

# Air-to-Water Heat Pump System

Sustainable Building Comfort in New and Existing Buildings



An electrified HVAC system is becoming the future for buildings as the energy grid reduces reliance on fossil fuels. Many states and municipalities are pushing electrification further with mandates or incentives for building owners to reduce or eliminate fossil fuel-powered HVAC systems.<sup>1</sup>

Trane® can help you make the switch. Whether to satisfy new regulatory requirements, achieve efficiency certifications or advance net-zero energy consumption goals, our electrified air-to-water heat pump system offers configurations and options to fit a variety of building types so you can reduce or eliminate emissions from your building HVAC system while providing reliable occupant comfort. An air-to-water heat pump system from Trane gets it done.

## Pump Up System Reliability, Efficiency, and Flexibility

Heat pumps are a key enabler for decarbonization. Because they move energy rather than generate it, a heat pump can be up to **three times more efficient** than other forms of electric heating.

The Trane Comprehensive Air-to-Water Heat Pump System provides controls, equipment and technical knowledge packaged together for system success.

Paired with Trane's Hydronic Branch Conductor, heat pump projects can significantly reduce project costs and the complexity of retrofitting spaces from separate boiler/chiller plants to one heat pump system. This combination can increase system efficiency by up to **four times** compared to gas boilers and reduce piping and coil conversion costs by up to **50%**.

When higher hot water temperatures are needed, the cascade system option expands efficient heat pump heating to the higher temperatures that traditional boilers operate at, which simplifies conversion to electrified heating by allowing piping and coils to stay in place.

## Year-Round Comfort

In colder climates, the consequences of heating system failure can potentially be significant, making it important to design an HVAC system for the possibility of an extreme weather event. That's why Trane air-to-water heat pump systems are configured to meet the temperature, flows, and redundancy required for year-round heating and cooling.

The system has the flexibility to be configured to simultaneously support heating and cooling using multiple heat pump units. One heat pump can be in heating mode while the other is cooling, with the proper system volume to match. Each heat pump uses Symbio® 800 unit controls to enable efficient and reliable system integration and connected smart building management. The use of a buffer tank is recommended; supplemental or dual-fuel heating can also be used as needed.

## Electrified HVAC

The heart of our air-to-water heat pump system is a fully electric Ascend air-to-water heat pump model ACX. Ascend ACX helps meet efficiency and sustainability targets with:

- Full and part-load efficiency that meets ASHRAE® 90.1-2019 energy building codes
- Enhanced efficiency with variable speed fans, intermediate discharge valves on compressor, electronically-commutated fan motors and brazed-plate evaporator heat exchangers
- Dual expansion valves - one for heating and one for cooling - for better system control and reliability
- Flexible capacity options from 80 to 230 tons of nominal cooling capacity and 960 to 2500 MBh heating capacity
- Vapor Injection Technology allows for expanded operating map with outdoor ambient temperatures down to -15°F (-26°C) ambient

1. Utility Dive, Feb. 2, 2022: "States are accelerating efficiency, electrification efforts ..."

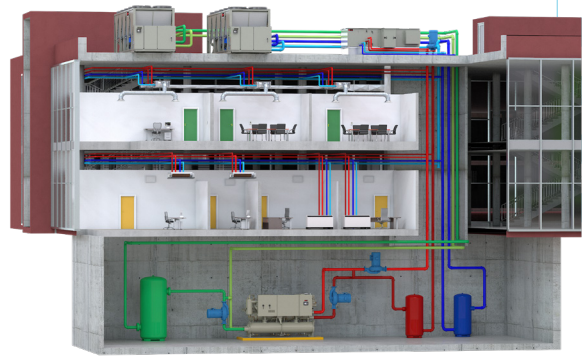


## System Options

### Cascade System Option

Available as an option for Trane's existing Air-to-Water Heat Pump System, the Air-to-Water Cascade Heat Pump System is a fully packaged high temperature hydronic heating solution. It uses multiple heat pump chillers in a cascade arrangement to deliver temperatures up to 165°F (74°C), which enables the retrofitting of traditional boiler systems while maintaining the current building distribution and infrastructure.

