Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

Large Array Main Control Panel

MADE IN USA
WITH U.S. & IMPORTED PARTS

For Units produced from 1/1/25 to:

IM-MCPLA-NWS-L251121

Installation Manual

Lochinvar, LLC 300 Maddox Simpson Parkway, Lebanon, Tennessee 37090 ▪ (877) 737-2840 ▪ Lochinvar.com

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Contents

Introduction

Thank you for your purchase of a Large Array Main Control Panel. This 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 controller is intended for use in “single-pass” heating configurations ONLY.

This controller has enhanced capabilities for controlling large single-pass domestic hot water systems, and is suitable for all R513A WHP and MHP heat pump water heaters. It also includes a BMS Gateway, for integration into BACnet® systems via IP or MSTP protocols.

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

Large Array Main Control Panels (MCP-LA's) are central controllers that synchronize the operation of up to fifty attached commercial heat pump water heaters, for use in commercial domestic hot water systems that use a single-pass piping method, with the main storage tank array arranged in a series piping configuration.

Usage

Main Control Panels are installed as external controls to the controlled heat pumps. The MCP-LA 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 single-pass systems.

MCP-LA's are NOT intended for space heat applications, multi-pass water heating systems, or for heat pumps produced by other manufacturers.

Controls and Electrical

Main Control Panels require single phase, 120v power, and come equipped with a plug for use with standard north american receptacles.

Tank sensors are required for operation, directly wired to the MCP-LA. Control devices may wire to the MCP-LA as well for specific applications. Heat pumps are connected to the MCP-LA by ethernet cables.

MCP-LA 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-LA 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

Electrical Specifications	
Voltage	120/1/60
Rated Current (RLA)	0.52 Amp
Minimum Circuit Ampacity (MCA)	1.1 Amp
Maximum Overcurrent Protection (MOCP)	15 Amps
Short Circuit Current Rating (SCCR)	5

Operational Specifications

Operational Specifications	
Max Connected Heat Pumps	50
Maximum Connected Sensors	14x 10k NTC
Pump Relay Outputs	2x 120v
Pump Relay Max Current	6 Amps VAC
Pump Analog Output	1x 4-20mA or 0-10v
Onboard Ehernet Ports	16 [1]

Notes:

[1] Additional heat pumps can be connected with field supplied, unmanaged ethernet switches.

