Installation, Operation, and Maintenance

Modular Domestic Hot Water Heat Pump Array

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

July 2025

DHWHP-SVX004A-EN

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/ sleeves, butyl gloves, safety glasses, hard hat/ bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

⚠ WARNING

Cancer and Reproductive Harm!

This product can expose you to chemicals including lead and bisphenol A (BPA), which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

⚠ WARNING

Explosion Hazard!

Failure to follow instructions below could result in death or serious injury from explosion due to oxygen reacting violently with oil.

Do not use oxygen to purge or pressurize system for leak test.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury.

Before performing any service, turn off power to the water heater and label all wires prior to disconnecting. Wiring errors can cause improper and dangerous operation.

⚠ WARNING

Burn Hazard!

Water temperature over 125°F (52°C) can cause severe burns instantly resulting in death or serious injury.

- **Always feel water temperature before bathing or showering.**
- **Install temperature-limiting devices like mixing valves when required by orders for safe water temperatures at fixtures.**

⚠ WARNING

Explosion Hazard!

Failure to follow instructions below could result in death or serious injury due to water tank explosion from overheated water.

Install properly sized temperature and pressure relief valve in the opening provided on connected storage tanks.

Copyright

Trademarks

All trademarks referenced in this document are the trademarks of their respective owners.

Table of Contents

General Description

Purpose

Water source modular units are arrays of individual water-to-water Commercial Heat Pump Water Heaters (CHPWHs) using R513A refrigerant in closed and factory charged circuits. Each module uses a double wall heat exchanger to provide heat to a potable water circuit. Potable water is piped to the heat pump array in a loop to and from external storage tanks. Circulation is provided by the integral circulators in the heat pump modules. A single wall heat exchanger in each module extracts heat from a source water loop, such as a ground loop or condenser loop.

Usage

Water heaters are designed to provide hot water in a single-pass or a multi-pass configuration, determined when the unit is ordered.

In a single-pass configuration, water is delivered at full usable temperature to the potable storage tank in one pass. This allows for faster recovery of usable water temperatures than in traditional multi-pass configurations. This system is not an on-demand heater and does require external and stratified storage to operate effectively. Building recirculation loops must be returned to a separate swing tank to preserve this stratification.

Multi-pass units do not require swing tanks, and recirculate water to and from primary storage, raising the water several degrees with each pass. This requires larger primary storage tanks but can be more appropriate in some retrofit applications, especially for part-load heat pump contributions.

Flexible Installation

The enclosure is designed to minimize its footprint, and to simplify placement considerations. As a monobloc" style heat pump, the unit arrives ready to connect to electrical, condensate, source water loops, and potable water infrastructure in the field.

It features integral load side circulators, water temperature control valves, and double wall heat exchangers for direct piped domestic hot water, with left side or right side mounting options for primary power and/or onboard control panel locations, depending on options selected at order.

Controls and Electrical

The modular water source line is available in 208-230 and 440-480, and 575v 3-phase variants with a single point power connection. All R513A heat pumps feature an SCCR rating of 100.

All units are Modbus and BACnet® capable using the BMS Gateway accessory option, ready to be integrated into BMS systems by 3rd party integrators using Bacnet/IP and MSTP protocols.

All R513A units are certified to UL/CSA 60335-2-1 and -40. Power Distribution Centers (PDCs) or Main Power and Control Panels (MPCPs) mounted on the array are rated to UL508A.

For More Information

Please refer to the Performance Specifications for appropriate operating ranges and requirements.

Performance Specifications and Requirements

Table 1. Modular performance specifications

Performance Specifications	540WM		810WM		1080WM		1350WM	
	Single-pass	Multi-pass	Single-pass	Multi-pass	Single-pass	Multi-pass	Single-pass	Multi-pass
Nominal DOE Capacity[a]	557,600 BTUs/hr.		836,400 BTUs/hr.		1,115,200 BTUs/hr.		1,394,000 BTUs/hr.	
Nominal DOE Performance[a]	4.1 COP		4.1 COP		4.1 COP		4.1 COP	
Recovery Rate[b]	1328 Gal./hr.		1991 Gal./hr.		2655 Gal./hr.		3319 Gal./hr.	
Min. Ambient Exposure	33 Deg F		33 Deg F		33 Deg F		33 Deg F	
DHW Loop								
Max Water Pressure	150 psig							
Outlet Operating Range[c]	100 - 160 Deg F		100 - 160 Deg F		100 - 160 Deg F		100 - 160 Deg F	
Inlet Operating Range	40 - 115	40 - 140	40 - 115	40 - 140	40 - 115	40 - 140	40 - 115	40 - 140
Design Flow Rate	44.0 GPM	72.0 GPM	66.0 GPM	108.0 GPM	88.0 GPM	144.0 GPM	110.0 GPM	180.0 GPM
Water Circuit Pressure Drop [d]	16.9 Ft. Hd.	7.4 Ft. Hd.	16.9 Ft. Hd.	7.4 Ft. Hd.	16.9 Ft. Hd.	7.4 Ft. Hd.	16.9 Ft. Hd.	7.4 Ft. Hd.
Heat Pump Cv Value[d]	8	20	8	20	8	20	8	20
DHW External Head Allowance[e]	19.5 Ft. Hd.	18.7 Ft. Hd.	19.5 Ft. Hd.	18.7 Ft. Hd.	19.5 Ft. Hd.	18.7 Ft. Hd.	19.5 Ft. Hd.	18.7 Ft. Hd.
Min. Cold Cycle Volume[f]	119 Gal.							
Min. Warm Cycle Volume[g]	N/A	334 Gal.	N/A	334 Gal.	N/A	334 Gal.	N/A	334 Gal.
Min. Tank Volume[h]	N/A	835 Gal.	N/A	835 Gal.	N/A	835 Gal.	N/A	835 Gal.
Source Loop								
Max Water Pressure	300 psig							
Source Water Operating Range	35 - 120 Deg F							
Design Flow Rate	96 GPM		144 GPM		192 GPM		240 GPM	
Water Circuit Pressure Drop 4	11.11 Ft. Hd.							
Heat Pump Cv Value 4	22							
Miscellaneous								
Certifications	UL60335-1, UL60335-2-40, CSA C22.2 60335-1, CSA 60335-2-40 (LC16116-1)							

[a] Nominal heating performance is 100% water source at 80 Deg F, DHW 120 Deg. F. LWT and 70 Deg. F. EWT.
[b] Recovery Rate is at nominal heating performance condition producing 120 degree water.
[c] Maximum LWT not available at all source conditions. See max LWT graph.
[d] Heat Pump pressure drop and Cv value are for external pump applications at design flow rate.
[e] Piping pressure drop allowed by integral circulator in the heat pump.
[f] Cold Cycle volume is the volume below the cold trigger sensor. Cold in water over 70 Deg F will need more volume.
[g] Warm Cycle volume is the volume of water below the warm/recirc trigger sensor.
[h] Tank volume is based on individual project demands, but cannot be lower than this minimum value in any case.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in performance degradation or equipment damage.

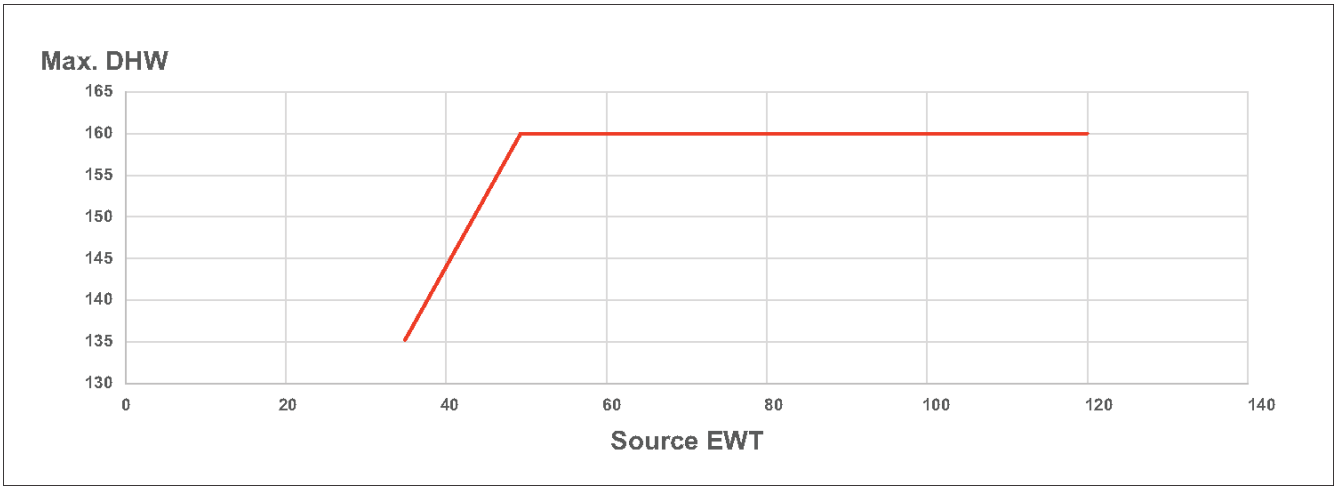
- **Do not install heat pumps such that they would need to be operated in conditions outside of their performance specifications.**
- **Do not install water source heat pumps in conditions that may freeze.**

Expanded Performance Data

Table 2. Modular single-pass performance: (50° EWT, 140° LWT, 100% water source side)

Unit Size	Entering Source Water	Supply Heating Capacity (Btu/hr)	Source Cooling Capacity (Btu/hr)	Power Input (kW)	Heating COP	Cooling COP	Combined COP
T540	90°F	560,800	407,260	45	3.7	2.7	6.3
	80°F	507,300	357,172	44.0	3.4	2.4	5.8
	70°F	453,800	307,084	43	3.1	2.1	5.2
	60°F	401,300	259,020	41.7	2.8	1.8	4.6
	50°F	348,800	210,955	40.4	2.5	1.5	4.1
	40°F	304,400	174,062	38.2	2.3	1.3	3.7
T810	90°F	841,200	610,890	67.5	3.7	2.7	6.3
	80°F	760,900	535,708	66.0	3.4	2.4	5.8
	70°F	680,700	460,626	64.5	3.1	2.1	5.2
	60°F	601,900	388,479	62.6	2.8	1.8	4.6
	50°F	523,200	316,433	60.6	2.5	1.5	4.1
	40°F	456,600	261,092	57.3	2.3	1.3	3.7
T1080	90°F	1,121,600	814,520	90	3.7	2.7	6.3
	80°F	1,014,600	714,344	88.0	3.4	2.4	5.8
	70°F	907,600	614,168	86	3.1	2.1	5.2
	60°F	802,600	518,039	83.4	2.8	1.8	4.6
	50°F	697,600	421,910	80.8	2.5	1.5	4.1
	40°F	608,800	348,123	76.4	2.3	1.3	3.7
T1350	90°F	1,402,000	1,018,150	112.5	3.7	2.7	6.3
	80°F	1,268,200	892,880	110.0	3.4	2.4	5.8
	70°F	1,134,500	767,710	107.5	3.1	2.1	5.2
	60°F	1,003,200	647,499	104.3	2.8	1.8	4.6
	50°F	872,000	527,388	101	2.5	1.5	4.1
	40°F	761,000	435,154	95.5	2.3	1.3	3.7

Figure 1. Modular water source heat pumps – maximum source EWT - maximum DHW



Note: *Maximum source EWT: 120° F*

Table 3. Modular multi-pass performance (140° ELWT, design GPM, 100% water source side)

Unit Size	Entering Source Water	Supply Heating Capacity (Btu/hr)	Source Cooling Capacity (Btu/hr)	Power Input (kW)	Heating COP	Cool-ing COP	Combined COP
T540	110°F	672,000	504,130	49.2	4.0	3.0	7.0
	90°F	612,000	444,130	49.2	3.6	2.6	6.3
	70°F	460,000	296,224	48.0	2.8	1.8	4.6
	50°F	356,000	196,318	46.8	2.2	1.2	3.5
	35°F	298,000	145,142	44.8	1.9	0.9	2.9
T810	110°F	1,008,000	756,194	73.8	4.0	3.0	7.0
	90°F	918,000	666,194	73.8	3.6	2.6	6.3
	70°F	690,000	444,336	72.0	2.8	1.8	4.6
	50°F	534,000	294,478	70.2	2.2	1.2	3.5
	35°F	447,000	217,714	67.2	1.9	0.9	2.9
T1080	110°F	1,344,000	1,008,259	98.4	4.0	3.0	7.0
	90°F	1,224,000	888,259	98.4	3.6	2.6	6.3
	70°F	920,000	592,448	96.0	2.8	1.8	4.6
	50°F	712,000	392,637	93.6	2.2	1.2	3.5
	35°F	596,000	290,285	89.6	1.9	0.9	2.9
T1350	110°F	1,680,000	1,260,324	123.0	4.0	3.0	7.0
	90°F	1,530,000	1,110,324	123.0	3.6	2.6	6.3
	70°F	1,150,000	740,560	120.0	2.8	1.8	4.6
	50°F	890,000	490,796	117.0	2.2	1.2	3.5
	35°F	745,000	362,856	112.0	1.9	0.9	2.9

Table 4. Modular high temperature performance data (160° EWT, 175 LWT, 100% water source side)

Unit Size	540WM	810WM	1080WM	1350WM
Entering Source Water Range	90 – 104°F			
Source Design GPM	120	180	240	300
Load Design GPM	78	117	156	195
Supply Heating Capacity (Btu/hr)	582,800	874,200	1,165,600	1,457,000
Source Cooing Capacity (Btu/hr)	356,243	534,365	712,486	890,608
Power Input (kW)	66.4	99.6	132.8	166
Heating COP	2.6			
Cooling COP	1.6			
Combined COP	4.1			

Electrical Specifications

Table 5. Modular electrical specifications

Unit Size	Main Power Input	208-230/3/60	460/3/60	575/3/60
T540	Minimum Circuit Ampacity (MCA)	196	99	68
	Minimum Overcurrent Protection (MOCP)	275	125	90
	Rated Load Amps (RLA)	168	86	61
	Short Circuit Current Rating (SCCR)	100		
	Internal Component Data			
	Compressor Locked Rotor Amps (LRA)	605	272	238
	Compressor Horsepower (HP)	25		
T810	Minimum Circuit Ampacity (MCA)	283	143	98
	Minimum Overcurrent Protection (MOCP)	350	175	125
	Rated Load Amps (RLA)	263	133	91
	Short Circuit Current Rating (SCCR)	100		
	Internal Component Data			
	Compressor Locked Rotor Amps (LRA)	605	272	238
	Compressor Horsepower (HP)	25		
T1080	Minimum Circuit Ampacity (MCA)	370	187	128
	Minimum Overcurrent Protection (MOCP)	450	225	150
	Rated Load Amps (RLA)	350	177	121
	Short Circuit Current Rating (SCCR)	100		
	Internal Component Data			
	Compressor Locked Rotor Amps (LRA)	605	272	238
	Compressor Horsepower (HP)	25		