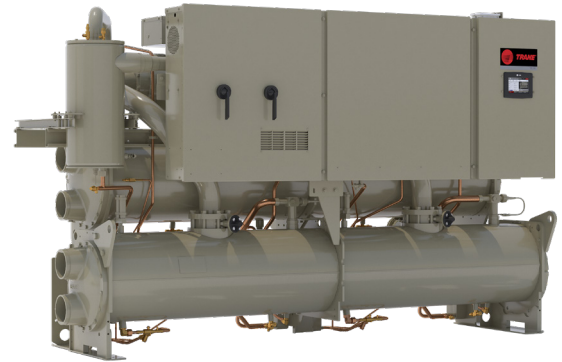
- Utilizes precise simultaneous heating and cooling temperature control
- Provides wide turn-down and minimum unloading (20%)
- Avoids replacement of heating pipes and coils
- Up to three times more efficient than traditional boilers



### Series R™ Water-to-Water Heat Pump

The RTWD is a key component of our cascade system, increasing the air-to-water heat pump leaving temperatures. It enhances heating capabilities for boiler replacement with:

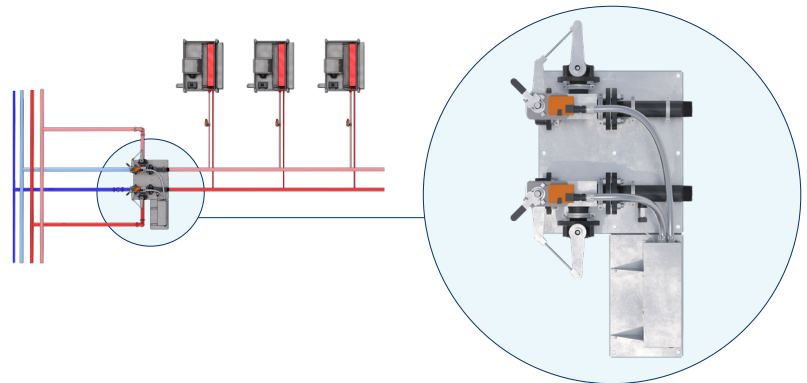
- Direct-drive compressor design to improve uptime, precision, and efficiency
- Dual compressor design offers redundancy for enhanced reliability
- Modulating capacity compressors help provide higher heating temperatures, better hot water control, and precise temperature regulation
- Cooling capacity ranges from 80 to 250 tons and heating capacity from 600 to 3,000 MBh



### Hydronic Branch Conductor Option

Paired with the air-to-water heat pump system, the Hydronic Branch Conductor enables existing buildings with 140 °F (60°C) to 180°F (82°C) hot water to convert to a more energy efficient 105°F (40°C) hot water heating supply, without replacing the existing branch piping. Simplifies conversion from two-pipe buildings to four-pipe year-round heating and cooling in buildings using efficient, lower-temperature hot water. In new construction, the Conductor can be deployed to reduce the first cost of both the piping distribution and heat pump plant.

- Repurposes high-capacity cold-water piping and a single dual-purpose coil for both heating and cooling, saving money.
- Each Conductor directs the flow of hot or cold water to a thermal area based on the changing needs of a thermal area throughout the day



## Systems Knowledge and Expertise

Electrified HVAC may be a new challenge, but Trane® has you covered. Through our consultative services approach, our Trane experts provide industry-based resources and pre-engineered system strategies including buffer tank location and sizing, defrost management, equipment sizing and selections, supplemental heat and location, and lower supply hot water temperatures (Ideally 105°F (40°C)). You can count on Trane to collaborate with you every step of the way from project initiation to post-installation maintenance, to keep your system operating efficiently and reliably.

**To learn more, contact your local Trane office or visit [trane.com/chiller-heater-system](https://trane.com/chiller-heater-system) today.**



Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit [trane.com](https://trane.com) or [tranetechnologies.com](https://tranetechnologies.com).

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