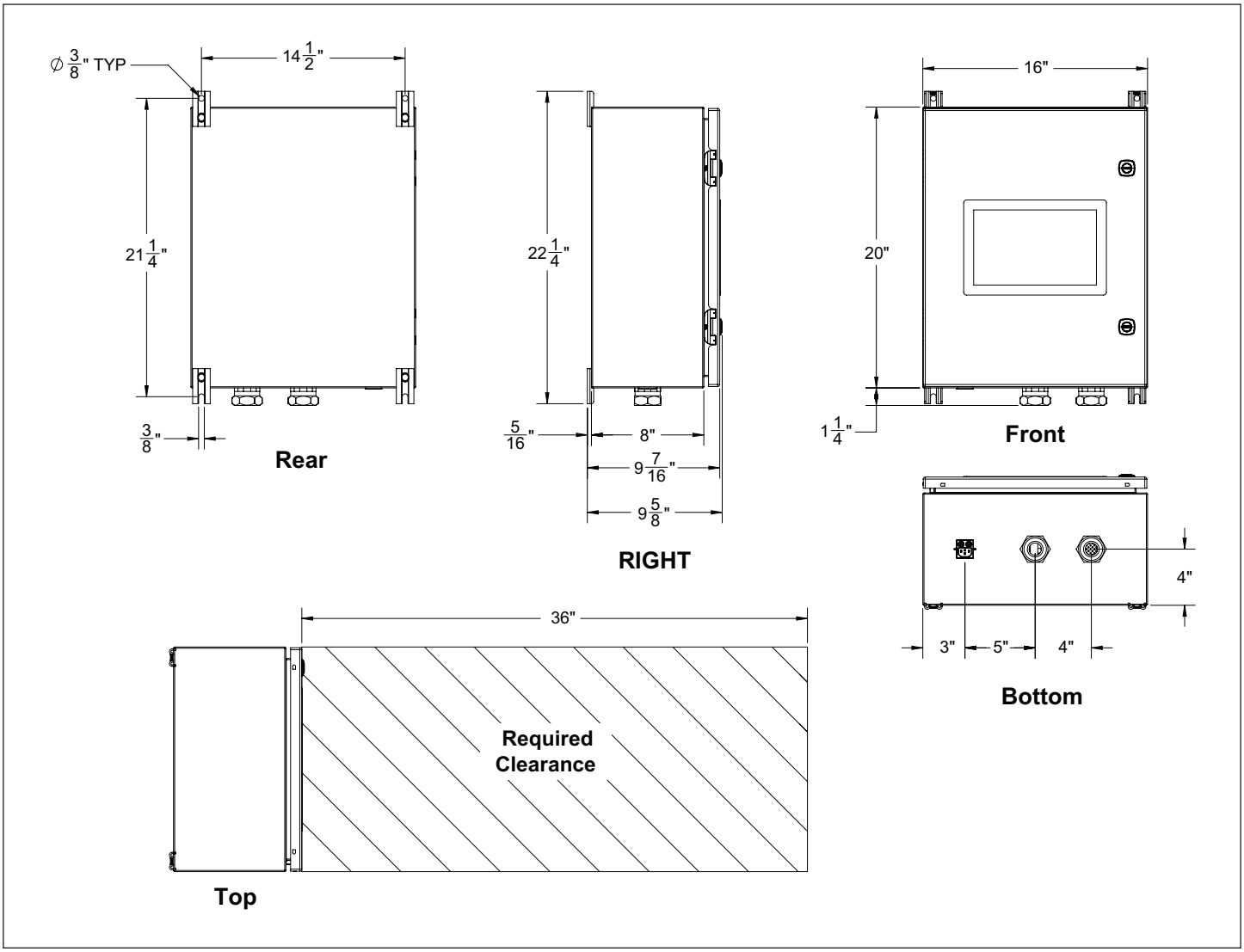
BMS Specifications

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

Physical Specifications and Clearances

Physical Specifications and Ratings	
Ambient Operating Temperature	32-120 Deg. F
Dimensions (in.)	16" W x 22-1/4" H x 13-1/8" D
Weight	43 lb.
Certifications	UL508A

Figure 1: Dimensions and Clearance



Before Ordering Your MCP-LA

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

If your system uses a multi-pass piping configuration, or if it includes older R134a heat pumps, please do not order the MCP-LA. Use the original MCP or MCP-G for those systems.

The MCP-LA is the best choice for controlling more than six single-pass R513A heat pumps for commercial domestic water heating.

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.
- ☐ If more than 16 heat pumps are to be controlled, additional field-supplied unmanaged ethernet switches are required.
- ☐ Primary 120v power wiring to a field receptacle for plug-in power.
- ☐ Control wires for attached devices and sensors.
- ☐ Site prep for mounting the MCP-LA.

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.
- ☐ MCP-LA's are intended for installation in interior, protected locations.
- ☐ Mounting location should avoid generating temperature extremes in the panel.
- ☐ Mounting location must be within 15 feet of a standard 120v electrical receptacle.

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 requirements and the following installation instructions.

Power Requirements:

1. Voltage is above 100v and below 130v.
2. Power is clean, reliable, and well grounded.
3. While not required, an external uninterruptible power supply is recommended for surge and noise protection.

Power Wiring Installation

The MCP-LA comes equipped with a standard 120v cord and plug suitable for North American 120v receptacles.

While the MCP-LA can be directly plugged into a receptacle, and does have fusing on its main power input for device protection, best practice would include using an external uninterruptible power supply for high quality surge and noise protection.