Table 5. Modular electrical specifications (continued)

Unit Size	Main Power Input	208-230/3/60	460/3/60	575/3/60
T1350	Minimum Circuit Ampacity (MCA)	N/A	232	158
	Minimum Overcurrent Protection (MOCP)	N/A	250	175
	Rated Load Amps (RLA)	N/A	221	151
	Short Circuit Current Rating (SCCR)	N/A	100	
	Internal Component Data			
	Compressor Locked Rotor Amps (LRA)	N/A	272	238
	Compressor Horsepower (HP)	N/A	25	

Physical Specifications and Clearances

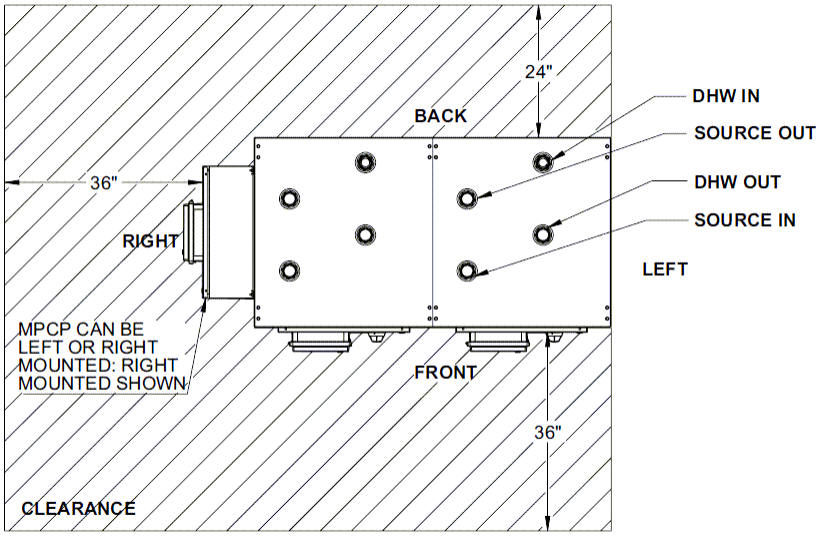
Table 6. Modular physical specifications

Unit Size	Physical Specification	
C540	Domestic Water Connections	2–in FPT x 4
	Source Water Connections	2–in FPT x 4
	Internal DHW Water Volume (Gal.)	9.5
	Internal Source Water Volume (Gal.)	0.8
	Dimensions (in.)	77-3/24–in L x 39–in D x 74-1/4–in H
	Weight (lbs.)	2342 Dry / 2421 Operating
	Compressor Type	Scroll
	Refrigerant	R513A
	Factory Charge	38.5 x 2
	Oil Charge (Initial/Recharge - Ozs.)	230/220 x 2
	Salt Spray Resistance Cabinet/Evap (Hrs.)	1000
C810	Domestic Water Connections	2–in FPT x 6
	Source Water Connections	2–in FPT x 6
	Internal DHW Water Volume (Gal.)	14.2
	Internal Source Water Volume (Gal.)	1.2
	Dimensions (in.)	110-1/8–in L x 39-1/4–in D x 74-1/4–in H
	Weight (lbs.)	3440 Dry / 3559 Operating
	Compressor Type	Scroll
	Refrigerant	R513A
	Factory Charge	38.5 x 3
	Oil Charge (Initial/Recharge - Ozs.)	230/220 x 3
	Salt Spray Resistance Cabinet/Evap (Hrs.)	1000
C1080	Domestic Water Connections	2–in FPT x 8
	Source Water Connections	2–in FPT x 8
	Internal DHW Water Volume (Gal.)	18.9
	Internal Source Water Volume (Gal.)	1.6
	Dimensions (in.)	142-1/2–in L x 39-1/4–in D x 74-1/4–in H
	Weight (lbs.)	4542 Dry / 4700 Operating
	Compressor Type	Scroll
	Refrigerant	R513A
	Factory Charge	38.5 x 4
	Oil Charge (Initial/Recharge - Ozs.)	230/220 x 4
	Salt Spray Resistance Cabinet/Evap (Hrs.)	1000

Table 6. Modular physical specifications (continued)

Unit Size	Physical Specification	
C1350	Domestic Water Connections	2–in FPT x 10
	Source Water Connections	2–in FPT x 10
	Internal DHW Water Volume (Gal.)	23.6
	Internal Source Water Volume (Gal.)	2.0
	Dimensions (in.)	174-3/4–in L x 39–in D x 74-1/4–in H
	Weight (lbs.)	5650 Dry / 5848 Operating
	Compressor Type	Scroll
	Refrigerant	R513A
	Factory Charge	38.5 x 5
	Oil Charge (Initial/Recharge - Ozs.)	230/220 x 5
	Salt Spray Resistance Cabinet/Evap (Hrs.)	1000

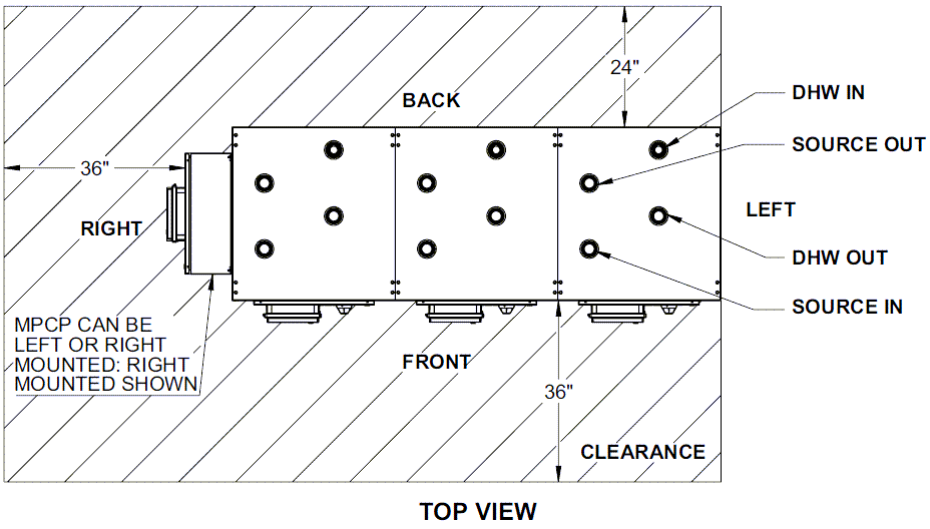
Figure 2. T540 modular water connections and required clearances



TOP VIEW

Note: *If vibration transmission and/or seismic activity is a concern for your installation, account for the additional height of vibration isolation or seismic measures as recommended by a qualified engineer.*

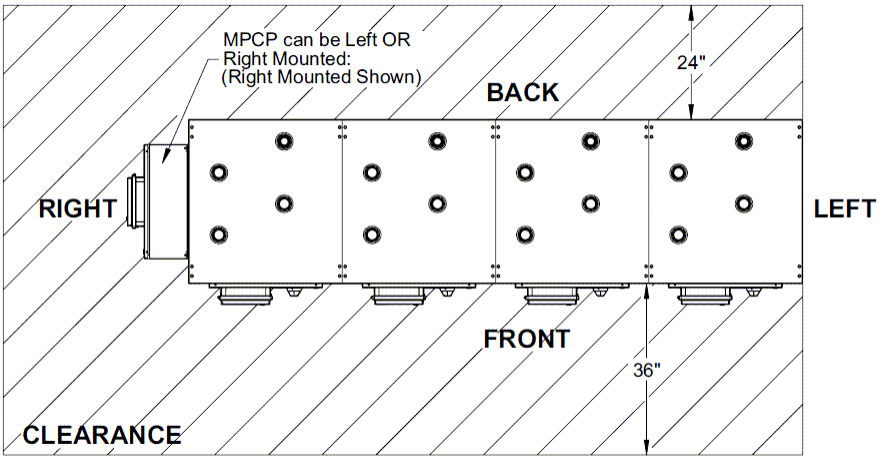
Figure 3. T810 modular water connections and required clearances



TOP VIEW

Note: *If vibration transmission and/or seismic activity is a concern for your installation, account for the additional height of vibration isolation or seismic measures as recommended by a qualified engineer.*

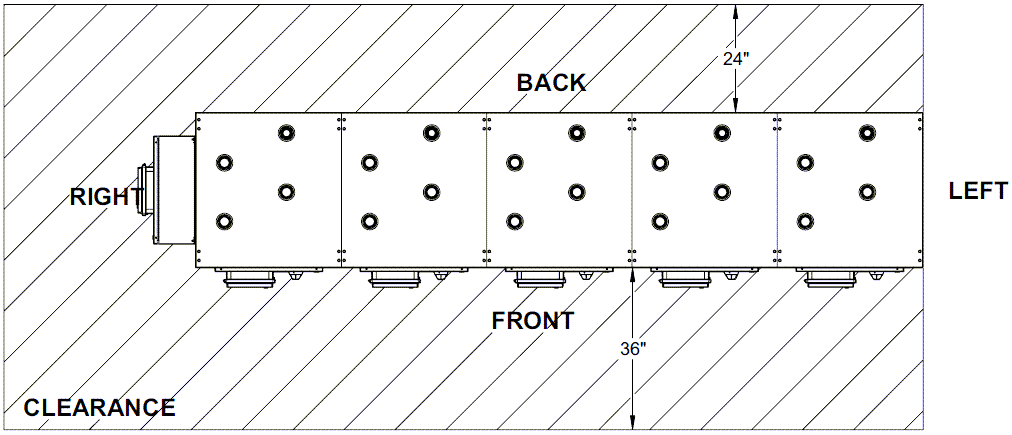
Figure 4. T1080 modular water connections and required clearances



TOP VIEW

Note: *If vibration transmission and/or seismic activity is a concern for your installation, account for the additional height of vibration isolation or seismic measures as recommended by a qualified engineer.*

Figure 5. T1350 modular water connections and required clearances



TOP VIEW

Note: *If vibration transmission and/or seismic activity is a concern for your installation, account for the additional height of vibration isolation or seismic measures as recommended by a qualified engineer.*

Pre-Order Checklist

- ☐ Thoroughly review this manual and become familiar with the equipment's installation requirements. The manual has been organized to follow the general sequence of most installations. If any details are not clear or questions are not answered contact your sales representative to resolve them ahead of time.
- ☐ Review performance specifications against the intended installed environment and water temperature requirements, and confirm the unit will perform appropriately for the conditions. Confirm all options and accessories are correct and appropriate.
- ☐ Review physical specifications to confirm the unit will have adequate installation space, support, and clearances, become familiar with piping and wiring connections to confirm all attached infrastructure will be able to access the unit.
- ☐ Evaluate the need for backup heat production, especially in applications with colder source water. Units without antifreeze additives in their source water should not be run below 45°F. inlet source water temperatures.
- ☐ Develop a plan to deliver, transport, mount, and secure the unit.
- ☐ Double check the voltage requirements of the unit, to confirm it is compatible with the available voltage on site.
- ☐ Double check the intended piping configuration for the project (single-pass or multi-pass) and confirm the correct model is ordered for the application.
- ☐ Water-to-Water heat pumps are multidisciplinary installations that may require any or all of the following trade specialties to support: site prep/structural, electrical, plumbing, automation/controls, and refrigeration. Confirm that various specialties involved in the project are well informed as to their role in the installation and are properly certified and qualified in their specialties in accordance with all governing codes and regulations.
- ☐ Confirm that qualified refrigeration technicians are available for installation troubleshooting support and ongoing system maintenance. If this is in question, contact your local sales representative to discuss support options.

Exterior Installation Considerations

Water source units are intended for indoor installation. It is possible to install them outdoors in mild climates, however, on-board freeze protection is limited. If the unit detects a freeze risk on its water lines, it will operate its pump. This requires the unit to be powered up, to have free flow through the connecting pipes, and it will not be sufficient protection against deep cold exposure. On the source loop side, the heat pump will trigger its pump contacts as a normal demand would to enable flow. However if external flow control devices are not operational, there is no other form of freeze protection on the source side of the unit. Glycol antifreeze for the source side is the best practice for exterior installations in all cases.

This heat pump must be shut down and drained prior to any exposure to temperatures significantly below freezing. Since most climates can experience temperatures that deviate well below typical annual norms, the manufacturer does not recommend installing its water source units outside and provides no warranty against freeze damage that may occur in outdoor installations.

