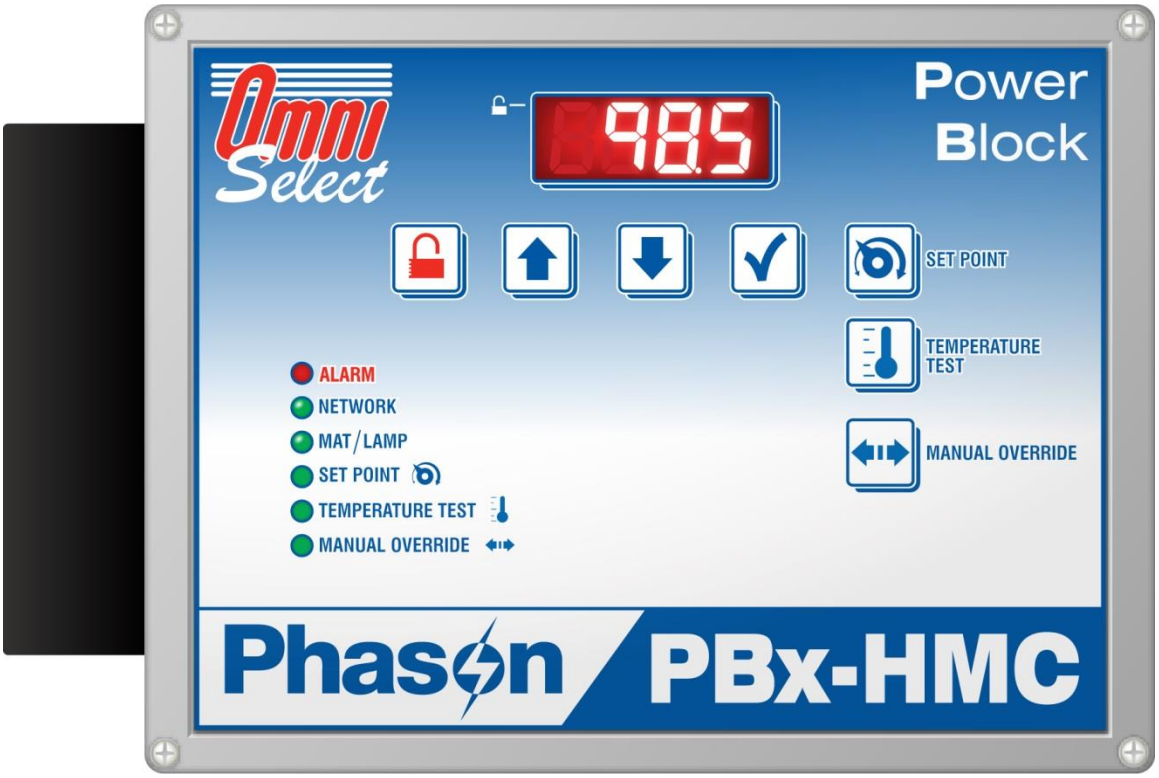
Omni Select
98.5
Power Block
SET POINT
TEMPERATURE TEST
MANUAL OVERRIDE
ALARM
NETWORK
MAT/LAMP
SET POINT
TEMPERATURE TEST
MANUAL OVERRIDE
Phason
PBx-HMC

LR 61791

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Chapter 1: Introduction

Introducing the PBx-HMC

The PBx-HMC Power Block is an automatic temperature-based control with one 20 amp variable stage for controlling heat mats in **OMNI Select** systems.

The PBx-HMC is centrally monitored and controlled by the **Select Ventilation** software, so you have all the power and control that OMNI Select offers you: temperature charts and reports, status viewers, and the option to add the **Select Alert** module.

The Heat Mat Control displays alert conditions such as high and low temperatures, power failure, and probe damage at the control itself. You can also connect to an alarm system or siren.

