Keep these instructions for future reference.

⚠️ WARNING

Failure to read and follow all instructions carefully before installing or operating this control could cause personal injury and/or property damage.

⚠️ CAUTION

ELECTRICAL SHOCK HAZARD.

To prevent electrical shock and/or equipment damage, disconnect electric power to the system at the main fuse or circuit breaker box until installation is complete.
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Introduction and Overview

The Premium User Interface is a smart logic controller that offers the optimal performance out of the MP Series heater. It modulates the heater(s) with a full PID controller considering various inputs and outputs. It utilizes the current set temperature, room temperature, mode selected, and other items to set the speed of modulation. Therefore, the heater output optimally matches the heat loss of the space.

Specifications

Physical Dimensions:
  Height: 7-3/4 Inches
  Width: 3-5/8 Inches
  Depth: 1-7/8 Inches

Programming Choices:
  Non-programmable
  7-Day programmable

Temperature Range:
  35°F – 120°F

Differential:
  1.0°F

Electrical Rating:
  Connection Type – RS485
  Constant Power – 15VDC (from heater)
  Battery – 3VDC (CR2032s)

Maximum Operating Humidity Level:
  85% Non-Condensing

Additional Features:
  Optional remote temperature sensor
  Optional outdoor air sensor
  Positive off
  BMS compatibility
  4-20mA
  0-10VDC
Figure 1.1 • TH-PUI Controller Features

Front View

- Digital Screen Display
- Blast Mode Key
- Mode/Set Key
- Power Key
- Down Arrow Key
- Up Arrow Key
- Thermostat Wire Hole

Base

- Mounting Holes
- #1 Phillips screw (6 provided)
- Contrast Adjust
- BMS Jumper
- Battery
- Wire Terminal Block
- Ribbon Connector

Figure 1.2 • TH-PUI Controller Home Screen Readout Description

- Operation Mode (Indicates the operation that is currently selected)
- Date (Indicates the present date)
- Set Temperature (Indicates the desired temperature)
- Time and Room Temperature (Alternates between the time of day and the actual room temperature)


2.0 Installation

WARNING

Electrical Shock Hazard
Disconnect power at the main fuse or breaker prior to installing this unit.

Installation

1. Using the template on page 16, mark hole locations for mounting and wire inlets.
2. Drill mounting holes. Ensure that the wires will feed through the wire opening in the base of the thermostat.
3. Remove cover from the base by unscrewing the two (2) #1 Phillips screws from the base. Carefully disconnect ribbon connector from the base by pulling it straight off of the board.

CAUTION

Forcing or straining the ribbon cable will cause damage to the unit.

4. Fasten base snugly to the wall or mounting surface utilizing the mounting holes provided. Level as necessary for visual purposes (unit being out of level will not affect performance).
5. Route 18 ga. shielded thermostat wire through the hole provided in the back of the base.
6. Connect wires to the terminal block following the appropriate wiring diagram.
7. Carefully re-connect the ribbon connector to the base and set the cover in place. Secure with the six (6) screws provided.
## Wiring Connections

### Chart 2.1 • Terminal Wiring Designations

<table>
<thead>
<tr>
<th>Terminal Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R (15+)</td>
<td>Constant power 15VDC from heater</td>
</tr>
<tr>
<td>W (485-)</td>
<td>RS485 communication wire, negative inverting pin</td>
</tr>
<tr>
<td>B (485+)</td>
<td>RS485 communication wire, positive non-inverting pin</td>
</tr>
<tr>
<td>G (GND)</td>
<td>Ground, reference for RS485, connection point for shield drain wire</td>
</tr>
<tr>
<td>COM</td>
<td>Common wire from 4-20mA or 0-10V signal (OPTIONAL)</td>
</tr>
<tr>
<td>4-20mA</td>
<td>4-20mA signal from BMS system (OPTIONAL)</td>
</tr>
<tr>
<td>0-10VDC</td>
<td>0-10VDC signal form BMS system (OPTIONAL)</td>
</tr>
<tr>
<td>0-20VDC</td>
<td>0-20VDC signal controller (OPTIONAL)</td>
</tr>
<tr>
<td>Room Thermistor</td>
<td>Connector for remote temperature sensor, 10kΩ (OPTIONAL)</td>
</tr>
<tr>
<td>Outdoor Thermistor</td>
<td>Connector for outdoor temperature sensor, 10kΩ (OPTIONAL)</td>
</tr>
</tbody>
</table>

### Figure 2.1 • General Wiring Diagram

![General Wiring Diagram](image_url)
TH-PUI Series

Installer Configuration

To enter the menu, press Mode/Set. This displays the main menu of the controller. Press up arrow or down arrow to cycle through the menu items. Press Mode/Set to adjust the selected menu item. Cycle through the adjustment options with the up arrow or down arrow keys. Press Mode/Set to enter the selected value. To return to the home screen, press the power key. Menus will auto exit after a predetermined time if no action is taken.

