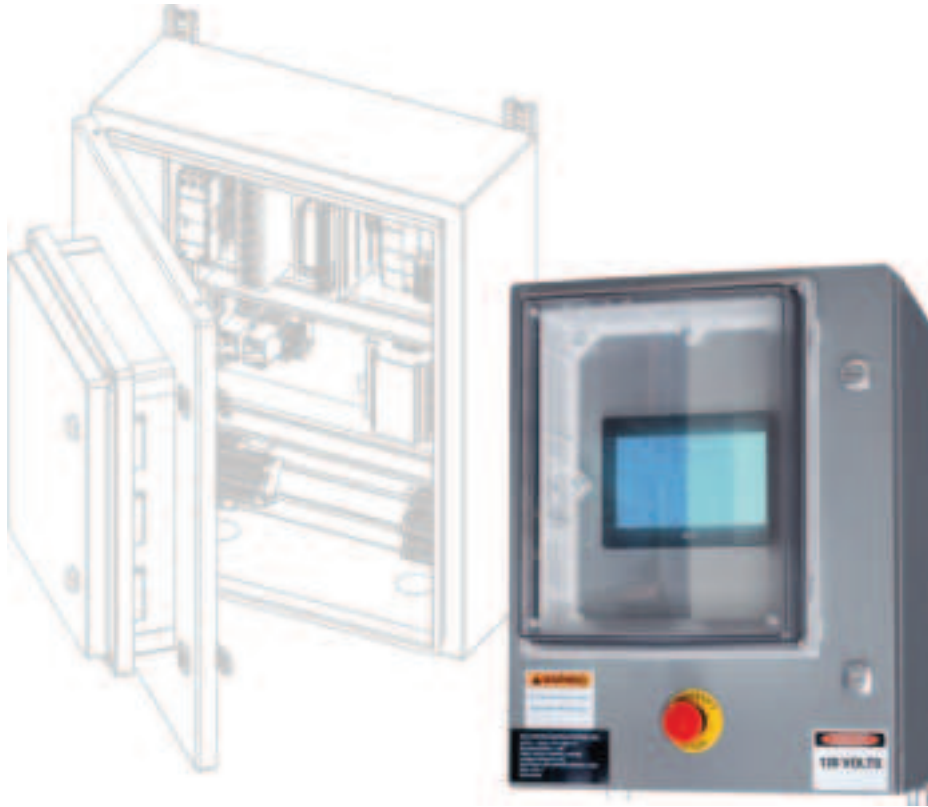


Main Control Panel



For Control Panels produced from 11/25/24 to:

IM-MCP-NWS-250319

Installation Manual

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Introduction

Thank you for your purchase of this Main Control Panel. The control panel is intended to synchronize the operation, interface, and staging of up to six commercial heat pump water heaters, allowing multiple heat pumps to work together to service larger domestic water loads.

This refreshed model has enhanced capabilities for controlling both Single and Multi-pass domestic hot water systems. It is available with and without an optional BMS Gateway, for integration into BACnet® systems via IP or MSTP.

Safety Information

The proper installation, use and servicing of this control panel is extremely important to your safety and the safety of others.

Many safety-related messages and instructions have been provided in this manual and on your own control panel to warn you and others of a potential injury hazard. Read and obey all safety messages and instructions throughout this manual. It is very important that the meaning of each safety message is understood by you and others who install, use, or service this control panel.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER

Ensure control power is OFF at the control panel when wiring accessories to the unit to prevent injury or death due to electrical shock.



WARNING

To prevent inductive power transfer, do not run sensor or communication wiring in parallel with any wires carrying 120v or greater voltage power. If this is unavoidable, use shielded wire or conduit for sensor wiring.

Precautions

If the unit is exposed to the following, do not operate until all corrective steps have been made by a qualified service agency.

- Fire
- Damage
- Exposure of internal components to water

Grounding Instructions

This control panel must be grounded in accordance with the National Electrical Code and/or local codes. These must be followed in all cases. Failure to ground this control panel properly may cause erratic system operation. This control panel must be connected to a grounded metal, permanent wiring system; or an equipment grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the control panel.

General Description

Purpose

Main Control Panels (MCPs) are central controllers that synchronize the operation of up to six attached commercial heat pump water heaters, for use in commercial domestic hot water systems.

Usage

Main Control Panels are installed as external controls to the controlled heat pumps. The MCP can then provide a central interface to control the attached heat pumps, and will monitor tank conditions to direct the staging and operation of the heat pumps for commercial domestic hot water heating, in either single-pass or multi-pass systems.

MCPs are NOT intended for space heat applications, and only function on heat pumps built to interoperate with this specific control, using proprietary communication protocols

Controls and Electrical

Main Control Panels require single phase, 120v power, direct wired. In addition, tank sensors are required for operation, also directly wired to the MCP. Control devices may wire to the MCP as well for specific applications. Heat pumps are connected to the MCP by ethernet cable.

MCP-G units are MODBUS and BACnet® capable using the included BMS Gateway, ready to be integrated into BMS systems by 3rd party integrators using BACnet/IP and BACnet MSTP protocols.

All MCP units are certified to UL508A.

For more information:

During the installation and commissioning of MCPs, it will be necessary to refer to individual heat pump manuals and tank sensor manuals for specifics on programming and placement.

Electrical and Operational Specifications

Electrical Specifications	
Voltage	120/1/60
Rated Current (RLA)	1 Amp
Minimum Circuit Ampacity (MCA)	1 Amp
Maximum Overcurrent Protection (MOCP)	15 Amps
Short Circuit Current Rating (SCCR)	5 kA

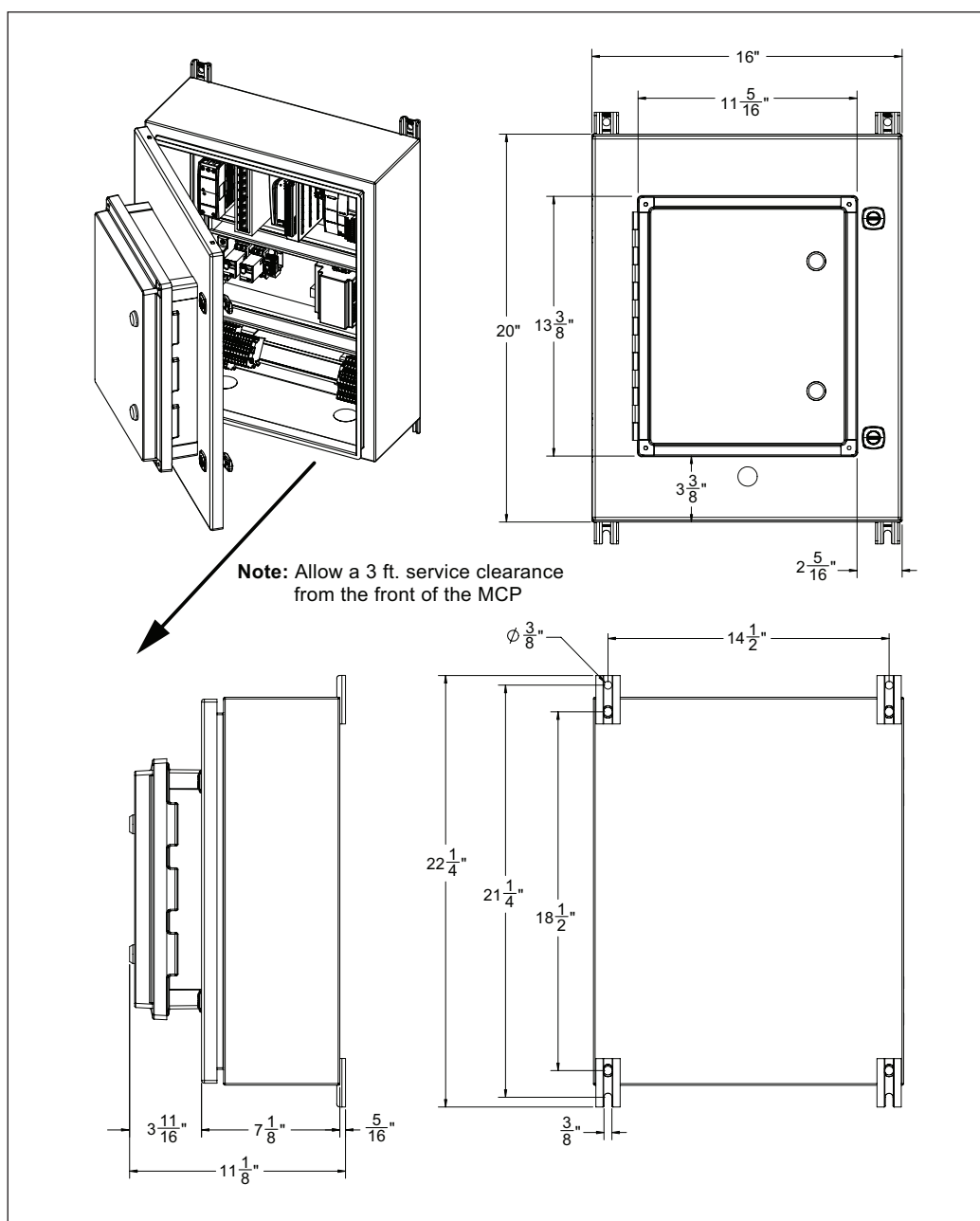
Operational Specifications	
Max Connected Heat Pumps	6
Maximum Connected Sensors	4x 10k NTC
Booster Pump Relay Outputs	2x 120v
Pump Relay Max Current	15 Amps VAC
Booster Pump Analog Output	1x 4-20mA or 0-10v
Booster Pump Stages	6 (Multi-pass only)

