250)	38.96	122,200 (35,805)	5.77	138,600 (40,610)	32.25	99,100 (29,036)	5.15
1400H(V)	Full	116.69 (26.50)	16,186 (27,500)	477,900 (140,025)	16.59	642,300 (188,194)	5.21	539,500 (158,074)	22.80	469,200 (137,476)	4.80	499,500 (146,354)	18.92	356,800 (104,542)	3.98
1400H(V)	Part	116.69 (26.50)	10,653 (18,100)	27,1500 (79,550)	20.56	363,900 (106,622)	6.77	306,400 (89,775)	37.59	259,700 (76,092)	5.85	294,600 (86,318)	31.40	210,500 (61,677)	5.03

Notes:
1. Rated in accordance ANSI/AHRI/ASHRAE/ISO13256-1 & GB/T19409-2003.
2. Test conditions are 80.6 ℉(27℃) DB/66.2 ℉(18.8℃) WB EAT in cooling and 68 ℉(20℃) DB/59 ℉(15℃) WB EAT in heating.
3. Entering liquid temperature in cooling is 86℉(30℃) for Water Loop, 77℉(25℃) for Ground Loop (full load), 68℉(20℃) for Ground Loop (part load), and 59℉(15℃) for Ground Water.
4. Entering liquid temperature in heating is 68℉(20℃) for Water Loop, 32℉(0℃) for Ground Loop (full load), 41℉(5℃) for Ground Loop (part load), and 50℉(10℃) for Ground Water.

Model W01R2-	Standard Air Flow CFM (m3/h)	External Static Pressure (Pa)											
		12	20	30	50	80	120	150	200	350	400	450	500
		Air Flow (m3/h)											
028H(V)	320 (543)	320 (510)	300 (510)	280 (475)	268 (455)	/	/	/	/	/	/	/	/
035H(V)	400 (680)	440 (748)	425 (722)	400 (680)	360 (611)	/	/	/	/	/	/	/	/
045H(V)	500 (850)	545 (926)	530 (900)	500 (850)	455 (773)	/	/	/	/	/	/	/	/
058H(V)	600 (1,020)	660 (1,121)	640 (1,087)	600 (1,020)	540 (918)	/	/	/	/	/	/	/	/
072H(V)	800 (1,360)	895 (1,520)	855 (1,452)	800 (1,360)	755 (1,280)	/	/	/	/	/	/	/	/
086H(V)	900 (1,530)	1,000 (1,699)	960 (1,631)	900 (1,530)	830 (1,410)	/	/	/	/	/	/	/	/
105H(V)	1,200 (2,039)	/	/	1,260 (2,140)	1,200 (2,039)	1,140 (1,936)	1,090 (1,852)	/	/	/	/	/	/
126H(V)	1,400 (2,379)	/	/	1,480 (2,515)	1,400 (2,379)	1,330 (2,260)	1,270 (2,158)	/	/	/	/	/	/
146H(V)	1,650 (2,803)	/	/	1,720 (2,922)	1,650 (2,803)	1,570 (2,668)	1,500 (2,548)	/	/	/	/	/	/
175H(V)	1,950 (3,313)	/	/	/	2,030 (3,450)	1,950 (3,313)	1,860 (3,160)	1,770 (3,007)	/	/	/	/	/
210H(V)	2,300 (3,908)	/	/	/	2,400 (4,078)	2,300 (3,908)	2,190 (3,720)	2,090 (3,550)	/	/	/	/	/
250H(V)	2,900 (4,927)	/	/	/	/	3,020 (5,130)	2,900 (4,927)	2,762 (4,693)	2,640 (4,485)	/	/	/	/
300H(V)	3,500 (5,947)	/	/	/	/	3,650 (6,201)	3,500 (5,947)	3,340 (5,675)	3,190 (5,420)	/	/	/	/
350H(V)	4,100 (6,966)	/	/	/	/	4,300 (7,305)	4,100 (6,966)	3,905 (6,635)	3,730 (6,337)	/	/	/	/
400H(V)	4,500 (7,646)	/	/	/	/	/	4,730 (8,036)	4,500 (7,646)	4,290 (7,288)	4,090 (6,949)	/	/	/
520H(V)	6,100 (10,364)	/	/	/	/	/	/	6,400 (10,874)	6,100 (10,364)	5,810 (9,871)	5,550 (9,430)	/	/
680H(V)	7,900 (13,422)	/	/	/	/	/	/	8,300 (14,102)	7,900 (13,422)	7,530 (12,794)	7,190 (12,216)	/	/
1400H(V)	15,600 (26,505)	/	/	/	/	/	/	/	16,300 (27,694)	15,600 (26,505)	14,900 (25,315)	14,200 (24,126)	/

Note: Fan performance above table are based on standard ESP units.