Main Menu

1 Set the Desired Temperature: When the programmed schedule is turned off, this feature will allow the user to select the desired temperature. If the unit is set to operate within the scheduled program, the set point temperature is bypassed.

2 Select Mode: This feature allows the user or installer to select the desired operating mode of the heater(s). There are three modes to choose from: Economy, Standard, or Comfort. For more information on the modes, see pages 8 & 9 or refer to the MP Series Insert Manual (LIOMP).

3 Run Program: This controller has the ability to run on a 7-day programmable schedule or operate as a non-programmable thermostat. In this menu, user can turn the program on or off, or enter the sub-menu to adjust the program schedule.

4 Set Date: Adjust the date to the current calendar date.

5 Set Time: Adjust the time to the current time of day.

6 Service Mode: This menu will allow the installer to enter into a sub-menu of configurations that is not normally accessed by the user. To enter this menu, press the Mode/Set key twice.

7 Exit: Select this menu item to exit to the previous menu, or simply press the power key to return to the home screen.

Service Mode Menu

1 Set Temperature Sensor: This allows user to select the method of sensing the temperature. The options are Local, Heater, and Remote.
   A. Local: Utilizes the built in thermistor on the Premium User Interface.
   B. Remote: Utilizes a remote thermistor connected to the Premium User Interface.
   C. Heater: Utilizes a thermistor connected to the modulating controller on the heater.

2 Outdoor Sensor: The installer can specify if an outdoor air temperature sensor is attached. This allows additional features to be activated on the Premium User Interface. For more information, reference the MP Series Insert Manual (LIOMP).

3 High Temperature Lockout: This feature allows user to turn on or off the ability to keep the heater from coming on if the outdoor temperature is higher than the desired temperature.

4 Set Temperature Lockout: User can adjust the set point temperature for the high temperature lockout. The factory default is 100°F.

5 Set °F / °C Display: Select the desired temperature unit of measure. Factory default is °F.
6 **Format Time:** Select the desired time format from 12hr to 24hr. Factory default is 12hr.

7 **Daylight Savings:** Select if the unit is to automatically correct for daylight savings. Factory default is off.

8 **Backlight Format:** This feature allows user to have the backlight on continuously or just on with the touch of a key. In low light conditions, the continuous backlight improves contrast.

9 **Software Version:** This will display the software version of the Premium User Interface.

10 **Lifetime Statistics:** This will allow the user to view some key statistics of the heater, such as the number of cycles, total runtime hours, total heating hours, and number of faults. For troubleshooting purposes, user can reset the statistics if needed.

11 **Building Management System (BMS):** The Premium User Interface can be connected to most building management systems. This menu item allows the installer to select the type of BMS employed. In addition, the jumper on the base must also be set to the proper type (4-20mA or 0-10VDC). For more information, see Building Management Systems on page 13 of this manual.

12 **Commissioning:** This feature allows the installer to enter another sub-menu where they can select certain tools for troubleshooting or commissioning. The code to enter this menu is a three (3) character code:

   A. Press in sequence: Mode/Set, up arrow, down arrow.

13 **Reset Control:** This feature allows the controller to be reset to the factory default settings.

14 **Exit Service:** This will allow user to exit back to the main menu.

### Commissioning Menu

1 **Model of Heater:** This will display the model of the Master heater as well as the heater's software version.

2 **Test Firing Rate:** To assist in measuring a stable manifold pressure this feature allows the unit to be temporarily locked into a test firing rate of 100% or 1%. Please reference the MP Series Insert Manual (LIOMP) for proper manifold pressures.

3 **Pressure Differential:** This feature allows the technician or installer to read the pressure differential of the master heater as it is running. This is measured by the pressure transducer of the modulating controller.

4 **% Open Gas Valve:** This feature allows the technician or installer to read the heaters % open of the gas valve as determined by the modulating controller. This is for reference only, and does not necessarily indicate proper operation of the heater.