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.

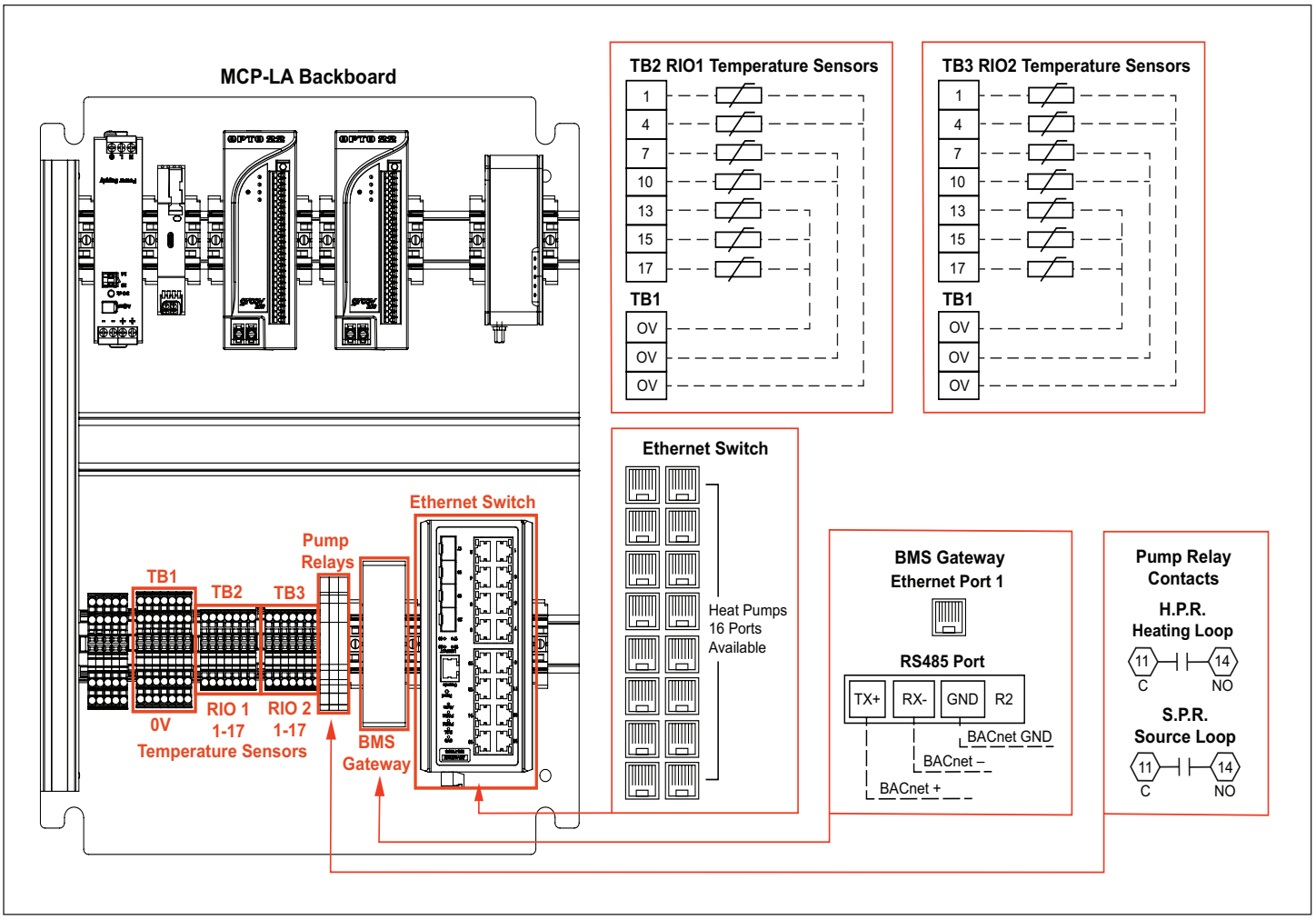
Control Wiring Installation

1. Ensure the control panel is powered down when making electrical connections.
2. Open the panel enclosure.
3. Run sensor and control wiring and/or conduit to, or through, the two 1¼" thread connectors in the bottom of the enclosure.
4. Once in the enclosure, wires can be attached to their target terminals. See Figure 2 on page 10 for specific wiring connections.
5. 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 2: Control Wring Connections



Field Wiring Control Points

BMS: The Ethernet or Serial connection used to connect to building automation systems.

