QUANTECH

QTH1 Air-to-Water Inverter Scroll Heat Pumps

Electric heating and cooling optimized for efficiency and performance

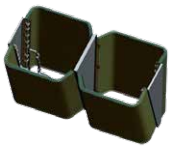
Air-to-Water Inverter Scroll Heat Pump

QTH10035 to 140

A complete range from 35 Tons up to 140 Tons

Brazed plate
heat exchanger

EC fans



Air-side heat
exchangers

OptiView LT
Controller
(Compatible with
Verasys)

Suction
accumulator

Inverter scroll
with EVI technology

Four-pipe benefits and operation

- Full capacity in heating-only or cooling-only mode
- Simultaneous heating-and-cooling mode using recovered energy
- Supports balanced or unbalanced loads in simultaneous heating and cooling mode
- Independent and dynamic control of both hot and chilled water temperatures

AHRI CERTIFIED™
www.ahridirectory.org

R-454B

Exceeds efficiency standards

The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump is designed to meet tomorrow's efficiency standards today. Delivering performance beyond typical efficiency levels, this heat pump boasts a part-load IPLV efficiency of up to 20.01 under AHRI conditions. This exceeds stringent regulatory requirements through an optimized combination of efficiency-enhancing technologies from Johnson Controls.

- **Direct current (DC) inverter technology** provides variable capacity control and allows the heat pump compressors to operate more efficiently across all cooling load and ambient temperature conditions versus constant-speed heat pumps that use a step unloading design
- **Electronically commutated (EC) fans** use more efficient motors and better aerodynamics to improve overall system efficiency and sound performance, particularly in part-load conditions. At reduced ambient temperatures, the head pressure control varies fan speeds to optimize the system efficiency and ensure reliable operation. This combination of variable-speed compressor and fans provides a displacement power factor as high as 0.93, lowering electricity costs
- **High-efficiency brazed plate heat exchanger** uses less refrigerant and transfers heat from the liquid to refrigerant more efficiently, providing excellent heat transfer performance in a compact design. This also results in a lower water-side pressure drop, allowing the use of smaller pumps to further minimize building power consumption
- Dual circuit design enables the entire heat transfer surface area to remain active at part load, delivering exceptional performance all year
- Simultaneous heating and cooling version balances heat intelligently through the building, conserving energy and moving it to where it's needed. Excess heat is rejected through the coils when not needed, or captured through them when more heat is required. The setpoints for both loops are controlled at all times for maximum stability and performance

Performance without compromise

The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump is a no-compromise solution for a variety of climates and locations. Built specifically to deliver better performance through a wider operating envelope, this heat pump can maintain efficiency in a variety of conditions without kits or add-ons – up to 118°F ambient in cooling mode and down to an impressive -13°F ambient in heating mode. The applicability of an air-to-water heat pump is dependent on its ability to deliver sufficient heat output when it's cold outside. The QTH1 excels in this area, offering the widest operating map to deliver as much as 20 percent more heating capacity at low ambient operation.

With the smallest installed footprint across the widest capacity range, this heat pump is also the perfect solution for high performance in smaller spaces. Installation is simplified with a compact size that permits forklift loading, and a modular configuration allows units to be arranged in varying footprints to fit different space requirements. This modularity means capacity can be increased incrementally as buildings are constructed or spaces are occupied. And if maintenance is required, other modules in the system will continue to operate, helping to reduce downtime and loss of capacity.

The coefficient of performance in simultaneous heating-and-cooling mode (COPshc) tells you just how efficient a heat pump can be when the work energy of the cooling process can be recovered and reused for heating.

$$\textbf{COPshc} = \frac{\text{(Cooling capacity + heating capacity)}}{\text{Electrical power input}}$$

The QTH1 exceeds COPshc 8 – now that's efficient!

We want to ensure our neighbors are comfortable too, even in retrofits. That's why our systems offer three levels of sound performance. If requirements call for sound reduction beyond our standard low-noise levels, an optional Ultra Quiet Kit can further reduce sound power by an impressive 5dBA, providing one of the quietest units available.

The proof is in the numbers.

- IPLV = 20.01
- EER = 10.2
- COPshc = 8.1

The QTH1 is at the top of its class!

Advanced control made easy

Comfort, productivity, and up to half of the energy used in your building – these are all factors affected by how your heat pump operates and how it interacts with other components in your HVAC/R system. To help maximize efficiency and keep you in control, the Quantech QTH1 comes as standard with integrated advanced controls and communication technologies. This technology allows the equipment to connect seamlessly to building controls, such as our world-class Verasys system, where enabled equipment can self-identify and interoperate.

Verasys provides a plug-and-play experience, with no programming or commissioning tools required. Remote access over a secure internet connection and alarm notifications via email or text are possible through Verasys. The user-friendly graphical interface provides easy access to critical equipment and facility information to help minimize the risk of unplanned downtime and costly repairs. Verasys also provides enhanced energy efficiency control.

The key to this efficiency is demand control, where Verasys routes the energy requirements of a room or space to the heating and cooling equipment – matching the demand side and the supply side to provide greater overall energy efficiency.

In addition to Verasys integration capabilities, this model provides added flexibility with standard BACnet MS/TP, Modbus RTU or N2 connectivity for communication with virtually any building management system. This advanced, embedded control capability also allows multiple heat pumps to be connected and monitored through a single controller, which features a touchscreen display that has an easy-to-use, web-style interface, and intuitive navigation for easy access to operational data. Information can be displayed in multiple languages and setup is very easy.

Plug-and-play experience

A history of reliability

When your reputation is at stake, count on efficient, reliable cooling and heating solutions from Quantech to lower costs and maximize uptime with dependability. Our local stocking allows quick shipment to North American locations. And with our units shipping as a complete package, everything arrives at the same time. We also offer a variety of standardized, locally-stocked parts to ensure our systems continue to provide maximum uptime.