Features

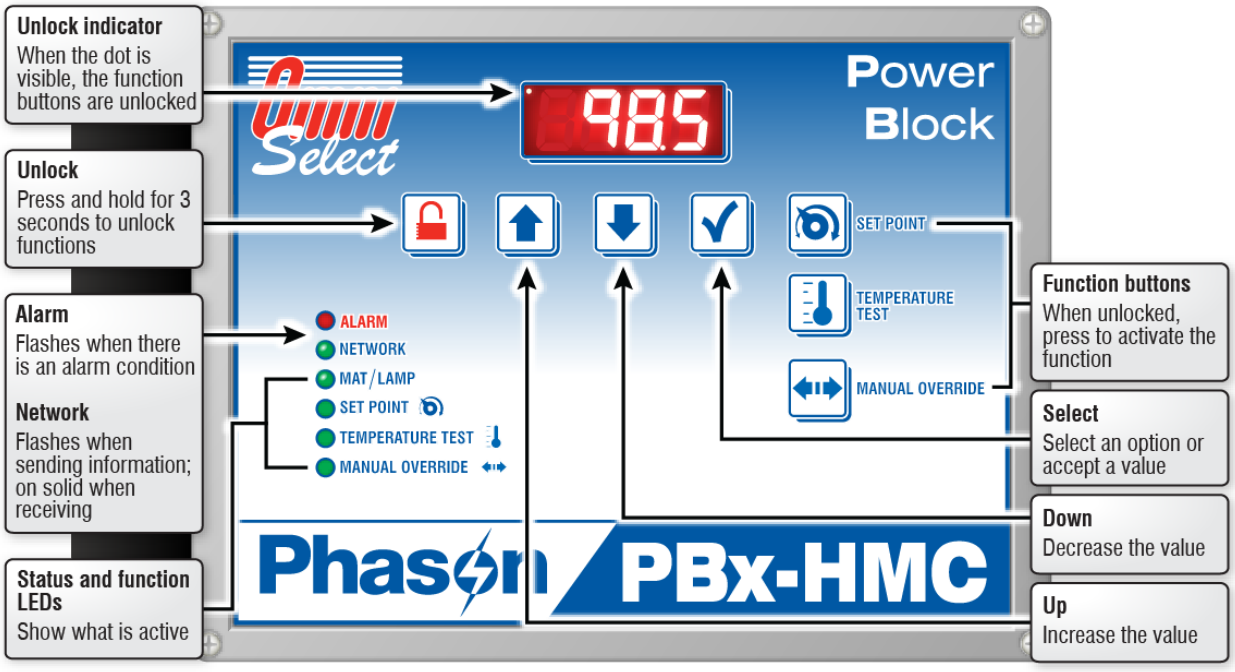
- Automatic temperature-based control, range: 70 to 125°F (21 to 51°C)
- Central monitoring and control using Select Ventilation
- Variable heating stage for controlling heat mats
- Alarm relay (for external alarm system or siren)
- Temperature probe input
- Functions available at the control:
  - Adjustable group set point
  - Temperature test
  - Manual override
- Rugged enclosure (corrosion resistant, water resistant, and fire retardant)
- CSA approval
- Limited warranty (two years)

Electrical ratings

- Input power: 120/230 VAC, 50/60 Hz
- Input fuse: 250 V, 1 A fast-acting glass
- Variable AC: 20 A at 120/230 VAC, general-purpose (resistive)
  2300 W at 120 VAC; 4600 W at 230 VAC
- Alarm relay: 0.4 A at 125 VAC; 2 A at 30 VDC, resistive load
  0.2 A at 125 VAC; 1 A at 30 VDC, inductive load

Becoming familiar with the PBx-HMC

The four-character LED display shows temperatures, alarm messages, and programming information.



NOTE

If you leave the PBx-HMC in a menu or display other than the main display, the control returns to the main display after five minutes without any key presses. The only exceptions are manual override mode and temperature test mode; the control remains in these modes until you manually exit them.