Ethernet: 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 sixteen heat pumps can be connected in this way within the enclosure of the MCP-LA. Additional heat pumps can be added with external, field supplied, unmanaged ethernet switches.

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: These sensor inputs allow the MCP to monitor and control the tank temperatures. Up to 14 sensors can be used, one of which must be a “termination sensor” that marks the end of a heat demand, typically installed on the piping feeding the heat pumps.

Table 1: MCP-LA Control Wiring Specifications

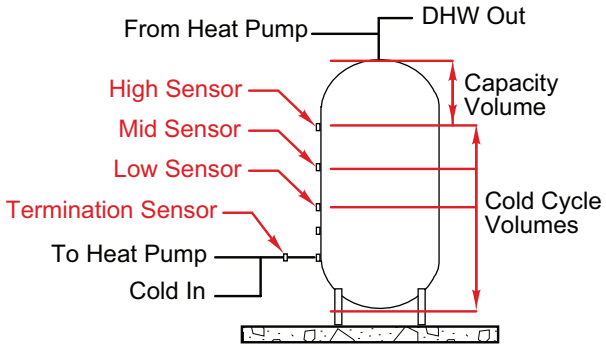
Contact	Location	Terminals		Wire Type	Power
Pump Contact (Source)	SPR	11	14	Any	Dry[1]
Pump Contact (Heat)	HPR	11	14	Any	Dry[1]
Tank Sensors	TB2/TB3	P1-17	0v	Stranded/Shielded	24Vdc
BMS (MSTP)	COM	TX+	RX-	Stranded/Shielded	Variable
BMS (IP)	Ethernet port on Gateway			CAT-5 or CAT-6	–
Ethernet	Switch	–	–	CAT-5 or CAT-6	–

Notes:

[1] All Pump Relay contacts are rated for 6A/250VAC, or 6A/30VDC max.

Single-Pass Tank Sensors for MCPs

Figure 3: Multiple Heat Pumps with Central Controller



Notes:

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

Main Control Panels on single-pass DHW systems use a total of 2 to 13 tank sensors to determine how many heat pumps, or “stages”, to call to satisfy a heat demand. More sensors provides more control over staging, so we recommend using one sensor per heat pump, or the maximum number of sensors possible in larger systems.

In addition, one pipe mounted sensor is used to terminate the demand, mounted on the pipe supplying the heat pumps from the tanks.

Sensor placement must consider the “cold cycle volume” of the heat pumps in use. Sensors must be placed so that as the “Cold Cycle volume” exists between the tank sensor in question, and the next lowest sensor, for each heat pump that will trigger at that sensor location. For example, a sensor will call 2 additional heat pumps, which will require double the “cold cycle volume” of the heat pump model in use between that sensor and the next lowest sensor in the array.

The number of heat pumps that each sensor may call is discussed in the “Configuration” section of this manual, in the sequence of operation. Note that the staging calculation may result in “fractional” heat pumps per stage. You may round down to the nearest whole heat pump when determining sensor spacing in large arrays.

Cycle volume requirements for your heat pumps can be found in the installation manual for the heat pumps in use.

Note that sensor placement also affects the static “capacity volume”, or the stored hot water always available to meet peak demands, of the storage array. Ensure your project has sufficient “capacity volume” after the last sensor to meet peak demand period requirements for hot water delivery.

Configuration

IMPORTANT!