BMS Specifications (MCP-G Only)	
BMS Connection Types	BACnet IP, BACnet MSTP
Baud	9600, 19200, 38400, 57600, 768000, 115200

Physical Specifications and Clearances

Physical Specifications and Ratings	
Ambient Operating Temperature	14-120 Deg. F
Ambient Operating Humidity	10-90 RH
Dimensions (in.)	16" W x 20" H x 11½" D
Weight	40 lb.
NEMA Class	4
Certifications	UL508A

Dimensions and Clearances



Before Ordering Your MCP

Please ensure you are ordering the correct MCP for your project!

If integration into a Building Management System (BMS) is required, please order the MCP-G variant. This avoids the need to add a BMS gateway to each individual heat pump.

Control Panel Installation

Required Tools and Materials

In addition to all standard tools and material required for any electrical installation and to mount the control panel, some of the other specialty tools required to support this installation include:

1. Heat transfer compound such as Honeywell part number 107408 or equivalent.
2. Electrical switch lockout devices - used to secure disconnect switches/breaker panels while servicing.
3. Electronic thermometer with range of 10°F - 210°F (-12°C - 100°C) including:
 - Sensors capable of measuring surface temperatures on water piping
4. 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:

- ☐ Ethernet cables between the control panel and all connected heat pump locations.
- ☐ Primary 120v power wiring.
- ☐ Control wires for attached devices and sensors.
- ☐ Site prep for mounting the MCP.

Please refer to the appropriate sections of the 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 Control Panel:

1. Transport the unit with care appropriate to prevent damage to electronic devices.
2. Do not expose the panel to condensing conditions, extreme heat or extreme cold.

Placement considerations for the control panel:

- ☐ Ensure the location meets all requirements for ambient temperature, structural support, unit dimensions, operational and service clearances. See physical specifications to confirm.
- ☐ Mounting location must be structurally stable.
- ☐ Mounting location should be easily accessible for visual inspection and for regular service.
- ☐ Mounting location should ideally allow for protection from the elements during service work, which may require ladders or opening the control panel door.
- ☐ Mounting location should avoid generating temperature extremes in the panel, such as rooftop mounting in very hot environments in direct sunlight.

Mounting the Control Panel

The control panel has four anchor points to mount to a wall or vertical support structure. Use appropriate anchors or bolts to attach the panel to the mounting surface. See the dimensional drawings for the MCP to prepare properly for mounting bolt spacing and placement.

Control panels can be surface mounted directly on suitably sound wall surfaces. However, using a secondary mounting system such as unistrut can allow for improved airflow behind the unit. This can reduce risks of condensation corrosion or heat buildup in the control panel. When possible, we recommend using spacers or mounting systems behind the control panel.

Always mount the control panel in the correct orientation. Do not mount the panel inverted or rotated from its normal orientation.

Power Wiring

WARNING

Improper handling of unit electrical power can result in immediate equipment damage, fires, injury, and death. Ensure only qualified personnel interact with main power lines. Never work while power is live; use all possible safety precautions and perform all work in accordance with appropriate local codes, National Electric Code, and/or CSA regulations.

Main Control Panels are voltage-specific, and require proper planning to provide the electrical support appropriate to each unit. Please be sure to refer to the product's electrical specifications, project documentation, and the requirements and installation instructions below.

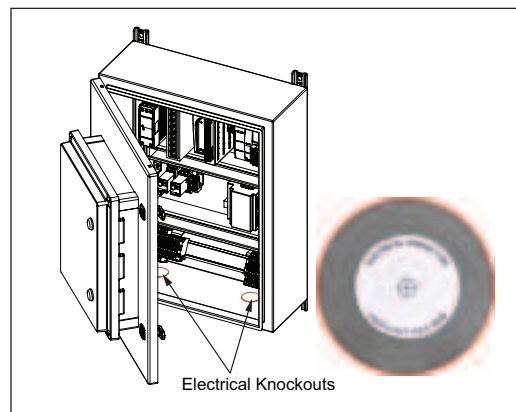
Power Requirements:

1. Voltage is above 100v.
2. Power is clean, reliable, and well grounded.
3. Wire and breakers are appropriately sized for the load.
4. Wire and breakers are properly specified for the environment they are installed in.
5. Backup generators should include line conditioning suitable for running electronics.
6. Follow manufacturer's torque specifications for all power wire equipment by others.

Power Wiring Installation

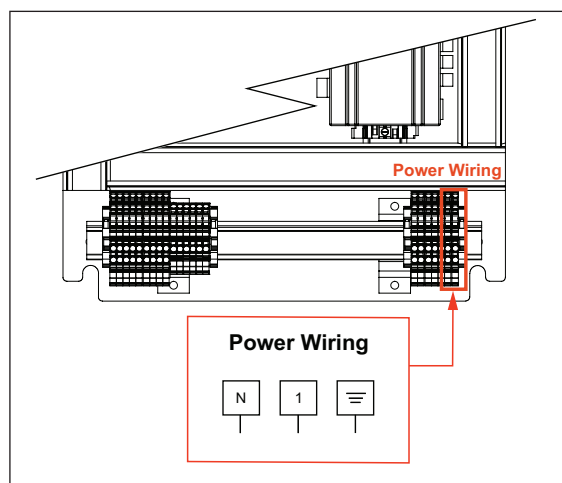
Electricians must create their own entry points into the MCP. There are two points that require creation of an access hole, both marked with "Knock Out Hole Here" stickers. All holes should be weather tight when installation is completed.

Figure 1: Open electrical control panel and locate the knockout holes



1. Open the electrical enclosure access door.
2. Identify the two "Electrical access - knockout hole location" stickers in the bottom of the cabinet.
3. Drill or knock out both sticker locations.
4. Run conduit to/through the knockouts with appropriate, weather tight connections, and pull wire into the enclosure.
5. Make the final power wire and ground wire connections in accordance with the power wiring as shown in [Figure 2](#). Use 0.5Nm of torque on wire terminals in the heat pump.