Model W01R2-	Volts (V/Hz/Ph)	No. of compressors	Total Unit FLA	Comp RLA(ea)	Comp LRA(ea)	Blower Motor FLA	No. of Fan Motor	Minium Circuit Ampacity	Maximum Overcurrent Protective Device	Power wire	
										Diameter	Number
028H(V)	230/50/1	1	3.0	2.5	11.0	0.5	1	3.7	15.0	1.5mm^2	3
028H(V)	115/60/1	1	7.6	6.4	36.0	1.2	1	9.2	15.0	1.5mm^2	3
028H(V)	208~230/60/1	1	6.5	3.7	16.0	0.6	1	8.1	16.0	1.5mm^2	3
035H(V)	230/50/1	1	5.7	5.0	23.0	0.7	1	7.0	15.0	1.5mm^2	3
035H(V)	115/60/1	1	13.7	12.1	58.0	1.6	1	16.7	25.0	1.5mm^2	3
035H(V)	208~230/60/1	1	8.5	6.7	27.0	0.8	1	10.7	15.0	1.5mm^2	3
045H(V)	230/50/1	1	8.6	7.9	36.0	0.8	1	10.6	15.0	2.5mm^2	3
045H(V)	208~230/60/1	1	10.3	7.9	36.0	0.8	1	12.9	15.0	2.5mm^2	3
058H(V)	230/50/1	1	10.5	9.6	42.0	0.9	1	13.2	20.0	2.5mm^2	3
058H(V)	208~230/60/1	1	12.7	9.6	42.0	0.9	1	15.9	20.0	2.5mm^2	3
072H(V)	230/50/1	1	14.9	12.8	58.3	2.1	1	18.1	30.0	2.5mm^2	3
072H(V)	208~230/60/1	1	17.8	12.8	58.3	2.1	1	22.2	30.0	2.5mm^2	3
072H(V)	230/60/3	1	10.6	7.7	53.7	1.5	1	11.2	15.0	2.5mm^2	3
086H(V)	230/50/1	1	16.2	14.1	73.0	2.1	1	19.7	30.0	2.5mm^2	3
086H(V)	208~230/60/1	1	21.8	14.1	73.0	2.1	1	27.3	30.0	2.5mm^2	3
086H(V)	230/60/3	1	13.5	8.9	58.0	2.1	1	16.9	20.0	2.5mm^2	3
105H(V)	380~415/50/3	1	11.6	6.0	44.0	1.7	1	14.6	15.0	4mm^2	3
105H(V)	230/60/3	1	18.7	9.0	71.0	3.6	1	23.3	25.0	4mm^2	3
126H(V)	380~415/50/3	1	17.1	13.5	88.0	3.6	1	20.5	30.0	4mm^2	5
126H(V)	230/60/3	1	21.2	13.5	88.0	3.6	1	26.5	30.0	4mm^2	5
146H(V)	380~415/50/3	1	22.9	14.5	98.0	2.8	1	28.6	35.0	4mm^2	5
146H(V)	230/60/3	1	24.2	21.4	135.0	2.8	1	29.6	50.0	4mm^2	5
175H(V)	380~415/50/3	1	31.7	25.3	134.0	5.4	1	38.3	60.0	4mm^2	5
175H(V)	230/60/3	1	25.5	15.6	110.0	5.4	1	31.9	40.0	4mm^2	5
210H(V)	380~415/50/3	2	24.3	10.4	73.0	3.5	2	26.9	35.0	4mm^2	5
210H(V)	230/60/3	2	26.4	10.4	73.0	5.6	2	29.0	35.0	4mm^2	5
210H(V)	460/60/3	2	14.7	5.8	38.0	3.1	2	16.2	20.0	4mm^2	5
250H(V)	380~415/50/3	2	14.5	6.3	55.0	2.4	2	16.1	20.0	6mm^2	5
250H(V)	230/60/3	2	29.7	14.5	73.0	4.8	2	33.3	45.0	6mm^2	5
250H(V)	460/60/3	2	16.7	6.3	55.0	4.1	2	18.3	20.0	6mm^2	5
250H(V)	575/60/3	2	13.1	6.0	41.0	3.3	2	14.6	20.0	6mm^2	5
300H(V)	380~415/50/3	2	15.2	5.8	38.0	2.4	2	16.1	20.0	6mm^2	5
300H(V)	230/60/3	2	32.0	10.4	73.0	7.1	2	35.6	50.0	6mm^2	5
300H(V)	460/60/3	2	31.1	14.5	98.0	6.2	2	34.7	45.0	6mm^2	5
300H(V)	575/60/3	2	12.1	6.0	41.0	2.3	2	13.6	45.0	6mm^2	5
350H(V)	380~415/50/3	2	37.6	16.0	110.0	5.6	2	41.6	50.0	6mm^2	5
350H(V)	230/60/3	2	36.8	16.0	110.0	4.8	2	40.8	50.0	6mm^2	5
350H(V)	460/60/3	2	19.7	7.8	52.0	4.1	2	21.7	25.0	6mm^2	5
350H(V)	575/60/3	2	14.7	5.7	38.9	3.3	2	16.1	20.0	6mm^2	5
400H(V)	380~415/50/3	2	17.7	7.7	54.0	2.3	2	19.6	25.0	6mm^2	5
400H(V)	230/60/3	2	53.0	22.4	149.0	8.2	2	58.6	80.0	6mm^2	5
400H(V)	460/60/3	2	25.3	10.6	75.0	3,3	2	20.6	25.0	6mm^2	5
400H(V)	575/60/3	2	18.7	7.7	54.0	4.1	2	28.0	35.0	6mm^2	5
520H(V)	380~415/50/3	2	64.0	25.0	164.0	14.0	2	70.3	90.0	10mm^2	5
520H(V)	230/60/3	2	63.0	25.0	164.0	13.0	2	69.3	90.0	10mm^2	5
520H(V)	460/60/3	2	30.9	12.2	100.0	6.5	2	34.0	45.0	10mm^2	5
520H(V)	575/60/3	2	23.3	9.0	78.0	5.3	2	25.6	30.0	10mm^2	5
680H(V)	380~415/50/3	2	70.0	25.0	164.0	20.0	2	76.3	100.0	10mm^2	5
680H(V)	230/60/3	2	69.4	25.0	164.0	19.4	2	75.7	100.0	10mm^2	5
680H(V)	460/60/3	2	34.1	12.2	100.0	9.7	2	37.2	45.0	10mm^2	5
680H(V)	575/60/3	2	26.0	9.0	78.0	8.0	2	28.3	35.0	10mm^2	5
1400H(V)	380~415/50/3	4	87.1	36.0	221.0	38.0	4	95.0	175.0	16mm^2	5
1400H(V)	230/60/3	4	81.2	36.0	221.0	36.0	4	93.2	175.0	16mm^2	5
1400H(V)	460/60/3	4	59.4	25.0	164.0	19.4	4	65.7	90.0	16mm^2	5
1400H(V)	575/60/3	4	58.2	25.0	164.0	18.2	4	64.5	80.0	16mm^2	5

Note: All models specifications are subject to change without prior notice, please refer to nameplates for the most accurate specifications.

Airflow correction factors table

Of rated air flow	Cooling				Heating		
	Total capacity	Sensible capacty	Input power	Heat of rejection	Heating capacity	Input power	Heat of rejection
60%	0.927	0.789	0.912	0.922	0.947	1.152	0.897
69%	0.946	0.829	0.926	0.942	0.959	1.107	0.924
75%	0.961	0.862	0.937	0.955	0.969	1.078	0.943
81%	0.972	0.895	0.950	0.968	0.977	1.053	0.959
88%	0.983	0.930	0.965	0.979	0.985	1.032	0.974
94%	0.992	0.965	0.982	0.990	0.993	1.014	0.988
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.008	1.034	1.022	1.009	1.007	0.989	1.011
113%	1.012	1.064	1.042	1.018	1.012	0.982	1.019
119%	1.016	1.092	1.066	1.025	1.018	0.979	1.027
125%	1.018	1.116	1.091	1.032	1.022	0.977	1.033
130%	1.020	1.134	1.112	1.037	1.027	0.977	1.037

Cooling capacities correction factors for variation in entering air / water temperature

Entering air temperature		Entering water temperature (℉/℃) of source side				
DB(℉/℃)	WB(℉/℃)	59/15	68/20	77/25	86/30	95/35
73.4/23	60.8/16	1.08	1.03	0.98	0.92	0.89
77.0/25	64.4/18	1.15	1.08	1.02	0.96	0.93
80.6/27	66.2/19	1.21	1.12	1.06	1.00	0.97
82.4/28	68.0/20	1.25	1.16	1.10	1.04	1.01
86.0/30	71.6/22	1.29	1.20	1.13	1.07	1.04
89.6/32	75.2/24	1.33	1.23	1.17	1.10	1.07

Heating capacities correction factors for variation in entering air / water temperature

Entering air temperature		Entering water temperature (℉/℃) of source side				
DB(℉/℃)	WB(℉/℃)	50/10	59/15	68/20	77/25	86/30
59.0/15	51.8/11	0.82	0.93	1.05	1.12	1.20
64.4/18	57.2/14	0.80	0.91	1.02	1.09	1.15
68.0/20	59.0/15	0.78	0.89	1.00	1.07	1.13
73.4/23	60.8/16	0.75	0.86	0.97	1.04	1.09
77.0/25	64.4/18	0.73	0.83	0.94	1.00	1.06

Airflow correction factors table

Of rated air flow	Cooling				Heating		
	Total capacity	Sensible capacty	Input power	Heat of rejection	Heating capacity	Input power	Heat of rejection
60%	0.921	0.782	0.9597	0.928	0.948	1.240	0.880
69%	0.941	0.832	0.964	0.946	0.960	1.163	0.915
75%	0.957	0.8678	0.695	0.959	0.969	1.115	0.937
81%	0.969	0.901	0.975	0.970	0.978	1.076	0.956
88%	0.981	0.934	0.982	0.981	0.986	1.043	0.973
94%	0.991	0.967	0.990	0.991	0.993	1.018	0.988
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.007	1.033	1.011	1.008	1.006	0.990	1.010
113%	1.014	1.065	1.023	1.015	1.012	0.986	1.017
119%	1.018	1.098	1.036	1.021	1.018	0.983	1.024
125%	1.021	1.131	1.051	1.026	1.021	0.981	1.030
130%	1.024	1.158	1.063	1.030	1.025	0.978	1.035

Cooling capacities correction factors for variation in entering air / water temperature

Entering air temperature		Entering water temperature (℉/℃) of source side				
DB(℉/℃)	WB(℉/℃)	59/15	68/20	77/25	86/30	95/35
73.4/23	60.8/16	1.112	1.061	1.009	0.948	0.917
77.0/25	64.4/18	1.183	1.111	1.049	0.988	0.957
80.6/27	66.2/19	1.243	1.150	1.089	1.00	0.996
82.4/28	68.0/20	1.284	1.191	1.129	1.068	1.037
86.0/30	71.6/22	1.322	1.230	1.158	1.097	1.066
89.6/32	75.2/24	1.361	1.258	1.197	1.125	1.095