Unit Diagram

Figure 6. Individual module

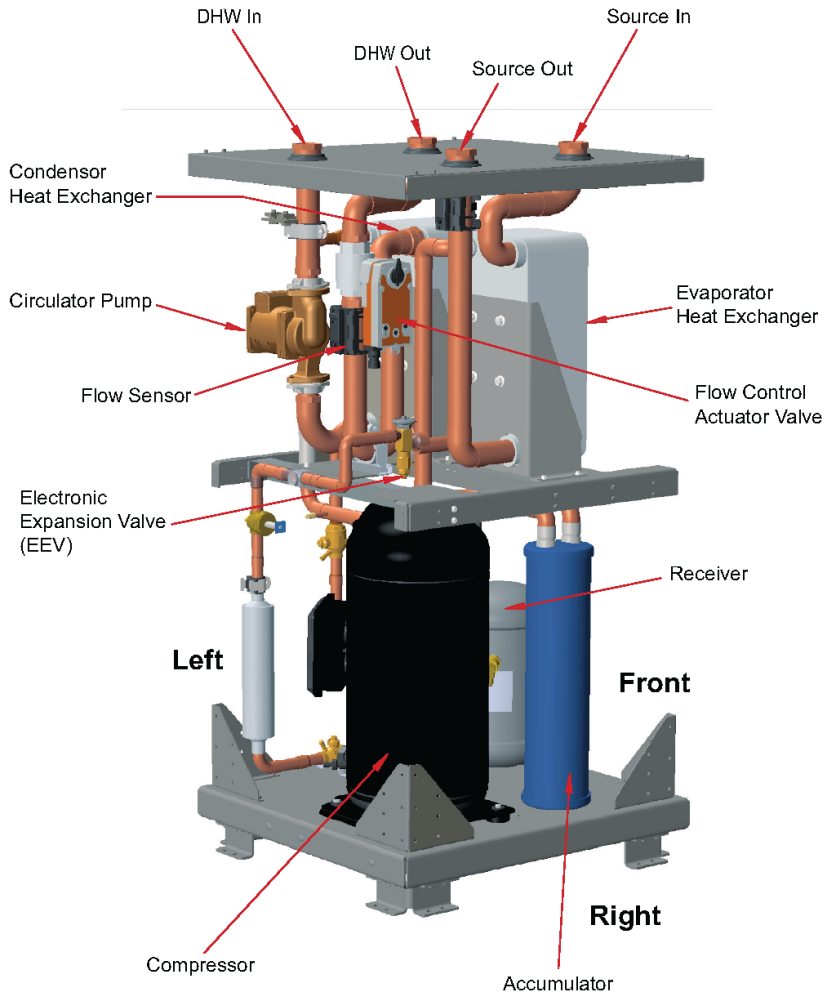
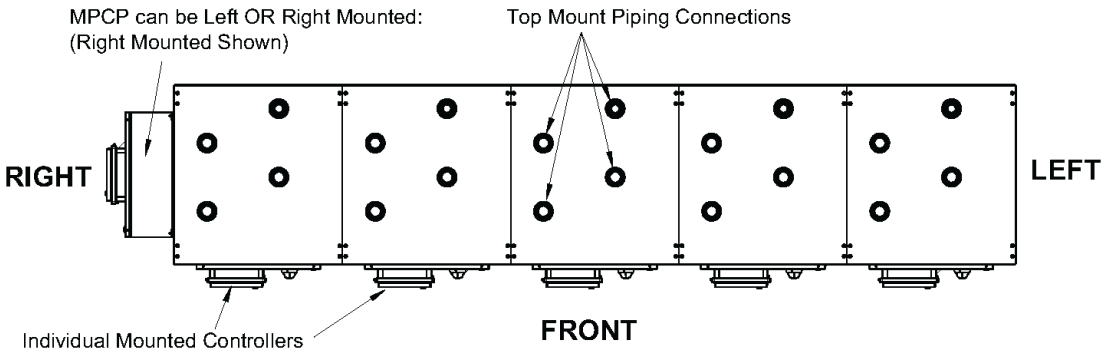


Figure 7. T1350 modular unit



Installation

Required Tools and Materials

In addition to the standard tools and material required for any electrical or plumbing installation, specialty tools required to support this installation include:

- Heat transfer compound such as Honeywell part number 107408 or equivalent.
- Electrical switch lock out devices - used to secure disconnect switches/breaker panels while servicing.
- Electronic thermometer with range of 10°F - 210°F (-12°C - 100°C) including:
  - Sensors capable of measuring surface temperatures on water or refrigerant piping
  - Sensors capable of measuring ambient air temperature
- Volt-ohm multimeter - capable of measuring
  - AC voltage up to 600 VAC
  - DC voltage up to 24 VDC
  - Ohms up to 2,000,000 ohms
  - Continuity
  - Amperage up to 200 amps

Rough-in Checklist

Infrastructure must sometimes be installed prior to the installation of the unit. Items to consider for rough-in installation include:

☐ Potable water pipes to and from storage tanks, including pipe insulation and heat tracing as necessary.

☐ Primary power wiring.

☐ Control wiring for alarms, BMS interface, and external accessories. The manufacturer recommends running a minimum of one 18/12 control wire and a CAT- 5e/6 wire to confirm that all likely accessories and control functions can be used.

☐ Site prep for mounting the heat pump.

Note: *Refer to the appropriate sections of this manual for the specific details associated with each item.*

Transportation, Placement, Mounting

Important: *Do not remove, cover, or deface any permanent instructions, wiring diagrams, labels, or the rating labels present on the unit. These are important for installation and service.*

When Transporting the Heat Pump

1. Review the physical specifications of the heat pump to confirm equipment used and delivery route is appropriate for the size and weight of the unit.
2. Do not tilt the unit beyond 45 degrees at any time. Prior to fully hoisting the unit, perform a test lift to be certain the unit remains level and balanced at its center of gravity.
3. Do not hoist the unit with chains or straps unless spreader bars are furnished and used as depicted in Figure 8, p. 18. The side panels and roof of the unit are not constructed to handle significant force from the sides or above. Follow all standards and best practices for hoisting and load stabilization.
4. When using a forklift to raise or move the heat pump, take care not to damage the feet on the unit. Follow all standards and best practices for lifting and load stabilization.

Figure 8. Rigging and hoisting unit

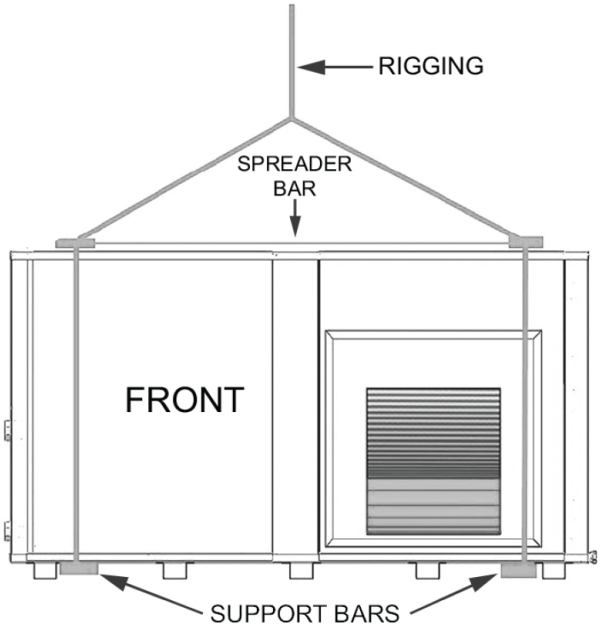


Figure 9. Rigging and hoisting unit — side view

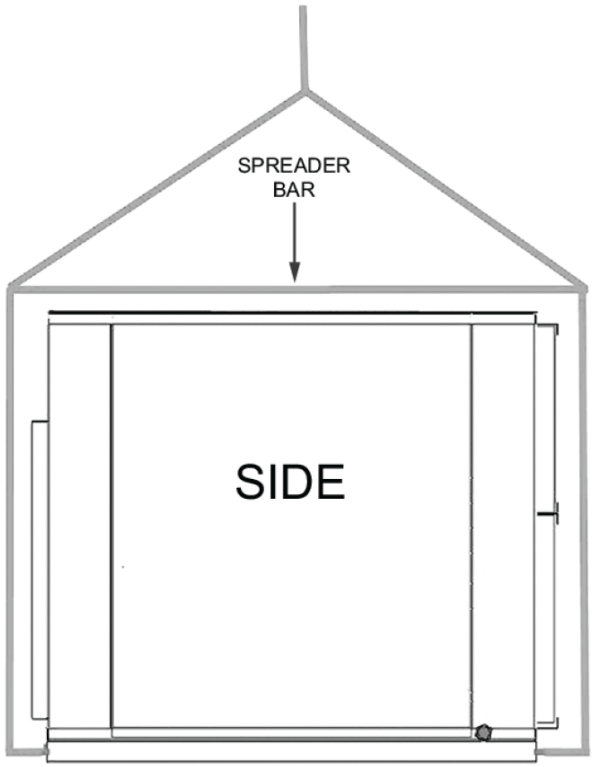
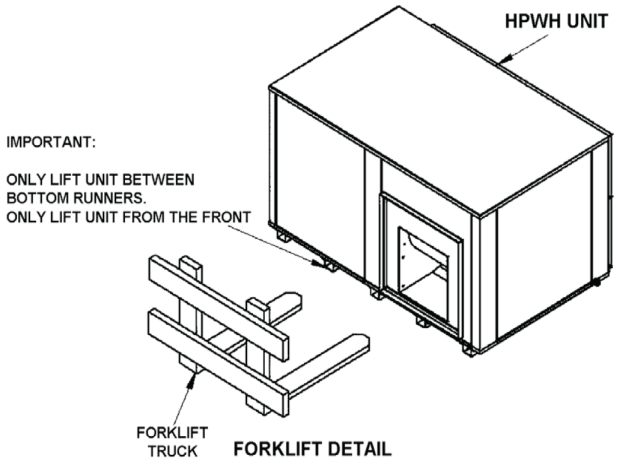


Figure 10. Lifting and moving unit with forklift



Placement Considerations for the heat pump

- Confirm the location meets all requirements for ambient temperature, structural support, unit dimensions, operational and service clearances.
- Mounting location must be level and stable.
- Unit location should be easily accessible for visual inspection and for regular service. Placement should allow for possible heat pump removal/replacement in the future.
- Unit Location should be interior, protected space. Exterior locations are possible in very mild climates that do not experience freezing conditions, but they are not recommended See “Exterior Installation Considerations,” p. 16 for additional notes on exterior installations.
- Unit location should minimize the risk of water damage in the event of leaks or drainage failure.
- Location of unit should be determined with consideration of operating sound and potential vibration on the surroundings and to avoid these impacts where possible.

Mounting the Heat Pump

The heat pump must be mounted on a solid, level base, typically a concrete pad. Unit should be bolted securely to the base using the supplied attachment points. If the base is not level, then the heat pump itself must be leveled to ensure proper condensate drainage and mounting stability.

Mounting the unit on elevated rails is also possible. Complete structural requirements for rails are beyond the scope of this manual: however, required rail positions and minimum rail widths are specified in Figure 8, p. 18, which will properly support the internal structure of the heat pump.

Seismic Mounting

Local area seismic or vibration considerations should be addressed with field supplied, additional equipment as per applicable codes, regulations, and best practice. Seismic mounts and vibration control measures should be evaluated and determined by a qualified engineer.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage due to excessive vibration.
After placing the heat pump, confirm that the unit is level front to rear and side to side.

Water Quality

Water quality is an important concern for human health and well being. Confirm DHW supply water is clean and meets all applicable standards for potable water consumption. In addition, water quality can affect longevity and performance of the heat pump water heater on both DHW and source sides of the system. Confirm system water meets, or is treated to meet, the specifications in the table of water quality guidelines in this manual.

⚠ CAUTION

Risk of Illness!

Failure to follow instructions below could result in illness.

Use only components and joining methods suitable for potable water usage and for temperatures in excess of 175 °F on the DHW piping circuit. Use only pure water or food grade additives within the DHW circuit on the heat pump. Any other additives or contaminants in the water circuit can make it unusable for domestic water heating.

Table 7. Water quality specifications

Element	MG/l or ppm
Alkalinity	70-300
Sulfate	<70
HCO3/SO4	>1
Conductivity	10-500 µS/cm
pH	7.5-10
Ammonium	<2
Chlorides	<100
Free Chlorine	<1
Hydrogen Sulfide	<0.05
Free CO2	<5
Total Hardness	60-120
Nitrate	<100
Iron	<0.2
Aluminum	<0.2
Manganese	<0.1

Water Piping — DHW Loop

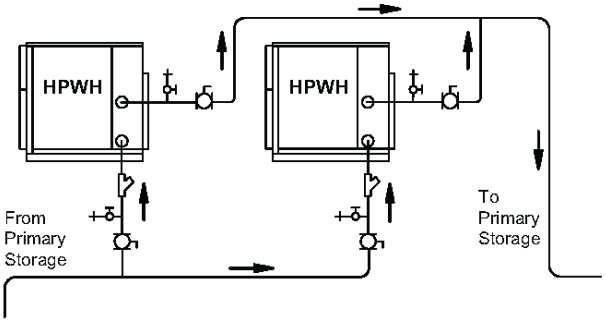
Heat pump water heaters are designed to be piped to tank water storage in either a single-pass configuration or a multi-pass configuration, depending on the unit that was ordered. These units significantly differ in their operation and are not interchangeable. Confirm the operation methods before ordering the heat pump.

Heat pump water heaters always require storage tanks and are not instantaneous water heaters.

Piping Consideration

All modular heat pumps require piping to each module in the array. Heat pump modules should always be piped in parallel to each other, but do not require reverse-return piping, check valves, or solenoids on their branch piping to the common header, as internal shutoffs and circulators are included.

Figure 11. Piping considerations



Important: *This drawing shows suggested piping configuration and other devices. Check with local codes and ordinances for additional requirements.*

Piping Considerations

Check Valves — All heat pumps have internal control valves that can be configured to be open or closed when the unit is off. External check valves are not necessary on heat pump piping. Single-pass units, which can modulate flow to vary flow velocities, cannot use check valves on the heat pump supply or return piping.

Pipe Sizing and Care — All connected piping must be sized for the design flow rates, appropriate velocity, and available head pressure for the heat pump in use. Refer to the performance specifications for this information. Confirm that pipes are clean and protected from intrusion of dirt or other contaminants during the installation.

Pressure Testing and Purging — All connected pipes and components should be pressure tested with air before filling with water. A thorough fill and purge process is required to remove any air bubbles from the lines before starting up the unit. Failure to purge piping of air bubbles can damage the internal circulator. Install purge valves in the connected piping to facilitate this process.

Tank Selection — Temperature stratification is necessary to the proper operation of single-pass systems, and usable volume is very important for multi-pass systems. For optimal system operation, vertical tanks are preferred for commercial heat pump domestic water heating systems, as they typically maintain usable volumes and stratification better than horizontal tanks.

⚠ WARNING

Risk of Expansion!

Failure to properly accommodate expansion could result in equipment failure, nuisance callbacks, injury, or death.

All hot water systems require accommodation for fluid expansion when heated. Confirm the expansion devices such as expansion tanks or compression tanks are specified and sized by a qualified engineer. T and P valves are required on primary storage tanks and are sized for the total maximum BTU capacity of all attached heat sources.

⚠ WARNING

Burn Hazard!

Failure to follow instructions below could result in scalding injuries or death.

Commercial water heating is typically done at storage temperatures that are dangerous for human contact. Per manufacturer's recommendation, all water heating systems must install mechanical temperature limiting devices, such as tempering valves, between storage volumes and the building's plumbing fixtures.

Typical Water Piping Process

1. Rough-in any pipe/insulation/heat trace in areas that will not be accessible or traversable during the final installation. 2.
2. Install all water piping and components.
3. Pressure test the water side components with air to a pressure less than 150 PSI or the pressure rating on the storage tank pressure relief valves. The manufacturer recommends testing to 80-100 PSI or 1.25x the standing pressure of the system, whichever is higher, for a minimum of two continuous hours.
4. Find and rectify any leaks.
5. Install heat tracing and pipe insulation after the piping is determined airtight.

Note: *This may require a standalone pressure test of rough-in piping so insulation and heat tracing can rough-in with the pipes.*

6. Isolate the building piping from the heat pumps and storage, then use purge valves to fill the heat pump and storage system.
7. Purge lines by continuing to fill through isolated flow paths until fill water exits a far point drain valve in a clean and continuous stream without stuttering or foaming.
8. After the system has operated for 24 hours incluing several heat/cool cycles of the heat pump, perform a final check for water leaks.