With the Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump, we're building on our legacy of cooling solutions and technology leadership. We don't judge success based on theoretical findings but real-world experience. We use DC inverter technology proven over 30 years of use.

Every QTH1 heat pump is subjected to a Highly Accelerated Life Test (HALT) during the design product development stages. This testing simulates a variety of extreme conditions and ensures long-term operational reliability and quality.

- **Decades of extensive air-cooled expertise** is backed by proven components used in a variety of conditions in installations across the globe
- **Compressor management improves overall reliability** by balancing system operation time between each compressor
- **Smart logic controller** coordinates and optimizes units for off-design and part-load operation
- **Intelligent defrost** optimizes the sequencing of the defrost cycle and allows the remaining modules in the system to continue to provide heat, reducing interruptions
- **Compliance and certifications** include UL 60335 and AHRI certification

The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump is a no-compromise solution that delivers high efficiency, unmatched flexibility, world-class sound performance, extensive control capability and long-lasting reliability. These highly optimized designs use advanced components and innovative thinking to provide the high performance that you expect from a leader in heat pump solutions.

Dedicated to sustainability

At Johnson Controls, we are dedicated to protecting the environment. This goes back to our founder, Warren S. Johnson, and his invention of the electric thermostat in 1885. It sparked a fundamental shift in the energy efficiency of buildings. Now, all over the world, our products and services empower customers and communities to consume less energy and conserve resources.

On our quest for the most sustainable and energy-efficient refrigerant, we have conducted extensive research, testing and evaluating:

- Capacity
- Efficiency
- Safety
- Availability
- Longevity
- Global warming potential (GWP)
- Ozone depletion potential (ODP)
- And other metrics

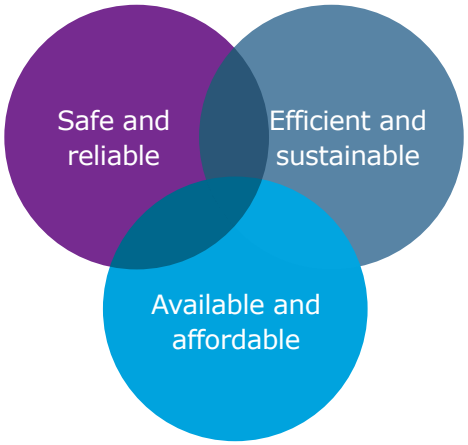
We are confident in our selection of R-454B for use in HVAC/R equipment with scroll compressors sold in North America. R-454B has the lowest Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP1) approved GWP for unitary applications of all ASHRAE classified A2L refrigerants on the market today.

With a low GWP of just 466 and zero ODP, the R-454B refrigerant belongs in the HFO class, which eliminates ODP and reduces GWP.

The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump with R-454B refrigerant complies with the HFC Phase Down plan to reduce greenhouse gas emissions. The physical properties of R-454B are similar to the R-410A refrigerant. In fact, most of the components designed for R-410A can be used with R-454B.

This new model uses 10 percent less refrigerant compared to products that use R-410A. In addition, it will maximize the use of existing components to cut waste. This heat pump is an eco-friendly offering whose operations work to protect our environment.

Want to know more about transitioning to low-GWP refrigerants? Scan the QR code or visit: **www.johnsoncontrols.com/corporate-sustainability/commitments/refrigerant-transition**



Safe and reliable

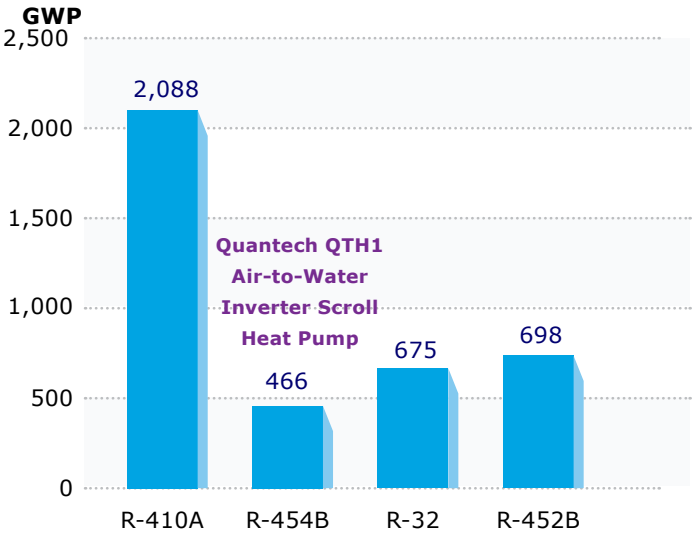
Toxicity and flammability must be addressed for all refrigerant options. Systems must be designed for new refrigerants and undergo long-term testing.

Efficient and sustainable

Future refrigerant choices must present equal or better overall performance values than current refrigerants. Energy efficiency is the ultimate priority to reduce the carbon footprint of HVAC products.

Available and affordable

Local availability at a reasonable cost is critical for building owners' bottom line.



R-454B

78% lower GWP than R-410A
31% lower GWP than R-32
10% less charge than R-410A

Safety is our priority

The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump is designed for safe operation. The new R-454B refrigerant was chosen with safety and low toxicity in mind.

R-454B has a 78 percent lower GWP value in comparison to R-410A and is classified in safety class A2L (non-toxic and difficult to ignite). This heat pump is equipped with refrigerant leakage detection sensors, additional ventilation and software management for leak warning messages. With multiple functional and reliability tests, quality assurance is enhanced.

To maximize safety, the system design has been verified by a third-party certification body to increase customer peace of mind. The customized components together with our advanced technology grant absolute confidence.