Heating capacities correction factors for variation in entering air / water temperature

Entering air temperature		Entering water temperature (℉/℃) of source side				
DB(℉/℃)	WB(℉/℃)	50/10	59/15	68/20	77/25	86/30
59.0/15	51.8/11	0.8245	0.958	1.082	1.154	1.236
64.4/18	57.2/14	0.823	0.937	1.051	1.123	1.185
68.0/20	59.0/15	0.801	0.914	1.000	1.099	1.161
73.4/23	60.8/16	0.769	0.882	0.994	1.066	1.117
77.0/25	64.4/18	0.747	0.849	0.962	1.000	1.084

Methanol (concentration by volume)						
Item	0%	10%	20%	30%	40%	50%
Cooling capacity	1.000	0.998	0.997	0.995	0.993	0.992
Heating capacity	1.000	0.995	0.990	0.985	0.979	0.974
Pressure drop	1.000	1.023	1.057	1.091	1.122	1.160

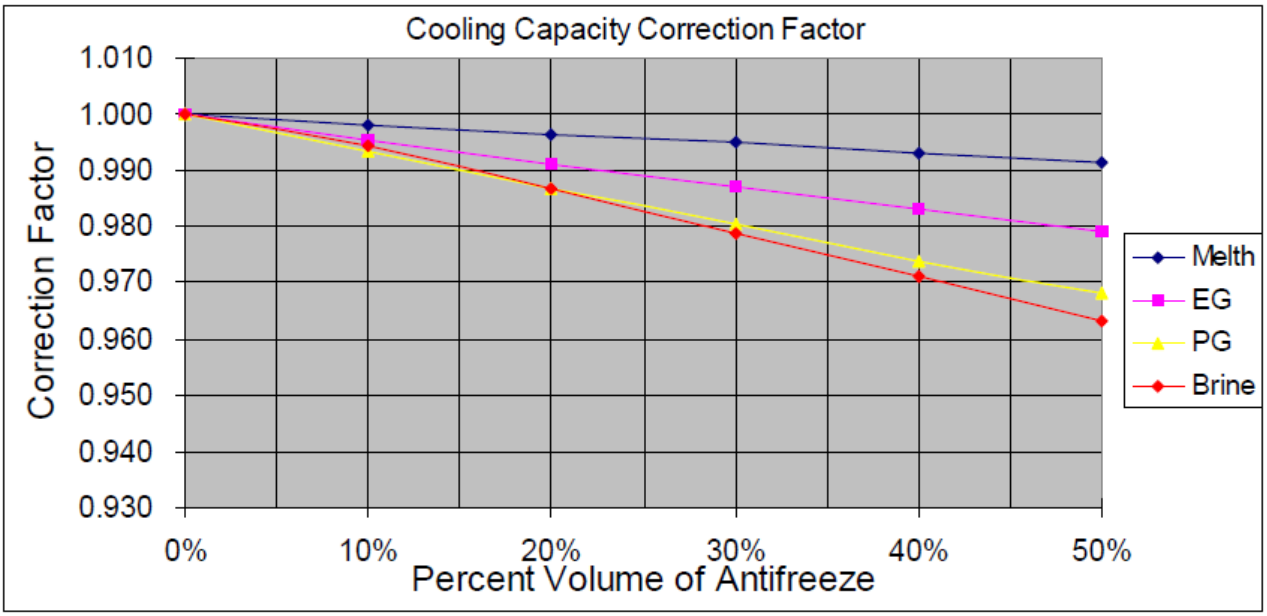
Ethylene Glycol (concentration by volume)						
Item	0%	10%	20%	30%	40%	50%
Cooling capacity	1.000	0.996	0.991	0.987	0.983	0.979
Heating capacity	1.000	0.993	0.985	0.977	0.969	0.961
Pressure drop	1.000	1.024	1.068	1.124	1.188	1.263

Propylene Glycol (concentration by volume)						
Item	0%	10%	20%	30%	40%	50%
Cooling capacity	1.000	0.993	0.987	0.980	0.974	0.968
Heating capacity	1.000	0.986	0.973	0.960	0.948	0.935
Pressure drop	1.000	1.040	1.098	1.174	1.273	1.405

Brine (concentration by volume)						
Item	0%	10%	20%	30%	40%	50%
Cooling capacity	1.000	0.994	0.987	0.979	0.971	0.963
Heating capacity	1.000	0.993	0.987	0.982	0.978	0.976
Pressure drop	1.000	1.154	1.325	1.497	1.669	1.841

Example 1 (Ethylene Glycol):
The antifreeze solution is 20% by volume of Ethylene Glycol. Determine the corrected cooling capacity and waterside pressure drop for a 058H(V when the EWT is 86℉/30℃ and the GPM is 5.25. From the catalog data, the cooling capacity at these conditions with 100% water is 20.4 Mbtuh, and the waterside pressure drop is 6.4 feet of head. At 20% Ethylene Glycol, the correction factor for cool capacity is 0.991 and the pressure drop is 1.068. The corrected cooling capacity (Mbtuh) = 20.4 * 0.991 = 20.2. The corrected water side pressure drop (Ft. head) = 6.4 * 1.068 = 6.8.

Example 2 (Propylene Glycol):
The antifreeze solution is 30% by volume of Propylene Glycol. Determine the corrected heating capacity and waterside pressure drop for a 126H(V) when the EWT is 45℉/7.2℃ and the GPM is 11.32. From the catalog data, the heating capacity at these conditions with 100% water is 44.6 Mbtuh, and the waterside pressure drop is 16.6 feet of head. At 30% Propylene Glycol, the correction factor for heat capacity is 0.960 and the pressure drop is 1.174.
The corrected heating capacity (Mbtuh) = 44.6 * 0.960 = 42.8. The corrected water side pressure drop (Ft. head) = 16.6 * 1.174 = 19.5.


Cooling Capacity Correction Factor
Correction Factor
1.010
1.000
0.990
0.980
0.970
0.960
0.950
0.940
0.930
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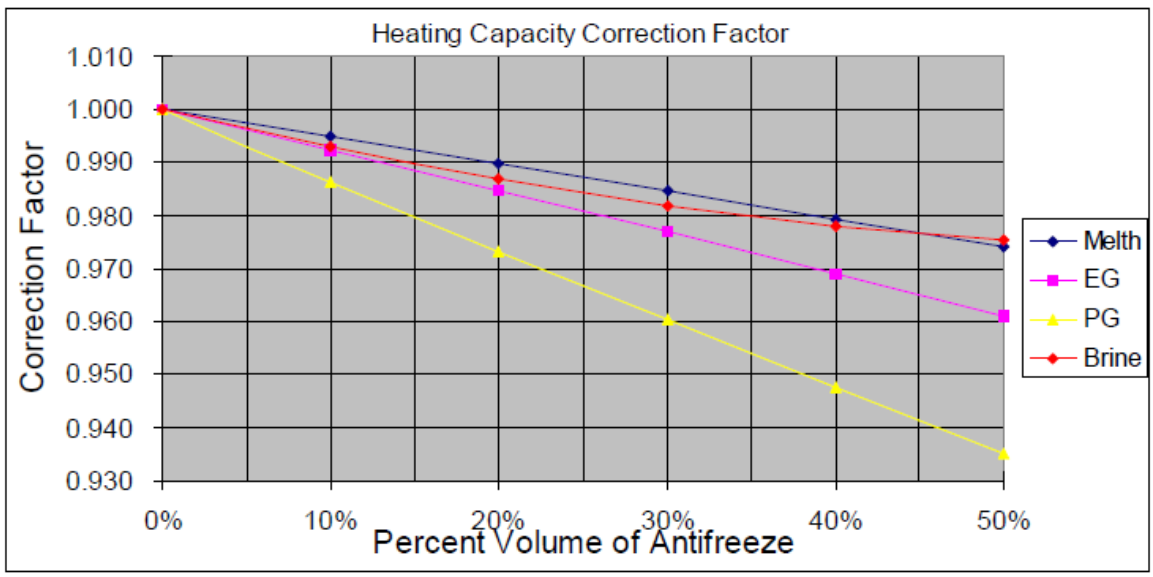
10%
20%
30%
40%
50%
Percent Volume of Antifreeze
Melth
EG
PG
Brine