Single-pass with Swing in Series Piping

Single-pass units deliver water at a variable flow rate, at a fixed temperature, to the top of a stratified temperature storage tank. Water is pulled from the cold, bottom portion of the tank. Flow rates through the heat pump will vary depending on inlet water temperature, outlet target water temperature, and ambient temperature.

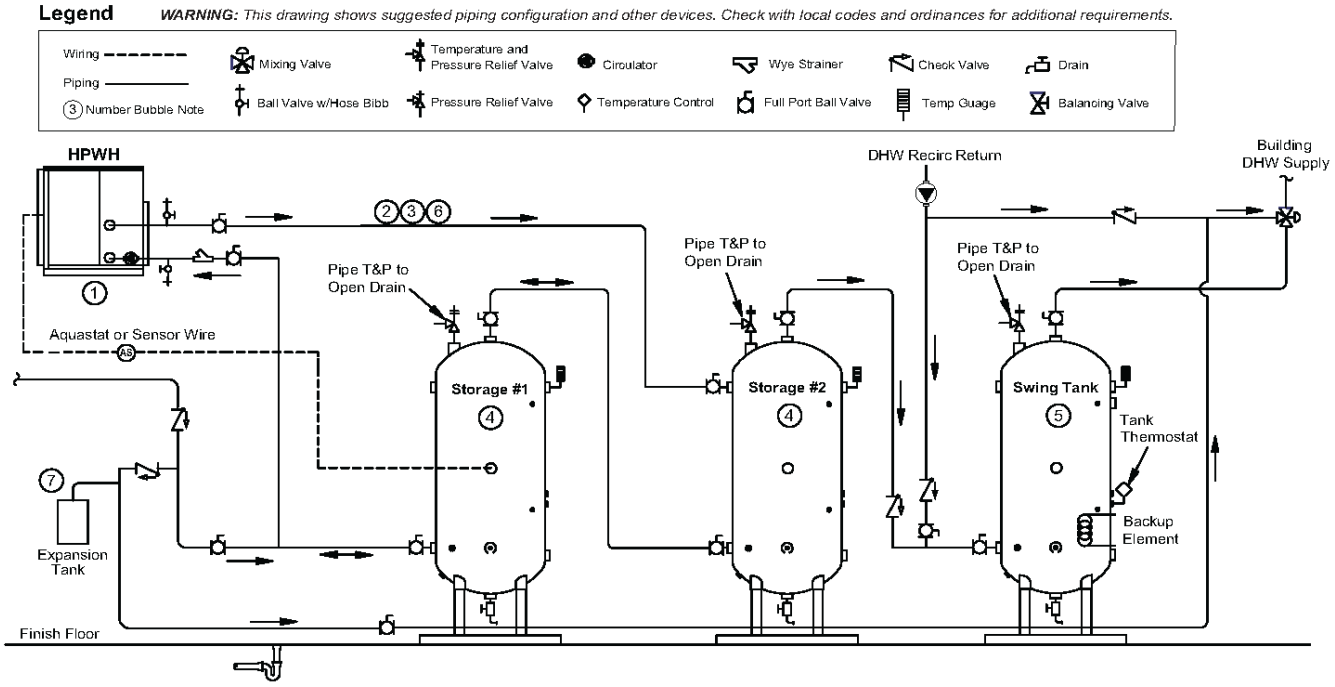
To maintain stratification in the primary storage tank, as well as minimum temperature rise requirements at the heat pump, circulating loops from other sources, such as building recirculation loops or boiler backup heat, must be handled with a separate swing tank, which is fed by the heat pump storage tank in series during domestic hot water demands.

Important: *Recirculation loops are NOT returned to the primary storage in single-pass systems.*

The swing tank is heated by a secondary heat source to handle recirculation losses when demands are not present and can provide a convenient way to provide backup heat to the system as well. Swing tanks are typically kept at a slightly lower temperature than the primary storage to maximize the contribution of the heat pump to overall energy demand.

These systems feature the smallest storage and heat pump capacity requirements and are typically the most efficient method as well.

Figure 12. Single-pass piping concept



Notes:

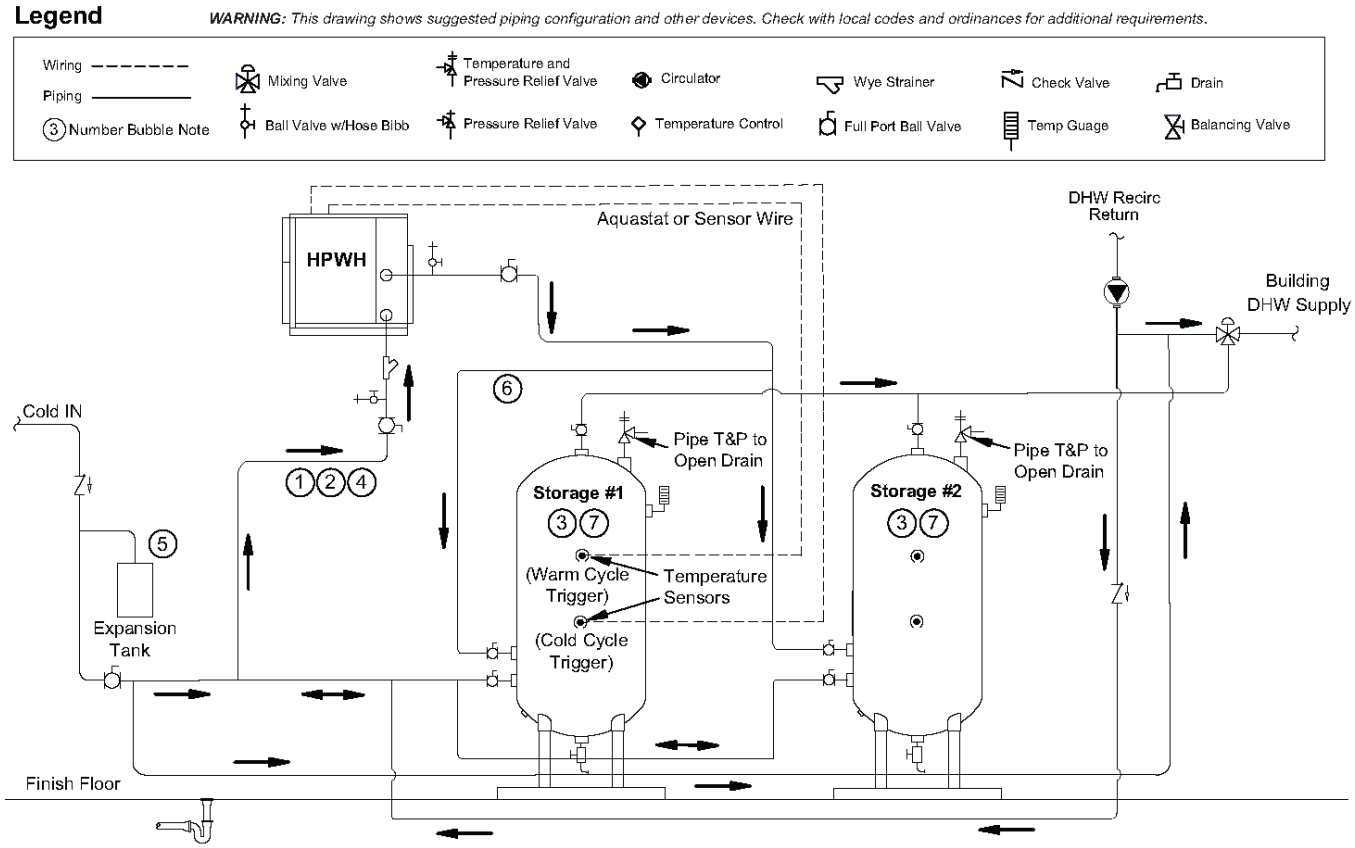
1. *Do Not install check valves to or from single-pass HPWHs.*
2. *All piping between heat pump and storage should be sized for appropriate pressure drops and velocities. Refer to performance specifications for available pressure and flow rate requirements.*
3. *Pump circulation between heat pump and storage tanks is required as a part of freeze protection in some conditions. Any external solenoids or zone valves must be interlocked with the unit to open when the pump is triggered.*
4. *Ensure storage and/or swing tanks are rated for potable usage, have adequate volume for the design, have tappings at required locations, and are approved to handle system flow rates without fitting erosion.*
5. *Swing tank must have backup heat installed sufficient to cover at least the recirc system heat losses. Backup heat can be installed in the tank itself, or piped to it from an external heater.*
6. *Air venting is recommended at the high point of the hot water supply piping from the water heater. Use only air vents suitable for open systems. Ensure the air vent is installed in an interior, protected space.*
7. *Expansion tank must have a direct pipe run with no opposing check valve to the swing tank.*

Multi-pass Piping

Multi-pass units deliver water at a fixed rate, at a variable temperature, with leaving water temps several degrees higher than incoming water temp. These systems do not stratify their tanks, and water is taken from the colder bottom portion and returned slightly higher in the tank, similar to traditional boiler-driven systems. Multi-pass systems do not require swing tanks, and building recirculation will typically return directly to the primary storage tanks. They require significantly more storage and heat pump capacity than single-pass systems, but can be more efficient for systems with large recirculation loads that would otherwise require backup boilers or electric resistance heating.

Multi-pass units can also be used to heat swing tanks in single-pass systems, instead of electric resistance or fossil fuel backup.

Figure 13. Multi-pass piping concept



Notes:

1. *All piping between heat pump and storage should be sized for appropriate pressure drops and velocities. Refer to performance specifications for available pressure and flow rate requirements.*
2. *Pump circulation between heat pump and storage tanks is required as a part of freeze protection in some conditions. Any external solenoids or zone valves must be interlocked with the unit to open when the pump is triggered.*
3. *Ensure storage and/or swing tanks are rated for potable usage, have adequate volume for the design, have tappings at required locations, and are approved to handle system flow rates without fitting erosion.*
4. *Air venting is recommended at the high point of the hot water supply piping from the water heater. Use only air vents suitable for open systems. Ensure the air vent is installed in an interior, protected space.*
5. *Expansion tank must have a direct pipe run with no opposing check valve to the primary storage tanks.*
6. *Multiple storage tanks must be piped reverse-return: first in, last out, with equal branch runs to all units off of a common header with consistent pipe sizing. Do not step down the header pipe after the first tank takeoff. Balancing and isolation valves are also required.*
7. *If multiple tanks are used, a single temp sensor can pick any tank to trigger heating operation. However, the main control panel accessory can be used to add averaging of multiple tank sensors, which is more ideal for multiple, multi-pass tank systems.*

Water Piping — Source Loop

Source water piping is similar to DHW water piping, and requires all the same considerations for water quality, expansion, pipe sizing, pressure testing and purging. Review the “,” section regarding those topics.

Key differences from DHW water piping are described in the following sections.

Glycol and Freeze Protection

Evaporator discharge water can be significantly colder than the source water temperature. In any application that is likely to see source loop temperatures fall below 45°F, an antifreeze additive such as inhibited propylene glycol must be used. The manufacturer recommends targeting a freeze protection rating at least 20° below the coldest inlet temperature or exposure temperature expected for the source loop, whichever is lower. Use only antifreeze products formulated for use in hydronic systems: automotive antifreeze or other such products are not appropriate.

NOTICE

Heat Pump Damage!

Failure to follow instructions below could cause source loops to freeze and result in catastrophic heat pump failure and damage to attached pumps and piping.
DO NOT operate the heat pump on source loops that fall below 45°F without appropriate freeze protection additives.

The source loop design flow rate includes a safety factor appropriate for up to 30% blends of ethylene or propylene glycol: no adjustment to design flow rates are required for glycol mixtures. However, pressure drops through the heat pump are affected in accordance with the following table: use these corrected values instead of the standard design pressure drop for the source loop, if glycol is used in the loop. Greater than 30% concentration of glycol additives requires evaluation by qualified engineers.

Table 8. Source pressure drops for glycol antifreeze

	10% Mix	20% Mix	30% Mix
Propylene Glycol (Ft. Hd.)	10.5	11.8	13.9
Ethylene Glycol (Ft. Hd.)	11.2	12.8	14.9

Non-Potable Applications

Most source loops are not potable water. In non-potable applications, any piping capable of handling the temperature and pressure requirements of the source water loop can be used, without regard for its suitability in potable systems, in accordance with local codes. Careful consideration should be given to plastic pipes that run outdoors that may be exposed to and damaged by UV light.

Pumping and Flow Control

The source side of the water source units do not have integral circulators. Therefore, circulators and control devices are field-supplied and must be sized and controlled appropriately to provide design flow rates for the heat pump. Failure to reach design flow rates can result in lockouts, under-performance, and creates a potential freeze risk in non-glycol systems.

Confirm pumps are sized properly for design flow and pressure drops. heat pumps need individual source loop pumps, or fast-acting control valves to avoid nuisance flow alarm lockouts. The source pump contacts on the heat pump can be used as a control signal for source loop pumps and/or flow controls.

Power Wiring

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

Heat pump water heaters are voltage-specific, and require proper planning to provide the electrical support appropriate to each unit. Refer to “,”, specific product submittals, project documentation and the requirements, and the following installation instructions.

Power Requirements

- Voltage is correct to within +/- 5% of ratings and within +/-2% between phases.
- Power is clean, reliable, and well grounded.
- Wire and breakers are appropriately sized for the load and equal to or larger than wire sizes in the wire specifications below.
- Wire and breakers are properly specified for the environment they are installed in.
- Backup generators should include line conditioning suitable for running electronics.
- Follow the manufacturer’s torque specifications for all power wire equipment by others.
- Install service disconnects on incoming power feeds at the heat pump location.
- All power wiring to the unit must be rated for 600V.

Power Wiring Installation

Electricians must create their own entry into the enclosure of the PDC or MPCP package on the end of the modular array. Recommended entry points are marked with knockout stickers on the inside of the enclosure, see Figure 14, p. 26. All holes should be weather tight when installation is completed.

1. Open the electrical enclosure access door.
2. Locate the Electrical Connection - Knock Out Hole Here sticker.
3. Drill or knock out the sticker location.
4. Run conduit to/through the knockout with appropriate, weather tight connections, and pull wire into the enclosure.
5. Make the power wire and ground wire connections in accordance with Figure 15, p. 26. Use 375 foot-pounds of torque on heat pump wire terminal connections.