Flammability	Refrigerant Safety Groups	
Higher	A3	B3
Lower	A2	B2
Difficult to Ignite and Sustain	A2L	B2L
No Flame Propagation	A1	B1
	Lower	Higher
	No identified toxicity at concentrations ≤ 400ppm	Evidence of toxicity below 400ppm
	Toxicity	

Source: ASHRAE Standard 34 Safety Classification

Customized hermetic scroll compressors designed for A2L refrigerant

Optimized plate heat exchanger, suitable for R-454B application

A ventilation system installed inside the unit to ensure no A2L gas accumulates

Leakage detection sensor equipped to detect any gas leakage

Performance specification

Two-Pipe Model			QTH10035PJP	QTH10070PJP	QTH10105PJP	QTH10140PJP
Performance	**Cooling Mode (1)**					
	Cooling Capacity	Ton	35	70	105	140
	Input Power	kW	41.17	82.40	123.5	164.8
	EER	BTU/W	10.2			
	IPLV	BTU/W	20.01			
	Heating Mode (A47°F/43°F , W105°F) (2)					
	Heating Capacity	MBH	458.4	916.8	1,375	1,834
	Input Power	kW	38.94	77.88	116.8	155.8
	COP_H	kW/kW	3.45			
	Sound Power Level (Cooling)	dB(A)	84	87	90	91
Refrigerant	Type	No.	R-454B			
	Refrigerant Circuit	No.	2	4	6	8
	Refrigerant Charge/Circuit	lb	25.4			
Compressor	Type		DC inverter EVI scroll			
	Capacity Step		Stepless (Inverter)			
	Quantity	No.	2	4	6	8
Air-Side Heat Exchanger	Coil Type		Copper tube, aluminum plate fin			
	Fan Type		Axial fan, EC inverter motor			
	Fan Quantity	No.	2	4	6	8
	Total Air Flow Rate	cfm	25,900	51,800	77,700	103,600
	Working Ambient Temp (Cooling)	°F	-4 to 118.4			
	Working Ambient Temp (Heating)	°F	-13 to 109.4			
Water-Side Heat Exchanger	Type		Braze plate exchanger			
	Water Connection		Victaulic			
	Nominal Water Flow Rate (Cooling) (1)	gpm	83.38	166.8	250.1	333.5
	Nominal Water Flow Rate (Heating) (2)		83.38	166.8	250.1	333.5
	Pressure Drop (Cooling) (1)	ft H_2O	13.7			
	Pressure Drop (Heating) (2)		12.9			
	Working-Range Leaving-Water Temperature (Cooling)	°F	14 to 68			
	Working-Range Leaving-Water Temperature (Heating)	°F	77 to 140			
Dimensions and Weight	Length (w/o Pump Kit)	in.	88.2	120.1	192.9	265.8
	Width (w/o Pump Kit)	in.	47.2	88.2		
	Height (w/o Pump Kit)	in.	99.0			
	Shipping Weight (w/o Pump Kit)	lb	2,370	5,164	7,870	10,569
	Operation Weight (w/o Pump Kit)	lb	2,403	5,230	7,969	10,701
Electrical Features	Voltage	V/ph/hz	460/3/60			
	MCA (w/o Pump Kit)	Amps	74	140	206	272
	RLA (w/o Pump Kit)	Amps	66	132	198	264

Notes (two-pipe):

1. Rated cooling performance: chilled EWT/LWT 54°F/44°F, outdoor air 95°F;
   IPLV data is according to AHRI standard 550/590 I-P
2. Rated heating performance: hot LWT 105°F, outdoor air 47°F/43°F (db/wb), the water flow rate used for heating is same as rated cooling condition

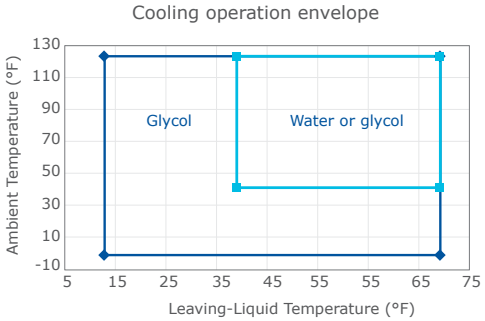
Notes (four-pipe):

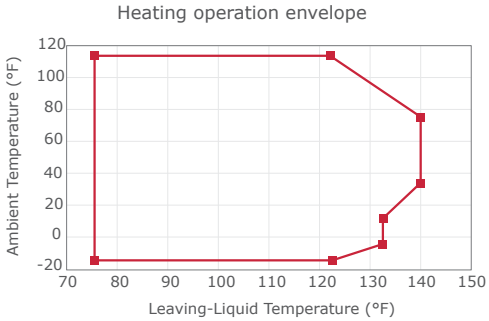
1. Rated cooling performance: chilled EWT/LWT 54°F/44°F, outdoor air 95°F
   IPLV data is according to AHRI standard 550/590 I-P
2. Rated heating performance: hot LWT 105°F, outdoor air 47°F/43°, the water flow rate used is determined by the hot EWT/LWT 95°F/105°F
3. Simultaneous heating and cooling: chilled LWT 44°F, water flow rate is determined by the water temperatures at rated cooling capacity,
   hot EWT/LWT 95°F/105°F, the water flow rate is determined by heating capacity and water temperatures.