This configuration section is specific to MCP-LA software version 1.0. Check your software version using the MCP's system information 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-LA 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-Startup 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 control 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-LA Controller Screens

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

Heat Pump Status: Individual heat pumps can report their status through these screens.

System Configuration Screens: User-configurable options are available on this screen.

System Overview Screen: This is the default display screen, and features a variety of indicators related to the current operation of the entire system.

System Status Screen: This screen gives status summary information including sensor and heat pump health, current setpoints and relay status.

Configurable Modes

Large Array Main Control Panels can be configured only for single-pass operation. **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.**

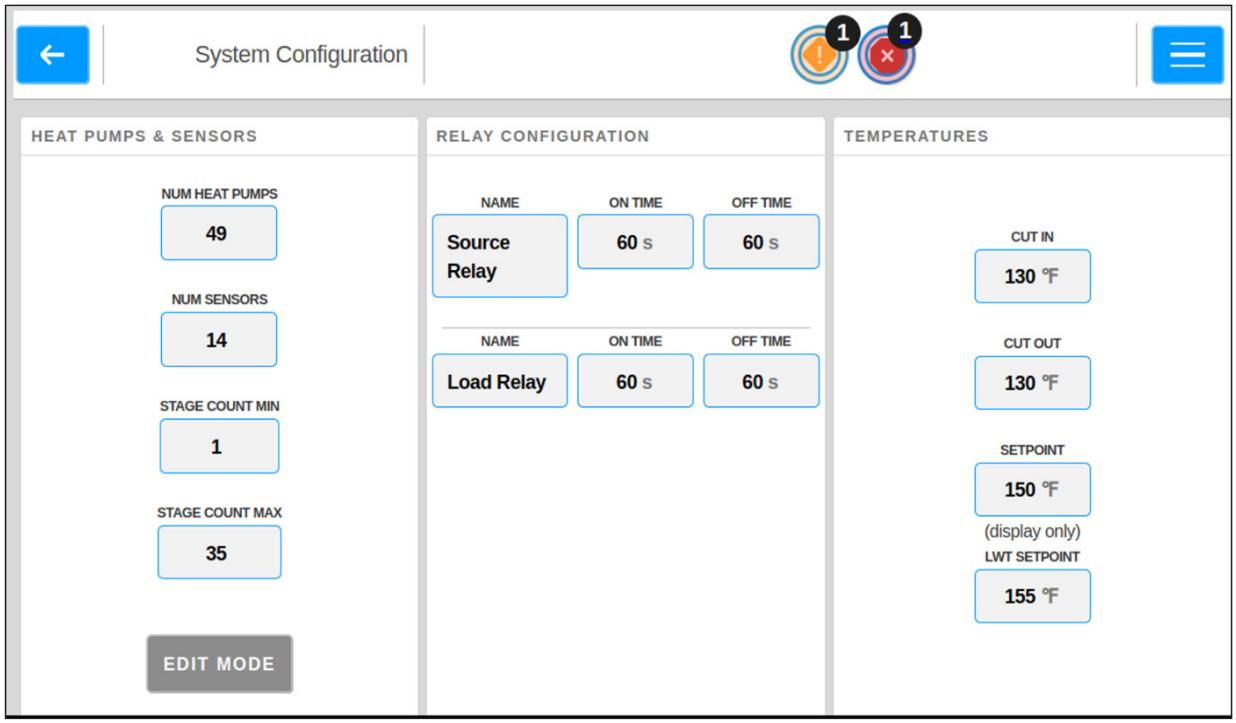
Heat Pump Configuration for MCP-LA

In addition to the MCP itself, each attached heat pump must be configured properly to operate with the main control panel.

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. Failure to remove this jumper may result in permanent heat demands on the equipment.
3. The heat pump must be able to perform in single-pass water heating systems. Multi-pass heat pumps may not be used.
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.