Figure 14. Electrical power and control entry points

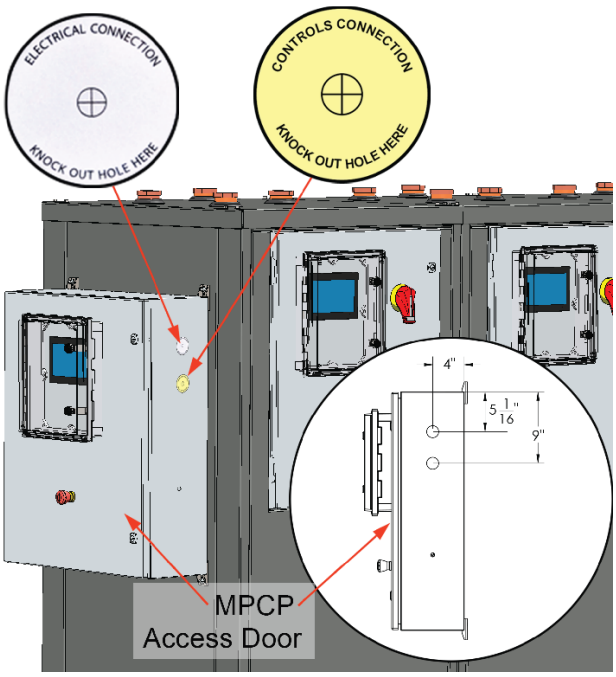
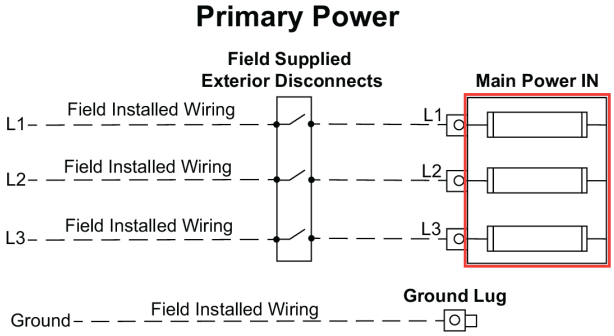


Figure 15. Power wire connections



Control Wiring

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

Modular heat pump arrays come with two control options: either an on-board Main Power and Control Panel (MPCP) or an on-board Power Distribution Center (PDC).

Arrays built with the MPCP option have all necessary controls on board. Arrays using the PDC option require an external, field-mounted controller to be wired to the PDC with an ethernet cable for the array to function properly. In both cases, all field wiring will occur in the MPCP or PDC enclosure, except in special circumstances where individual module control points are needed for unique applications.

The manufacturer recommends running enough conductors to use all available contacts if the installation site would make wire retrofits challenging, even if those contacts are not intended for use during the initial installation. This allows changes and reconfiguration to happen seamlessly in the future. Additional conductors to allow for wire breakage, and/or the addition of future accessories, is also recommended.

The following drawing and notes provide a quick reference of the available contacts for both MPCP and PDC configurations, and what they are used for. For more advanced configuration guidance, see the Configuration section of this manual and/or instructions for any relevant accessories.

Do not steal power from powered contacts for external devices. Follow all ratings and wire types for the contacts as described in the following instructions.

Control Wiring Installation

1. Confirm the heat pump is powered down when making electrical connections.
2. Do not obscure service or removable panels with wire or conduit
3. Create a control wire access point into the enclosure. The location of the control wire knockout sticker shows the recommended location for this access point.
4. Run all external sensor wires and/or control wiring for field accessories through the control wire access point. Use weathertight connections and conduit for all wiring.
5. Once in the enclosure, wires can be entered into the electrical raceways to get to the appropriate termination locations. See for specific wire runs.
6. Tug test the new connections, and then close the electrical enclosure.
7. Restore power to the heat pump.

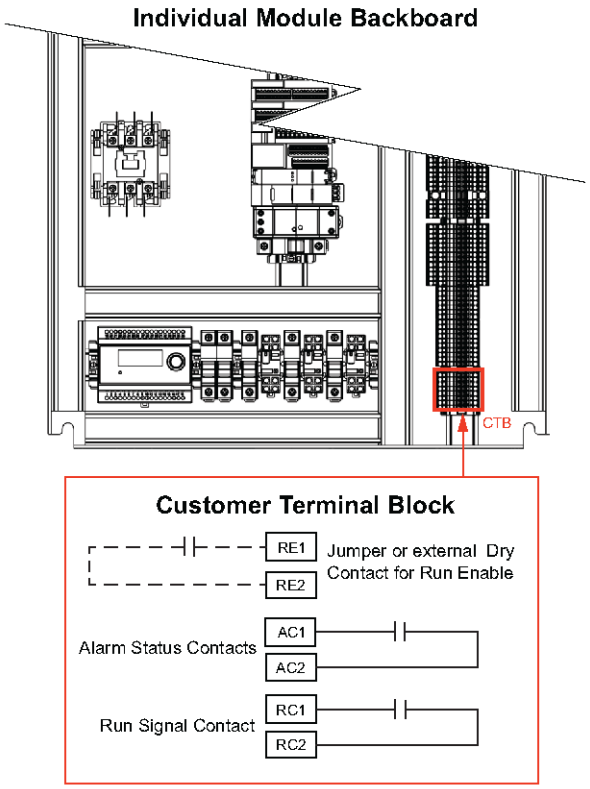
NOTICE

System or Equipment Damage!

Failure to follow instructions below could result in equipment damage and system failure due to applying power to a powered contact.

Contacts labeled Dry are intended to switch power from external sources. Do not apply external power to any contact that is not Dry. Follow all power specification for each contact.

Figure 16. Individual module field wiring



Field Wiring Control Points — Individual Modules

In most installations, wiring to individual modules is not necessary. However, in special applications some field wiring contacts on the individual modules may be useful.

Alarm Status Contacts: This dry set of contacts close whenever the module's compressor will not run because of lockout

Run Signal Contact: This dry set of contacts close whenever the internal circulator is engaged. External devices that need to run in response to the module's operation can use this as a trigger, such as source loop solenoid valves and/or booster pump relays.

Table 9. Individual module control wiring specifications

Contact	Location	Terminals			Wire Type	Power
Alarm Status	CTB	AC1	AC2	–	Any	Dry[a]
Run Signal	CTB	RC1	RC2	–	Any	Dry[a]
Service Mode[b]	TB2	i7	24v	–	Any	24Vdc

[a] All CTB Dry contacts are rated for 6A/250VAC, or 6A/30VDC maximum.
[b] Service Mode enables access to the Diagnose screen. Jump terminals for access.

Field Wiring Control Points - MPCP Option

Modular arrays using the MPCP option will wire sensors and accessories to the MPCP enclosure itself, which factory mounted on the left or right hand side of the array as a specifiable option at the time of order.

Analog Pump Output: These terminals output a 0-10v or 4-20ma signal to control modulating equipment, such as an external circulator, in response to current staging demands.

BMS (MPCP-G Only): The Ethernet or Serial connection used to connect to building automation systems.

Ethernet: Ethernet is used for connecting to all attached heat pumps. Each heat pump to be controlled needs to be connected to the ethernet switch. No more than six heat pumps can be connected in this way.

Pump Contacts (HPR and SPR): These dry sets of contacts close when the system is operating for a heat demand. They are intended to trigger control devices such as valves or pumps on the heating side (HPR) of the system, or the source loop side (SPR) for water source heat pumps.

Tank Sensor terminals (P1, P4, P7): These sensor inputs allow the MCP to monitor and control the tank temperatures. Take care that the tank sensors are installed in accordance with the sensor diagrams appropriate to the type of heat pump in use, single- or multi-pass. Tank sensor behavior changes in different modes of operation. See Tank Sensor detail sections following this section.

Outlet/Termination Sensor (P10): Sensor input for single-pass demand termination, or multi-pass Minimum Outlet trigger in multi-tank applications. In single-tank multi-pass applications, this sensor is a Warm Trigger sensor. See Tank Sensor detail sections following this section.

Figure 17. MPCP field wiring connections

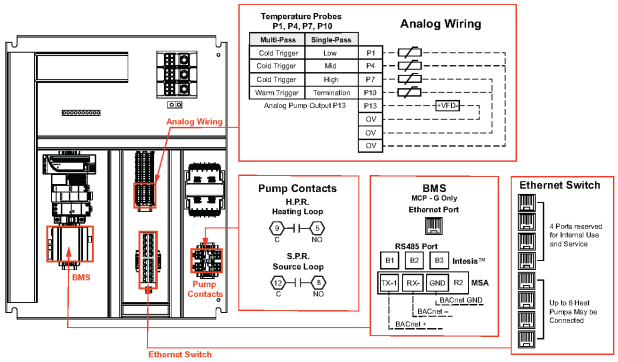


Table 10. MPCP control wiring specifications

Contact	Location	Terminals		Wire Type	Power
Analog Pump Output	Analog	P13	0v	Stranded/Shielded	4-20ma
BMS[a]	RX-	TX+	G	Stranded/Shielded	Variable
Ethernet	[b]	–	–	CAT-5 or CAT-6	–
Pump Contact HPR	Relay	9	5	Any	Dry[c]
Pump Contact SPR	Relay	12	8	Any	Dry
Tank Sensor (High/Cold)[d]	Analog	P7	0v	Stranded/Shielded	24Vdc
Tank Sensor (Med/Cold)[d]	Analog	P4	0v	Stranded/Shielded	24Vdc
Tank Sensor (Low/Cold)[d]	Analog	P1	0v	Stranded/Shielded	24Vdc
Termination/Outlet Sensor[d]	Analog	P10	0v	Stranded/Shielded	24Vdc

Table 10. MPCP control wiring specifications (continued)

(a) For MCP-G only.
(b) Ethernet Port on BMS for BACnet IP and on switch for heat pump connections.
(c) All relay contacts are rated for 15A/250VAC or 6A/28VDC max.
(d) Sensor outputs vary by mode of operation. See tank sensor sections for details.

Field Wiring Control Points - PDC Option

Modular arrays using the PDC option expect an external controller to be wired to the PDC enclosure by ethernet cable. Any available ethernet port in the PDC enclosure may be used.

Field wiring to the external controller is addressed in the installation manual for the specific controller in use. Refer to the controller's manuals for sensor, BMS, and accessory wiring as needed.

Single-pass Tank Sensors for MPCP

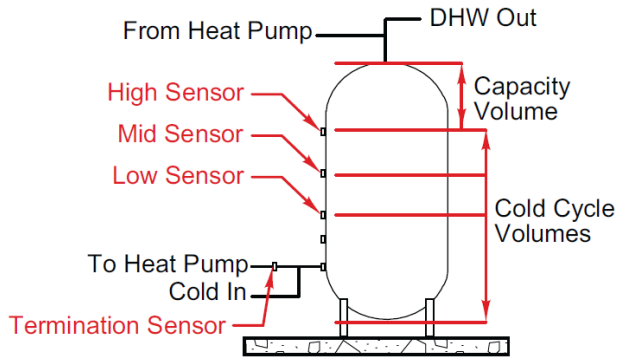
MPCP-enabled modular arrays on single-pass DHW systems use a total of two or three tank sensors to determine how many individual modules, or stages, to call to satisfy a heat demand. In addition, one pipe mounted sensor is used to terminate the demand.

Sensor placement must consider the cold cycle volume of all modules that may run when a given sensor is triggered. This means that sensors must be placed so that at least that much water volume exists between the tank sensor in question, and the termination sensor. If a sensor calls two modules, this will double the cold cycle volume of the heat pump model in use.

For more specific information about single-pass systems, cycle volumes, and tank sensor installation, please refer to the tank sensor installation manual.

The number of modules that run for each sensor is dependent on the total number of modules connected to the MPCP. Stages will trigger as follows for each tank sensor:

Figure 18. Single-pass, multiple heat pumps with central controller



Notes:

- *Minimum CCV is listed in the heat pump specifications.*
- *Multiply minimum CCV by the minimum number of heat pumps to operate simultaneously for each sensor position.*
- *Confirm high sensor point allows for adequate capacity volume above the sensor.*

Multi-pass Tank Sensors for MPCP

MPCPs on multi-pass systems are set up one of two ways, depending on whether the heat pump array is serving a single tank or multiple tanks in parallel.

On a single tank, two sensors are used: a cold trigger sensor and a warm trigger sensor. The cold trigger sensor is positioned so there is at least the cold cycle volume of water between the sensor and the heat pump outlet pipe on the tank, and the warm trigger sensor is positioned so there is at least the warm cycle volume of water between the sensor and the heat pump outlet pipe.

On multiple-tank arrays, multiple cold trigger sensors can be used, up to a maximum of three, one in each tank. One outlet sensor is then mounted on the pipe serving hot water to the mixing valve, which will trigger a maximum stage demand if necessary.

For more specific information about multi-pass systems, cycle volumes, and tank sensor installation, please refer to the tank sensor installation manual.

Staging in multi-pass systems is activated on time and temperature, and sensors participate in this process differently.

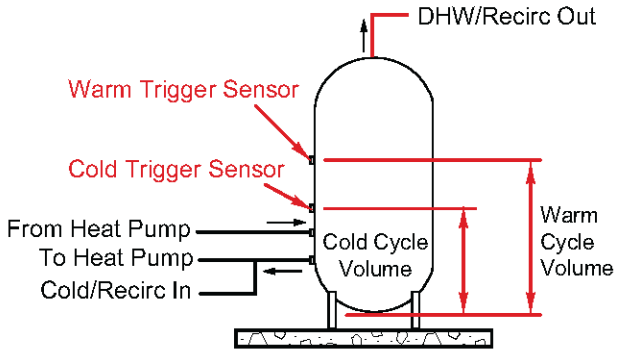
Cold Trigger Sensors: If the cold trigger sensors activate, one module will run, with more modules triggering over

time if the average sensed temperature does not rise. When any cold trigger sensor is satisfied, all demands end.

Warm Trigger Sensor: If a warm trigger sensor activates, one module will run. More modules will trigger over time if the cold trigger sensor temperature does not rise. Demands will continue until any cold trigger sensor satisfies.

Min Outlet Temperature Sensor: When a minimum outlet temperature sensor triggers, the Maximum Stage Count (configurable) number of modules will run immediately.

