



Water-Source Heat Pumps

ROOFTOP UNITS



Water-Source Heat Pump Rooftop Unit

Features:

- Water-source and geothermal heat pump rooftop units with capacities from 2-230 tons
- R-410A scroll compressors with up to 8 compressors per unit
- Variable capacity and variable speed scroll compressors for load matching cooling and heating, along with improved part load efficiency
- Heat pump heating with optional electric, gas, steam or hot water auxiliary heating
- AMCA certified and labeled low leakage economizer dampers
- Direct drive backward curved plenum fans
- Power exhaust and power return options
- Factory installed AAON AIRE total and sensible energy recovery wheels
- Double wall rigid polyurethane foam insulated cabinet construction
- Unit access doors with full length hinges and lockable handlers
- Optional walk-in compressor and control service vestibule for units 45 tons and larger
- Option boxes available for field installed components

○ *Makeup Air Applications
Up to 100% Outside Air*

○ *Dehumidification and Premium
Filtration Capabilities*

○ *Large Tonnage WSHP
Rooftops*

○ *Factory Installed or Customer
Specific Controls Options*

WSHP | Rooftop Units

AAON Rooftop Water-Source Heat Pumps incorporate the AAON long term commitment and dedication to excel as the premier manufacturer of rooftop equipment. Geothermal heat pump systems, often referred to as ground source heat pumps (GSHP) or water-source heat pumps (WSHP), are among the most efficient, environmentally friendly ways to heat, cool and dehumidify buildings by recovering otherwise wasted energy and utilizing that energy to satisfy the needs of the building.

Superior Features

- Water-source and geothermal heat pump configurations for energy efficient heating and cooling.
- Cabinet construction consists of rigid polyurethane foam panels with G90 galvanized steel on both sides and a closed cell polyurethane foam interior core. The inner wall protects the insulation from moisture damage, prevents microbial growth, and is easy to clean.
- Two inch rigid polyurethane foam insulated panels have a thermal resistance R-value of 13 or greater, which exceeds the R-value of a cabinet with four inch thick fiberglass construction. It also makes the cabinet more rigid and resistant to damage and provides increased sound dampening.
- Access doors with full length stainless steel piano hinges and quarter turn, lockable handles provide improved reliability over single point hinges and make the unit easily serviceable.
- Corrosion resistant polyurethane paint exceeds a 2,500 hour salt spray test.
- AMCA certified and labeled low leakage gear driven dampers are standard on AAON rooftop units. AAON low leakage dampers meet the California Title 24 damper air leakage requirement. Optional Economizer Fault Detection and Diagnostics is also available with the low leakage dampers to meet the California Title 24 requirements.
- Compressors and unit controls are contained within a compartment isolated from the air stream for ease of service and increased sound dampening.
- Direct drive backward curved plenum fans provide improved energy efficiency and reduced maintenance versus belt driven fans.
- Double sloped stainless steel drain pans eliminate standing water which can support microbial growth and stainless steel construction prevents corrosion or rust that could lead to water leaks and contaminants in the air stream.
- Run test report, wiring diagram, and Installation, Operation, and Maintenance manual with startup form is provided in control access compartment of every unit.
- 5 year non-prorated compressor warranty, 15 year non-prorated aluminized steel gas heat exchanger warranty, and 25 year non-prorated stainless steel gas heat exchanger warranty.



RN Series Water-Source Heat Pump Rooftop Units include brazed plate refrigerant-to-water heat exchanger and waterside components in a rigid polyurethane foam insulated service compartment. Heat pump refrigeration components are also accessible from this compartment.

Ease of Service



RQ Series Water-Source Heat Pump Rooftop Units include hinged service access doors to all airside components, compressor, controls, and waterside components. Coaxial refrigerant-to-water heat exchanger and waterside components are in a rigid polyurethane foam insulated service compartment.