MCP-LA Configuration



On the **"System Configuration"** Screen:

1. To change configuration settings, press the **"Edit Mode"** button. enter the service mode password: **1547**. If successful, the configuration field borders will turn blue, and you will be able to edit the values. Service mode will time out after one hour.
2. Set **(Num Sensors)** to the total number of sensors installed on the MCP (2 to 14 required), including the termination sensor and all tank sensors.
3. Set **(Num Heat Pumps)** to the total number of heat pumps attached to the MCP (1 to 50)
4. Set **(Stage Count Min)** to the minimum number of heat pumps to call for a heat demand.
5. Set **(Stage Count Max)** to the maximum number of heat pumps to call for a heat demand.
6. Configure the relay "on" times: this is the time after the heat demand begins and the relay closes, before the heat demand will be sent to the heat pumps.
7. Configure the relay "off" times. This is the time after the heat demand stops, that the relay will be kept activated.
8. Set the **(LWT Setpoint)** parameter to the desired outlet water temperature of the attached heat pumps.
9. Set the **(Cut-In/Cut-Out)** parameter to the maximum acceptable return temperature of your heat pumps. For WHP and MHP series heat pumps, this should be at least 25 Deg F below the LWT Set parameter.
10. **(Setpoint)** can be set for display purposes, however, it does not affect system operation, as tank storage temperature is ultimately determined by the LWT of the heat pumps.
11. Ensure that the attached heat pumps are configured as per the instructions in the "Heat Pump Configuration" section of this manual and their own installation manuals.

Naming Heat Pumps

Heat pumps connected to the MCP-LA default to displaying their serial numbers as their unit names. However, it is possible to rename heat pumps to match project documentation, field service tags, etc.

To re-name a heat pump, on the overview page, press the heat pump you wish to rename to call up the individual heat pump's status page.

From the heat pump's status page, click on the unit name, and enter the new name. The heat pump will then display that name.

MCP-LA Sequence of Operation

1. When an MCP-LA sensor detects a temperature below **(Cut in Temp)**, it is counted as "cold. The MCP-LA will begin calling a number of heat pumps appropriate to the current number of cold sensors:
   a. 2 sensors = Call **(Stage Count Min)** heat pumps.
   b. All sensors = Call **(Stage Count Max)** heat pumps.
   c. Per sensor in between 2 and All sensors = Call **(Stage Count Max - Stage Count Min)/(Num Sensors)**-2).

EXAMPLE

A system configured with Stage count min = 3, stage count max = 10, and with Num sensors = 5 will call (Max 10 - Min 3)/(Sensors 5 - 2) = 7/3 = 2.33 Heat pumps per sensor after sensor 2 calls, rounding down.

2. At the beginning of the heat demand, the MCP's HPR and SPR pump contacts close.
3. After **(Relay On Times)** expire, the heat demand will be sent to the appropriate heat pumps.
4. 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 first.
5. Heat pumps begin operation, modulating their output water temperature to the MCP's **(LWT SETPOINT)**.
6. Staging will adjust the number of heat pumps as a lower sensor rises above the **(Cut Out Temp)**. For example, a demand set at sensor 13 will reduce the stage count when sensor 12 rises above the **(Cut Out Temp)**.
7. When the last cold sensor detects water above the **(Cut Out Temp)** temperature, demand ends.
8. 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.
9. **(Relay Off Times)** seconds after the end of the demand, the MCP-LA will open its pump contacts.

BMS Installation and Configuration

⚠ 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.

Configuration Prep and Login

1. Power up the controller, and allow it to finish its startup, before attempting to configure the BMS gateway. After startup is completed, connect a laptop or PC directly to the gateway, using the ethernet port on the gateway. This component is shown in the "field wiring control points" diagram in the "control wiring" section of this manual, for reference.

2. Open a web browser and connect directly to https://192.168.1.170
    a. You may get a “Web Server Security Unconfigured” message. It is okay to proceed with HTTPS from that warning message.
    b. You may get a “Your Connection is not Private” message. If so, click “Advanced”, and click “proceed to 192.168.1.170 (unsafe)”.
3. Login to the gateway web interface. Username is “admin”. Password is written on the gateway’s label, and is also available via QR code on the gateway. The gateway is located within the electrical enclosure, and it may be necessary to temporarily unseat the gateway from the DIN rail to read the label.
4. On the first login, the security mode will need to be set. We recommend “Basic HTTP” or “HTTPS with own trusted certificate”.

