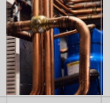
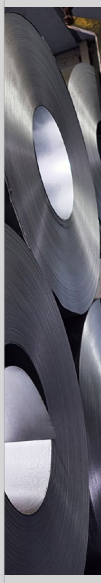
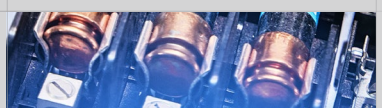


Water-Source Heat Pumps

RN Series
RQ Series
M2 Series
SA/SB Series





Building decarbonization, the reduction of carbon dioxide through the use of low-carbon power sources, is now a crucial design standard. Many are shifting to fossil fuel-free solutions — with HVAC equipment playing a pivotal role.

For a Better Tomorrow

AAON Water-Source Heat Pumps deliver best-in-class performance, high efficiency, and sustainable comfort—designed to reduce energy consumption while providing precise temperature control. AAON manufactures a wide range of Water-Source Heat Pumps (WSHP) from Rooftop Units, Vertical Self-Contained Units, and Modular Air Handling Units with capacities ranging from 2-70 tons.

Engineered for Reliable Performance and Superior Air Quality

Water-source heat pumps operate on the same proven principle as the air-source heat pumps, but instead of relying on outdoor air, they rely on piped water as the heat source or heat sink. Because water is a more stable heat source, water-source heat pumps deliver consistent performance year-round.

Unlike traditional hydronic systems, the water in a water-source heat pump does not directly heat or cool the air. Instead, the water provides the opportunity to absorb and reject heat from the DX cycle, while the refrigerant does the work of heating or cooling the space. This allows the system to operate efficiently with water temperatures kept within a moderate temperature range of 60 to 90 degrees Fahrenheit. As a result, the boilers and the cooling tower can remain off during milder conditions, reducing energy use, operation costs, and equipment wear.

GEOTHERMAL APPLICATIONS

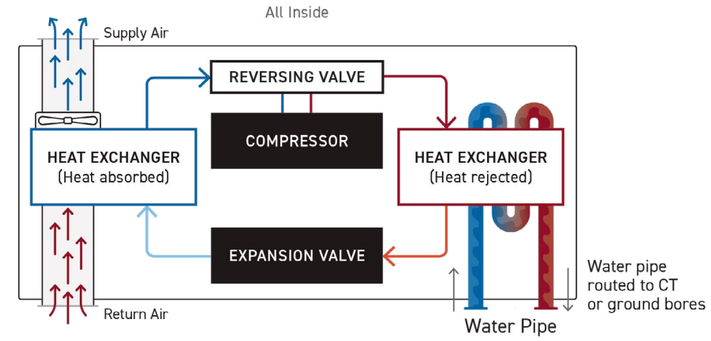
In a geothermal or ground-source heat pump system, underground piping replaces the boiler and cooling tower. The system draws from the underground piping (ground bores) where the natural temperature is approximately 50 to 65 degrees Fahrenheit. This allows the ground to act as a heat source or heat sink for the water loop. When the temperature drops below the ground temperature in the heating season, the ground serves as a heat source, and in the cooling season, when the water temperature is higher than the ground temperature, the ground serves as a heat sink. In a geothermal heat pump system, the bore field can also be bypassed until the water temperatures approach the limits of the acceptable range.

OPERATION

A water-source heat pump contains a refrigeration cycle and is connected to a water loop in which the refrigerant exchanges heat with the water.

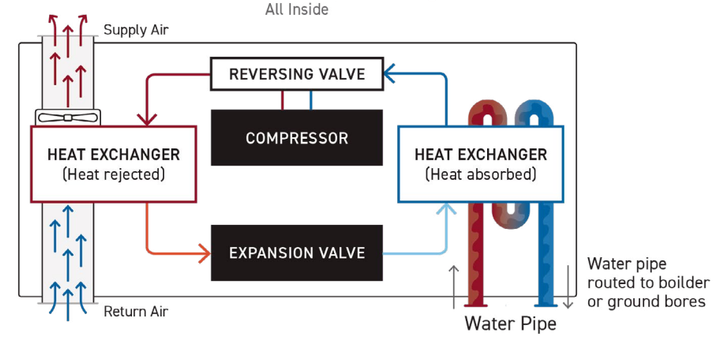
1. **Compressor** – pumps refrigerant in and throughout the copper piping in the unit.
2. **Air-to-refrigerant heat exchanger** – also known as the indoor coil, air passes over and exchanges heat with the refrigerant inside.
3. **Expansion valve** – regulates the amount of refrigerant entering the evaporator.
4. **Water-to-air heat exchanger** – AAON water-source heat pumps offer two refrigerant-to-water heat exchanger options: a coaxial coil, in which two concentric tubes are wrapped in a coil with refrigerant in the inner tube and water in the outer tube allowing heat exchange between mediums, or a brazed plate heat exchanger for larger commercial applications requiring more efficient heat transfer.
5. **Reversing valve** – enables the unit to switch between heating mode and cooling mode based on demand.