Premier Options



- Variable capacity and variable speed R-410A scroll compressors for load matching cooling and improved part load efficiency.
- Head pressure control with 2-way water valve allows for variable flow condenser water operation and operation with lower entering water temperature.
- Factory installed total or sensible AAONAIRE energy recovery wheels. Humidity control options including: High Capacity Coils, Modulating Humidity Control, Return Air Bypass, and Mixed Air Bypass.
- Hot water or steam heating coils allow unit to tie into a boiler system.
- Polymer e-coated coils are available to extend the life of the coils and protect them in corrosive environments.
- Power exhaust and power return fans with economizer for application flexibility.
- VFD controlled and ECM driven supply, exhaust, and return fans for precise airflow control, building pressure control, and reduced power consumption.
- Cupronickel coaxial or SMO 254 brazed plate corrosion resistant refrigerant-to-water heat exchangers are available for additional chloride corrosion resistance.
- Unit controls options including factory installed customer provided controls.
- Dual fuel, using both the heat pump and a second form of heat, offers great flexibility and a supplemental form of heat during heat pump operation.
- SCR (Silicon Controlled Rectifier) electric heat control for reduced power consumption, longer heater life, and improved occupant comfort.
- Modulating gas heat with stainless steel heat exchanger provides greater fuel efficiency, longer heater life, and improved occupancy comfort.
- Interior corrosion protection option protects interior components of the unit in corrosive environments.
- Knock down, solid bottom, and seismic certified curbs are available to meet building requirements.
- Multiple methods of humidity control including: High Capacity Cooling Coils, Return Air Bypass, and Modulating Humidity Control which provides efficient dehumidification, even with low sensible heat loads, without the temperature swings common with on/off reheat systems.
- Factory installed, sensible or enthalpy, gear driven economizer allows for free cooling.
- Multiple high efficiency filtration options with up to a MERV 14 efficiency rating.
- Hot gas bypass for evaporator coil freeze protection.
- Compressor isolation valves are available for improved serviceability.
- Option boxes are segments of the unit that can be left empty from the factory so that components may be installed in the field without the trouble of installation and service in a crowded cabinet.
- Seismically certified construction options are available to meet California OSHPD or ASCE 7-05 / ICC-ES AC 156 requirements.



RL/RZ Series (45-230 tons)

Modulating Gas Heater with
Stainless Steel Heat Exchanger



RN Series (6-140 tons)

Dual Fuel

All AAON water-source heat pump rooftop units are available with auxiliary and emergency heating capability. Dual fuel units include an additional heat source from natural gas, LP gas, steam, hot water or electric heat. Dual fuel systems offer great flexibility by allowing a second heat source to be used as a supplemental heat to the heat pump or a form of back up heat if water loop down time is required.

Ease of Service

AAON equipment is designed from concept to completion with minimum service time as a primary factor. Readily accessible compressors and control components allow timely evaluation of service issues without delay. Color-coded wiring diagrams allow fast connection identification and analysis and thus a reduction in down time 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.

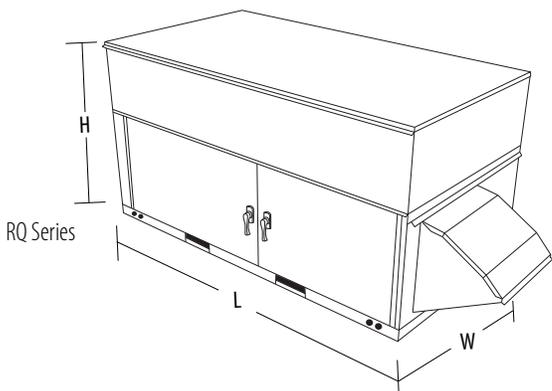
Direct Drive Backward Curved Plenum Fans

Direct Drive Backward Curved Plenum Fans are more energy efficient, quieter, and require less maintenance than belt driven fans. VFD controlled and ECM driven supply, exhaust, and return fans are available for precise air flow control, building pressure control, and reduced power consumption.



Dehumidification

AAON offers many humidity control options. High capacity cooling coils are available which allow for more dehumidification versus standard cooling coils. Return air bypass and mixed air bypass are available on RN Series units for single coil humidity control. Modulating humidity control is available to provide energy efficient dehumidification, even with low sensible heat loads, without the temperature swings common with on/off reheat systems.