Heating Capacity Correction Factor
Correction Factor
1.010
1.000
0.990
0.980
0.970
0.960
0.950
0.940
0.930
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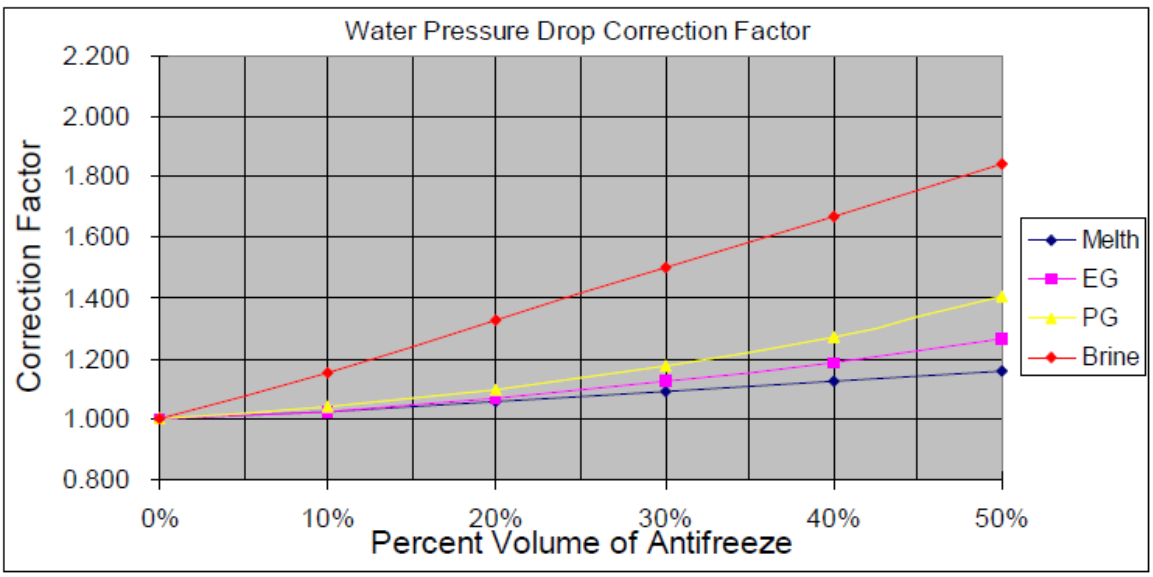
30%
40%
50%
Percent Volume of Antifreeze
Melth
EG
PG
Brine


Water Pressure Drop Correction Factor
Correction Factor
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0%
10%
20%
30%
40%
50%
Percent Volume of Antifreeze
Melth
EG
PG
Brine

Environment

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

Additional information for initial start-up only

Standard range units:

Units are designed to start in an ambient of 50℉(10℃), with entering air at 50℉(10℃), with entering water at 70℉(21℃), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

Geothermal range units:

Geothermal range heat pump conditioners are designed to start in an ambient of 40℉(5℃), with entering air at 40℉(5℃), with entering water at 40℉(5℃), with both air and water at the flow rates used in the ISO 13256-1 rating test, for initial start-up in winter.

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

Air Limits		Standard Range Units		Geothermal Range Units	
		Cooling	Heating	Cooling	Heating
Min. Ambient Air	℉	50	50	40	40
	℃	10	10	5	5
Normal Ambient Air	℉	80	70	80	70
	℃	27	21	27	21
Max. Ambient Air	℉	100	85	100	85
	℃	38	29	38	29
Min. Entering Ambient Air	℉	50	50	50	40
	℃	10	10	10	10
Normal Entering Air DB/WB	℉	80/67	70	80/67	70
	℃	27/19	21	27/19	21
Max. Entering Air DB/WB	℉	100/83	80	100/83	80
	℃	38/28	27	38/28	27

Water Limits		Standard Range Units		Geothermal Range Units	
		Cooling	Heating	Cooling	Heating
Min. Entering Water	℉	55	55	30	20
	℃	13	13	-1	-6
Normal Entering Water	℉	85	70	77	40
	℃	29	21	25	4
Max. Entering Water DB/WB	℉	110	90	110	90
	℃	43	32	43	32

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

Closed Loop Application

For operation in the shaded area, appropriate levels of a proper antifreeze should be used in systems with leaving water temperatures of 40℉(4.4℃). This is due to the potential of the refrigerant temperature being as low as 32℉(0℃) with 40℉ (4.4℃) leaving water temperature, which may lead to a nuisance cutout due to the activation of the low temperature protection.

Open Loop Application:

For operation in shaded area (below 40℉(4.4℃) LWT in open loop applications, ΔT should be set such that the LWT (=EWT- ΔT) doesn't drop below 40℉(4.4℃).

Notes:

1. When the source water temperature is too low(Ground loop),please add antifreeze to the source water system.
2. It is not recommended to run cooling mode under 50~59℉/(10～15℃) source water temperature with rated flow rate. If the source water temperature is lower than 59℉/15℃, reduce the source water flow to make sure the leaving source water temperature is higher than 68℉/20℃.

Power supply

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

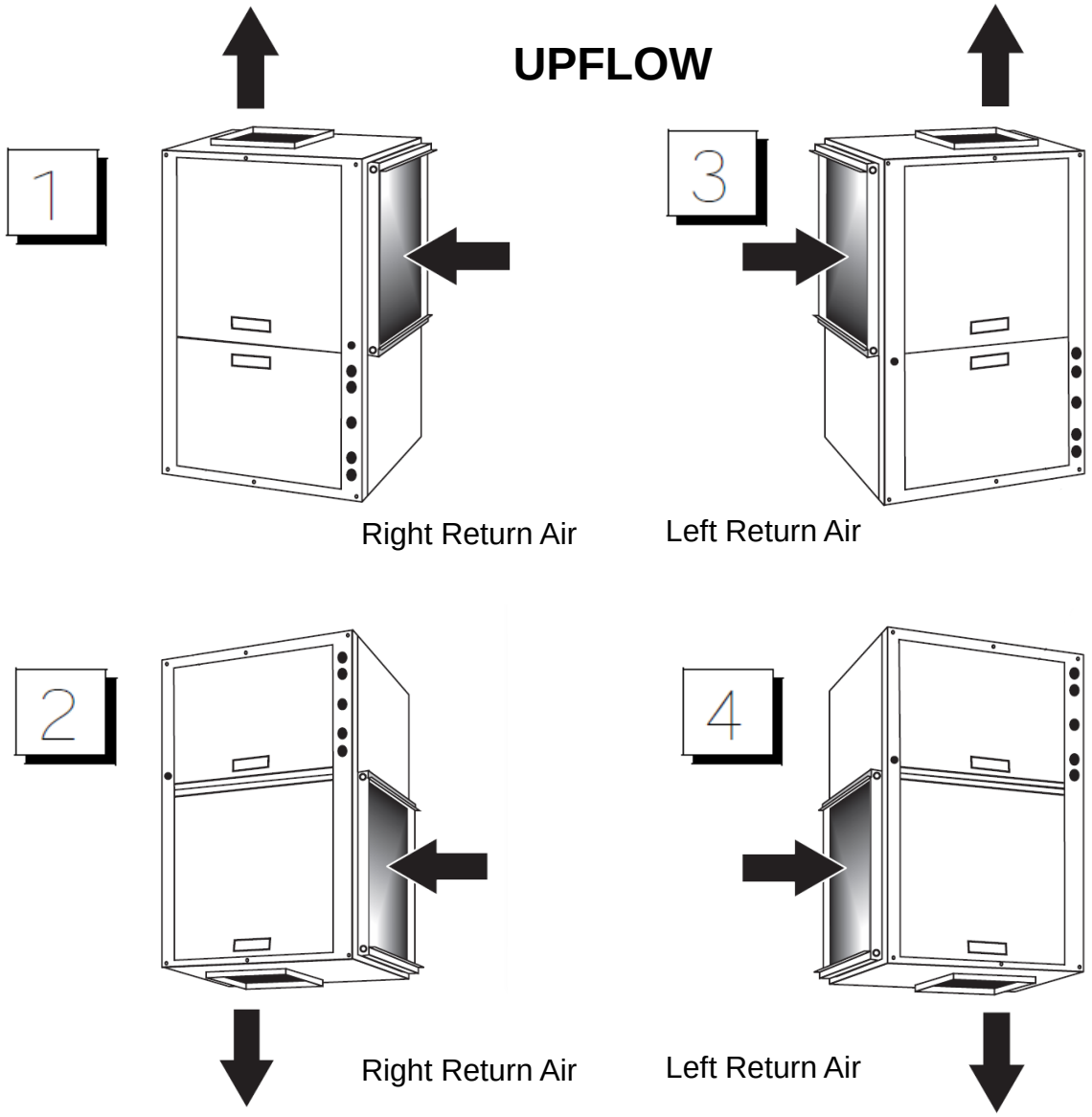
Electrical minimum and maximum 0.8 to 40 tons