Figure 2: Power Wire Connections



Control Wiring

Main Control Panels have several contact points for field wiring of external controls.

We recommend 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 in the control panel, 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.

All control wiring should follow best practices, local codes and regulations, and NEC/CSA guidelines.

Do not steal power from powered contacts for external devices. Follow all ratings and wire types for the contacts detailed below.

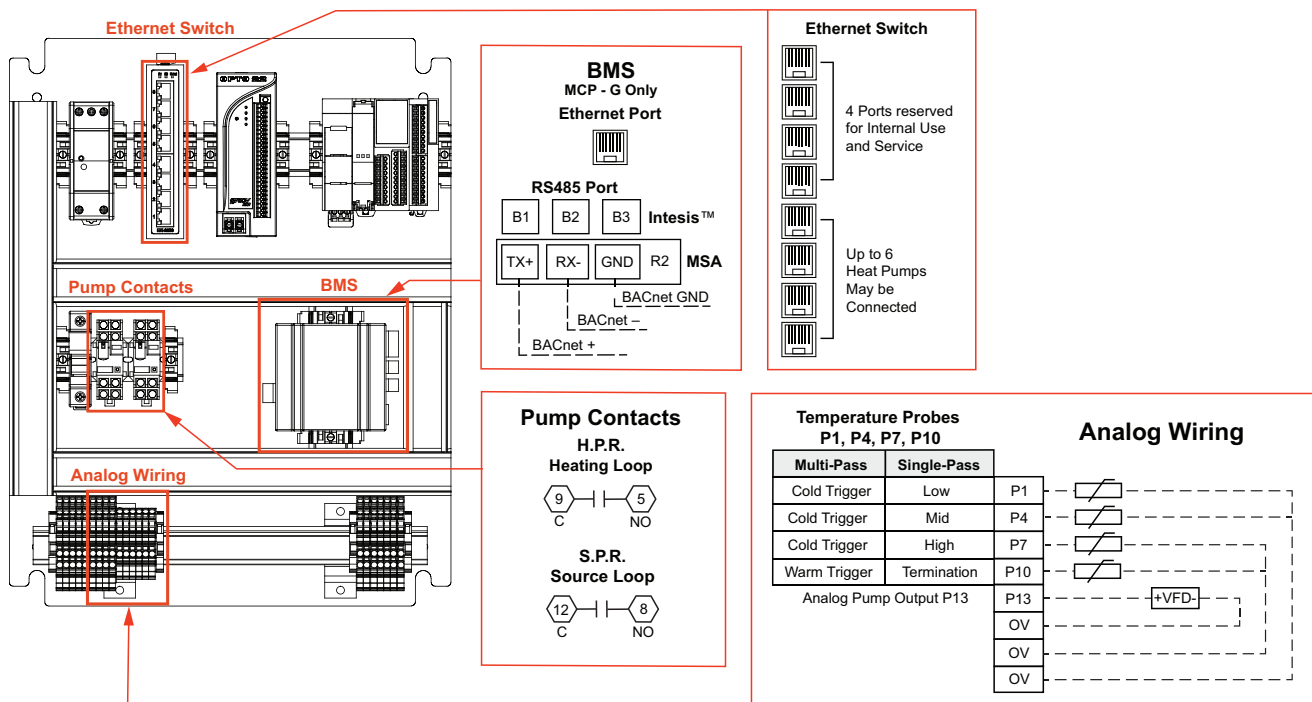
Control Wiring Installation

1. Ensure the control panel is powered down when making electrical connections.
2. Open the panel enclosure.
3. Create a control wire access point on the MCP: typically, following the knockout sticker guidance on the inside bottom face of the enclosure is recommended.
4. Run all external sensor wires and/or control wiring for field accessories through the access point, using a weather tight connection method.
5. Once in the enclosure, wires can be attached to their target terminals. See [Figure 3](#) below for specific wiring connections.
6. Tug test the new connections, and then close the electrical enclosure. It is now safe to restore power to the control panel.

CAUTION

Contacts labeled “Dry” are intended to switch power from external sources. **DO NOT APPLY EXTERNAL POWER** to any contact that is not “Dry”. Equipment damage and system failure can result from applying power to a powered contact. Follow all power specs for each contact.

Figure 3: Control Wiring Connections



Field Wiring Control Points

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 (MCP-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.

Table 1: MCP Control Wiring Specifications

Contact	Location	Terminals		Wire Type	Power
Analog Pump Output	Analog	P13	0v	Stranded/Shielded	4-20ma
BMS ¹	RX-	TX+	G	Stranded/Shielded	Variable
Ethernet ²	—	-	—	CAT-5 or CAT-6	—
Pump Contact HPR	Relay	9	5	Any	Dry ³
Pump Contact SPR	Relay	12	8	Any	Dry ³
Tank Sensor (High/Cold) ⁴	Analog	P7	0v	Stranded/Shielded	24Vdc
Tank Sensor (Med/Cold) ⁴	Analog	P4	0v	Stranded/Shielded	24Vdc
Tank Sensor (Low/Cold) ⁴	Analog	P1	0v	Stranded/Shielded	24Vdc
Termination/Outlet Sensor ⁴	Analog	P10	0v	Stranded/Shielded	24Vdc

Notes:

¹ For MCP-G Only.

² Ethernet Port on BMS for BACnet IP, and on switch for heat pump connections.

³ All Relay contacts are rated for 15A/250VAC, or 6A/28VDC max.

⁴ Sensor outputs vary by mode of operation. See tank sensor sections for details.

Single-Pass Tank Sensors for MCPs

Main Control Panels on single-pass DHW systems use a total of 2 or 3 tank sensors to determine how many heat pumps, 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 heat pumps 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 will call 2 heat pumps, you will need 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 installation manuals for your specific heat pumps, and the tank sensor installation manual.

The number of single-pass heat pumps that run for each sensor is dependent on the total number of heat pumps connected to the MCP. Stages will trigger as follows for each tank sensor:

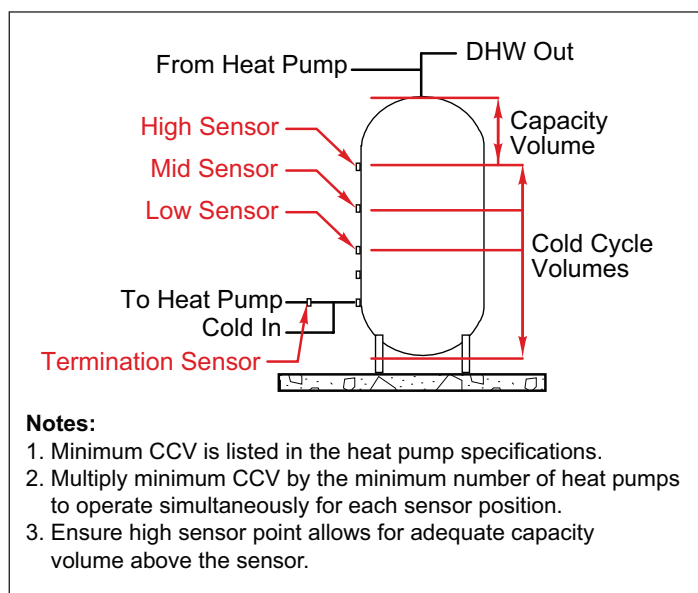
Low Sensor: This will trigger a single stage (heat pump).

Mid Sensor: This will trigger 50% of available heat pumps, rounded up.

High Sensor: This will trigger the Max Stage Count (configurable) number of heat pumps.

Termination Sensor: After the tank sensors satisfy, the demand will continue until the termination sensor senses water at or above the cut in/cut out temperature.