Chapter 2: Installation

Before installing the PBx-HMC

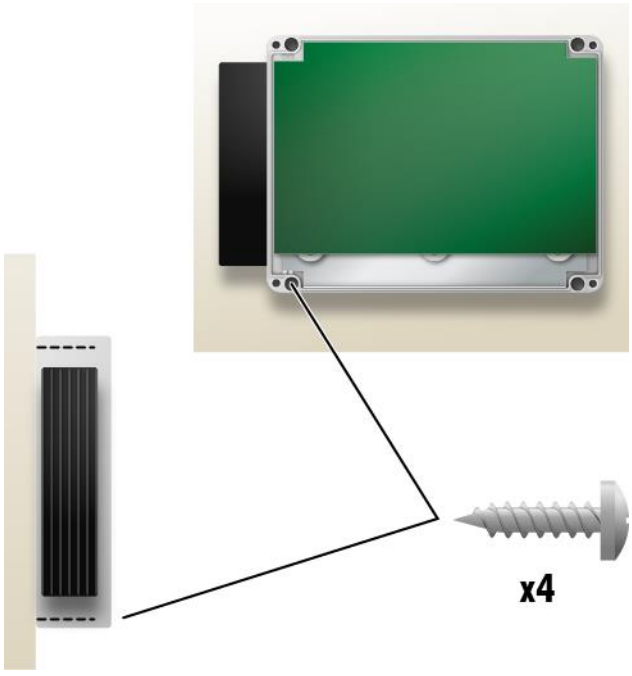
Before installing, you need to do some initial preparation:

1. Read the **Control Fundamentals** guide that came in the box with your control.
2. Read **Understanding power surges and surge suppression** on page 19.

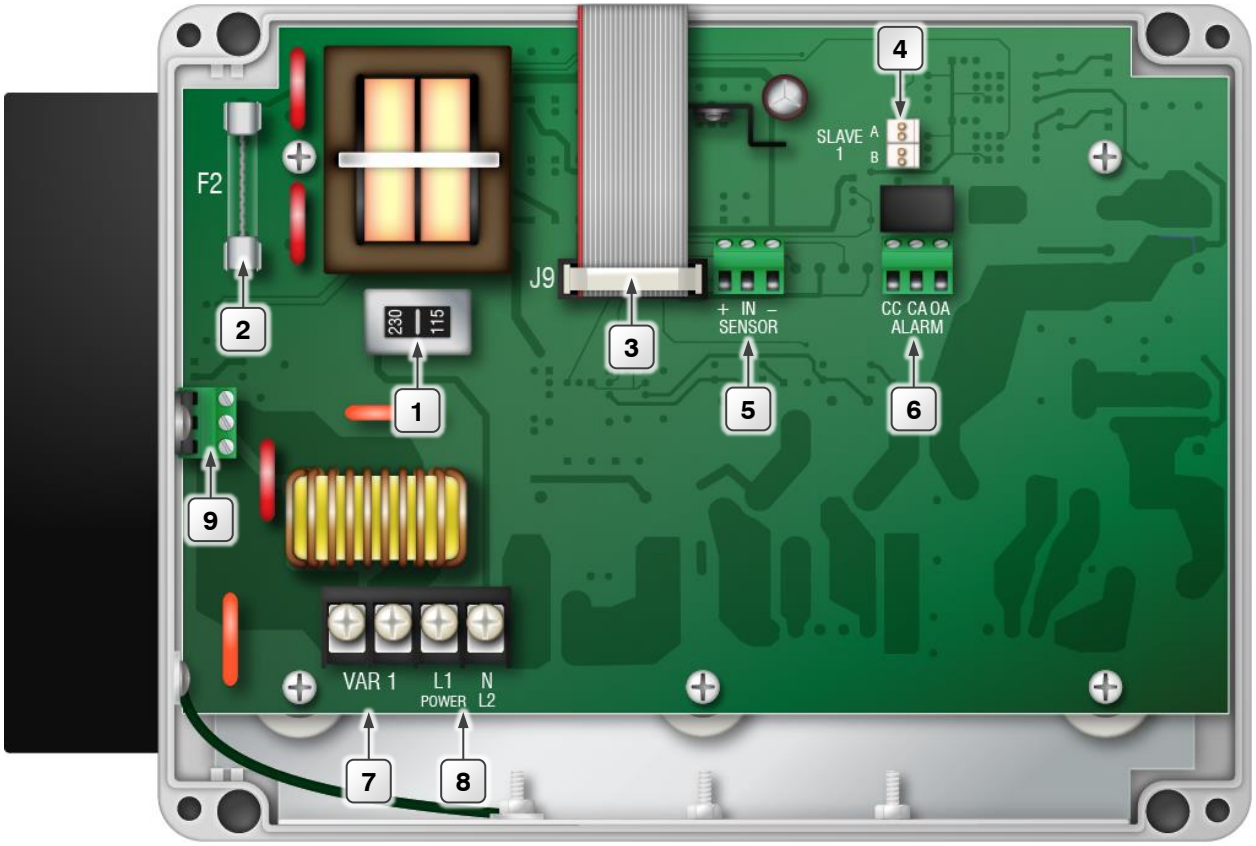
- ◇ If you do not install external surge suppression devices, you risk damage to the electronics inside your PBx-HMC, which might cause your control to fail.
- ◇ Because it is not possible to completely protect this product internally from the effects of power surges and other transients, Phason **highly recommends** that you install external surge suppression devices. For specific recommendations, see your electrical contractor.
- ◇ If you do not take these precautions, you acknowledge your willingness to accept the risk of loss or injury.