RN/RQ (tons)	Cabinet	Nominal cfm	Width	Height*	Length*				
RQ-002	--	850	44	43	82				
RQ-003		1,050							
RQ-004		1,400							
RQ-005		1,750							
RQ-006		1,800							
RQ-007		2,400		53					
RQ-008		2,800							
RQ-010		3,000							
RN-006		A				2,100	58	44	82
RN-007						2,450			
RN-008	2,800								
RN-010	3,500								
RN-009	B	3,000	73	50	88				
RN-011		3,600							
RN-013		3,600							
RN-015		4,200							
RN-016	C	6,400	78	59	110				
RN-018		6,800							
RN-020		7,000							
RN-025		9,000							
RN-030		10,500							
RN-026		D				10,000	100	95	155
RN-031	12,400								
RN-040	16,000								
RN-050	20,000								
RN-060	23,000								
RN-070	25,000								
RN-055	E		23,000	142	105	294			
RN-065			25,000						
RN-075		29,000							
RN-090		37,000							
RN-105		40,000							
RN-120		40,000							
RN-130		40,000							
RN-140		43,000							
RN Series - Horizontal Configuration									
RNA-011	C	3,600	78	60	138				
RNA-013		3,800							
RNA-016		6,400							
RNA-018		6,800							
RNA-020		7,000							
RNA-025		9,000							
RNA-030		10,500							

*Length and height vary depending on options selected.

All dimensions are in inches.

Design cfm may be 30-50% greater or less than nominal cfm.

Double Wall Rigid Polyurethane Foam Panel Construction

Water-source heat pump rooftop units are premium efficiency products and should be constructed using a premium cabinet design. AAON double wall rigid polyurethane foam insulated cabinets save cooling and heating energy through improved insulation and air seals. This reduces the energy lost to the environment and increases the building owner's savings. Not only does it have several times the insulating R-value, it creates a far more rigid and stronger assembly with less air leakage than fiberglass insulated panels. Saved energy is saved money. Heating and cooling energy lost through poor insulation and poor air seals results in significant monetary losses to building owners. AAON rigid polyurethane foam cabinets reduce these monetary losses through improved thermal resistance, thermal breaks and quality air seals.

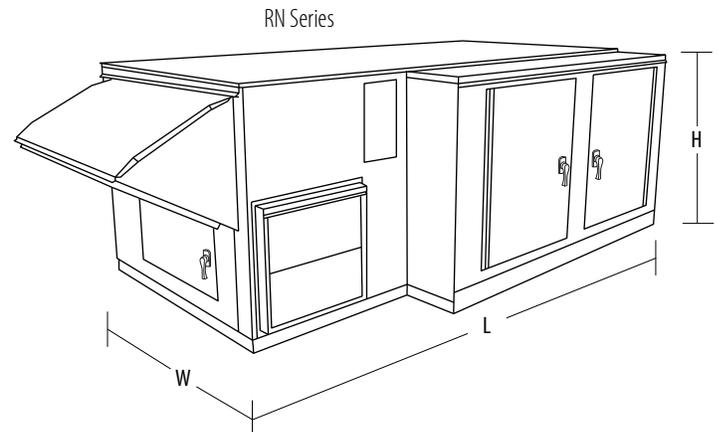
Variable Capacity Compressors

Water-source heat pump rooftop units with variable capacity compressors improve occupant comfort and system efficiency by varying the capacity of the system to match the instantaneous heating and cooling load of the conditioned space. Variable capacity compressors continuously adjust capacity to precisely match the supply air temperature setpoint. During much of the heating and cooling season, the compressor operates at a reduced energy level, saving you operating costs. By pairing variable capacity compressors with variable air volume fans, in a heat pump configuration energy efficiency is maximized and operating costs are drastically reduced.