Figure 4: Single-pass, Multiple Heat Pumps with Central Controller



Multi-Pass Tank Sensors for MCPs

Main Control Panels on multi-pass systems are set up one of two ways, depending on whether the heat pumps are 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 installation manuals for your specific heat pumps, and 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 Sensor(s): If a cold trigger sensor activates, one heat pump will run, with more heat pumps triggering over time if the sensed temperature doesn't rise. When any cold trigger sensor is satisfied, all demands end.

Warm Trigger Sensor: If a warm trigger sensor activates, one heat pump will run. More heat pumps will trigger over time if the cold trigger sensor temperature doesn't 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 heat pumps will run immediately.

Figure 5: Multi-pass, Single Tank Sensor Locations

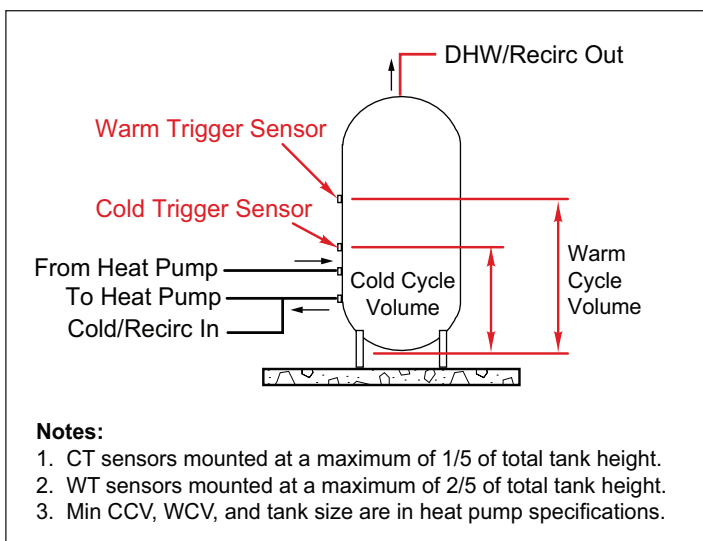
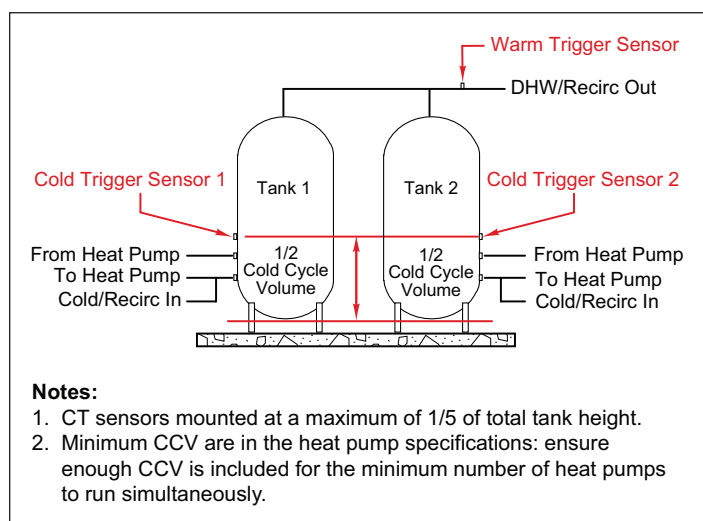


Figure 6: Multi-pass, Multiple Tanks with Central Controller



Configuration

IMPORTANT!

This configuration section is specific to MCP software version 1.4xx. Check your software version using the MCP's "Diagnose" page before attempting to configure the unit with these instructions. If your software version is different, you may need to download an updated product manual for up to date configuration instructions.

Setting configuration options for the MCP will require active main power for the control panel, as well as on all attached heat pumps.

CAUTION

Note that while activating the main power for programming is safe, turning compressor operation "on" at this stage is not. **Complete your heat pumps' Pre-Start-up Checklist before pressing the "on" button in the control interface on any attached heat pumps!** Operating the heat pump compressor before all checks have been performed can result in severe equipment damage or major component failure.

This manual addresses configuration required for the main controller panel accessory specifically. Individual heat pumps will have their own setup and commissioning requirements: be sure to refer to individual heat pump manuals during installation and startup as well.

MCP Controller Screens

MCPs 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 are available in the table, "[Troubleshooting](#)" on page 25.

Configurable Modes

Main 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 MCP configuration matches the installation type and operation type of the attached heat pumps, and is configured properly to ensure proper operation.**

Heat Pump Configuration for MCP

In addition to the MCP itself, each attached heat pump must be configured properly to operate with the main control panel. Heat pump configuration varies by your series of heat pump. Confirm whether your heat pumps are older R134A models, or newer R513A models.

R513A Heat Pump Configuration:

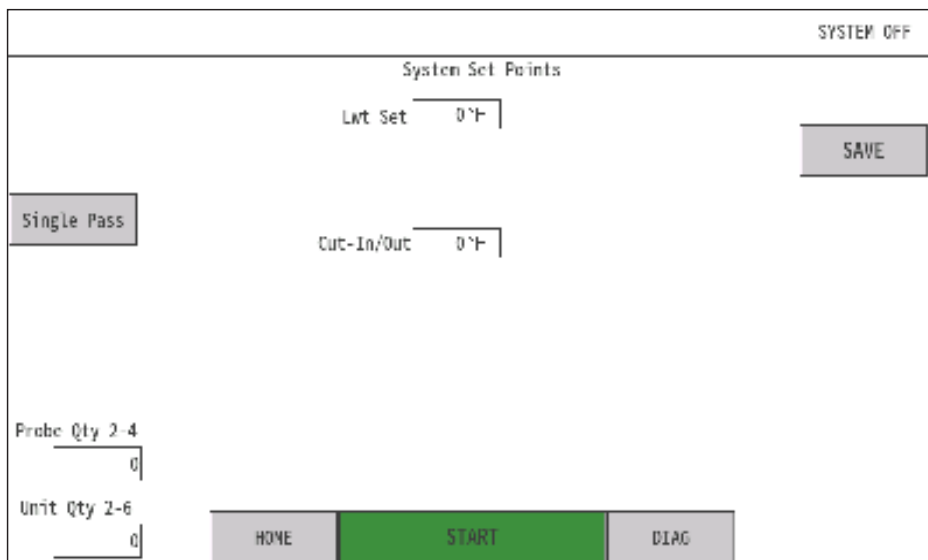
1. Heat pumps must be configured for “External” or “Remote” control mode, depending on what model heat pump you are using.
2. Heat pumps with jumpers on their “Run Enable” or “Remote Enable” terminals need the jumpers removed.
3. The heat pump must be able to perform in the selected mode of operation, single- or multi-pass.

4. When multiple heat pumps are ordered with an MCP, the factory sets their “unit numbers” to unique values. Verify each heat pump has a unique “unit number” on their configuration pages to avoid communication problems.
5. Heat pumps have additional parameters not present on the MCP related to timing, safeties, defrost, etc. Ensure those parameters are set properly at the heat pump using project documentation and heat pump installation manuals.

R134A Heat Pump Configuration:

1. Heat pumps must have their IP addresses set individually on the heat pump controller. Typically, the last digit of the IP address should match the HP number (1, 2, 3,...) and each heat pump needs a unique IP address. IP addresses ship factory set for MCP installation, when heat pumps are ordered together with an MCP.
2. The heat pump must be able to perform in the selected mode of operation, single- or multi-pass.
3. Heat pumps have additional parameters not present on the MCP related to timing, safeties, defrost, etc. Ensure those parameters are set properly at the heat pump using project documentation and heat pump installation manuals.