Mounting your control

1. Select a location for your control. Make sure you have enough cable and wire to reach all the equipment you want to control.
2. Remove the screws from the front cover and then gently lift it off.
3. Mount the enclosure to a wall using the four screws provided with the control. Insert the screws into the large holes in each corner of the box and then tighten.



PBx-HMC layout



1	**Voltage selection switch**: set this switch to the correct line voltage before installing the PBx-HMC.
2	**Control fuse:** 250 V, 1 A fast-acting glass.
3	**Display cable:** make sure the ribbon cable from the display is properly connected to the socket.
4	**Single-Phase Slave connection:** if you are using Single-Phase Slave units to expand the capacity of your control system, connect them here. For more information, read the **Single-Phase Slave installation guide**.
5	**Temperature probe terminals:** connect the temperature probe to the **IN** and **–** of this terminal.
6	**Alarm relay terminals:** connect an external alarm system or alarm siren to this terminal.
7	**Variable AC terminals:** connect heat mats to these terminals.
8	**Incoming power terminals:** connect the incoming power (120/230 VAC, 50/60 Hz) to this terminal.

Connecting equipment

Use the electrical knockouts for bringing wires or cables into or out of your control enclosure. Do not make additional holes in the enclosure; this can damage the watertight seal or control components and void the warranty.

Manual and temperature test modes are useful for testing your control and equipment after installing and configuring it. For more information, read **Testing settings and equipment** on page 13.

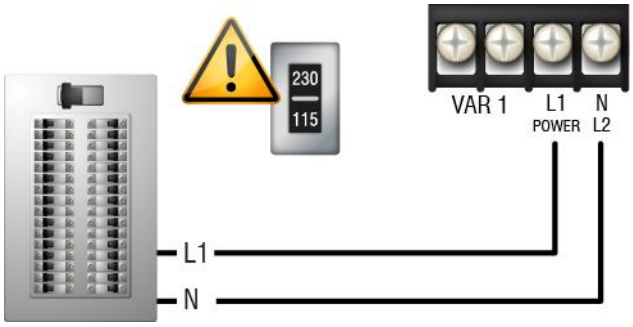
Connecting the power source

You can connect your PBx-HMC to 120/230 VAC, 50/60 Hz power.