Robust Applications

Central Water-Source Heat Pump Unit

By utilizing large commercial water-source heat pump rooftop units to provide outside air to occupied spaces, or interior units, the total number of units in the building can be reduced and complexity of the water piping can be simplified. An AAON water-source heat pump rooftop unit may supply up to 230 tons of cooling capacity with only a single water connection. The air from water-source heat pump rooftop units can be ducted to variable air volume systems or provide outside air for smaller WSHP units that serve individual zones. Because AAON water-source heat pump rooftop units have no outdoor fans, in addition to high efficiency, the units offer extremely quiet operation and have low maintenance requirements.



Variable Air Volume Capability

AAON water-source heat pump rooftop units with variable capacity compressors and variable speed fans can be applied to Variable Air Volume (VAV) systems with VAV boxes and to Single Zone VAV systems. These systems combine the energy saving benefits of a water-source heat pump configuration with the variable airflow energy savings of a VAV system. Variable capacity scroll compressors provide energy efficient consistent supply air temperature.

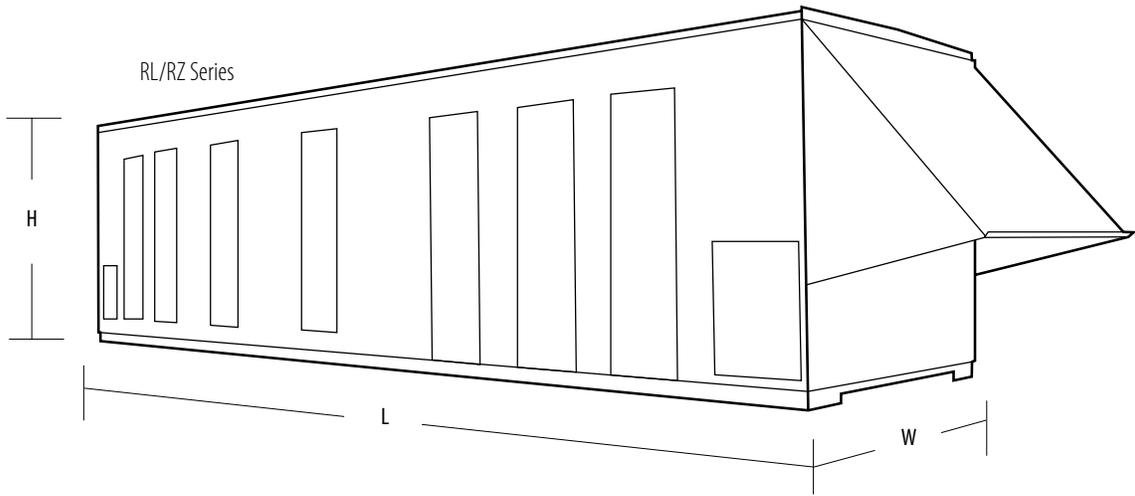
Makeup Air Capability

AAON water-source heat pump rooftop units have makeup air capability and can be specified with up to 100% outside air. AAON AIRE energy recovery wheels are available on makeup air units to increase the unit's energy efficiency. Modulating gas heat and SCR electric heat are available to provide energy efficient, consistent supply air temperature heating. Modulating hot gas reheat humidity control is available to provide dehumidification without over-cooling. Variable capacity scroll compressors are available to provide energy efficient consistent supply air temperature.





RL/RZ Series



◀ 10-100% variable capacity scroll compressors provide load matching cooling and improve part load efficiency

VFD controlled variable speed scroll compressor provide load matching cooling and improved part load efficiency ▶

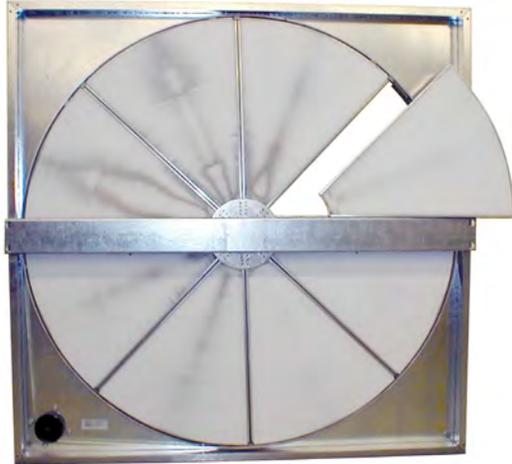


RL (tons)	Condenser Type	Compressor Type	Width	Height	Length
045	Water-Cooled, Water-Source Heat Pump, or Geothermal	R-410A Scroll	100	102	Length varies depending on options selected
060					
070					
075					
095					
100					
110			142		
125					
134					
135			100		
155			142		
170					
190					
210					
230					
RZ (tons)					
055	Water-Cooled, Water-Source Heat Pump, or Geothermal	R-410A Scroll	142	104	Length varies depending on options selected
065					
075					
090					
105					
120					
130					
140					