After selecting a mode, you will get a “redirecting” message, and then the Field server GUI should open.

Network Settings

5. To configure network settings, on the GUI landing page, click on the “Settings” tab. Within “Settings”, click on the “Network” tab.
    a. On the first connection, you will get a warning message that you are about to leave the registration process. Click “Exit Registration”.
6. You should now see a page with “ETH 1” and “Routing” tabs. Click the “Routing” tab.
    a. Select the default connection in the first row of the table.
    b. Click the “Add Rule Button” to add a new row.
    c. Set a new Destination Network, Netmask, and Gateway IP Address as needed.
    d. Set the priority for each connection from 1 (highest) to 255 (lowest).
    e. Click the “Save” button.
7. Now click the “ETH 1” tab to access the ethernet settings.

Be advised, if IP addresses are changed, it will be necessary to reconnect to the gateway via your browser using the new IP address before continuing with configuration settings! Only proceed once ready to connect to the building’s network.

8. DHCP to automatically accept IP settings can be enabled here, or IP settings can be manually configured.
    a. For manual configuration, set IP Address, Netmask, Default Gateway, and Domain Name Server.
    b. If the gateway will be connected to a router, the gateway MUST set the “Gateway” field to the IP address of the router.
9. Click “Save” to activate the settings changes.

Protonode Configuration

To configure the protonode, start from the “Device List” page in the GUI and click “Settings”.

10. Choose “Configuration”, and click the “Profiles Configuration” Button. Set the “protocol_select” field.
    a. Set to 1 for BACnet IP.
    b. Set to 2 for BACnet MSTP.
    c. Set to 3 for BACnet MSTP (Single Node).
    d. Hit “submit” after entering the correct value.

Selecting a protocol will change the list of visible parameters to only parameters applicable to your protocol.

11. Set the remaining parameters according to the needs of your network and BMS system. Press “submit” to save each value.

Table 2: Configuration Parameters for BMS Gateway

Parameter	Protocol	Values	Description
protocol_select	All	1,2,3	Protocol Selector: set to 1: BACnet IP. 2: BACnet MSTP. 3: BACnet MSTP (single node).
mod_baud_rate	All	9600-19200-38400-57600	Set to the Modbus RTU baud rate required.
mod_parity	All	None,Even,Odd	Set to the Modbus parity required (Factory Set).
mod_data_bits	All	7,8	Set to the Modbus data bits required (Factory Set).
mod_stop_bits	All	1,2	Set to the Modbus stop bits required (Factory Set).
network_nr	1, 3	1 - 65535	Sets the BACnet network number for the gateway.
node_offset	1, 3	0 - 4194303	Sets the BACnet device instance (Device address plus offset).
bac_ip_port	1	1 - 65535	Set to the BACnet IP port required for the gateway.
bac_cov_option	ALL	enable, disable	Enables or Disables COVs for the BACnet application.
bac_bbmd_option	1	BBMD, -	Enables or Disables BBMD for the BACnet application.
bac_virt_nodes	1, 3	No, Yes	No: single heat pump on gateway. Yes: multiple heat pumps on gateway.
bac_device_id	2	1 - 4194303	Sets this BACnet device instance.
bac_mac_addr	2, 3	1 - 127	Sets the BACnet MSTP MAC address.
bac_baud_rate	2, 3	9600-19200-38400-76800	Sets the BACnet MSTP Baud Rate.
bac_max_master	2, 3	1 - 127	Sets the BACnet MSTP max master.
bac_max_info_fr	2, 3	1 - 65535	Sets max number of frames before token must be passed.