Water- or Ground-Source Heat Pump — Cooling



When cooling is required, the water-source heat pump removes heat from the air and transfers it into the water loop, delivering cool and comfortable air into the space.

Water- or Ground-Source Heat Pump — Heating



When heating is required, the system reverses the process utilizing a reversing valve to redirect the refrigerant flow. Heat is then pulled from the water loop and transferred into the supply air.

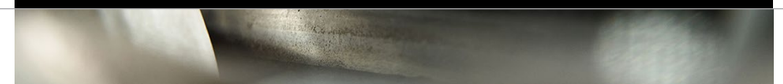
A Growing Market

Water-source heat pumps offer a highly stable and efficient operation because they draw heat from a controlled water loop rather than relying on fluctuating outdoor air conditions. This consistent source allows WSHPs to maintain reliable heating and cooling performance, even where weather conditions can vary.

Since the water loop remains within a moderate temperature range, WSHPs deliver dependable comfort and reduced energy use throughout the year. When paired with geothermal bore fields, they can further enhance system stability and sustainability by using the naturally consistent ground temperature as a heat source or heat sink.

As more places seek solutions that meet stringent energy efficiency demands and sustainability goals in heating and cooling systems, the market for water-source heat pumps is anticipated to continue growing, much like the rapidly expanding air-source heat pump market.

AAON Water-Source Heat Pumps are engineered to maximize the advantages of water-source heat pump technology with high efficiency, precise temperature control, and flexible system configurations.



Water-Source Heat Pump Advantages

DURABLE CONSTRUCTION

Double wall rigid polyurethane foam injected panel cabinet construction has a higher thermal resistance, or R-value, compared with fiberglass construction. Panels include a thermal break, with no metal contact from inside to outside, to prevent heat transfer through the panel and prevent condensation on the outside of the cabinet. Our construction also makes the cabinet more rigid and resistant to damage, provides increased sound dampening, and reduces air leakage and infiltration.

PREMIUM COMPRESSOR OPTIONS

Quiet and efficient, AAON units offer two-step and variable capacity (digital) compressors that provide load-matching cooling and optimized efficiency for single or multi-zone VAV and makeup air applications.

DIRECT DRIVE FANS

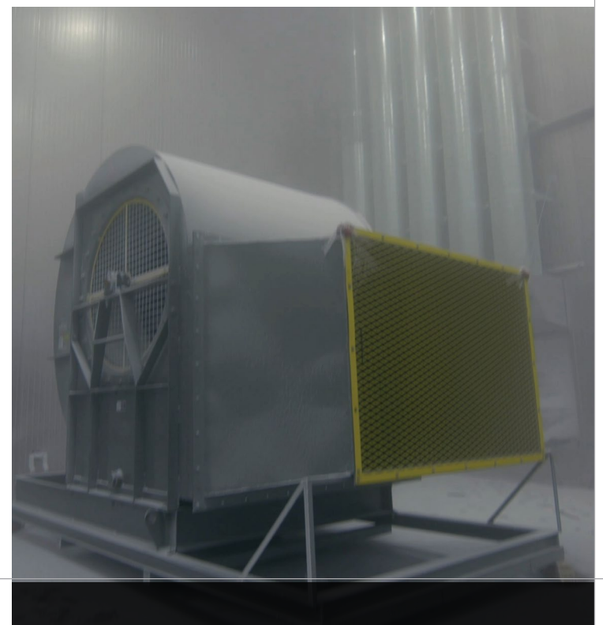
Direct Drive Backward Curved Plenum Fans are more energy efficient, quieter, and require less maintenance than belt driven fans. Variable speed supply fans provide high-performance heat pump heating and cooling airflow. Variable speed control allows for energy savings at reduced airflow.

AMCA CERTIFIED LOW LEAKAGE ECONOMIZERS

AAON uses AMCA-certified low leakage dampers, ensuring optimal fresh air supply only when needed.

CORROSION PROTECTION

AAON Water-Source Heat Pumps offers premium corrosion protection, like standard 2,500 salt spray resistant paint and options like polymer e-coated coils for corrosion protection.



Flexibility

FACTORY INSTALLED ENERGY RECOVERY

AAONAIRE® enthalpy energy recovery wheels are capable of transferring both sensible (temperature) and latent (moisture) energy from the incoming air stream to the exhaust air, thus preconditioning the supply air. This saves energy by reducing mechanical heating and cooling use, and can lower costs through increasing effective system capacity by 30%, or more, thus allowing smaller equipment to be selected. AAONAIRE energy recovery wheels are also available as sensible only, when moisture recovery is not needed or wanted.