*Dimension may vary depending on options selected.
All dimensions are in inches.



◀ AMCA Certified and Labeled Low Leakage Dampers



AAONAIRE Energy Recovery Wheels

AAONAIRE energy recovery wheels, total or sensible, provide energy savings by recycling energy instead of losing energy through exhaust air streams. AAONAIRE systems also enhance indoor air quality by allowing larger amounts of outside air to be provided to the space and through improved humidity control.



Walk-In Service Vestibule

The walk-in service vestibule provides shelter for the maintenance and service personnel while periodic maintenance is performed on the unit. A light fixture is furnished in the compartment, controlled by a light switch at the door, and the vestibule can be heated and/or cooled for comfort. Double pane viewing windows can be installed in all doors where viewing of operating equipment or interior cabinet is needed.



Blower Section

Single or fan array direct drive backward curved plenum fans with spring isolation on the entire assembly allows optimization of fan diameter, sound level, and efficiency.



Spring Isolators

Spring isolators provide sound attenuation for the main blower section.



Lockable Handles

Walk-in doors are constructed with stainless steel piano hinges, perimeter gaskets and zinc cast lockable handles that operate from a single point.

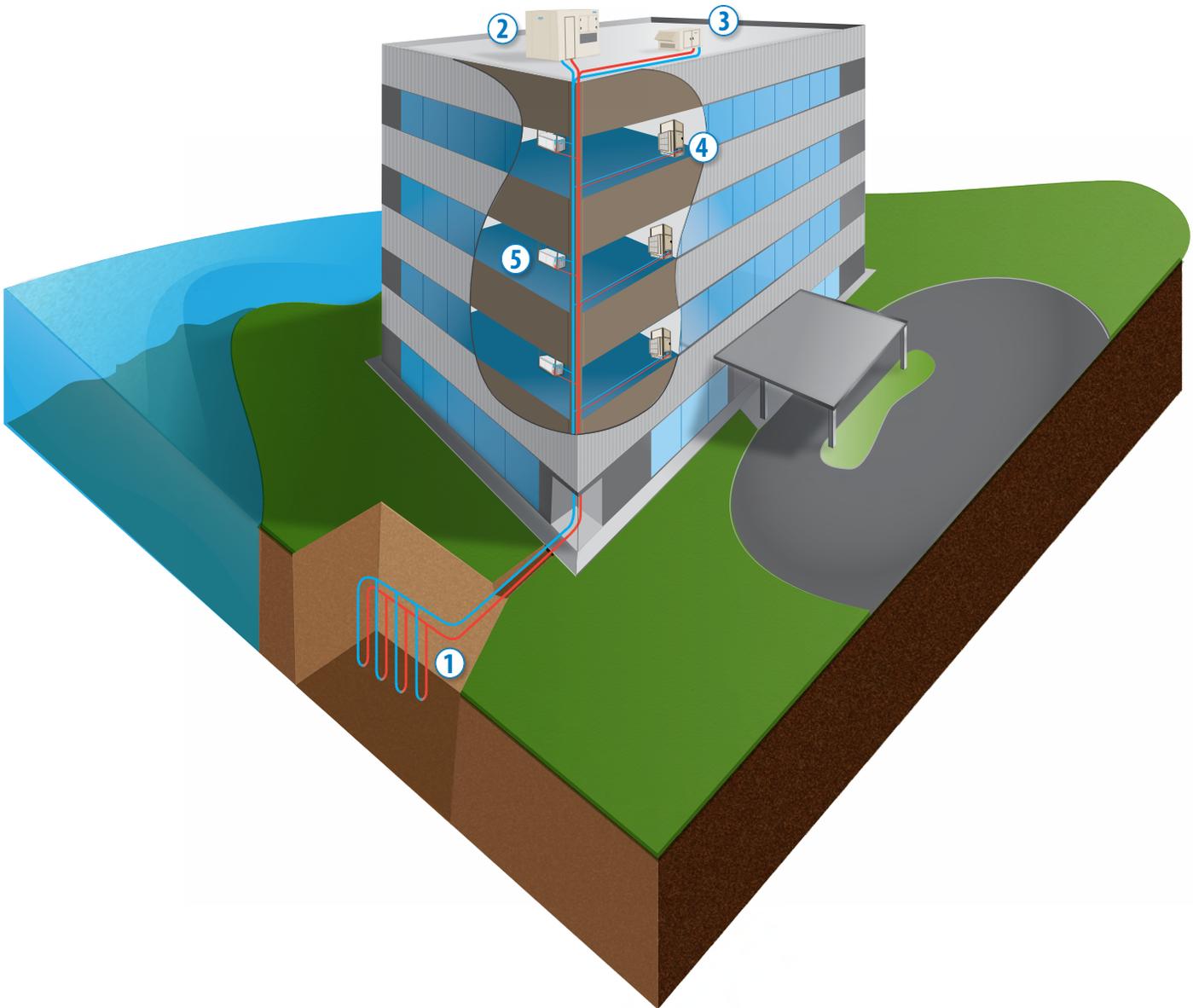


Optional Exhaust and Return Fans

The axial flow and plenum power exhaust and return fans are directly driven by the motor.