Rated voltage	Hz	Ph	Min.Ultiz. Voltage	Max.Ultiz. Voltage
115	60	1	104	126
208	60	1	197	229
230	60	1	207	253
208	60	3	187	229
460	60	3	414	506
575	60	3	518	633
220~240	50	1	198	264
380~415	50	3	342	456
208~230	60	1	197	253
208~230	60	3	187	253

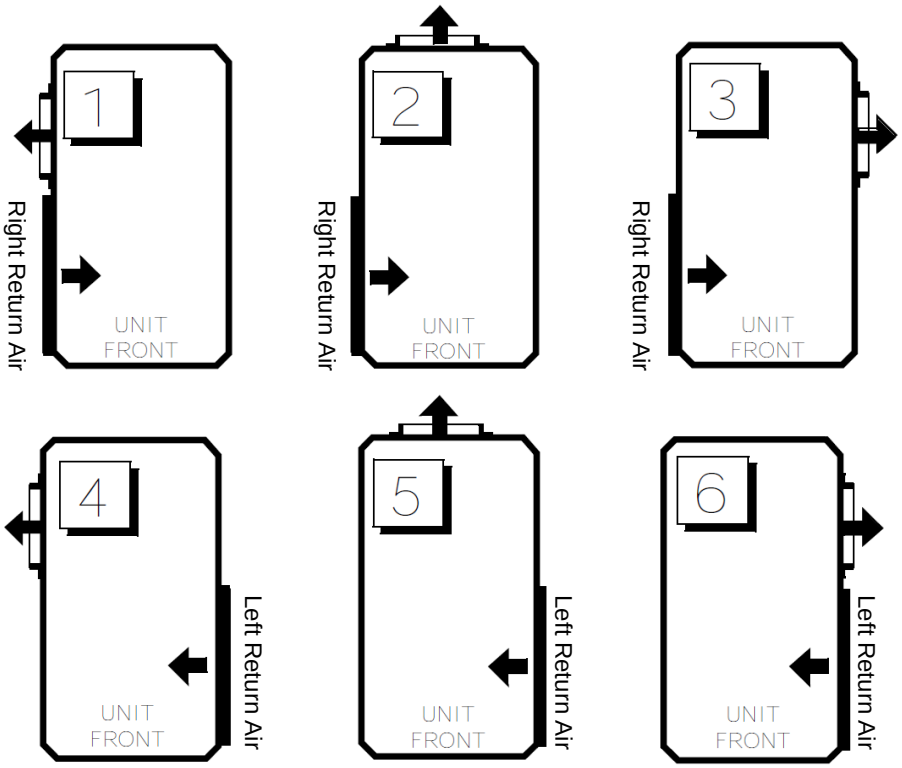
The unit is not capable of on-site modifications. Units must be ordered with the correct return and supply orientation as this cannot be modified in the field.

The four configurations are for small capacity of vertical WSHP:

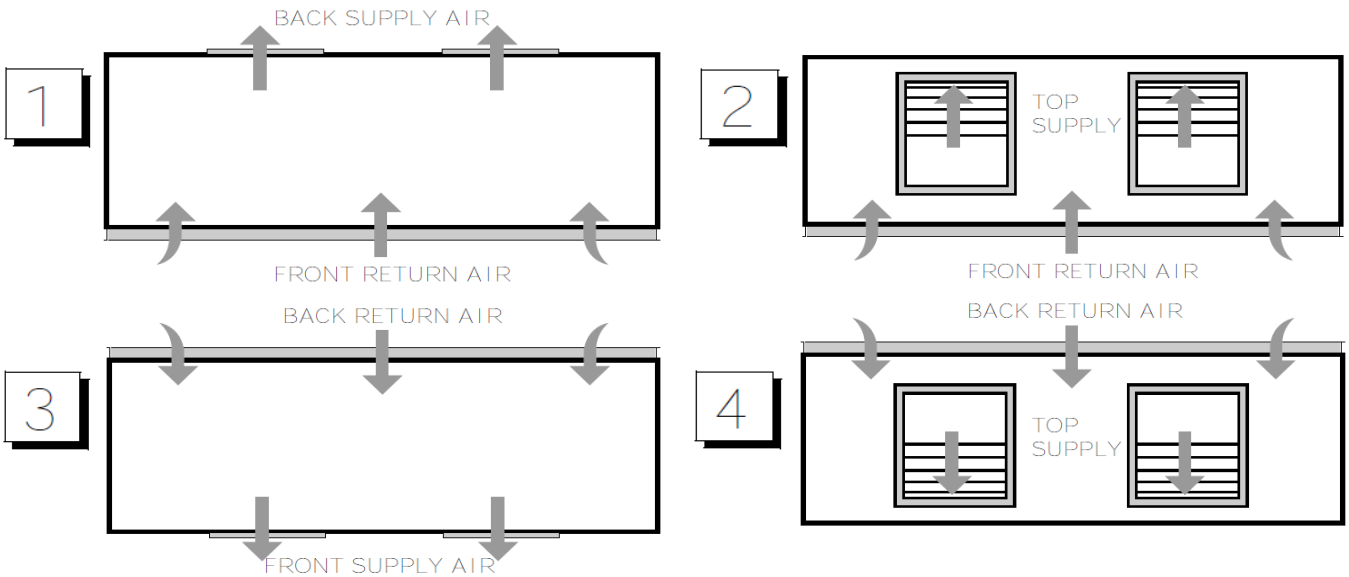
1. Right Return Air with top supply air (UPFLOW) combination
2. Right Return Air with bottom supply air (DOWNFLOW) combination
3. Left Return Air with top supply air (UPFLOW) combination
4. Left Return Air with bottom supply air (DOWNFLOW) combination



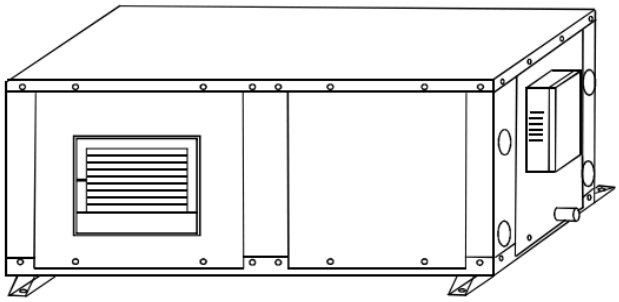
The six configurations are for small capacity of horizontal WSHP:
1. Left Return Air with left supply air combination
2. Left Return Air with back supply air combination
3. Left Return Air with right supply air combination
4. Right Return Air with left supply air combination
5. Right Return Air with back supply air combination
6. Right Return Air with right supply air combination