- ◇ Before connecting the incoming power, switch OFF the power at the source.
- ◇ Do not switch ON the power until you have finished all wiring and verified all equipment is properly connected and free of obstructions.

To connect the incoming power

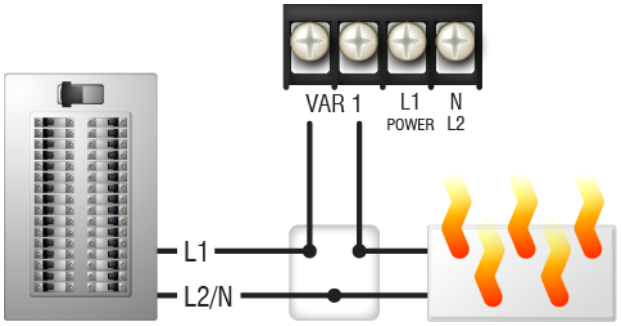
1. Set the voltage selection switch to the correct line voltage.
2. Connect the incoming power as shown in the diagram.



Connecting heat mats

To connect heat mats

Connect heat mats as shown in the following diagram.



You can connect more than one heat mat to the variable stage as long total current draw does not exceed the stage's limit.

Variable stage ratings: 20 A at 120/230 VAC, general-purpose (resistive)
2300 W at 120 VAC; 4600 W at 230 VAC

Connecting an alarm system

You can connect an alarm system to your PBx-HMC. An alarm system can be a siren, alarm panel, or auto-dialer. Read your alarm system's installation guide for installation instructions and information about the type of system: **normally open** or **normally closed**.

Below are the descriptions for the alarm terminal.

- **CC**: common connection
- **CA**: **normally open**; closes during alarm conditions
- **OA**: **normally closed**; opens during alarm conditions

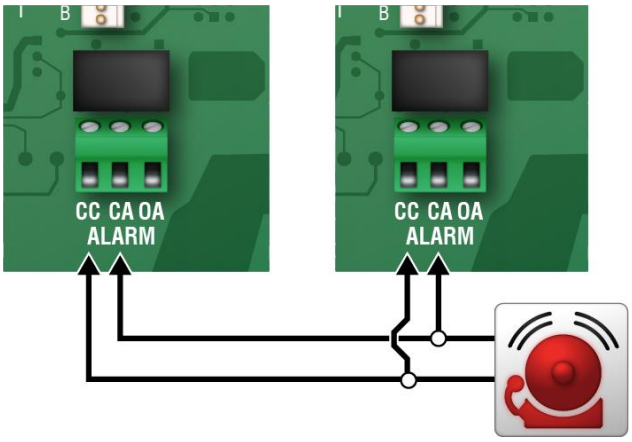
For the alarm system to sound (or dial out) during an alarm condition, you must enable the alarms. For more information, read the section and the **Select Ventilation user manual**.

The ratings of the alarm system must not exceed the ratings of the relay.

Alarm relay ratings: 0.4 A at 125 VAC; 2 A at 30 VDC, resistive load
0.2 A at 125 VAC; 1 A at 30 VDC, inductive load

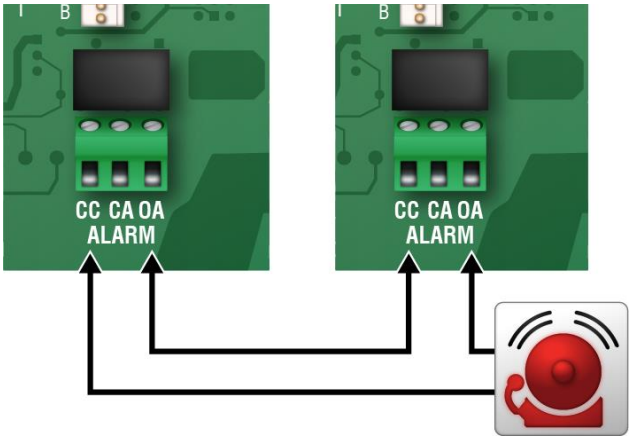
To connect a normally OPEN alarm system

A **normally open** connection closes when there is an alarm condition. Join all the common (CC) connections together and all the closed-on-alarm (CA) connections together. The alarm relays must be **in parallel** with each other so any control can trigger the alarm system when an alarm condition occurs.