Geothermal heat pumps use the constant temperature of the earth as the exchange medium instead of the outside air temperature. A few feet below the earth's surface the ground remains at a relatively constant temperature. Depending on latitude, ground temperatures range from 45°F to 75°F. This ground temperature is warmer than the air above it during the winter and cooler than the air above it in the summer. The geothermal heat pump takes advantage of this constant temperature by exchanging heat with the earth through a ground heat exchanger.



Office Building with Geothermal Heat Pump System

- 1 - Ground Coupled Vertical Loop Geothermal System
- 2 - Cooling Tower with Boiler and Pumping Package Outdoor Mechanical Room
- 3 - 100% Outside Air Ventilation Water-Source Heat Pump Rooftop Unit
- 4 - Vertical Self-Contained Unit Water-Source Heat Pump Units
- 5 - Horizontal Configuration Water-Source Heat Pumps Units

AAON Geothermal and Water-Source Heat Pump *Advantages*

● **High Efficiency**

Direct Drive Backward Curved Plenum Fans, High Efficiency Refrigerant-to-Water Heat Exchangers, Double Wall Rigid Polyurethane Foam Panel Construction, 10-100% Variable Capacity Scroll Compressors, Variable Speed Supply Scroll Compressors

● **Flexibility**

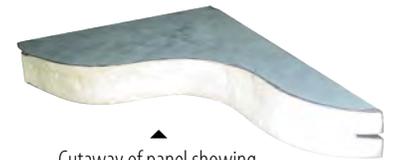
Factory Installed Energy Recovery Wheels, High Efficiency Filtration, Modulating Hot Gas Reheat Humidity Control, Makeup Air Capability, R-410A Scroll Compressors, Economizers, Variable Speed Supply, Return, and Exhaust Fans, Factory Installed Control Options

● **Serviceability**

Hinged Access Doors, Access to All Sections of the Unit, Color-Coded Wiring

● **Solutions**

Replacement or New Construction, LEED Points, Power Company Rebates, Tax Incentives



Cutaway of panel showing thermal break and foam core.



▲ Refrigerant-to-Water Heat Exchanger Walk-In Service
Access is available on units 45 tons and larger.