Single-pass MCP Configuration



MCP Programming for Single-pass

On the “Config” Screen:

1. Set “Probe Qty” to the total number of sensors installed on the MCP (2 to 4 required).
 - a. If less than 4 sensors are used, low sensor is dropped first, middle sensor is dropped second.
2. Set the “Unit Qty” to the total number of heat pumps 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 Deg F below the LWT Set parameter.
5. Ensure that the attached heat pumps are configured as per the instructions in the “Heat Pump Configuration” section of this manual.
2. At the beginning of the heat demand, the MCP’s HPR and SPR pump contacts close.
 - a. Variable speed output is NOT USED in single pass mode.
3. The MCP will trigger the heat pumps with the lowest run hours that are not in a current alarm condition to respond to the heat demand.
4. Heat pumps begin operation, modulating their output water temperature to the MCP’s (**LWT SET**).
5. Staging will adjust the number of heat pumps as a lower sensor rises above the (**Cut in/Cut Out Temp**).
 - a. A maximum stage count demand reduces when the mid sensor satisfies.
 - b. A 50% stage count demand reduces when the low sensor satisfies.
 - c. Single heat pumps will run until the termination sensor satisfies.
6. When the termination sensor detects water above the (**Cut in/Cut Out Temp**) temperature, and all tank sensors are satisfied, demand ends.
7. At demand end, heat pump 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 MCP will open its pump contacts.

MCP Sequence of Operation for Single-pass

1. When an MCP tank sensor detects a temperature below (**Cut in/Cut Out Temp**), a heat demand begins, calling a number of heat pumps appropriate to the sensor call:
 - a. Low sensor = 1 heat pump.
 - b. Mid sensor = 50% of connected heat pumps, rounded up.
 - c. High sensor = All connected heat pumps.

Multi-pass MCP Configuration

SYSTEM OFF			
System Set Points			
Pump Staging 1 Call	0 %	Tank Set	0 °F
2 Call	0 %	Cold Set	0 °F
		Warm Set	0 °F
		Stage Time	0 s
		Stage Diff	0 °F
		Mix Timer	0 s
		Max Stage Count	0
Multi Pass		SAVE Warm Max Off	
Probe Qty 2-4 0			
Unit Qty 2-6 0			
HOME		START	
		DIAG	

MCP Programming for Multi-pass:

On the “Config” Screen:

- Set “Probe Qty” to the total number of sensors installed on the MCP (1 to 4 required).
 - If less than 4 sensors are used, P1 is dropped first, then P4, then P10.
- Set the “Unit Qty” to the total number of heat pumps attached to the MCP (2 to 6).
- Set “Max Stage Count” to the largest number of attached heat pumps to run simultaneously.
- 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.
- 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 Deg F is typically recommended.
- Toggle the “Warm Max” button in accordance with the warm trigger/outlet sensor usage:
 - Toggle to ON in multiple tank arrays using an outlet temperature sensor.
 - Toggle to OFF for single tank systems using a warm trigger sensor.
- Set the “Warm Set” parameter in accordance with the warm trigger/outlet sensor usage:
 - For multiple tank arrays using an outlet temperature sensor, set this to the minimum allowed water temperature to be sent to the mixing valve.
 - 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 degrees above the return water temperature is recommended.
- 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.
- Set the “Stage Time” parameter to the length of time desired in between staging demands. At least 900 seconds is typically recommended.
- Set the “Stage Diff” parameter to the temperature rise required to prevent additional stage demands. 2 Degree F is typically recommended.

MCP Sequence of Operation for Multi-pass:

1. A heat demand is initiated in one of two conditions:
 - a. A cold trigger sensor senses water temp below **(Cold Trigger)**.
 - b. 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.
 - a. 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 (MCP-G Only)

WARNING

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.

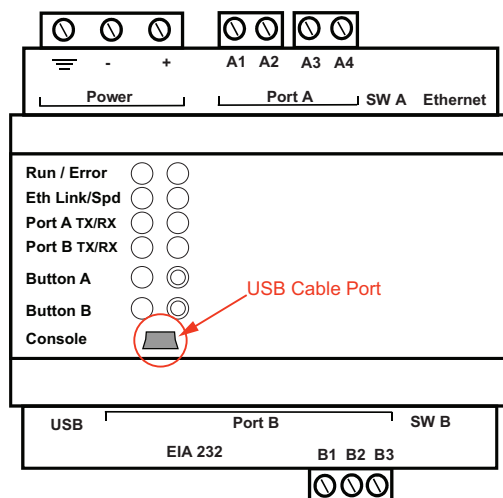
Gateway Initial Configuration

Note: These steps are done in the factory if the gateway was pre-installed. Skip to “BMS Integration” if the gateway was installed in the factory.

To configure a new gateway in the field, the gateway must be initialized to the proper settings to allow further configuration to occur.

1. Plug the USB Flash Drive provided into a laptop.
2. Load the MAPS software from the flash drive to the laptop.
3. Download the configuration file ending in “.ibmaps” from the “MCP 1.4 or newer” folder on the flash drive, to the laptop.
4. Plug the laptop into the BMS Gateway with the provided Mini-B USB cable.

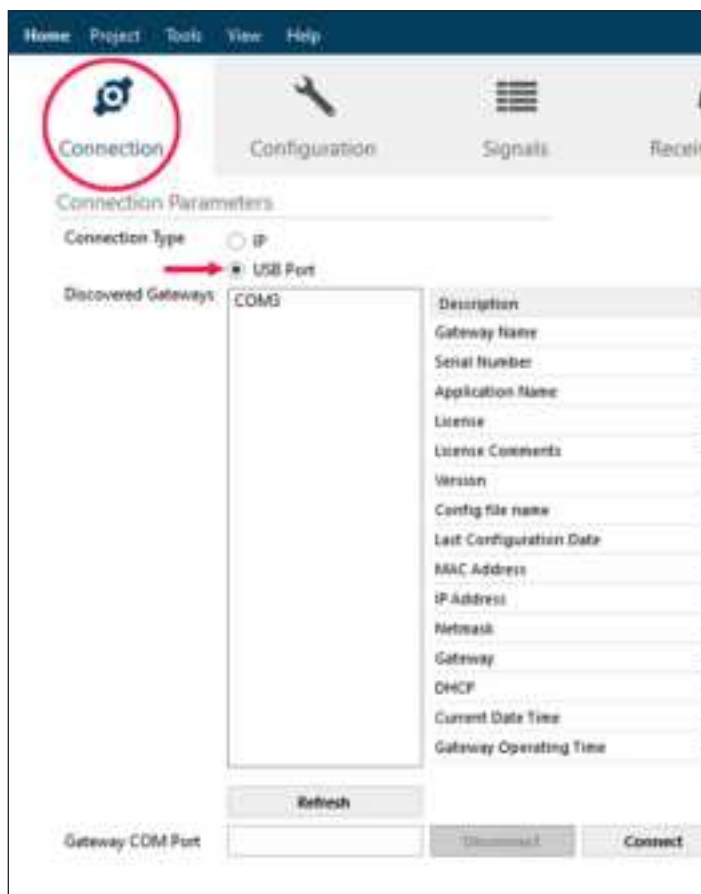
Figure 7: Plug USB cable into BMS Gateway



5. Open the MAPS Software on the laptop.

6. Select the “Getting Started” on the left, and select “Load Project” in that menu.
7. Open the downloaded .ibmaps file to load the project.
8. Once a “General Configuration” tab opens, select the “Connection” Tab, [Figure 8](#).