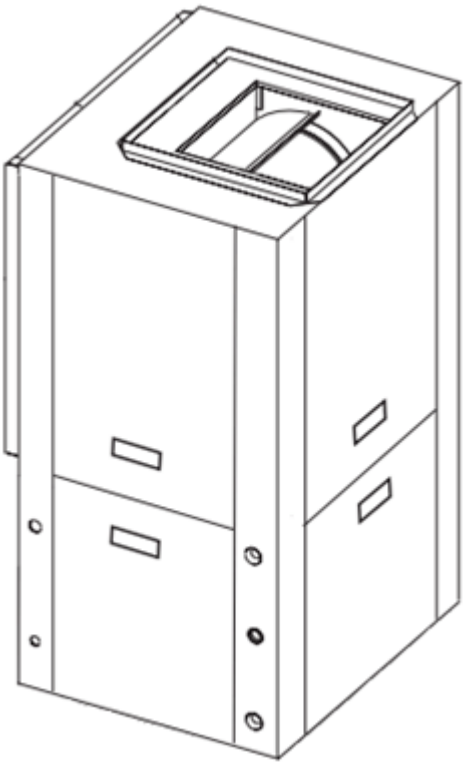


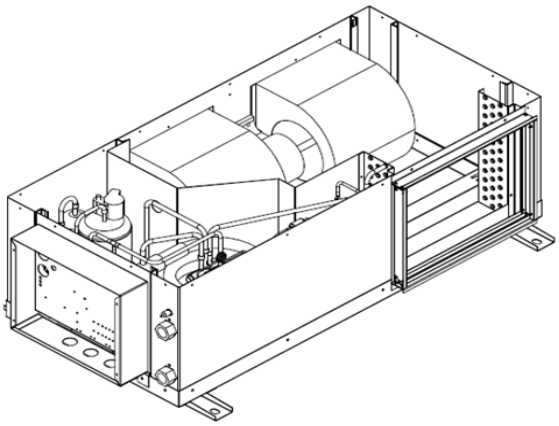
The four configurations are for large capacity of vertical WSHP:
1. Front Return Air with back supply air combination
2. Front Return Air with top supply air combination
3. Back Return Air with front supply air combination
4. Back Return Air with top supply air combination



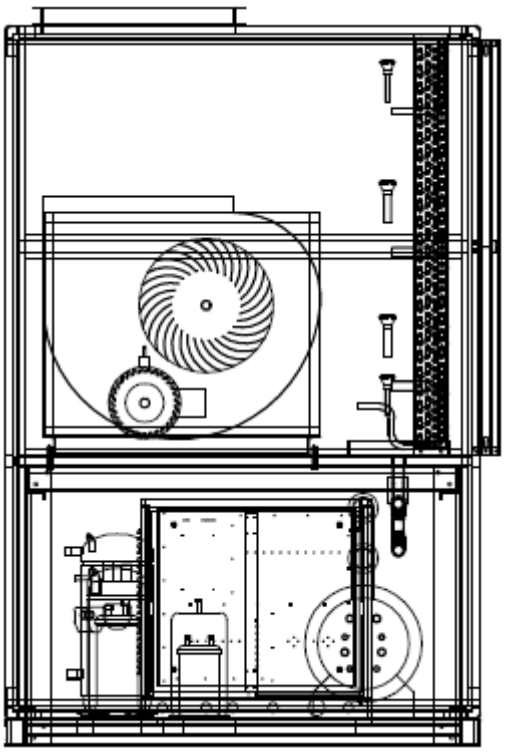
View of Small Capacity Horizontal / Vertical Water-Source Heat Pumps