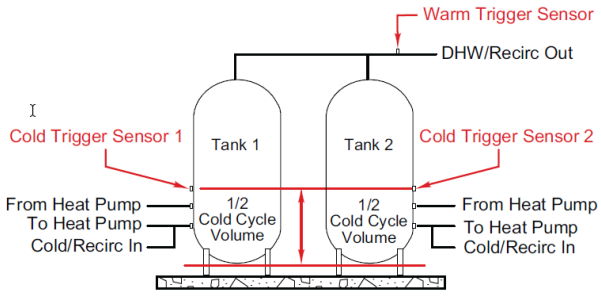
Figure 19. Multi-pass, tank sensor locations



Notes:

- *CT sensors mounted at a maximum of 1/5 of total tank height.*
- *WT sensors mounted at a maximum of 2/5 of total tank height.*
- *Min CCV, WCV, and tank size are in heat pump specifications.*

Figure 20. Multi-pass, multiple tanks with central controller



Notes:

- *CT sensors mounted at a maximum of 1/5 of total tank height.*
- *Minimum CCV are in the heat pump specifications: confirm enough CCV is included for the minimum number of heat pumps to run simultaneously.*

Configuration

NOTICE

Equipment Damage!

Failure to follow the instructions below could result in equipment damage or major component failure.

Confirm all checks are performed before operating the heat pump compressor. Complete the pre-startup checklist before pressing the ON button in the control interface.

Modular arrays do not need to configure the individual modules on site. All module configuration occurs in the factory.

Modular arrays with the PDC package do all configuration via their external controller. To configure these systems, refer to the installation manual of the specific controller the project is using.

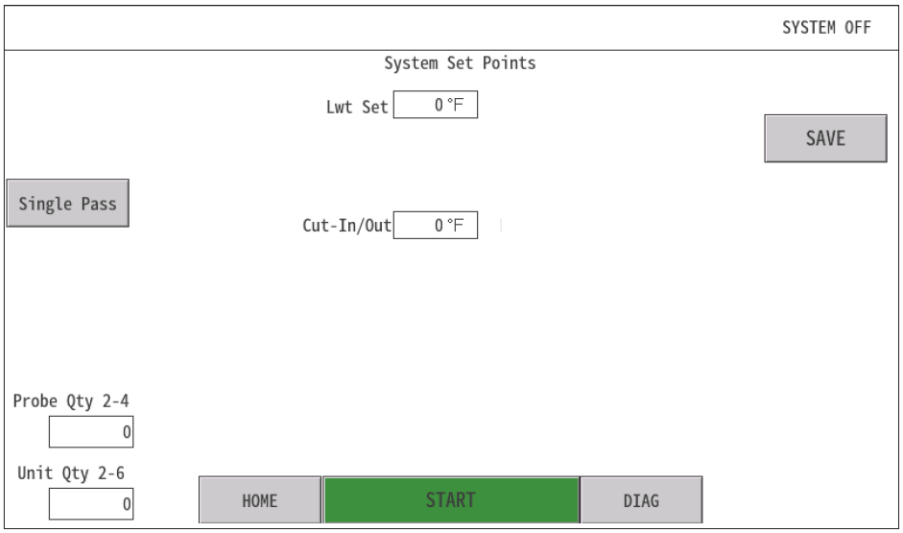
Modular arrays with the MPCP package should use the rest of this configuration section to properly configure the array for operation.

MPCP Configuration

Important: *This configuration section is specific to MPCP software version 1.4xx. Check software version using the MPCP's Diagnose page before attempting to configure the unit with these instructions. If the software version is different, download an updated product manual for up to date configuration instructions.*

Single-Pass MPCP Configuration

Figure 21. Single-pass configuration



Setting configuration options for the MPCP will require active main power for the control panel, as well as on all attached modules.

MPCP Controller Screen

MPCPs come with a full color touchscreen mounted on the front of the cabinet, under a weatherproof enclosure. Whenever power is available, the controller will be active. These are the primary screens that may be used during installation and typical operation.

Home Screen: This is the default display screen, and features a variety of indicators related to the current operation of the unit.

Config Screens: Most user-configurable options are available on these screens.

Diag Screen: Operating information specific to troubleshooting and diagnostics are available here, as well as selected diagnostic and/or commissioning tools. More detail on the Diagnose screen items is available in the Troubleshooting section of this manual.

MPCP Configurable Modes

Main Power and Control Panels can be configured for single-pass or multi-pass operation, and each type has its own configuration requirements. It is very important to ensure that the MPCP configuration matches the installation type and operation type of the attached modules, and is configured properly to ensure proper operation.

MPCP Programming for Single-pass

On the **Config** screen:

1. Set **Probe Qty** to the total number of sensors installed on the MPCP (2 to 4 required).

- If less than 4 sensors are used, sensor 1 is dropped first, sensor 2 is dropped second.

2. Set the **Unit Qty** to the total number of modules attached to the MCP (2 to 6).
3. Set the **LWT Set** parameter to the desired outlet water temperature of the attached heat pumps.
4. Set the **Cut-In/Out** parameter to the maximum acceptable return temperature of your heat pump. This should be at least 25° F below the LWT Set parameter.

MPCP Sequence of Operation for Single-pass

1. When an MPCP tank sensor detects a temperature below (**Cut in/Cut Out Temp**), a heat demand begins, calling a number of modules appropriate to the sensor call:

- Low sensor = 1 module.
- Mid sensor = 50% of connected modules, rounded up.
- High sensor = All connected modules.

2. At the beginning of the heat demand, the MPCP's HPR and SPR pump contacts close.

- Variable speed output is NOT USED in single pass mode.

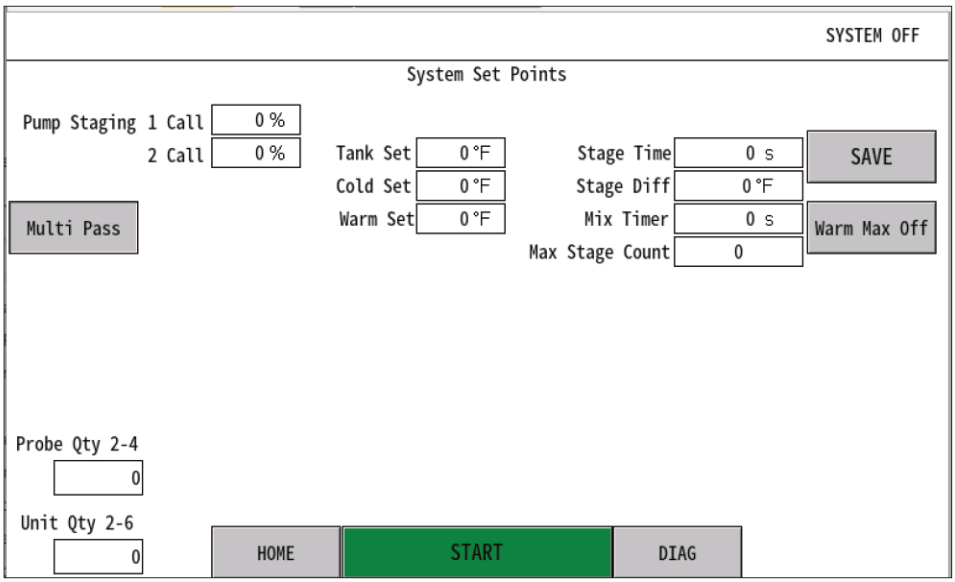
3. The MPCP will trigger the modules with the lowest run hours that are not in a current alarm condition to respond to the heat demand.
4. Modules begin operation, modulating their output water temperature to the MCP's (**LWT SET**).
5. Staging will adjust the number of modules as a lower sensor rises above the (**Cut in/Cut Out Temp**).

- A maximum stage count demand reduces when the mid sensor satisfies
- A 50% stage count demand reduces when the low sensor satisfies.
- Single modules will run until the termination sensor satisfies.

6. When the termination sensor detects water above the (**Cut in/Cut Out Temp**) temperature, demand ends.
7. At demand end, module internal circulators will continue to run until their locally set (Purge Cut Out temperature) or (Max Purge Time) is reached, whichever comes first.
8. 120 seconds after the end of the demand, the MPCP will open its pump contacts.

Multi-pass MPCP Configuration

Figure 22. Multi-pass configuration



MPCP Programming for Multi-pass

On the **Config** screen:

1. Set **Probe Qty** to the total number of sensors installed on the MPCP (1 to 4 required).

- If less than 4 sensors are used, P1 is dropped first, then P4,then P10.

2. Set the **Unit Qty** to the total number of modules attached to the MPCP (2 to 6).

3. Set **Max Stage Count** to the largest number of attached modules to run simultaneously.
4. If an external variable speed pump is used, set the percentage speed for the pump to run with each number of stages operating in the Pump Staging table.
5. Set the **Cold Set** parameter to a temperature BELOW the return water temperature of any attached building recirculation loops, and ABOVE the temperature of incoming cold water. 100° F is typically recommended.
6. Toggle the **Warm Max** button in accordance with the warm trigger/outlet sensor usage:
7. Toggle to ON in multiple tank arrays using an outlet temperature sensor.
8. Toggle to OFF for single tank systems using a warm trigger sensor.
9. Set the **Warm Set** parameter in accordance with the warm trigger/outlet sensor usage:
10. For multiple tank arrays using an outlet temperature sensor, set this to the minimum allowed water temperature to be sent to the mixing valve.
11. For single tank systems using a warm trigger sensor, set this to a temperature ABOVE the return water temperature of any attached building recirculation loops. Setting this within 5
12. degrees above the return water temperature is recommended.
13. Set the **Mix Timer** parameter to allow the attached tank to be affected by incoming flow from the heat pump. 120 seconds is typically recommended.
14. Set the **Stage Time** parameter to the length of time desired in between staging demands. At least 900 seconds is typically recommended.
15. Set the **Stage Diff** parameter to the temperature rise required to prevent additional stage demands. 2° F is typically recommended.

MCP Sequence of Operation for Multi-pass

1. A heat demand is initiated in one of two conditions:
   - A cold trigger sensor senses water temp below (**Cold Trigger**).
   - A warm trigger sensor senses water temp below (**Warm Trigger**).
2. If the warm trigger activates, and (**Warm Max**) is set to On to indicate this is an outlet sensor, the MCP will call (**Max Stage Count**) heat pumps immediately. Otherwise, a single heat pump will be called.
3. The MCP will trigger the heat pump with the lowest run hours first.
4. At demand initiation, the MCP will close its HPR and SPR pump contacts, and energize the variable speed pump output to the percentage specified on the pump staging table for the number of stages that are running.
5. The MCP will trigger heat pump operation, and then wait (**Mix Time**) seconds. At the end of that time period, the MCP will record the current average temperature of the cold trigger sensors. This allows time for mixing to occur in the tank if necessary.
6. After the Mix Time times out, the MCP will wait (**Stage Time**) seconds, and compare the current average of the cold trigger sensor temperatures to the previously stored temperature.
   - If the new temperature value has not risen by (**Stage Diff**) degrees F, then the MCP will call an additional heat pump, and escalate the variable speed pump output in accordance with the pump staging table percentage values for the number of currently operating heat pump stages.
7. When any cold trigger sensor senses a water temperature above (**Tank**) setpoint, the demand will end.
8. At demand end, heat pump internal circulators will continue to run until their locally set (**Purge Cut Out temperature**) is reached or (**Max Purge Time**) is reached, whichever comes first.
9. 120 seconds after the demand ends, all pump contacts on the MCP will open and the variable speed pump output will de-energize.

BMS Installation and Configuration (MPCP-G Only)

Important: *DO NOT connect the heat pump to the building network prior to gateway configuration! This will potentially overwrite the default IP address of the gateway and make finding the gateway on the network more difficult. If this occurs, it may be necessary to find the gateway on the network using the MAC address on the gateway label.*

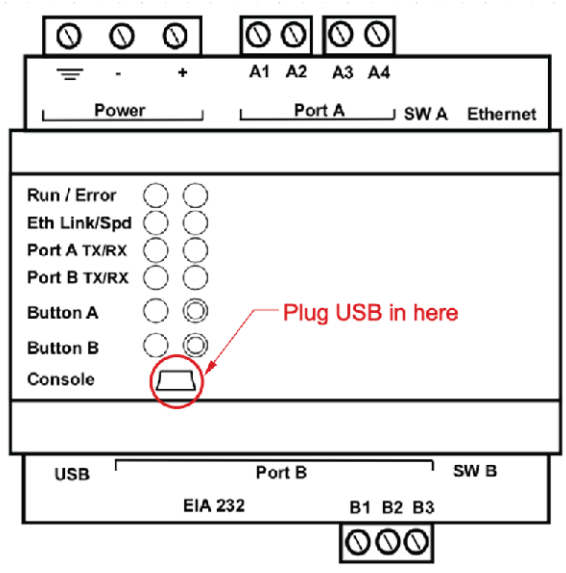
MPCP packages can be ordered in the MPCP–G configuration, which adds a BMS gateway to the onboard controls. External controllers can also have BMS gateways. To configure those controllers, refer to their installation manuals. To integrate an MPCP-G system into a local BMS, use the following instructions.

MPCP-G BMS Integration

The BMS integrator is responsible for using the MAPS software to configure the gateway accessory properly with the local BMS network configuration settings. The MAPS software is available on the USB flash drive provided with the MPCP-G.

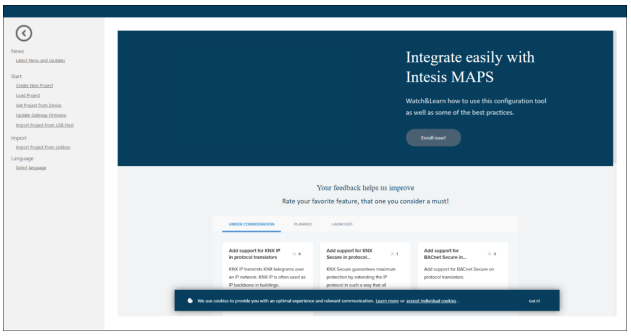
1. Plug the Anybus USB Flash Drive provided with the MPCP-G into a laptop.
2. Load the MAPS software from the flash drive to the laptop.
3. Remove the flash drive from the laptop.
4. Plug the laptop into the BMS Gateway with the provided Mini-B USB cable.

Figure 23. Gateway USB port location



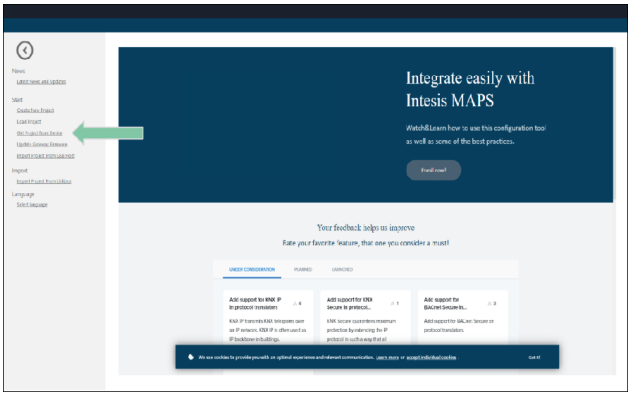
5. Open the MAPS Software on the laptop.