5 **Exit:** This feature will return user to the previous menu, the Service Mode Menu.
3.0 Programming

Programming

Prior to adjusting the program schedule, verify that the date and time are properly set. The program will run on a 7 day schedule. The controller will offer two set points for each day of the week. One for occupied, and one for unoccupied. The times and temperatures of these are adjustable to the users needs to reach their comfortable temperature.

Chart 3.1 • Factory Pre-Set Programming

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Occupied Time</th>
<th>Temperature</th>
<th>Unoccupied Time</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Tuesday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Wednesday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Thursday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Friday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Saturday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
<tr>
<td>Sunday</td>
<td>6:00A</td>
<td>70°F</td>
<td>5:00P</td>
<td>62°F</td>
</tr>
</tbody>
</table>

To Adjust the Program:

1. Press the Mode/Set key to bring up the main menu.
2. Press the down arrow key twice (2X) until the screen called ‘Run Program’ is displayed.
3. Press the Mode/Set key to activate the selection field.
4. Press the down arrow key until the selection ‘Adjust schedule’ is flashing, then press Mode/Set.
5. Press the up arrow or down arrow key to cycle through the days of the week and the occupied and unoccupied desired temperature.
6. To adjust the desired temperature, press the Mode/Set key to initiate the temperature to start flashing. Using the up arrow or down arrow, adjust the temperature to the desired set point.
7. Repeat steps 5-6 until all of the program temperatures are set to the desired set point.
8. To set the time schedule for the occupied and unoccupied times, select ‘Timing adjust’ from the menu and press Mode/Set.
9. Select the desired timing to adjust and press the Mode/Set key. Press the up arrow or down arrow to adjust the hours. Press Mode/Set again to adjust the minutes. Press Mode/Set to lock in the adjusted timing.
10. Once all timings have been selected, press power key or select Exit to return to the home screen.
Chart 3.2 • Worksheet for Re-Programming the 7-Day Program

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Occupied</th>
<th>Unoccupied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time</td>
<td>Temperature</td>
</tr>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Manual Operation for Non-programmable Mode

The TH-PUI controller has the ability to run like a standard non-programmable thermostat. To activate this ability, the 'run program' must be off. To verify this, from the home screen, press the `Mode/Set` key, then the `down arrow` key twice. The header will display ‘RUN PROGRAM’. The bottom line should read ‘OFF’. If it does not, press the `Mode/Set` key until the bottom line is flashing and then select off with the `up arrow` or `down arrow` key.

1. Press `Mode/Set` key to bring up the main menu.
2. Press the `down arrow` key twice until the screen called ‘Run Program’ is displayed.
3. Press the `Mode/Set` key to activate the selection field.
4. Press the `down arrow` key until the selection ‘Adjust schedule’ is flashing, then press `Mode/Set`.

BLAST Mode

The BLAST Mode allows users to temporarily override the preset program or temperature setting by turning on the heater(s) to 100% input rate and not allowing it to modulate. This feature would be used to compensate for rapid changes in the environment, such as a loading door open, a cold mass introduced into the environment, or other high demand situations. This is a temporary, timed option that is selected by the user on demand.

When the `Blast` key is pressed, it will initiate the blast mode. The desired timer for the mode can then be selected by pressing the `up arrow` or `down arrow` keys. The timing is set in 10 minute increments, with a maximum time of 50 minutes. During the sequence, the operation mode indicator will read BLAST, and the remaining time will be read in the date indicator area. Once the timer has expired, the unit will revert back to the normally scheduled program.
Blast mode can never be locked on indefinitely. If the heater is transitioning from BLAST mode to the normally scheduled program, the heater may not shut off if the program is not satisfied. However, it will revert back to the ability to fully modulate. To discontinue Blast Mode, press the down arrow until no time remains.

**Mode Selection Guide**

The MP Series heater is programmed to operate on several different performance curves, or ‘MODES’. These curves are to allow the user to select their desired operation that best accommodates their specific need. The performance curves can be selected by the Premium User Interface (TH-PUI) under the main menu.

The three available modes are:

- **Economy Mode**: Unit operates to maximize thermal efficiency.
- **Comfort Mode**: Unit operates to maximize perceived human comfort.
- **Standard Mode**: Unit operates as a balance between comfort and economy mode.

These modes can be selected at any time during normal cycles of the heater. The currently selected mode will be displayed in the upper left hand corner of the home screen. Factory default is ‘Comfort Mode’.