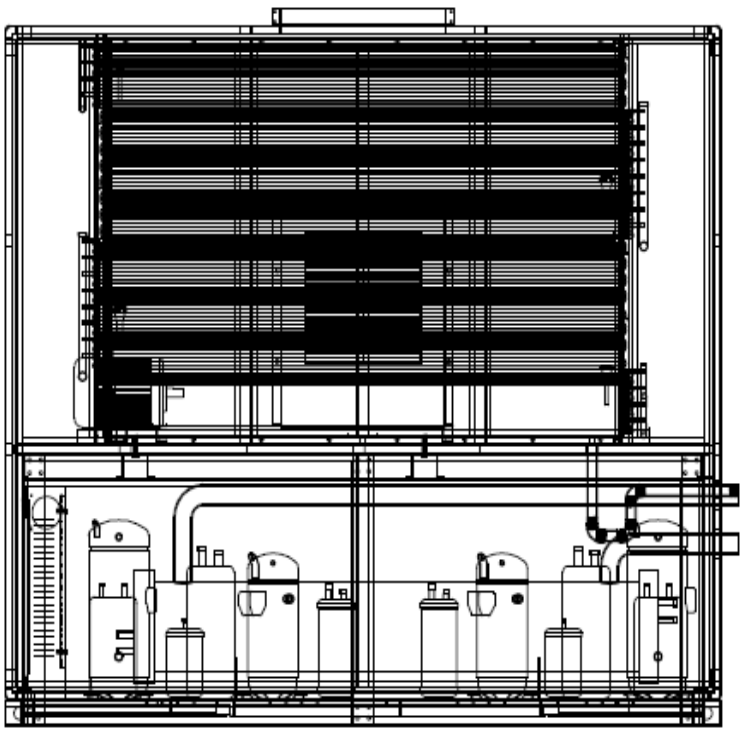






View of Large Capacity Vertical Water-Source Heat Pumps

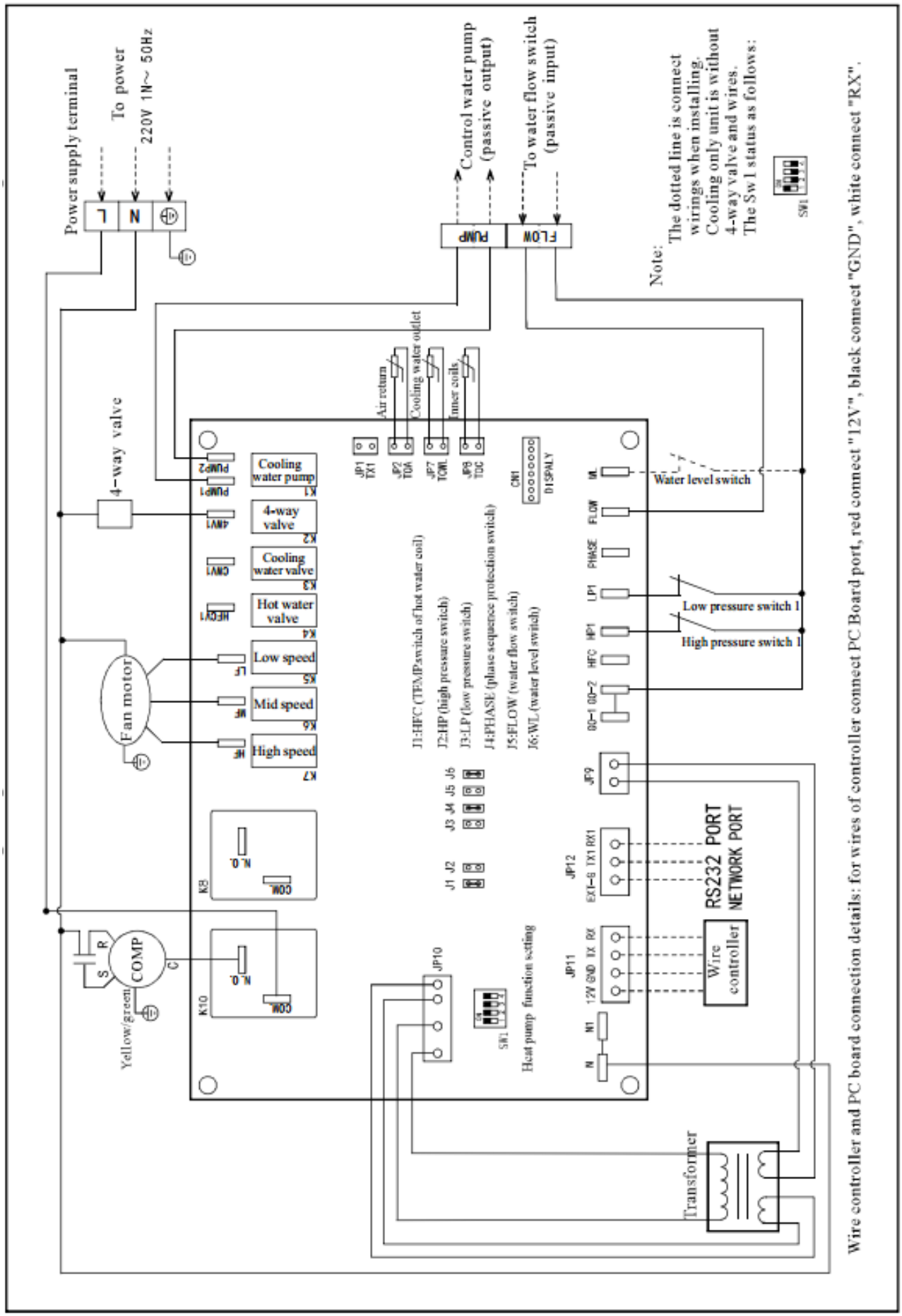




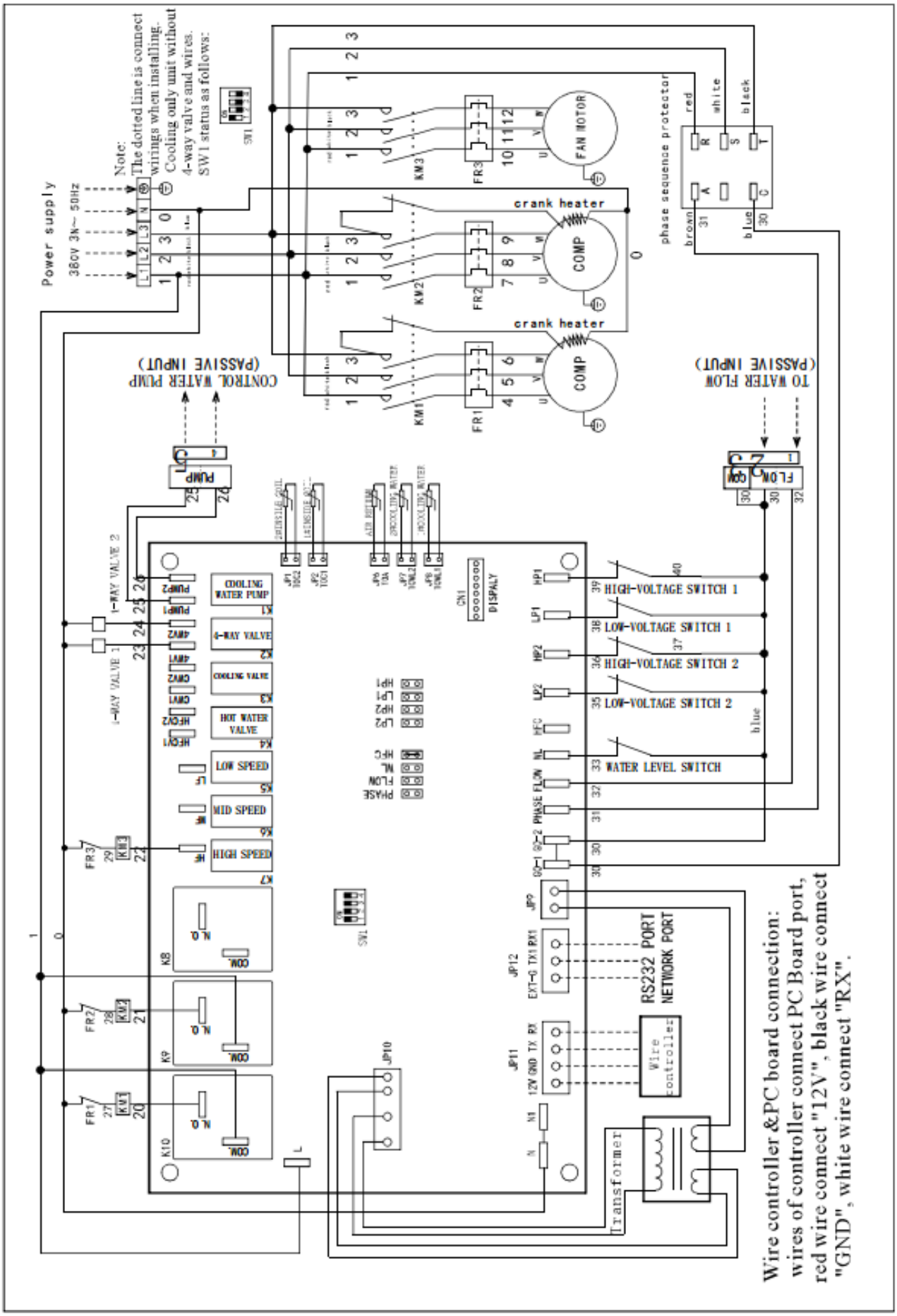
Model W01R2-	Horizontal Unit						Vertical Unit					
	Length		Width		Height		Length		Width		Height	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
028H(V)	41	1,050	20	500	14	360	20	520	20	520	43	1,100
035H(V)	41	1,050	20	500	14	360	20	520	20	520	43	1,100
045H(V)	41	1,050	20	500	17	420	20	520	20	520	43	1,100
058H(V)	41	1,050	20	500	17	420	20	520	20	520	43	1,100
072H(V)	43	1,100	22	560	19	485	26	650	26	650	47	1,200
086H(V)	43	1,100	22	560	19	485	26	650	26	650	47	1,200
105H(V)	51	1,300	27	680	21	525	28	720	28	720	56	1,420
126H(V)	51	1,300	27	680	21	525	28	720	28	720	56	1,420
146H(V)	55	1,400	27	680	21	525	30	750	30	750	61	1,550
175H(V)	57	1,450	27	680	26	650	31	800	31	800	65	1,660
210H(V)	62	1,580	39	1,000	29	730	45	1,150	45	1,150	70	1,780
250H(V)	62	1,580	39	1,000	29	730	45	1,150	45	1,150	70	1,780
300H(V)	79	2,000	46	1,180	29	730	61	1,560	48	1,220	94	2,390
350H(V)	79	2,000	46	1,180	29	730	61	1,560	48	1,220	94	2,390
400H(V)	79	2,000	46	1,180	29	730	61	1,560	48	1,220	94	2,390
520H(V)	94	2,380	46	1,180	35	880	77	1,950	50	1,270	102	2,580
680H(V)	94	2,380	55	1,400	52	1,330	77	1,950	50	1,270	102	2,580
1400H(V)	101	2,560	87	2,203	58	1,476	88	2,240	61	1,560	103	2,620

Note: All models dimensions are subject to change without prior notice, please refer to nameplates for the most accurate specifications.

For Small Capacity (0.8 to 6 tons) Water Source Heat Pumps



For Large Capacity (8 to 40 tons) Water Source Heat Pumps



General

Equipment shall be completely assembled, piped, internally wired, fully charged with R-410A and test operated at the factory. Filters, thermostat field interface Terminal Plug, and all safety controls are furnished and factory installed. The system water inlet and outlet connections shall be an inside-thread NPT composed of either copper or a bronze option. Service and caution area labels shall also be placed on the unit in their appropriate locations.
All units come standard with a 5-year compressor warranty.

Air-to-Refrigerant Coil

Internally finned, 3/8-inch copper tubes mechanically bonded to a configured aluminum plate fin as standard. Coils are leak tested at the factory to ensure the pressure integrity. The coil shall be leak tested to 450 psig and as working pressure up to 650 psig. The tubes are to be completely evacuated of air and correctly charged with proper volume of refrigerant prior to shipment.