12. Connect the gateway to the building network.
13. Reconnect to the new gateway IP address with your web browser, if necessary. Verify communications in accordance with the “Testing” instructions in the next section.
14. The gateway should now allow for building management system integration. Points lists for different heat pumps are available at the end of this manual for this process.

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 3: Relevant Data Points for MCP-LA: Writable Values

Profile Description	Profile Name	Description of Operation
Cycle Bit	Cycle	Set to 1 to enable operation, 0 to disable operation.
Leaving Water Setpoint (SP) / (DR)	Lw_Set	Target leaving water temperature for single-pass operation (Deg F).
Cut-In/Out Setpoint (SP)	Cut_in_out_set	Activation/Termination temperature for single-pass operation (Deg F).
Temperature Setpoint Tank	Tank_Set	Target tank temperature (Deg F). This is a display value only.

Table 4: Relevant Data Points for MCP-LA: Read-Only Values

Profile Description	Profile Name	Description of Operation
System Cycle Status	Cycle_Status	Whether MCP-LA is currently on or off.
System Status (Idle / Active / Others)	System_Status	Whether heat demand is active or idle.
System Alarms (MCP Generated)	System_Alarm	Communication Fault, Probe Fault, etc.
Number of Installed Units	Installed_Units	The number of heat pumps the MCP is configured to operate.
Number of Units Currently Running	Running_Units	The number of heat pumps currently in active demand status.
Tank Probe X	TankProbeX	Tank Sensor X, where X = 1 to 13.
Tank Probe 14	Probe14	Another sensor location. Legacy point name from prior points lists.
Alarm Number Unit X	UnitAlarmX	Alarm Status of Heat Pump 1, 2, up to 50 where X = HP Number.
Compressor Run Hours X	Compressor-RunHRSX	Cumulative Run Hours for Heat Pump 1, 2, up to 50 where X = HP Number.

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.

In addition, system communication can be checked. For serial connections, check that the TX and RX LEDs are rapidly flashing.

You can also log into the field server GUI with a web browser, as in the **"Configuration"** section. From there, clicking on "Diagnostics and Debugging", and then on "connections", shows you a table of communication connections. The "errors" column would indicate if there are errors requiring additional troubleshooting.

Communication errors are usually caused by:

- Baud rate, parity, data bits or stop bits set incorrectly
- Device addresses incorrect
- Wiring problems
- Device not listed in the Web Configurator
- IP Addressing incorrect

If communication errors cannot be troubleshot, a "Diagnostic Capture" can be taken and emailed to the factory for assistance.

1. Connect to the field server GUI with your web browser.
2. Click on "Diagnostics".
3. Select "Full Diagnostic".
4. Set the capture time period.
5. Click start. When the capture period is finished, a download button will appear.
6. Download the capture.
7. Email the capture to your factory Rep, along with any supporting information needed to describe the problem.

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

Electrical Checks

- ☐ Main power wire is securely attached to the MCP-LA, receptacle 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 the factory to authorize warranty replacement, BEFORE the components are removed from service.

Problem	Check
Display Screen is Dark	Main power is active and power wire is secure.
	Power Supply is providing 24v power.
	Fuses show continuity
	Control screen is receiving power.
Loading Screen doesn't Load	Check Ethernet cable to screen
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.
	Heat pumps are set to DHCP network mode.
	Ethernet switch is on and connected to Rio in MCP
	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 in HPs
	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 reading correct values
	All heat pumps show "Connected"
Heat Pumps are short cycling	LWT Set and Cut-In/Out are far enough apart
	Tank sensors are far enough apart on tank
Heat Pump(s) will not reach target LWT	Heat pumps are configured for Single-pass
	Target LWT on MCP is set correctly.

Lochinvar®

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 thedealer 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: _____

Lochinvar®

Service Log

Issue Description	Date	Servicer

Lochinvar, LLC 300 Maddox Simpson Parkway, Lebanon, Tennesee, 37090 ▪ (877).737.2840 ▪ Lochinvar.com