● **Systems**

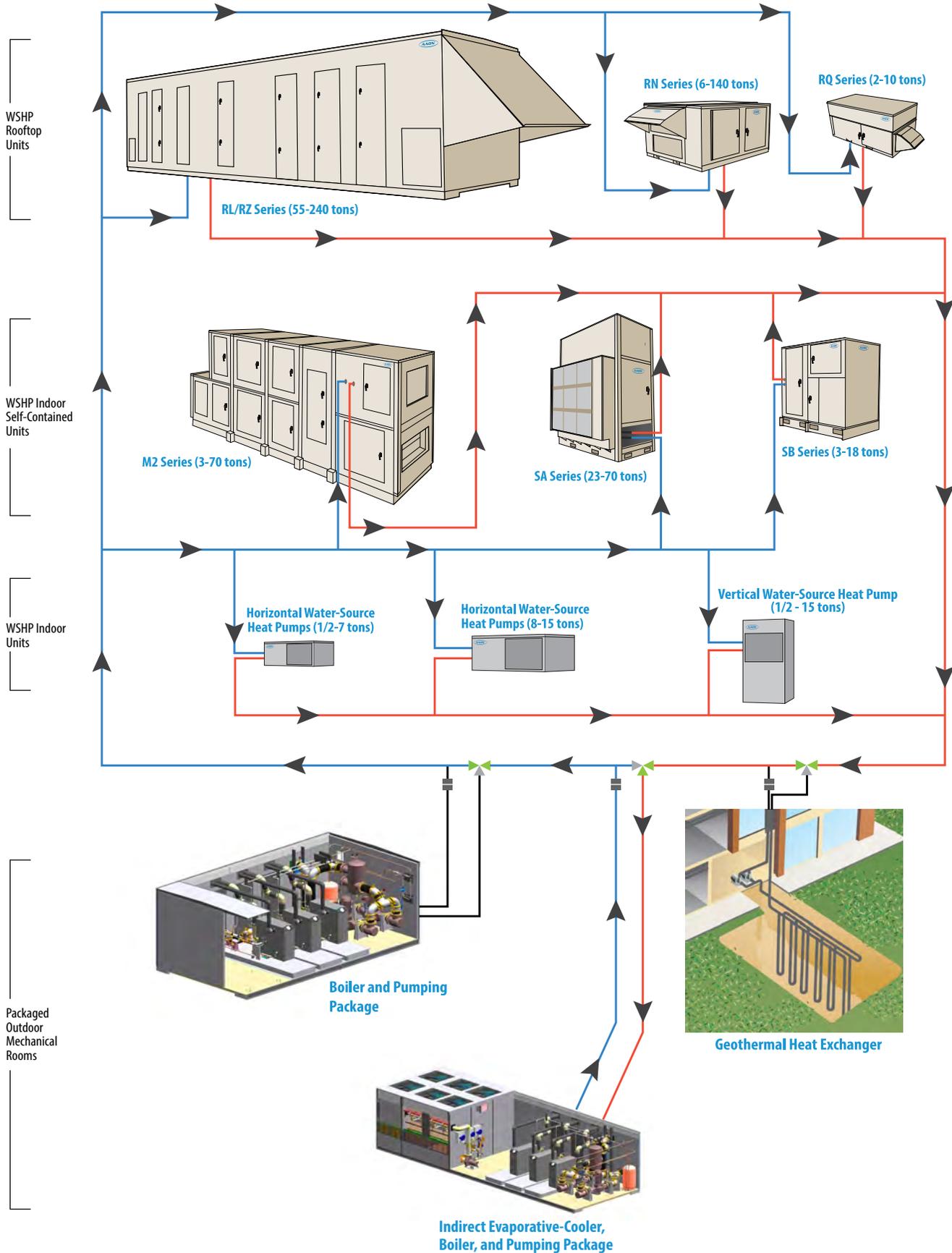
RQ, RN, and RL/RZ Series Water-Source Heat Pump Rooftop Units; SB, SA, and M2 Series Water-Source Heat Pump Self-Contained Units, WH and WV Series Horizontal and Vertical Water-Source Heat Pumps

● **Applications**

Constant Volume, Variable Air Volume (VAV), Single Zone VAV, and Makeup Air Systems