Four-Pipe Model			QTH10035PJS	QTH10070PJS	QTH10105PJS	QTH10140PJS
Performance	**Cooling Mode (1)**					
	Cooling Capacity	Ton	35	70	105	140
	Input Power	kW	41.17	82.34	123.5	164.7
	EER	BTU/W	10.2			
	IPLV	BTU/W	20.01			
	Heating mode (A47°F/43°F , W105°F) (2)					
	Heating Capacity	MBH	450.8	901.5	1,352	1,803
	Input Power	kW	37.21	74.42	111.6	148.8
	COP_H	kW/kW	3.55			
	Simultaneous heating and cooling mode (Cooling chilled LWT 44°F, heating hot EWT/LWT 95°F/105°F) (3)					
	Cooling Capacity	Ton	34.1	68.2	102.3	136.4
	Heating Capacity	MBH	546	1,092	1,638	2,184
	Input Power	kW	34.60	69.2	103.8	138.4
	COP_{shc}	kW/kW	8.1			
	Sound Power Level (Cooling)	dB(A)	84	87	90	91
Refrigerant	Type	No.	R-454B			
	Refrigerant Circuit	No.	2	4	6	8
	Refrigerant Charge/Circuit	lb	25.4			
Compressor	Type		DC inverter EVI scroll			
	Capacity Step		Stepless (inverter)			
	Quantity	No.	2	4	6	8
Air-Side Heat Exchanger	Coil Type		Copper tube, aluminum plate fin			
	Fan Type		Axial fan, EC inverter motor			
	Fan Quantity	No.	2	4	6	8
	Total Air Flow Rate	cfm	25,900	51,800	77,700	103,600
	Working Ambient Temp (Cooling)	°F	-4 to 118.4			
	Working Ambient Temp (Heating)	°F	-13 to 109.4			
Water-Side Heat Exchanger	Type		Braze plate exchanger			
	Water Connection		Victaulic			
	Nominal Water Flow Rate (Cooling) (1)	gpm	83.97	167.9	251.9	335.9
	Nominal Water Flow Rate (Heating) (2)	gpm	90.04	180.1	270.1	360.2
	Nominal Water Flow Rate (SHC) (3)	gpm	83.9 (cooling) 109.1 (heating)	167.8 (cooling) 218.2 (heating)	251.7 (cooling) 327.3 (heating)	335.6 (cooling) 436.4 (heating)
	Pressure Drop (Cooling) (1)	ft H_2O	13.4			
	Pressure Drop (Heating) (2)	ft H_2O	15.3			
	Pressure Drop (SHC) (3)	ft H_2O	13.4 (cooling) 22.0 (heating)			
	Working-Range Leaving-Water Temperature (Cooling)	°F	14 to 68			
	Working-Range Leaving-Water Temperature (Heating)	°F	77 to 140			
	Working-Range Leaving-Water Temperature (SHC)	°F	14 to 68 (cooling) 77 to 140 (heating)			
Dimensions and Weight	Length (w/o Pump Kit)	in.	88.2	120.1	192.9	265.8
	Width (w/o Pump Kit)	in.	47.2	88.2		
	Height (w/o Pump Kit)	in.	99			
	Shipping Weight (w/o Pump Kit)	lb	2,602	5,627	8,564	11,495
	Operation Weight (w/o Pump Kit)	lb	2,668	5,759	8,762	11,759
Electrical Features	Voltage	V/ph/hz	460/3/60			
	MCA (w/o Pump Kit)	Amps	74	140	206	272
	RLA (w/o Pump Kit)	Amps	66	132	198	264

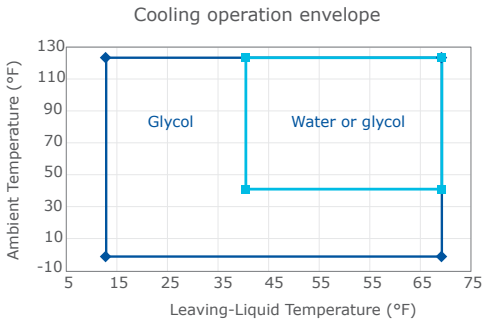
High performance and flexibility

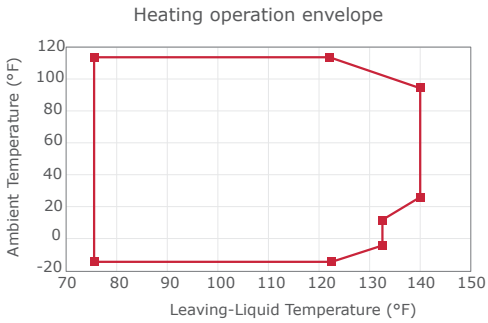
QTH1 operating envelope (two-pipe unit)

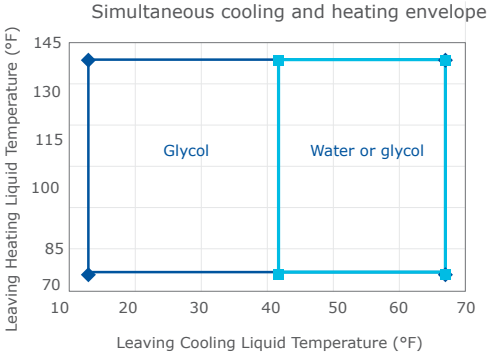




QTH1 operating envelope (four-pipe unit)







The Quantech QTH1 Air-to-Water Inverter Scroll Heat Pump offers up to eight independent circuits (QTH10140 has four modules, each with two circuits) to offer greater flexibility.

QTH10035
- 2 compressors
- 2 circuits

QTH10070
- 4 compressors
- 4 circuits

QTH10105
- 6 compressors
- 6 circuits

QTH10140
- 8 compressors
- 8 circuits

Various options

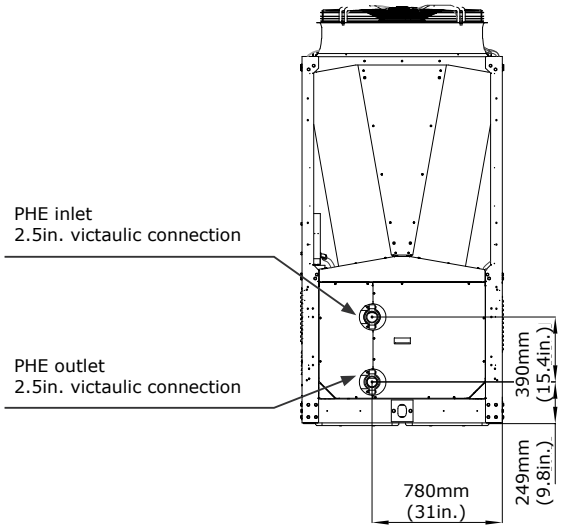
- Single VSD pump kits*
- Dual VSD pump kits*
- Low-sound kits
- Protection wire guard
- Single power connection (standard for QTH10070, QTH10105 and QTH10140)