Figure 8: Connection Menu - “Connection” Tab



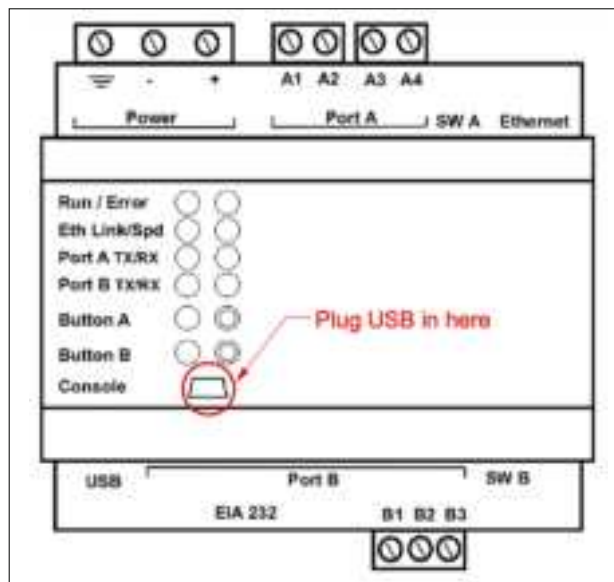
9. Select “USB Port” for “Connection Type”.
10. In “Discovered Gateways”, a “COM#” should appear. If not, perform a refresh.
11. Once a COM# appears, select it and select “Connect”. Status bar at the bottom of the screen should indicate “Connected” and turn dark blue.
12. Go to Receive/Send button at the top of the screen. Press “Send” if active. If “Send” is not active, verify the connection.
13. When “download complete” is displayed, press ok.
14. Disconnect the USB from the gateway, or leave connected to continue with BMS integration.

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 9: Gateway USB Port Location



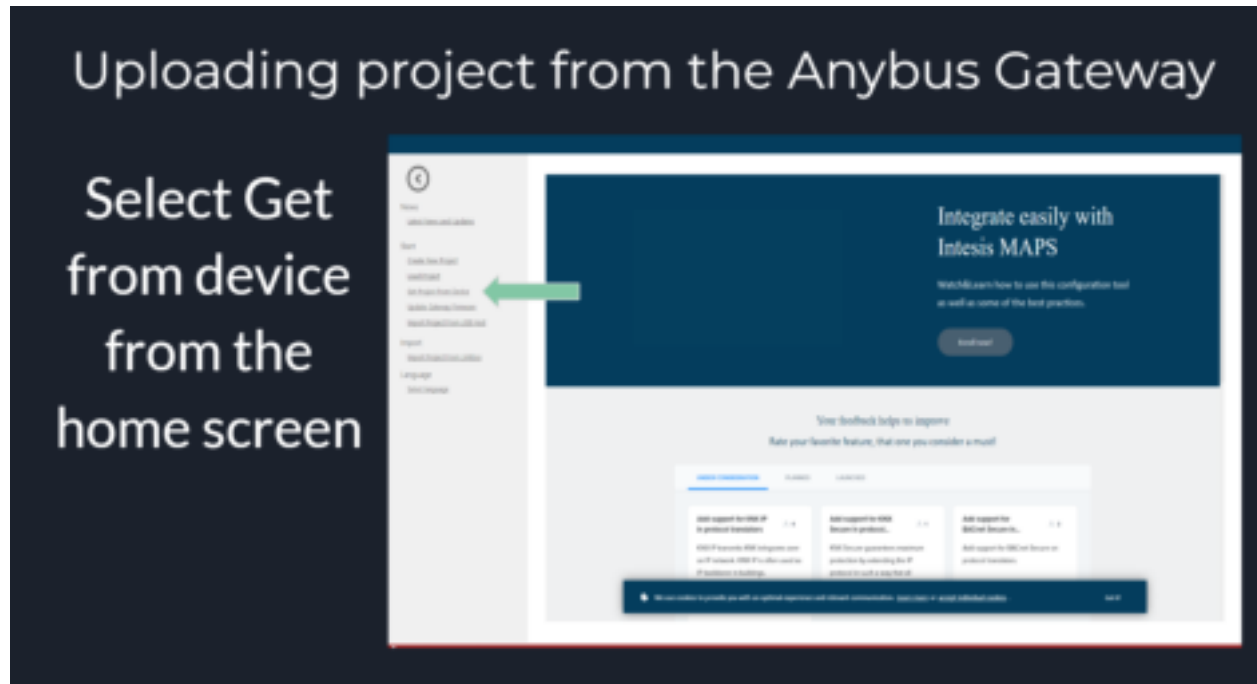
5. Open the MAPS Software on the laptop, [Figure 10](#)

Figure 10: MAPS Opening Screen



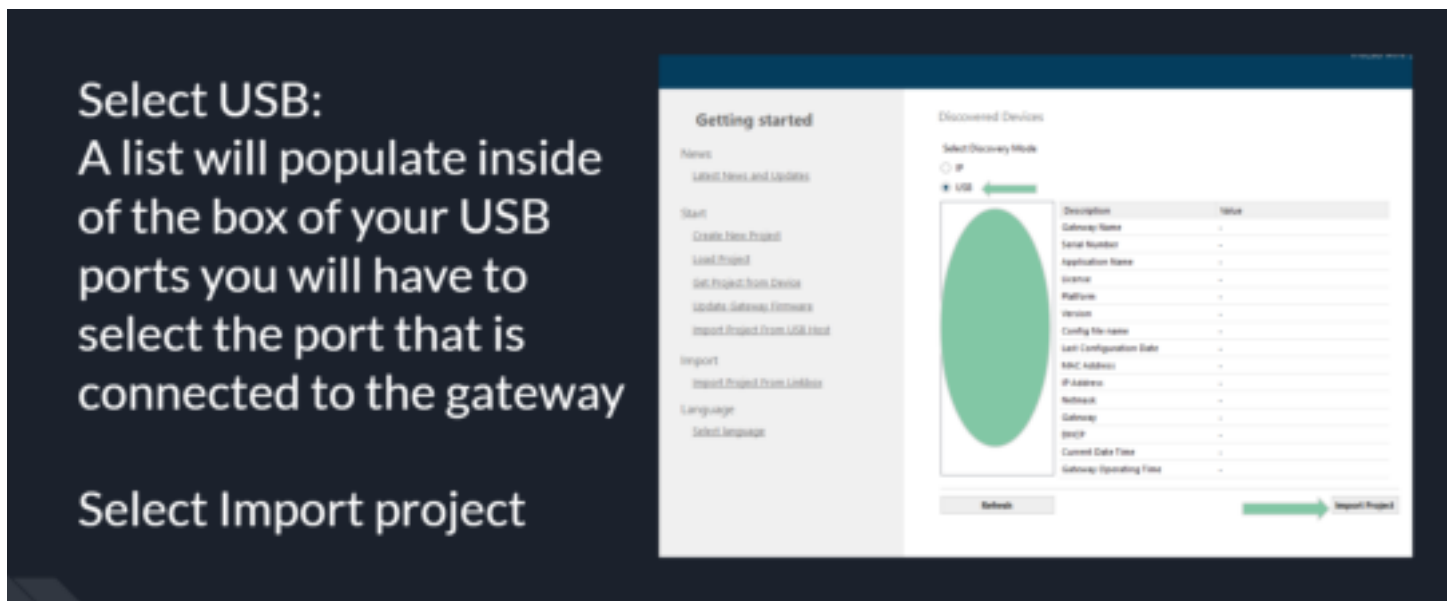
6. In the MAPS software start menu, click “Get Project From Device”.