Cross-flow fixed plate heat exchangers save heating and cooling dollars by pre-cooling, pre-heating, and humidifying the ventilation outdoor air (depending on ambient conditions). Cross-flow fixed plate heat exchangers have no moving parts and can improve indoor air quality by eliminating cross contamination. Sensible only or enthalpy fixed plate heat exchangers are available to meet application requirements.

MODULATING HOT GAS REHEAT

Options like modulating hot gas reheat, space temperature and humidity levels can be precisely controlled.

MULTIPLE FILTRATION OPTIONS

ASHRAE recommends using a minimum of MERV 13 filter to effectively trap viruses more effectively. This option is available on all sizes of rooftop equipment and the standard backward curved supply fans are capable of handling the additional static pressure associated with the higher quality filtration. AAON offers up to MERV 14 pleated air filters.

SCR ELECTRIC HEAT CONTROL

SCR controlled electric heat strips can be used for precise electric heating control without the need for gas piping.

WATERSIDE ECONOMIZER (SA SERIES)

Factory installed constant or variable flow waterside economizer allows for free cooling at low ambient conditions (SA Only).

DESIGN FLEXIBILITY

The compact design of the SB allows for efficient use of limited space. The modular design of the SA and M2 series supports scalability for easy configuration and future expansion, additionally, the RN and RQ WSHPs are offer flexible tonnage selection with an efficient rooftop design

Serviceability

LOCKABLE ACCESS DOORS

Access doors with full-height stainless steel piano hinges and lockable handles provide superior access and serviceability for the isolated compressor and controls compartment. Access to the unit interior for maintenance is made easy with standard hinged doors that open against pressure.

ISOLATED COMPRESSOR AND CONTROLS

Unit controls and compressors are contained within a compartment isolated from the air stream for ease of service and quiet operation.

COLOR-CODED WIRING

Color-coded wiring diagrams allow fast connection identification and analysis, reducing downtime and cost. Individual components and wires are also labeled for quick circuit evaluation. The result of this AAON standard procedure is low service cost and greater unit run time.

DUAL FUEL

AAON water-source heat pump units are available with auxiliary and emergency heating capability in select models. Dual fuel units include an additional heat source from natural gas or LP gas. Dual fuel systems offer great flexibility by allowing gas heat as the second heat source to be used as a supplemental heat to the heat pump.

Applications

HEALTHCARE FACILITIES

Healthcare facilities demand an HVAC System that is energy efficient while improving the indoor air quality for a comfortable environment.

SCHOOLS

Educational facilities need an energy efficient and quiet HVAC system that is not disruptive while providing a comfortable learning environment.

HIGH RISE BUILDINGS

High rise buildings need an HVAC system that offers energy efficiency, easy serviceability, and delivers comfort to multiple areas.

Water-Source Heat Pump Models

RN SERIES

Capacity 6–140 tons

RQ SERIES

Capacity 2–5 tons

M2 SERIES

Capacity 3–70 tons

SA/SB SERIES

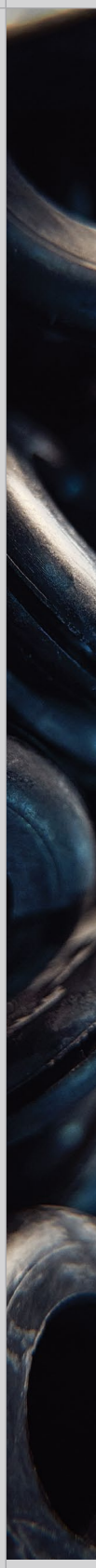
Capacity 3–70 tons

For a better tomorrow

The path to a sustainable and energy efficient future continues to gain momentum as more facilities adopt technologies that support decarbonization and long-term energy savings. Water-source heat pumps play a role in this transition, reducing overall energy use while supporting lower carbon footprints.

AAON Water-Source Heat Pumps are engineered to deliver immediate performance advantages along with long term savings on energy costs. With high efficiency operation, precise temperature control, quiet performance, and flexible installation options for both indoor and rooftop applications, AAON systems ensure comfort and efficiency remain the top priority. Designed with serviceability and reliability in mind, they provide year-round heating and cooling without compromising occupant comfort. When integrated with geothermal bore fields, they unlock even greater sustainability by leveraging naturally consistent ground temperatures.

As you explore the possibilities of a water-source heat pump system, you are not only choosing a smart solution for performance and efficiency, but you are also contributing to a greener and more sustainable future. Join us in advancing heating and cooling systems that support the comfort of today without placing a burden on the world of tomorrow.



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