To connect a normally CLOSED alarm system

A **normally closed** connection opens when there is an alarm condition. Join the alarm relays in a continuous loop. The alarm relays must be **in series** with each other so any control can trigger the alarm system when an alarm condition occurs.

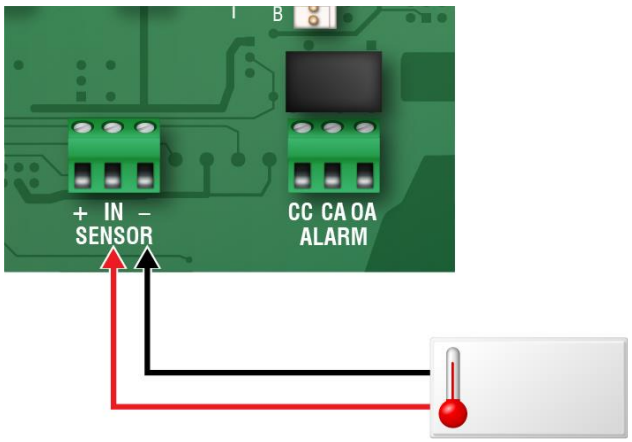


Connecting temperature probes

The PBx-HMC is compatible with heat mats that have an internal temperature probe. The probe must be **1K Ω at 25°C**, such as the Hog Hearth® heat mat.

To connect a temperature probe

- Do not run the probe cable in the same conduit as AC power cables
- Do not run the sensor cable beside AC power cables or near electrical equipment.
- When crossing other cables or power lines, cross them at a 90-degree angle.



Replace damaged probes as soon as possible. If there is no probe present or working properly, the control uses the set point as the current temperature.

Finishing the installation

1. Make sure all wires are properly connected to the correct terminals.
2. Make sure the display cable is properly connected. For more information, read **PBx-HMC layout** on page 7.
3. Place the cover on the control and then tighten the screws a few turns.
4. Switch on the power.
   As soon as the power comes on, the display should show the version, followed by the temperature. If the display does not come on, go back to step 1.

   After displaying the temperature for a few seconds, the display will flash between PF (power failure) and the temperature. Press **Select** to acknowledge the power fail alarm.

   If the display shows other messages, acknowledge them and then read **Alarm and error messages** on page 18.
5. Tighten the four cover screws.

Do not over tighten the screws. Avoid using power screwdrivers or drills.

Chapter 4: Monitoring and maintenance

Monitoring your PBx-HMC

The PBx displays temperature, alarm, and status information. Monitoring the control regularly gives you a better idea of what is going on in your facility. When in normal operation, the display shows the ambient temperature. The displayed temperature is the average from all probes connected.

For more information about probe configuration and temperature averaging, read *Configuring Power Blocks* section of the **Select Ventilation user manual**.

Acknowledging alarms

The alarm relay activates if an enabled alarm condition is present for longer than the minimum duration of one minute. The one-minute minimum duration prevents alarms from occurring when the temperature rises or drops for just a few seconds. The exception to the 1-minute minimum is the power fail alarm. The power fail alarm automatically triggers the relay on a loss of power.

When an alarm occurs, the alarm relay activates, the LED for **Alarm** switches on, and the alarm message displays. If there is more than one message, after acknowledging the first alarm, the next one displays.