Figure 11: Select, “Get Project From Device”



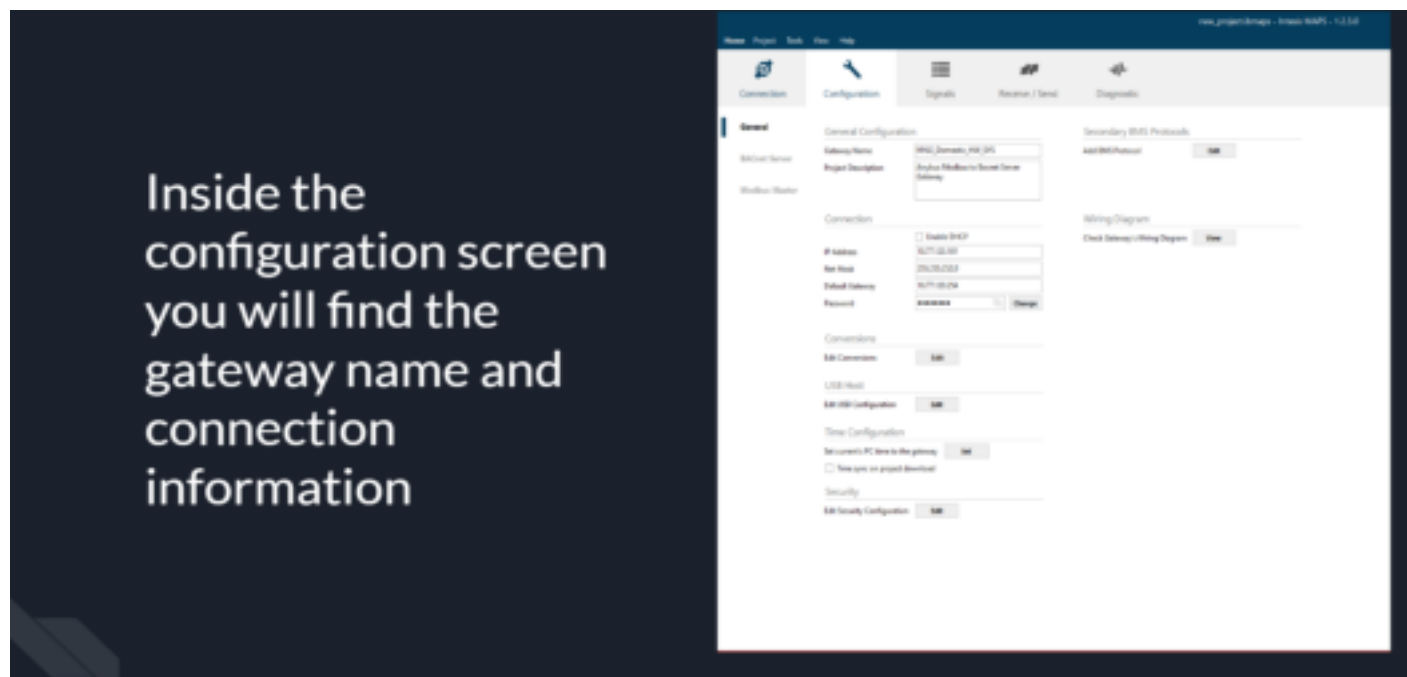
7. Select USB Discovery Mode and Import Project.

Figure 12: Select, “USB Discovery Mode”



8. Go to the “Configuration” Tab.

Figure 13: Select, “Configuration” Tab

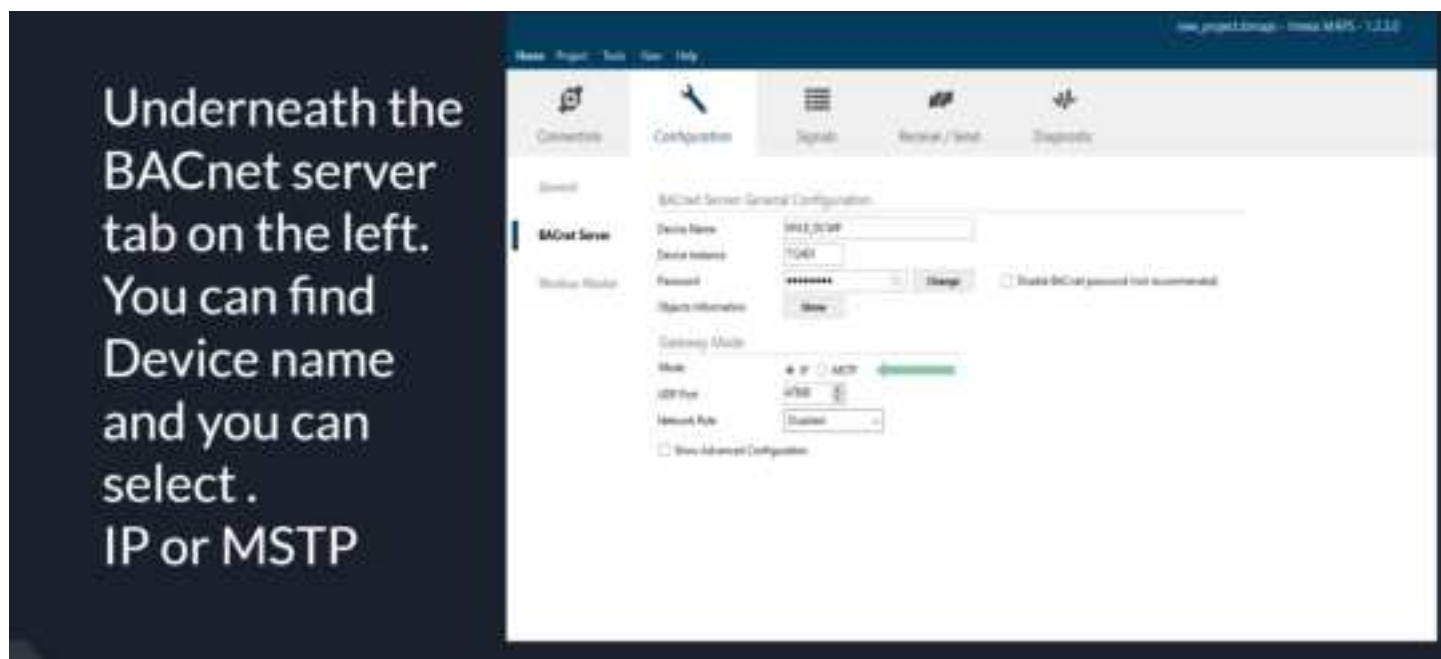


IMPORTANT!

Do not modify any Modbus parameters for any reason!

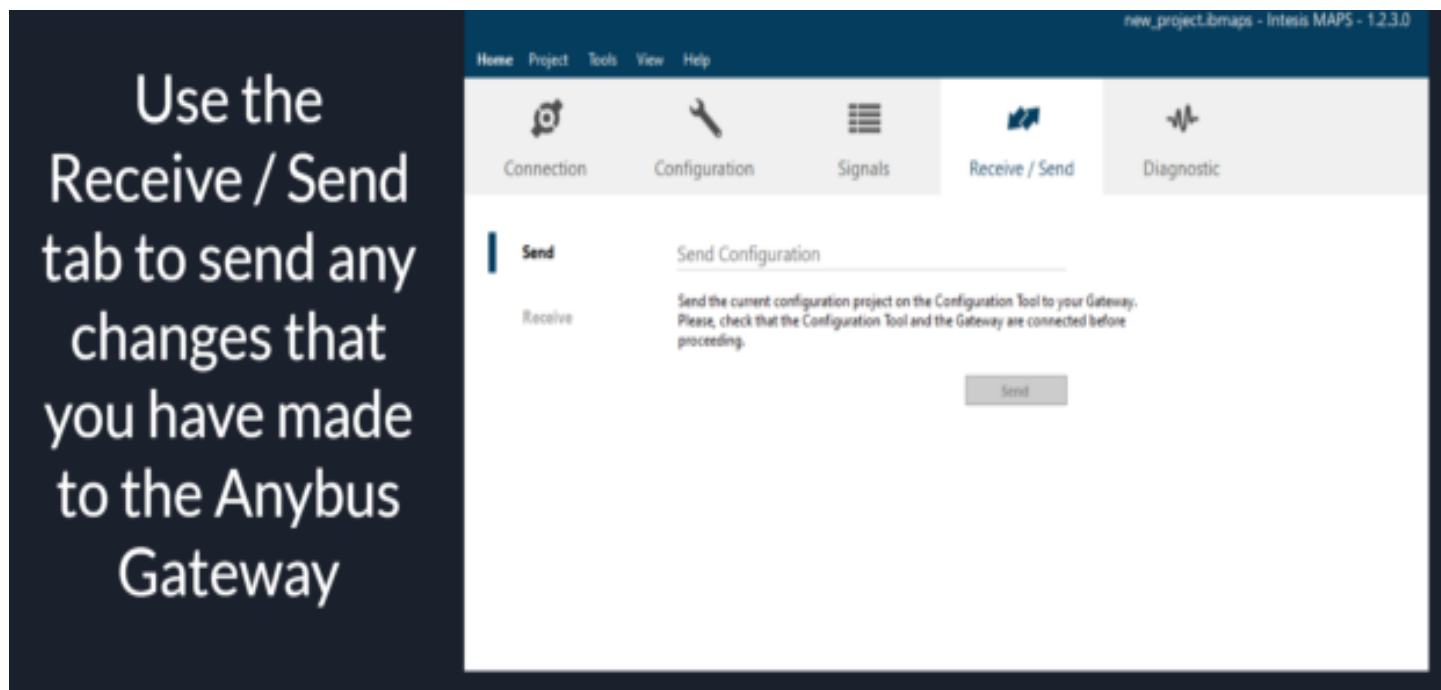
9. Under “BACnet Server”, Select BACnet Mode (IP or MSTP).