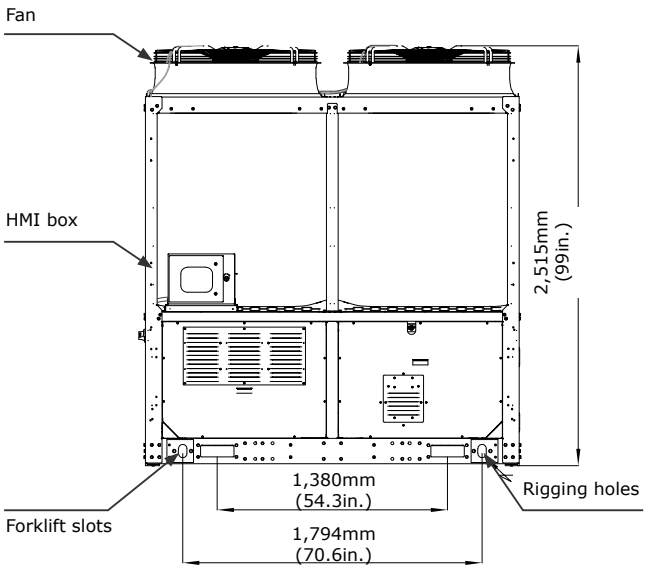
* Refer to the YMAE Variable Speed Pump Kits brochure.

Technical drawings

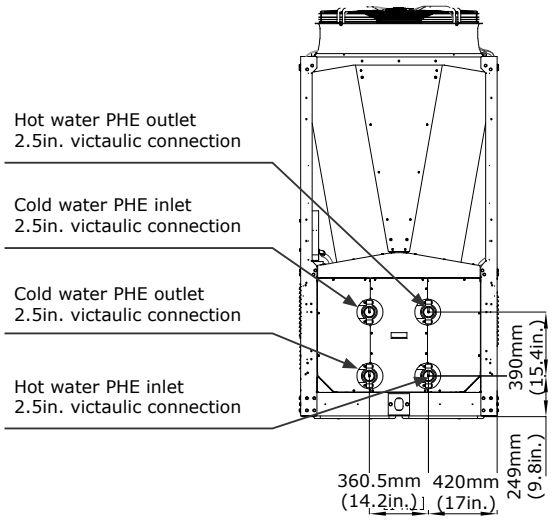
QTH10035PJP two-pipe base unit
QTH10035PJS four-pipe base unit

Piping connection side (QTH1 two-pipe unit)

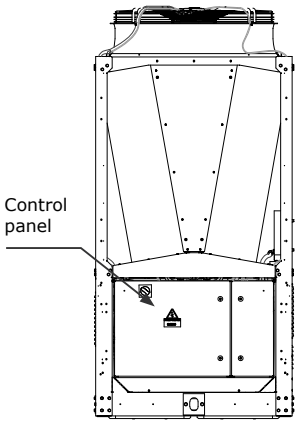




Piping connection side (QTH1 four-pipe unit)



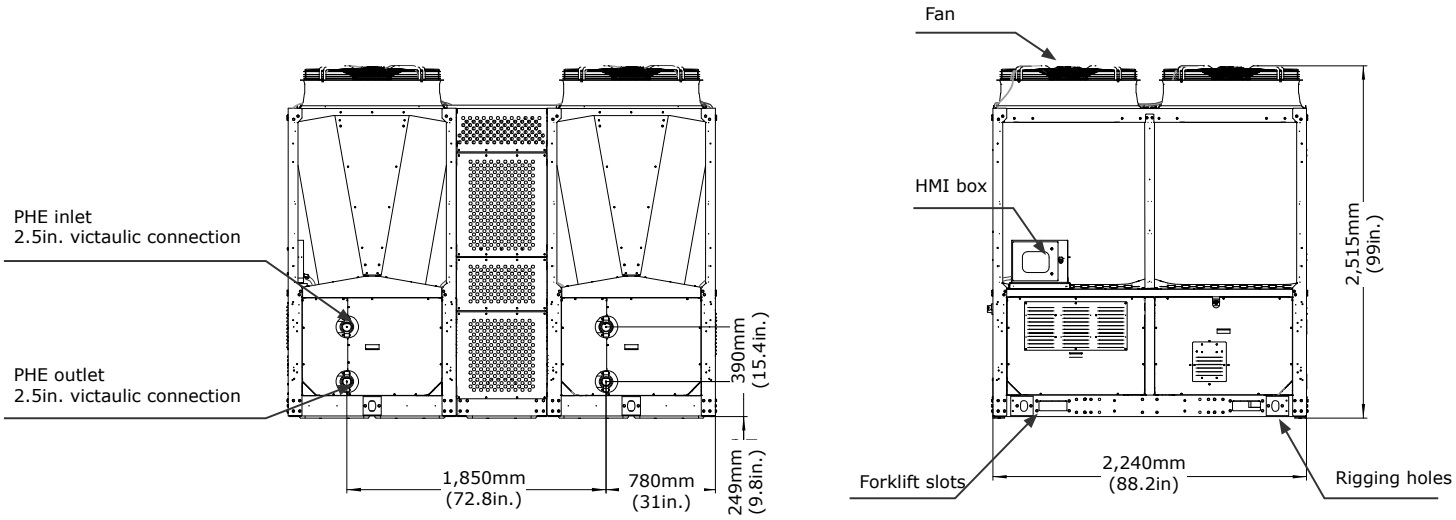
Control panel side (QTH1 two-pipe / four-pipe unit)