**Chart 3.3 • Mode Selection and Application Chart**

<table>
<thead>
<tr>
<th>Comfort Mode</th>
<th>Standard Mode</th>
<th>Economy Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patios</td>
<td>Service garages</td>
<td>Aircraft hangars</td>
</tr>
<tr>
<td>Loading docks</td>
<td>Fire stations</td>
<td>Car washes</td>
</tr>
<tr>
<td>Break areas and lunch rooms</td>
<td>Populated warehouse heating</td>
<td>Pole barns</td>
</tr>
<tr>
<td>Kennels</td>
<td>Manufacturing</td>
<td>Foundries</td>
</tr>
<tr>
<td>Parts counters and service desks</td>
<td>Auto showrooms</td>
<td>Unpopulated warehouses</td>
</tr>
<tr>
<td>Golf driving ranges</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodworking shops</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For more information about the modes and their performance curves, please see the MP Series Insert Manual (LIOMP).
Connecting to a BMS System

The Premium User Interface allows a building management system or remote analog signal to be used to dictate the firing rate of the MP Series. Most building management systems output a PID loop control for this purpose. The Premium User Interface can receive a 4-20mA signal, 0-10VDC signal, or 0-20VDC signal. The input rate of the heater is varied linearly according to the percentage of the signal. If a positive off is desired, the control signal can be wired in series through another set of contacts on the BMS controller.

Configuring the Premium User Interface for a BMS System

1. Ensure the proper wire connections are made per the selected system’s signal (see wiring diagram).
2. Configure the BMS Jumper located in the upper right corner of the base to the proper position for the system’s signal (see figure 2.2).
3. Under the Service mode Menu (See page 7, Service Mode), select ‘BLDG MGMT SYSTEM’. Press Mode/Set key.
4. Press up arrow key or down arrow key to select the appropriate signal being connected.
5. Press the Mode/Set key again to lock in the selection.
6. Press the power key to return back to the home screen.

NOTE: The Building Management System (BMS) option under the Service Access Menu must be turned on to the correct configuration in order for the heater to operate according to the signal. If it is ‘OFF’ then the heater will revert back to the normal operation of the schedule built into the Premium User Interface.

Figure 3.2 • BMS Jumper Configurations

<table>
<thead>
<tr>
<th>0-10VDC Configuration</th>
<th>4-20mA Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20mA 0-20V</td>
<td>4-20mA 0-20V</td>
</tr>
<tr>
<td>No Jumper</td>
<td>Place Jumper Here</td>
</tr>
</tbody>
</table>
Figure 3.3 • 0-10VDC Wiring Diagram

Figure 3.4 • 4-20mA Wiring Diagram
4.0 Troubleshooting and Service

Troubleshooting

When ‘Reset Control’ is performed, installer configurations and programming will reset to default factory settings.

Chart 4.1 • Troubleshooting Chart

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank Screen</td>
<td>Control is wired improperly. Power to heater is off. Heater control board has open fuse.</td>
<td>Correct wiring. Restore power to heater. Replace 3A ATO or APS (Violet) fuse.</td>
</tr>
<tr>
<td>Error with User Interface</td>
<td>Key pad shorted or closed for a time greater than 1 minute. Ribbon connector is not properly connected.</td>
<td>Verify proper connection of ribbon connector. Reset control. Replace keypad. Consult factory.</td>
</tr>
</tbody>
</table>
5.0 **Limited Warranty**

One-Year Limited Warranty. Detroit Radiant Products Company (hereinafter referred to as the Company) warrants to the original purchaser or original user that the control covered in this manual is free from defects in material or workmanship under normal use and service. The Company’s sole obligation under this warranty shall be limited to furnishing replacement parts, F.O.B. Warren, Michigan, for 12 months from the date of initial installation of the heater, but not to exceed 18 months from the date of shipment by the Company of the heaters, for any parts which the Company’s examination shall disclose to its satisfaction to be defective. Defective parts are to be returned to the Company, transportation charges prepaid.

The warranties herein shall be null and void if the unit is not installed by a competent heating contractor and/or if the unit is not installed according to Company instructions, normal industry practices and/or if the unit is not maintained and repaired according to Company’s instructions. Normal product degradation and wear (rust, oxidation, etc.) does not constitute a material defect and applicable warranty claim.

Written permission is required for the return of any parts or equipment and any such return must be made on the basis of transportation charges prepaid. Shipment may be refused unless prior written permission is obtained and goods returned prepaid.

This Warranty applies only within the United States.

6.0 **Mounting Pattern**

Cut out and use this pattern to assist in locating the proper mounting holes.

1:1 SCALE