For example, if you have a high temperature and a low temperature alarm, the display shows H - AL. After acknowledging the high temperature alarm, the display shows L - AL. When all alarms have been acknowledged, the display shows the temperature.

To acknowledge alarms

1. Press and hold **Unlock** for three seconds until the control beeps and the unlock indicator is lit.
2. Press **Select**.
   If there was only one alarm message, the PBx clears the message and returns to the main display.
   If there are additional alarm messages, the PBx displays the next message.
3. Press **Lock** to return to the main display.

For a list of alarm messages, their descriptions, and possible resolutions, read **Alarm and error messages** on page 18.

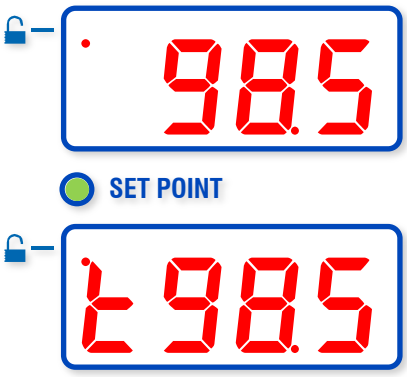
- ◇ Acknowledging alarms clears the alarm message; it does not deactivate the alarm relay or LED. To deactivate the alarm relay, resolve the problem causing the alarm condition.
- ◇ If you acknowledge the alarm, but do not resolve the problem causing the alarm condition, the alarm message displays again after five minutes without any key presses.
- ◇ If the condition causing the alarm returns to normal (for example, the temperature drops below the high alarm setting), the alarm relay and LED deactivate, but the alarm message remains.

Adjusting the set point

The set point is the target or desired temperature. The PBx-HMC continually monitors temperature and adjusts output to maintain the set point.

To adjust the set point

1. Press and hold **Unlock** for three seconds until the control beeps and the unlock indicator is lit.
2. Press **SET POINT**.
   The display shows the current set point. The SET POINT indicator is lit.
3. Press **Up** or **Down** to adjust the set point.
4. Press **Lock** to return to the main display.



Testing settings and equipment

The PBx-HMC has two test utilities: **manual override mode** and **temperature test mode**.

Using manual override mode

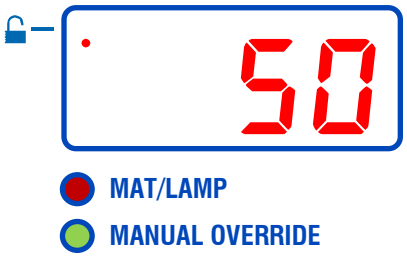
Manual override mode is for individually testing the installation and equipment connected to the PBx-HMC. When you go into manual override mode, the control sets the output to 0%. You can adjust the output from **0 to 100%**, or set the alarm relay **OFF for ON**.

The output and alarm relay remain at the state you set them until you leave manual override. When you leave manual override, the control returns to normal, programmed operation. For example, if you adjust the output to 100%, it stays at 100% until you leave manual override.

NOTE

- ◇ When the PBx-HMC is in manual override mode, it does not operate according to the measured temperature.
- ◇ The PBx-HMC **does not** automatically exit manual override mode. When finished testing, press **Lock** until the control exits manual override.

To use manual override for the variable stage



1. Press and hold **Unlock** for three seconds until the control beeps and the unlock indicator is lit.
2. Press **MANUAL OVERRIDE** until the display shows the variable stage output and the MAT/LAMP indicator flashes.
3. Press **Up** or **Down** to adjust the output.
4. If you want to override both the variable stage and the alarm relay at the same time, go to step 2 of the next section.
5. To exit manual override and return to normal operation, press **Lock**.

To use manual override for the alarm relay

1. Press and hold **Unlock** for three seconds until the control beeps and the unlock indicator is lit.
2. Press **MANUAL OVERRIDE** until the ALARM indicator flashes.
3. Press **Up** or **Down** to change the relay state.
4. If you want to override both the variable stage and the alarm relay at the same time, go to step 2 of the previous section
5. To exit manual override and return to normal operation, press **Lock**.