Water-Source/Geothermal Heat Pump System



WSHP Rooftop Units

RL/RZ Series (55-240 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged and VFD Controlled Variable Speed Compressors
- VFD Controlled Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction

RN Series (6-140 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged and 10-100% Variable Capacity Compressors (6-70 tons)
- Staged and VFD Controlled Variable Speed Compressors (55-140 tons)
- VFD Controlled Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction

RQ Series (2-10 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged, Two-Step, and 10-100% Variable Capacity Compressors
- VFD Controlled Variable Speed Compressors
- VFD Controlled and ECM Driven Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction

WSHP Indoor Self-Contained Units

M2 Series (3-70 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged, Two-Step, and 10-100% Variable Capacity Compressors
- VFD Controlled and ECM Driven Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction
- Modular cabinet construction can be configured to meet the application

SA Series (23-70 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged and 10-100% Variable Capacity Compressors
- VFD Controlled Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction
- Vertical self-contained unit cabinet construction can be configured to meet the application

SB Series (3-18 tons)

- Constant Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Units
- Staged and 10-100% Variable Capacity Compressors
- ECM Driven Variable Speed Direct Drive Backward Curved Plenum Fans
- Double Wall Rigid Polyurethane Foam Panel Construction
- Vertical self-contained unit cabinet construction can be configured to meet the application

WSHP Indoor Units

Horizontal Water-Source Heat Pumps

- (1/2-7 tons)
- Replacement Ready Stocked Units
- **Staged Scroll or Rotary Compressors**
- **High Efficiency PSC or ECM Fans**
- Microchannel Indoor DX Coil
- Easy Service Access
- All Aluminum Construction

Horizontal Water-Source Heat Pumps

- (8-15 tons)
- Replacement Ready Stocked Units
- **Staged Scroll Compressors**
- **High Efficiency PSC or ECM Fans**
- Microchannel Indoor DX Coil
- Easy Service Access
- All Aluminum Construction

Vertical Water-Source Heat Pumps

- (1/2-15 tons)
- Replacement Ready Stocked Units
- Staged Scroll or Rotary Compressors
- High Efficiency PSC or ECM Fans
- Microchannel Indoor DX Coil
- Easy Service Access
- All Aluminum Construction

Options

- **Waterside Economizer with Three-Way Control Valve**
- **Hot Gas Reheat Humidity Control**
- **Factory Wired Disconnect**
- **Four Inch High Efficiency Filtration**
- **Corrosion Resistant Cupronickel Heat Exchanger**

Packaged Outdoor Mechanical Rooms

Boiler and Pumping Package

- Packaged Boiler Outdoor Mechanical Room
- 98% Thermal Efficiency Condensing Boilers
- VFD Controlled Variable Flow Pumping Package
- Boilers heat the water in the system during the heating season
- Used when additional heating is needed beyond the capacity of the Geothermal Exchanger

Indirect Evaporative-Cooler, Boiler and Pumping Package (Future)

- Packaged Evaporative-Cooler and Boiler Outdoor Mechanical Room
- VFD Controlled Variable Flow Pumping Package
- Evaporative-cooler cools the water in the system during the cooling season
- Used when additional cooling is needed beyond the capacity of the Geothermal Exchanger
- Optional complete Packaged System with Evaporative-Cooler and Boiler

Geothermal Heat Exchanger

- **Transfers heat from the ground to the water or glycol loop during the heating season**
- **Transfers heat to the ground from the water or glycol loop during the cooling season**
- **Energy efficient first stage of the water or glycol loop heat exchange**

AAON Environmentally Friendly HVAC Product Family

ROOFTOP UNITS (2-240 tons)



OUTDOOR AIR HANDLING UNITS (800 - 100,000 + cfm)



CONDENSING UNITS (2-230 tons)



PACKAGED OUTDOOR MECHANICAL ROOMS (4-540 tons)



SELF-CONTAINED UNITS (3-70 tons)



COILS



INDOOR AIR HANDLING UNITS (800 - 100,000 + cfm)



WATER-SOURCE HEAT PUMPS (1/2 - 230 tons)



Defining Quality. Building Comfort.

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