Figure 24. MAPS opening screen



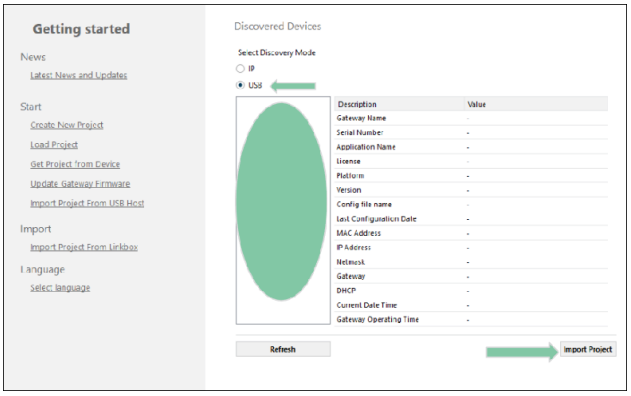
6. In the MAPS software start menu, click **Get Project From Device**.

Figure 25. Get project from device



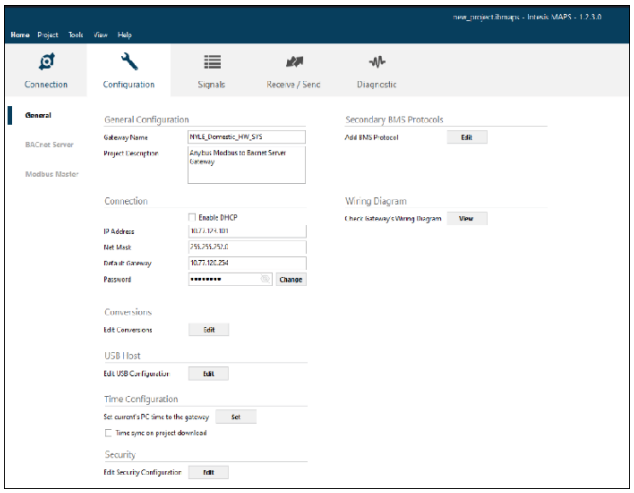
7. Select **USB**. A list populates wit USB ports.

Figure 26. Select USB



8. Select the port that is connected to the gateway.
9. Click **Import Project**.
10. Select the **Configuration** tab. The gateway name and connection information display.

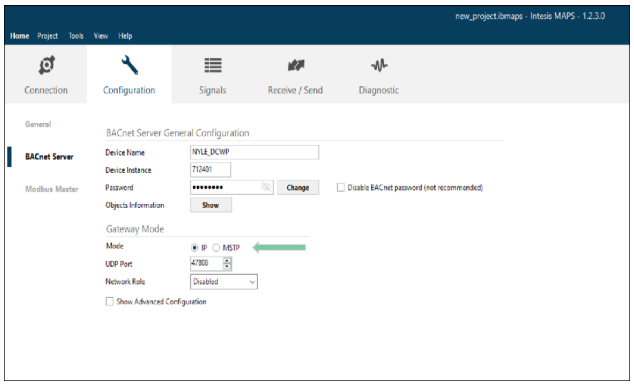
Figure 27. Configuration tab



Important: *Do not modify any Modbus parameters for any reason.*

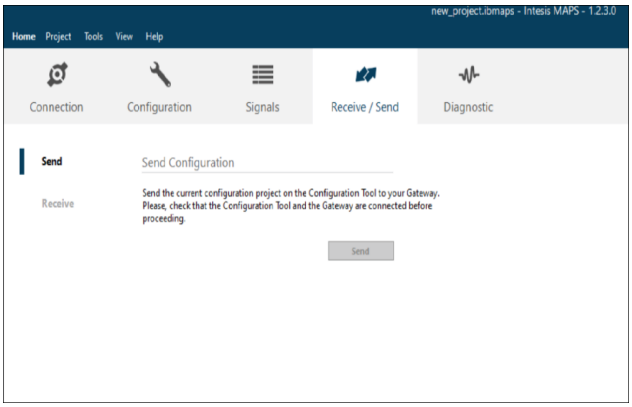
11. Selet the BACnet Mode (**IP** or **MSTP**).

Figure 28. BACnet mode



12. Configure the BACnet network settings as necessary.
13. Save a copy of the modified file as a backup.
14. Select the **Receive/Send** tab to send configuration settings to the gateway.

Figure 29. Receive/Send tab



15. Click **Send**.
16. Unplug from the gateway.

Points Lists

Following is the list of available points on the MCP-G for integration with BACnet BMS systems. Points for up to six attached heat pumps are available, in addition to the central control parameters.

Table 11. Relevant data points for MCP-G: writable values

Description	Name	Type	Units
Cycle Set Start Bit (Auto Reset)	SetCycle_Start	5: BV	-1
Cycle Set Stop Bit (Auto Reset)	SetCycle_Stop	5: BV	-1
Temperature Setpoint (MP Tank)	SetTemp_Status	2: AV	64
Temperature Setpoint (MP Warm)	SetTemp_Warm	2: AV	64
Temperature Setpoint (MP Cold)	SetTemp_Cold	2: AV	64
Temperature Setpoint (SP LW)	SetTemp_Lw	2: AV	64
Temperature Setpoint (SP CICO)	SetTemp_Cico	2: AV	64

Table 12. Relevant data points for MCP-G: read-only values

Description	Name	Type	Units
Suction Line Pressure Unit 1	SLP1	0: AI	56
Discharge Line Pressure 1	DLP1	0: AI	56

Table 12. Relevant data points for MCP-G: read-only values (continued)

Description	Name	Type	Units
Suction Line Pressure Unit 2	SLP2	0: AI	56
Discharge Line Pressure 2	DLP2	0: AI	56
Suction Line Pressure Unit 3	SLP3	0: AI	56
Discharge Line Pressure 3	DLP3	0: AI	56
Suction Line Pressure Unit 4	SLP4	0: AI	56
Discharge Line Pressure 4	DLP4	0: AI	56
Suction Line Pressure Unit 5	SLP5	0: AI	56
Discharge Line Pressure 5	DLP5	0: AI	56
Suction Line Pressure Unit 6	SLP6	0: AI	56
Discharge Line Pressure 6	DLP6	0: AI	56
Solenoid Status 1 (On/Off)	Solenoid_Status1	0: AI	95
Solenoid Status 2 (On/Off)	Solenoid_Status2	0: AI	95
Solenoid Status 3 (On/Off)	Solenoid_Status3	0: AI	95
Solenoid Status 4 (On/Off)	Solenoid_Status4	0: AI	95
Solenoid Status 5 (On/Off)	Solenoid_Status5	0: AI	95
Solenoid Status 6 (On/Off)	Solenoid_Status6	0: AI	95
Countdown Timer Status 1	CTD_Status1	0: AI	95
Countdown Timer Status 2	CTD_Status2	0: AI	95
Countdown Timer Status 3	CTD_Status3	0: AI	95
Countdown Timer Status 4	CTD_Status4	0: AI	95
Countdown Timer Status 5	CTD_Status5	0: AI	95
Countdown Timer Status 6	CTD_Status6	0: AI	95
Compressor Status 1 (On/Off)	Compressor_Status1	0: AI	95
Compressor Status 2 (On/Off)	Compressor_Status2	0: AI	95
Compressor Status 3 (On/Off)	Compressor_Status3	0: AI	95
Compressor Status 4 (On/Off)	Compressor_Status4	0: AI	95
Compressor Status 5 (On/Off)	Compressor_Status5	0: AI	95
Compressor Status 6 (On/Off)	Compressor_Status6	0: AI	95
Evap Coil A Unit 1 Temperature	EVAPT1a_Status	0: AI	64
Evap Coil B Unit 1 Temperature	EVAPT1b_Status	0: AI	64
Evap Coil A Unit 2 Temperature	EVAPT2a_Status	0: AI	64
Evap Coil B Unit 2 Temperature	EVAPT2b_Status	0: AI	64
Evap Coil A Unit 3 Temperature	EVAPT3a_Status	0: AI	64
Evap Coil B Unit 3 Temperature	EVAPT3b_Status	0: AI	64
Evap Coil A Unit 4 Temperature	EVAPT4a_Status	0: AI	64
Evap Coil B Unit 4 Temperature	EVAPT4b_Status	0: AI	64
Evap Coil A Unit 5 Temperature	EVAPT5a_Status	0: AI	64

Table 12. Relevant data points for MCP-G: read-only values (continued)

Description	Name	Type	Units
Evap Coil B Unit 5 Temperature	EVAPT5b_Status	0: AI	64
Evap Coil A Unit 6 Temperature	EVAPT6a_Status	0: AI	64
Evap Coil B Unit 6 Temperature	EVAPT6b_Status	0: AI	64
Cond Coil Unit 1 Temperature	CONDT1_Status1	0: AI	64
Cond Coil Unit 2 Temperature	CONDT2_Status2	0: AI	64
Cond Coil Unit 3 Temperature	CONDT3_Status3	0: AI	64
Cond Coil Unit 4 Temperature	CONDT4_Status4	0: AI	64
Cond Coil Unit 5 Temperature	CONDT5_Status5	0: AI	64
Cond Coil Unit 6 Temperature	CONDT6_Status6	0: AI	64
Unit 1 GPM	GPM_Status1	0: AI	89
Unit 2 GPM	GPM_Status2	0: AI	89
Unit 3 GPM	GPM_Status3	0: AI	89
Unit 4 GPM	GPM_Status4	0: AI	89
Unit 5 GPM	GPM_Status5	0: AI	89
Unit 6 GPM	GPM_Status6	0: AI	89
Compressor 1 Run Time	CompressorRunHRS1	0: AI	71
Compressor 2 Run Time	CompressorRunHRS2	0: AI	71
Compressor 3 Run Time	CompressorRunHRS3	0: AI	71
Compressor 4 Run Time	CompressorRunHRS4	0: AI	71
Compressor 5 Run Time	CompressorRunHRS5	0: AI	71
Compressor 6 Run Time	CompressorRunHRS6	0: AI	71
Master Cycle Status	Cycle_Status	5: BV	-1
Unit 1 AlarmNumber	AlarmNumber1	0: AI	95
Unit 2 AlarmNumber	AlarmNumber2	0: AI	95
Unit 3 AlarmNumber	AlarmNumber3	0: AI	95
Unit 4 AlarmNumber	AlarmNumber4	0: AI	95
Unit 5 AlarmNumber	AlarmNumber5	0: AI	95
Unit 6 AlarmNumber	AlarmNumber6	0: AI	95
Tank Probe 1 (Cold/Low)	TankProbe1	0: AI	64
Tank Probe 2 (Cold/Mid)	TankProbe2	0: AI	64
Tank Probe 3 (Cold/High)	TankProbe3	0: AI	64
Tank Probe 4 (Warm/Term)	TankProbe4	0: AI	64
Bit 6 - AlarmNumber1	BlowerAlarm1	5: BV	-1
Bit 6 - AlarmNumber2	BlowerAlarm2	5: BV	-1
Bit 6 - AlarmNumber3	BlowerAlarm3	5: BV	-1
Bit 6 - AlarmNumber4	BlowerAlarm4	5: BV	-1
Bit 6 - AlarmNumber5	BlowerAlarm5	5: BV	-1
Bit 6 - AlarmNumber6	BlowerAlarm6	5: BV	-1

Table 12. Relevant data points for MCP-G: read-only values (continued)

Description	Name	Type	Units
Bit 3 - AlarmNumber1	LowFlowAlarm1	5: BV	-1
Bit 3 - AlarmNumber2	LowFlowAlarm2	5: BV	-1
Bit 3 - AlarmNumber3	LowFlowAlarm3	5: BV	-1
Bit 3 - AlarmNumber4	LowFlowAlarm4	5: BV	-1
Bit 3 - AlarmNumber5	LowFlowAlarm5	5: BV	-1
Bit 3 - AlarmNumber6	LowFlowAlarm6	5: BV	-1
Bit 2 - AlarmNumber1	DefrostAlarm1	5: BV	-1
Bit 2 - AlarmNumber2	DefrostAlarm2	5: BV	-1
Bit 2 - AlarmNumber3	DefrostAlarm3	5: BV	-1
Bit 2 - AlarmNumber4	DefrostAlarm4	5: BV	-1
Bit 2 - AlarmNumber5	DefrostAlarm5	5: BV	-1
Bit 2 - AlarmNumber6	DefrostAlarm6	5: BV	-1

BMS Testing

Good practice will include thorough verification that values reported by the heat pump match the values received in the BMS system. Ideally, this would include monitoring through an active heat demand and comparing BMS reported values to heat pump reported values.

Pre-Startup Checklist

The following checklist is provided for reference, to assist in preparing for the eventual startup of the equipment. Please contact the manufacturer's representative more than one month from the intended startup date. The following checklist items will be reviewed for compliance before a final startup is scheduled with a factory authorized commissioning agent.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage or failure and void the warranty. Do not start the heat pump before a factory authorized commissioning agent is on site and ready to assist.

Placement and Physical Checks

- ☐ Unit is level, stable, and securely mounted.
- ☐ Unit has all appropriate service clearances, and access panels are not obstructed by pipes, wires, or other obstacles.
- ☐ Unit is adequately protected from falling objects, vehicles, or other potential damage.
- ☐ Open the heat pump and inspect the cabinet around the refrigeration piping and compressor for any signs of leaks or oil. If any signs of refrigerant leak are present, DO NOT START THE UNIT. Leaks need to be identified and fixed, and refrigerant charge weighed, before startup can occur safely.
- ☐ Perform a tug test on all wires in the electrical enclosure, to ensure all wires remain firmly seated after shipping. Ensure all power feeds are powered down for this testing.

Important: *Damage to the compressor due to startup with visible leak indication is not covered by warranty.*

Secure Loop Checks

- ☐ Pumps and control valves are wired, powered, and active.
- ☐ Source piping is insulated and freeze protected as appropriate.
- ☐ Source piping is pressure tested, filled, and purged of air.
- ☐ Source water quality is acceptable for operation.

DHW Water and Piping Checks

- ☐ Exterior water piping is insulated, freeze protected, pitched toward drain points.
- ☐ All water piping has been pressure tested and verified leak free.
- ☐ All water piping has been filled with water and actively purged of air.
- ☐ Pressure relief valves are piped to the floor, drain, or reservoir as per local codes.
- ☐ Water quality has been determined to be acceptable for operation and potable use.
- ☐ Verify tank temperature probe or aquastat is installed as per the tank sensors for single or multi-pass operation, as appropriate.