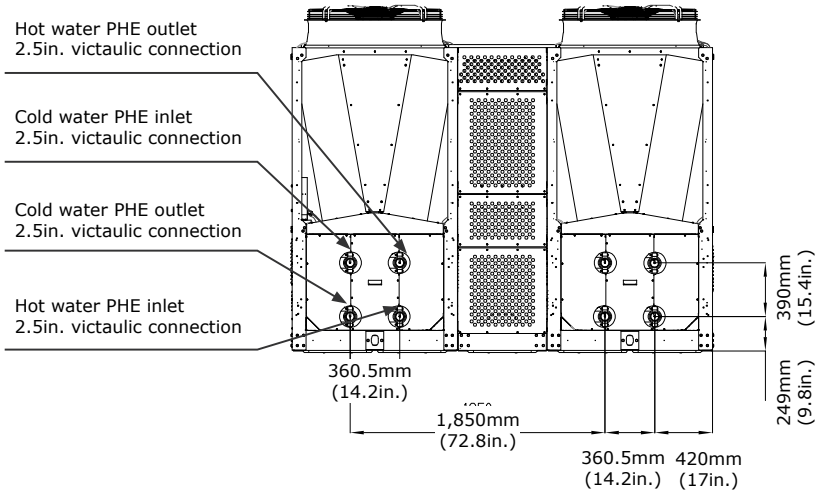
Drawings not to scale.

QTH10070PJP two-pipe modular array
QTH10070PJS four-pipe modular array

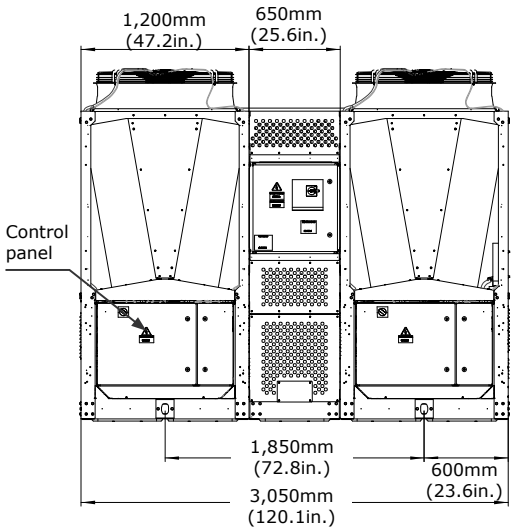
Piping connection side (QTH1 two-pipe unit)



Piping connection side (QTH1 four-pipe unit)



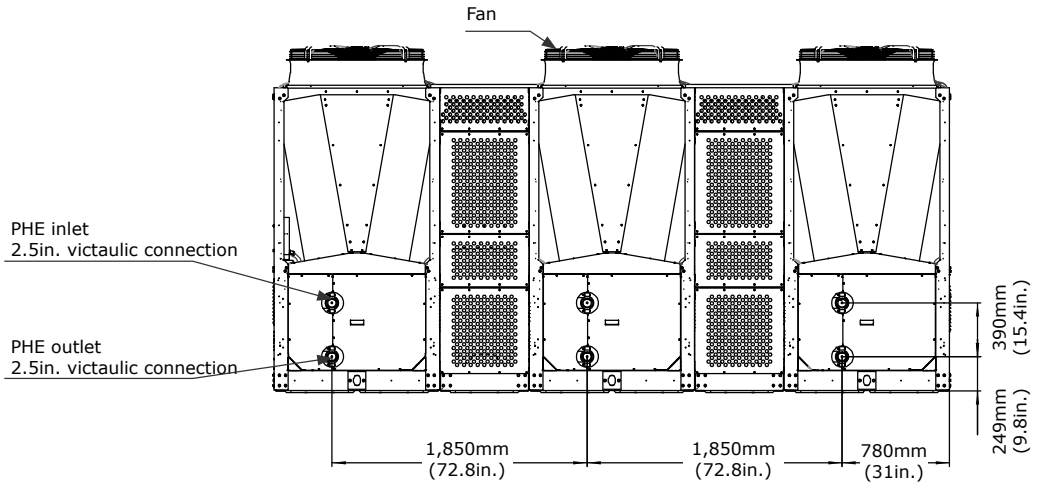
Control panel side (QTH1 two-pipe / four-pipe unit)



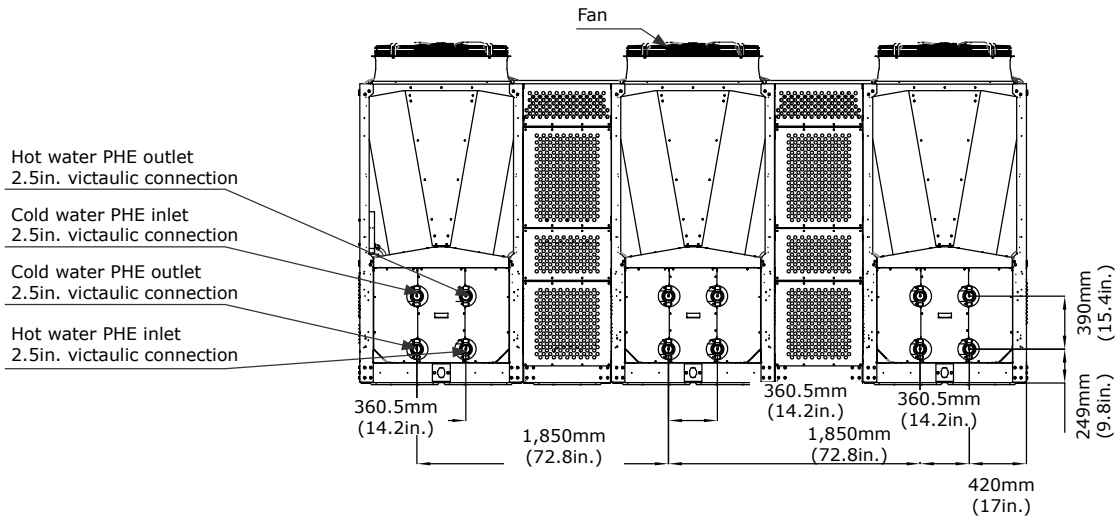
Drawings not to scale.