Figure 14: Select, “BACnet Mode” (IP or MSTP)



10. Configure your BACnet network settings as necessary. Save a copy of the modified file as a backup at this point.
11. Use send/receive to send your configuration settings to the gateway.

Figure 15: Slide 8



12. Unplug from the gateway.

Once that is complete, the following table of control points may be used for final programming. If more advanced configuration information is needed, please contact factory engineering for assistance.

Points List

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 2: 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 3: 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
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

Relevant Data Points for MCP-G: Read-Only Values (Continued)

Description	Name	Type	Units
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
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

Relevant Data Points for MCP-G: Read-Only Values (Continued)

Description	Name	Type	Units
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
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 your manufacturer's representative **MORE THAN ONE MONTH** from your intended startup date. The following checklist items will be reviewed for compliance before a final startup is scheduled with a factory authorized commissioning agent.

This list is Pre-Startup items specific to the MCP. Heat pumps have their own pre-startup checklists. Refer to the heat pump documentation during any pre-startup review.

CAUTION

Heat pump startups may only occur with a factory authorized commissioning agent. Do not start the heat pump before the authorized agent is on site and ready to assist, or you may void your warranty and cause equipment damage or failure.

Placement and Physical Checks

- ☐ MCP is level, stable, and securely mounted.
- ☐ MCP has appropriate service clearance, and the access panel is not obstructed by pipes, wires, or other obstacles.

Electrical Checks

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

Final Checks

- ☐ All configuration settings are checked and correct.
- ☐ All panels and enclosures are securely closed and affixed.

Troubleshooting

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

In the rare event that major components end up damaged or defective, you MUST obtain assistance and approval from your rep or from Lochinvar to authorize warranty replacement, BEFORE the components are removed from service.

Problem	Check
Display Screen is Dark	Main power is active at breaker and input terminals.
	Power Supply is providing 24v power.
	Control screen is receiving power.
Configuration options don't match manual	MCP software version matches "Configuration" section in manual.
Any Heat Pumps are not visible on MCP Display	Heat pumps are set to "External" mode.
	Ethernet between HPs and MCP is good.
	Ethernet switch is on and connected to Rio.
	MCP is configured to correct number of HP's.
Heat Pumps are visible on MCP but show "Disconnected"	Heat pumps are not in initial power up phase.
	Ethernet between HPs and MCP is good.
	Ethernet switch is on and connected to Rio.
	Heat pumps are "on".
One heat pump runs, but MCP won't stage on additional heat pumps	"Max Stages" is set to high enough value.
	Tank Sensors are wired to correct terminals.
	Tank Sensors are reading correct values.
	Mix and Staging interval has been met (multi-pass only).
	Staging temp has been met (multi-pass only).
	All heat pumps show "Connected".
Heat Pumps are short cycling	LWT Set and Cut-In/Out are far enough apart (Single-pass).
	Tank Set and Trigger temps are far enough apart (Multi-pass).
Heat Pump(s) will not reach target LWT (Single-pass)	Heat pumps are configured for Single-pass.
	MCP is configured for Single-pass.
	Target LWT on MCP is set correctly.



Limited Warranty – Commercial Heat Pump Water Heater System Control Panel

1 Year Limited Warranty

Effective

For **ONE (1) YEAR**, Lochinvar® LLC warrants the commercial heat pump system control panel against failure due to defects in materials or workmanship. All Parts are warranted for **ONE (1) year** from the date of manufacture. This limited warranty is in effect when the control panel is installed within the United States or Canada, provided it remains at its original place of installation.

Warranty coverage begins on the date of installation OR 60 days after the date of manufacture if installation cannot be verified. **Note:** *The date of manufacture can be determined using the Serial Number, located on the silver rating label.* The system control panel must bear the original rating label which has not been altered, defaced, or removed, except as required by Lochinvar.

What is Covered

In the event of a defect in materials or workmanship appearing during the limited warranty period, Lochinvar will repair, or at our discretion, replace any defective part covered under this limited warranty. Any replacement part will be warranted only for the unexpired portion of the original limited warranty period.

If an identical model is no longer available due to a change in law, regulation, or standard, Lochinvar will replace the product with one having at least the same capacity and input. In these instances, you will have the option of paying the difference between what was paid for the original model and the new model with the additional features; or receiving a refund of the portion of the purchase price allocable, on a pro-rata basis, to the unexpired portion of the limited warranty period.

What is Not Covered (Problems Caused By)

- Improper connections, voltage, wiring, or fusing
- Improper installation, sizing, delivery, or maintenance
- Failure to follow printed instructions enclosed with the product
- Abuse, misuse, accident, fire, flood, Acts of God
- Failure to conduct authorized factory start up as required
- Failure to properly perform maintenance, as outlined in the instruction manuals provided by the manufacturer

- Alterations that change the intended or certified use of the product
- Failure to follow applicable local code authority having jurisdiction
- Service trips to explain proper installation, use, or maintenance of the product/control panel or to describe compliance requirements under applicable codes and regulations
- Replacement parts after expiration of this warranty
- Premium associated with after hours or overtime labor
- Any accident to the system control, any misuse, abuse or alteration of it, any operation of it in a modified form, will void this warranty

Owner's Responsibilities

Owner's Are Responsible For:

- **All labor, shipping, delivery, installation, and handling costs associated with the repair and/or replacement, including removal cost of the system control panel**
- All cost necessary or incidental for any materials and/or permits required for installation of the replacement part
- Selecting a qualified service provider. Visit www.Lochinvar.com for a list of service providers in your area
- Following all instructions provided with the product
- Retaining all bills of sale or receipts for proof of installation
- Providing copies of all service and maintenance records
- Contacting your installer or dealer as soon as any problem or defect is noticed

Limitations

NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, THIS IS YOUR SOLE AND EXCLUSIVE WARRANTY. ALL OTHER WARRANTIES, INCLUDING A WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES. TOTAL LIABILITY ARISING AT ANY TIME SHALL NOT EXCEED THE PURCHASE PRICE PAID WHETHER BASED ON CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER LEGAL THEORY.

Claim Procedure

Any claim under this warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practicable, the owner should contact:

Lochinvar, LLC
300 Maddox Simpson Parkway
Lebanon, TN 37090
(615) 889-8900

Service Inquiries

For service inquiries, be prepared to provide the following information: name, address, and telephone number; the model and serial number of the water heater; proof of installation; and a clear description of the problem. For your records, fill in the product:

Serial Number: _____

Model Number: _____

Service Log

[illegible]