Electrical Checks

- ☐ Main power wires are securely attached to the heat pump and active.
- ☐ All control and communication wires are securely attached, and connected equipment is in place and ready to operate.

Final Checks

- ☐ All panels and enclosures are securely closed and affixed.
- ☐ All ball valves in the piping systems are open, including valves on expansion tanks, storage tanks, condensate drains and swing tanks.
- ☐ Turn on the main power to allow the heat pump to warm up. DO NOT engage any functions on the control interface.

Startup Procedure

NOTICE

Compressor Damage!

Failure to follow warm up time recommendations could result in compressor damage.

Heat pumps must be on active power for at least six hours before pressing the On button to enable operation. Activate the main power feeds, and confirm the system is Off at the control interface during this period.

The products to be started up by factory authorized commissioning agents ONLY.

Startup dates are to be requested through the manufacturer's representative more than one month before the intended startup.

Pre-Startup checklists must be submitted and completed more than five days before the startup date.

Troubleshooting

Use the following lists of startup issues, alerts, and faults to assist with the diagnosis and troubleshooting of some common problems.

Note: *If major components end up damaged or defective, the user MUST obtain assistance and approval from the manufacturer to authorize warranty replacement, before the components are removed from service.*

Relevant Screens for Troubleshooting

The interface on the heat pump has information available to assist with troubleshooting, on the Main display page and on the Diagnostic pages.

In addition to the informational interface pages below, the user can access the Alarms and “Error Log pages from the main screen. The Alarms page displays currently active alarms, and the Error Log displays a record of alarm conditions that the heat pump has experienced.

If alarms or problems occur, please refer to Table 13, p. 42 to help guide the troubleshooting response.

Figure 30. Main interface page

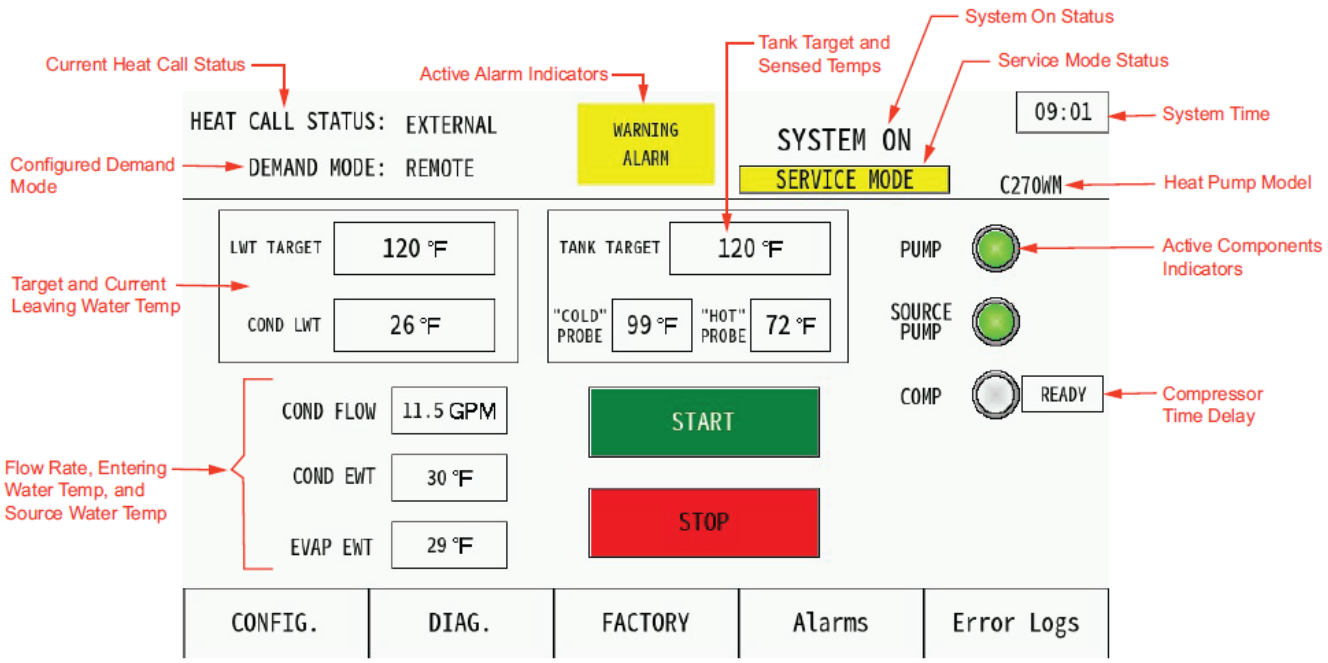


Figure 31. Diagnostic interface page

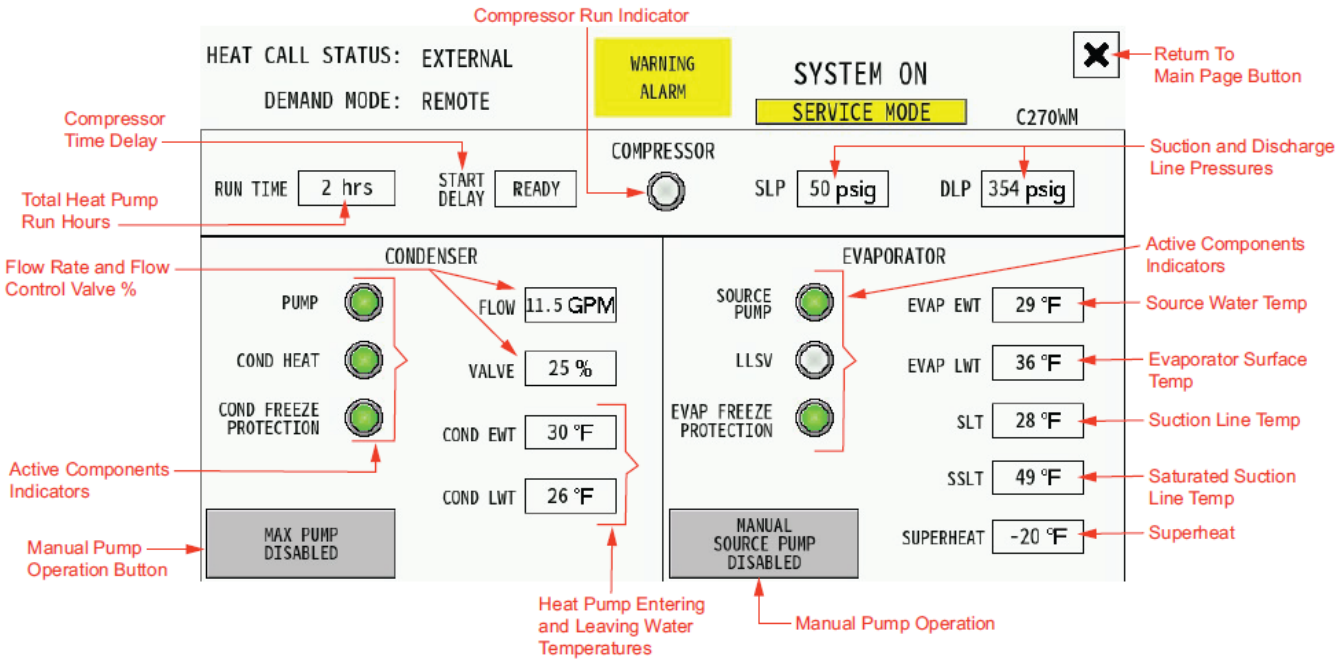


Table 13. Troubleshooting

Problem	Check
Display screen is dark	Main power is active at breaker and input terminals.
	Transformer is providing 120V power.
	Control screen is receiving power.
Cannot access diagnose screens	Service jumper is installed and secure.
Heat pump will not run	Primary power is active.
	No alarms or alerts present on control screen.
	System parameters would create a demand.
	System is turned "On" at control screen.
	System is "Enabled" by BMS.
Pump runs, but not compressor	No Alarms are present.
	Heat pump is not in post purge.
	Compressor Time Delay (CTD) is zero.
	EWT is not too hot for selected mode.
Unit runs, but water temperature is insufficient	Tank and/or outlet temps are set correctly.
	Single-pass: Internal control valve is working properly.
	Outlet temp is allowed by current ambient temps.

Table 14. Alerts and faults

Alert/Fault	Trigger	Check
High pressure	Refrigerant pressure is too high	All Outlet Flow checks are good.
		Ambient temperature is not too high.
		Inlet water temperature is not too high.
		Wye strainer is clean.
		Refrigerant charge is not too high.
		High pressure sensor and wiring are good.
Low pressure	Refrigerant pressure is too low	Source water flow is adequate.
		Source water temp is not too low.
		Inlet water temp is not too low.
		Single pass: Control valve is modulating flow.
		Refrigerant charge is not too low.
		Low pressure sensor and wiring are good.
Condenser or evaporator flow	Water flow rate is too low on load side or source loop side	External valves are open.
		Single Pass control valve is opening.
		Piping is not air-bound.
		Pump is operating w/sufficient pressure.
		Internal heat exchanger is not fouled/scaled.
		Wye strainer is clear.
		Flow sensor and wiring are good.
ESTOP	Central control has sent an emergency stop signal	Central control is actually in ESTOP
Modbus comm	Modbus communication detects errors or failure	Wiring between PLC and BMS module is good
		PLC and BMS modules are operational
Oil pressure	Compressor oil pressure is low	Compressor Oil Level is good.
		Oil Pump is good.
		No evidence of oil around compressor base.
Power fault	Primary power out of phase or voltage spec.	Primary power wiring correct and secure.
		Power Monitor adjusted to building voltage.
		Building is not experiencing power problems.
		Building voltage is in spec.
		Power Monitor and wiring are good.
Pump down safety	Pump down has not successfully reduced system pressure	LLSV is operational.
		Compressor is operational.
		Low Pressure sensor is operational.

Table 14. Alerts and faults (continued)

Tank probe	Tank Probe is not detected (TT1 or TT2)	Tank Sensor and wiring are good.
		In Multi-pass Mode, TT2 is connected.
		In remote mode, external controller is connected.
		System is configured in tank mode if no BMS.
Sensor (various)	Specified sensor is out of range or not detected	Specified sensor is wired and operational
M protection	Electrical or Temperature problem with compressor	Power Monitor and wiring are good.

Routine Maintenance

Like all modern equipment, heat pumps require routine maintenance for efficient, safe, and reliable operation. Confirm that a maintenance schedule is created and adhered to and that all personnel involved with maintenance are informed and educated on their role in supporting the system.

Following are suggesting timelines and maintenance items typically associated with heat pump water heater installations. It is not possible to foresee all possible system configurations, accessories, or site conditions, so this list should be considered advisory only. Final maintenance schedules are the responsibility of the service/maintenance personnel on the project, and should be adjusted in accordance with best practices and observed conditions.

Weekly Checks

- ☐ Visually inspect heat pump for wear or damage to unit exterior or interior.
- ☐ Inspect for ice or water buildup around the heat pump.
- ☐ Check screens and/or BMS portals for alarms.
- ☐ Verify the system is within normal operating parameters for water temperatures.

Biannual Checks (Spring and Fall)

- ☐ Inspect and clean cabinet interior as necessary.
- ☐ Inspect and operate all source side flow control devices.
- ☐ Isolate, inspect, and clean any wye strainers on the heat pump DHW and source piping.
- ☐ Inspect all attached piping for water leaks and/or uncontrolled condensation.

Annual Checks

- ☐ Confirm flow rate using the Max Purge button on the control interface, and verify that flow is at or above maximum design flow for the unit.
    - ☐ Descale heat exchanger if necessary (low flow unsolved by purging/pipe/pump inspection).
- ☐ Operate all relief valves and inspect for signs of weepage or leaking.
- ☐ With the unit off, disconnect the main power leads on the compressor. With a dielectric tester (megger), test and record resistance on each set of windings. Store this information for future reference. Reconnect the main power leads to the compressor.
- ☐ For systems with glycol antifreeze, test antifreeze efficacy, and water pH levels for excessively corrosive conditions.

Limited Warranty

The manufacturer extends the following LIMITED WARRANTY to the original owner of this commercial heat pump water heater subject to the terms, conditions and disclaimers stated below:

1. **Compressor**

   If the 5-Year Extended Compressor Warranty is purchased, and if within FIVE (5) years after delivery of this heat pump water heater the compressor shall prove, upon examination by the warrantor, to be defective, the warrantor will provide a replacement compressor.

2. **All Other Parts**

   If within 18 months after delivery or 12 months after commissioning of this heat pump water heater any other part or portion shall prove, upon examination by the warrantor, to be defective in material or workmanship, the warrantor will repair or replace such part or portion at its option. This warranty also extends to any factory supplied accessories.

3. **Conditions and Exceptions**

   Refrigerant, filters, refrigerant driers, and fan belts are not covered under this limited warranty. The warranty on all replacement parts, including the compressor, will be limited to the unexpired term of the original warranty. This warranty shall apply only when the heat pump water heater is installed in accordance with local plumbing and building codes, ordinances and regulations, the warranter's printed instructions provided with it and good industry practices.

   a. This warranty shall apply only when the unit is:

      i. used at temperatures not exceeding the maximum system temperatures printed in the instructions provided;

      ii. filled with potable water, free to circulate at all times and free of damaging water sediment or scale deposits;

      iii. used in a non-corrosive and not contaminated atmosphere;

      iv. in its original installation location, and under original ownership;

      v. in the United States, its territories or possessions, Canada, South America, Caribbean and Mexico;

      vi. sized in accordance with proper sizing techniques for commercial heat pump water heaters;

      vii. bearing the original rating label which has not been altered, defaced or removed, except as required by the warranter;

      viii. energized at the proper voltage and phase as stated on the rating label;

      ix. maintained in accordance with the instructions printed in the manual included with the heat pump water heater;

   b. Any accident to the water heater, any misuse, abuse (including freezing) or alteration of it, any operation of it in a modified form, will void this warranty.

4. **Service Repair and Expense**

   Under this limited warranty the warranter will provide only a replacement heat pump water heater or part thereof. The owner is responsible for all other costs. Such costs may include but are not limited to:

   a. Labor charges for service, removal, repair, or re installation of the water heater or any component part;

   b. Shipping, delivery, handling, and administrative charges for forwarding the new heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor;

   c. All cost necessary or incidental for any materials and/or permits required for installation of the replacement heater or part.

5. **Limitations on Implied Warranties**

   Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to 18 months after delivery or 12 months after commissioning duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Service Log

Issue Description	Date	Servicer

Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

DHWHP-SVX004A-EN 13 Jul 2025
Supersedes (New)