The refrigerant coil distributor assembly shall be of orifice style with round copper distributor tubes. The tubes are sized consistently with the capacity of the coil. Suction header is fabricated from rounded copper pipe.

A thermostatic expansion valve is factory selected and installed for a wide range of control.

Deluxe Controls

The deluxe control package has a 50 VA transformer (fused) or 75 VA transformer with circuit breaker, low and high pressure switches, condensate overflow and freeze protection. The controller shall include a lockout function, anti-short cycle compressor protection, random start delay, brown-out protection, low pressure time delay, compressor delay on start and an open relay for pump request.

Cabinet

Unit casing shall be constructed of zinc coated, heavy gauge, galvanized steel.
For big units, service to the refrigerant and controls shall be provided through a single access panel at the front of the equipment. Access to the refrigerant and controls for the larger units shall be provided through the front and side access panels.

Panels shall be insulated with either 1/2-inch thick dual density bonded glass fiber or 1/2-inch thick foil-faced glass fiber. Foil faced insulation edges are encapsulated to prevent glass fibers from entering the airstream. The glass fiber insulations have a flame spread of 25 or less and a smoke developed classification of 50. The dual density insulation has a minimum rated service air velocity of 3600 feet per minute.

Access for inspection and cleaning of the unit drain pan, coils & fan section shall be provided. The unit shall be installed for proper access. Procedures for proper access inspection and cleaning of the unit shall be included in the maintenance manual.

Compressor

The unit will contain a high efficiency rotary or scroll compressor. External vibration isolation shall be provided by rubber mounting devices located underneath the mounting base of the compressor. On small units, a second isolation of the refrigeration assembly shall be supported under the compressor mounting base.

Internal thermal overload protection shall be provided. Protection against excessive discharge pressure is provided by means of a high pressure switch. Protection against a loss of charge is provided by a low pressure safety.

Polymer Drain Pan

The condensate pan shall be constructed of corrosion resistant material and insulated to prevent sweating. The bottom of the drain pan shall be sloped on two planes which pitches the condensate to the drain connection.

Stainless Steel Drain Pan

The stainless steel drain pan and the drain stubout shall be constructed of heavy gauge type 304 stainless steel. The bottom of the drain pan shall be sloped on two planes which pitches the condensate to the drain connection. The drain pan shall be insulated to prevent moisture accumulation on the drain pan material. The drain pan insulation material shall be suitable to be used in the airflow and consists of closed cell elastomeric insulation.

Economizing Coil

The waterside economizing package shall be an external unit accessory pre-piped and pre-wired ready for turn-key installation to the unit. The economizing coil shall be designed to perform with the WSHP at unit measured flow rate of 80℉(26.7℃) DB/67℉(19.4℃) WB with 45℉(7.2℃) EWT. The working water pressure of the waterside economizer coil is 400 psi.

All hydronic coils are of 3/8 in. copper and aluminum plate fin combination. All coils shall be proof and leak tested. The proof test shall be performed at 1.5 times the maximum operating pressure and the leak test at the maximum operating pressure.

A dual sloped noncorrosive drain pan is easily accessible and cleanable for the hydronic economizing coil.

An electronic two-position, 3-way valve shall provide water flow to the economizing coil during the economizing mode. It is factory set to energize the economizing mode at 55℉(12.8℃), while simultaneously halting mechanical operation of the compressor.

For small units, hanging brackets with rubber isolation shall be provided for the horizontal version of the economizing coil option. The bracket design shall be the same throughout the equipment.

Electrical

The unit control box shall contain all necessary devices to allow heating and cooling operation to occur from a remote wall thermostat. These devices are as follows:
• 24 Vac energy limiting class II [50 VA (minimum) transformer applicable to small units.
• 24 Vac blower motor relay
• 24 Vac compressor contactor for compressor control
• Field thermostat connections shall be provided for ease of hook-up to terminal locations located in the unit's control box.
• Lockout function controls excessive cycling of the compressor shall be provided to protect the compressor during adverse operating conditions. The device may be reset by interrupting power to the 24 Vac control circuit. Reset may be done either at a remote thermostat or through a momentary main power interruption for units with thermostat controls.

Indoor Fan

For small units, the blower is a forward-curved style wheel with multiple speed combinations available. All direct drive motors have sealed bearings that do not require field lubrication. For horizontal units, the motor has a permanent split capacitor with thermal overload protection. Options of standard static or high static can be selected. For vertical units, an internally protected electronically commutated motor is provided. The motor contains a quick disconnect plug. They are constructed of corrosion resistant galvanized material. Removal of the motor and fan wheel can be made with the assistance of a factory provided orifice ring device. This device attaches the wheel and motor to the fan housing in a single assembly eliminating the need for access to the set screw on the backside of the fan hub.

The motor is an ECM variable speed motor with thermal overload protection. The ECM motor is programmed to provide soft starting and a constant torque over a range of static pressures and airflows. ECM control board is provided that allows easy field adjustment to manually set the fan speed to meet the specific application. The fans is placed in a draw-through configuration and shall be a centrifugal, direct drive type. They are constructed of corrosion resistant galvanized material. Removal of the motor and fan wheel is made possible utilizing the factory provided orifice ring.

For big units, the blower has multiple blower motor/sheave combinations available. Options of the blower motor/fan packages are selected and wired from the factory to match performance criteria suggested in the performance section. The fan(s) is placed in a draw-through configuration. They are constructed of corrosion resistant galvanized material. All big units are belt drive.

Electric Heat (Option)

For small horizontal units, internal boilerless control electric heat shall be factory wired and tested. It shall be composed of a nichrome open wire coil designed for 2-kW per unit ton. The design consists of a single stage of electric heat used as a primary heating source when compressor lockout has occurred due to the entering water temperature falling below 55° F with an adjustable range between 25° F to 60° F. The electric heat option is not intended for secondary heat. All power connections to the electric heat shall be made in the equipment's control box.

External boilerless electric heat control option is composed of a control interface for a field provided electric heat. The heater is placed external to the unit by the installer. Power connection to the electric heat is separate from the unit.

Filters

One-inch or two-inch, throwaway filters are standard and factory installed. Two-inch MERV 8 or 13 filters are also available as an option. The filters have an average arrestance of 75% and dust holding capacity of 26-grams per square foot.

Sound Attenuation

Sound attenuation shall be applied as a standard feature in the product design. For small units, the sound reduction package shall include vibration isolation to the compressor and water-to-refrigerant coil, unit base stiffeners, insulated metal compressor enclosure, and a second stage of vibration isolation to the compressor and water-to-refrigerant base pan.

Water-to-Refrigerant Heat Exchanger

The water-to-refrigerant heat exchanger shall be of a high quality co-axial coil for maximum heat transfer. The copper or optional cupro-nickel coil shall be deeply fluted to enhance heat transfer and minimize fouling and scaling. The coil has a working pressure of 400 psig on the water side and 650 psig on the refrigerant side. The factory shall provide rubber isolation to the heat exchanging device to enhance sound attenuation.

Water-to-Refrigerant Heat Exchanger and Suction Lines – Insulated Option

The water-to-refrigerant heat exchanger(s), water lines, and refrigerant suction lines shall be insulated to prevent condensation at low temperatures below 60° F. This can be added to the existing water-to refrigerant heat exchanger spec when the insulated option is selected. This would be both for the copper or optional cupro-nickel coil.

Factory Mounted Isolation Valve (Option)

The two-position valve is factory installed and wired and will open on a call for heating or cooling and close when there is no call for heating or cooling. The isolation valve has a working pressure of 360 PSIG for the 1/2" and 3/4" valves. The 1" valve has a working pressure of 600 PSIG.

Benefits At A Glance

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

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- Easy to maintain
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- Reduces operating expenses
- Environmentally sound refrigerant
- Building automation system compatible

For Consulting Engineers

- HFC refrigerants
- High-efficiency optimization
- Ideal for replacement projects
- Compliant local code requirements
- Quick response technical support services

For Contractors

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- Compact footprint
- Diagnostic controls
- Easy to break down
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- Reliable performance
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