QTH10105PJP two-pipe modular array
QTH10105PJS four-pipe modular array

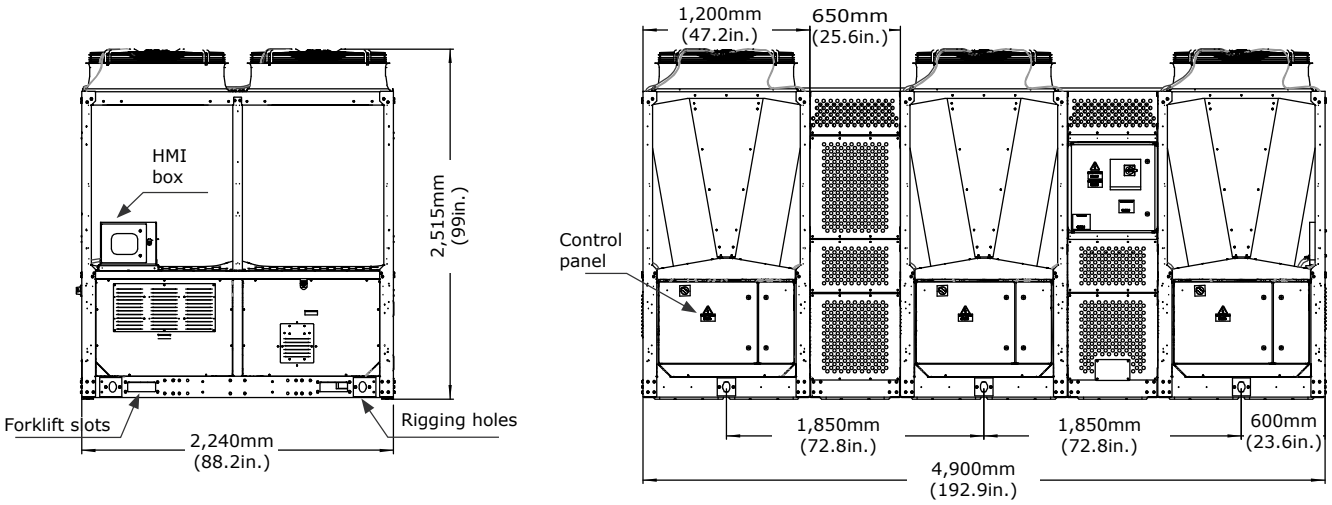
Piping connection side (QTH1 two-pipe unit)



Piping connection side (QTH1 four-pipe unit)



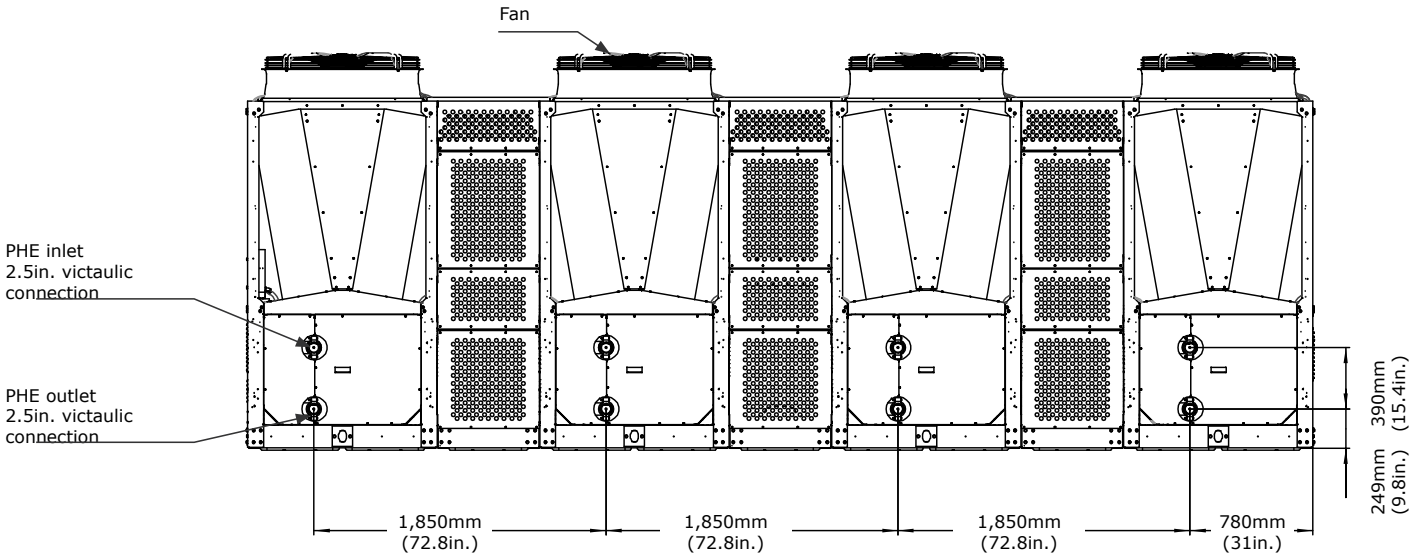
Control panel side (QTH1 two-pipe / four-pipe unit)



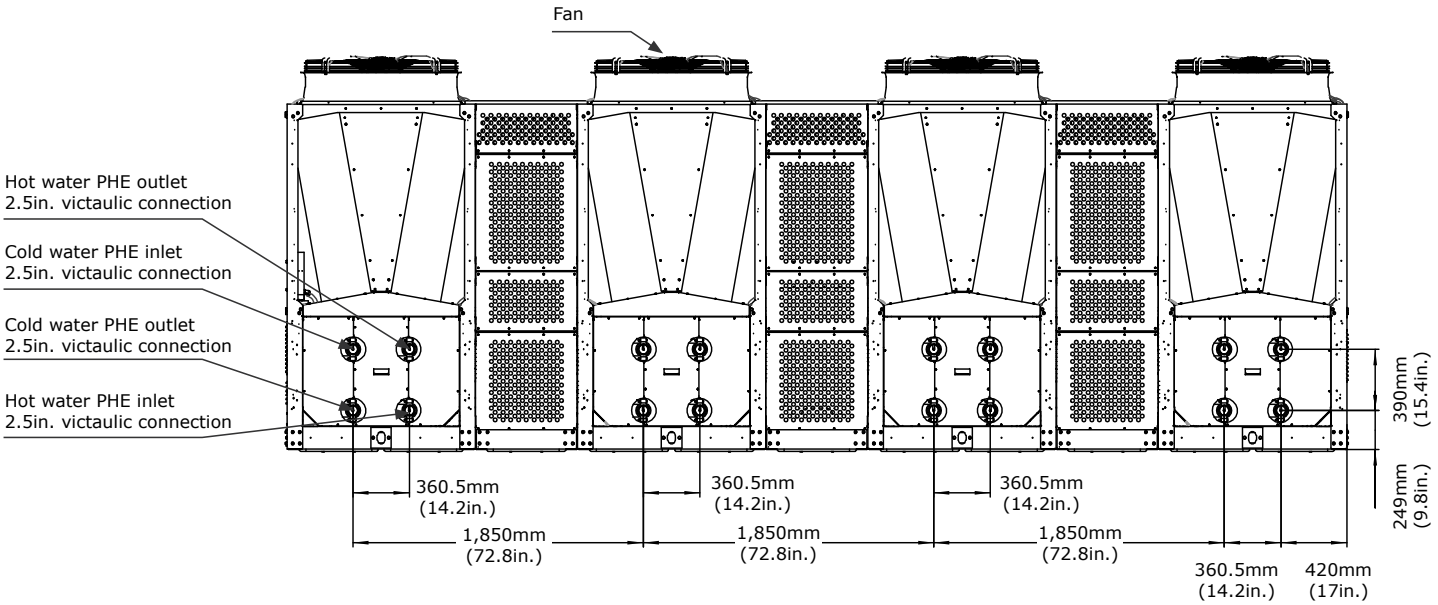
Drawings not to scale.

QTH10140PJP two-pipe modular array
QTH10140PJS four-pipe modular array

Piping connection side (QTH1 two-pipe unit)

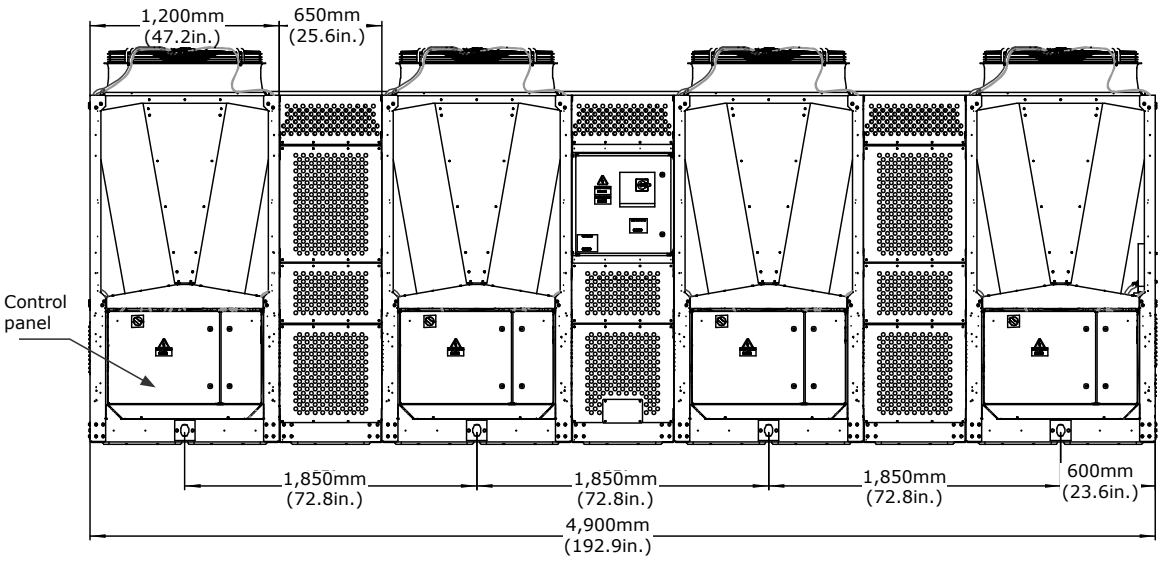


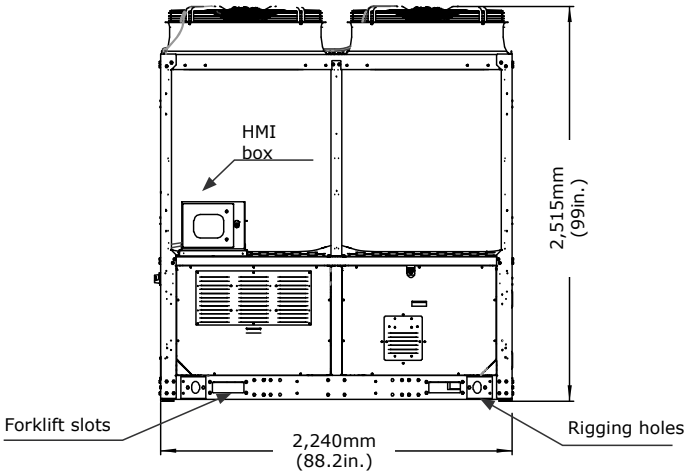
Piping connection side (QTH1 four-pipe unit)



Drawings not to scale.

Control panel side (QTH1 two-pipe / four-pipe unit)





Drawings not to scale.

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Today, with a global team of 100,000 experts in more than 150 countries, Johnson Controls offers the world's largest portfolio of building technology and software as well as service solutions from some of the most trusted names in the industry.

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