Using temperature test mode

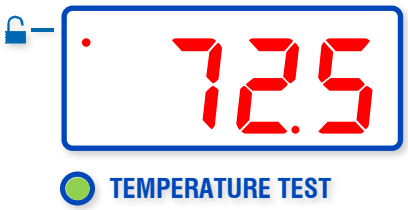
Temperature test mode allows you to test your equipment and programmed settings by simulating the temperature. Instead of adjusting the output of a variable stage or state of a relay, you adjust the *test temperature*.

As you increase or decrease the test temperature, the stages and relays operate according to their programmed settings and the test temperature. This gives you an idea of how your system performs over a full range of temperatures. The variable stages and relays remain operating according to the test temperature until you exit temperature test mode.

NOTE

- ◇ When the PBx-HMC is in temperature test mode, it operates according to the test temperature, not according to the measured temperature.
- ◇ The PBx-HMC does not exit test mode automatically. When finished testing, press **Lock**. The control will exit test mode and return to the main display.

To test equipment using temperature test mode



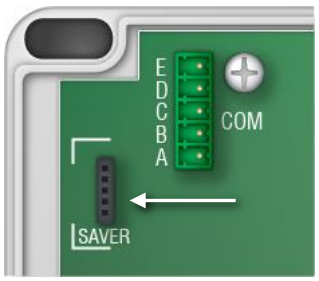
1. Press and hold **Unlock** for three seconds until the control beeps and the unlock indicator is lit.
2. Press **TEMPERATURE TEST**.
   The display flashes the current test temperature. The TEMPERATURE TEST indicator is lit.
3. Press **Up** or **Down** to adjust the test temperature.
   The variable stages and relays operate using their programmed settings according to the test temperature. When a variable stage or relay switches on, its LED switches on.
4. Press **Lock** to return to the main display.
   The control returns to normal operation.

Servicing and maintaining your control

Updating the firmware

The optional PBx-HMC Updater allows you to upgrade your control's firmware as new versions become available. The Updater takes seconds to use and can upgrade all PBx-HMCs at your site.

There are two methods for updating the firmware:



- **Power on**: the power on method allows you to update the firmware using the menu system, without having to switch the incoming power off and then on. If the power on method fails, use the power off method.
- **Power off**: the power off method allows you to update the firmware by switching the incoming power off and then on. Use the power off method if the power on method fails.

The **SAVER** connector on the inside of the cover is where you connect the PBx-HMC Updater. The cover label must face the right when you plug the updater into the socket.

To update the firmware using the *power on* method

1. Gently remove the cover from the control. Make sure not to disconnect the ribbon cable.
2. Insert the PBx-HMC Updater into the connector marked **SAVER** on the inside top-left of the cover.
3. At the same time, press and hold **Unlock**, **Up**, and **SET POINT** for three seconds until the control beeps and the unlock indicator is lit.
   The control updates its firmware. During the update, the display is blank and the control beeps. When the update is complete, the control resets, displays the current version for a couple seconds, and then shows the temperature.
4. Remove the PBx-HMC Updater.
5. Verify that the control functions properly.
6. Replace the cover and then tighten the four screws.

Because the PBx-HMC resets during the update process, you will see a power fail (PF) message displayed. Acknowledge the message and then continue normally. For more information, read **Acknowledging alarms** on page 12.

To update the firmware using the *power off* method

1. Gently remove the cover from the control. Make sure not to disconnect the ribbon cable.
2. Insert the PBx-HMC Updater into the connector marked **SAVER** on the inside top-left of the cover.
3. Switch off the power to the PBx-HMC for at least five seconds.
4. Switch on the power to the control.
   The control updates its firmware. During the update, the display is blank and the control beeps. When the update is complete, the control resets, displays the current version for a couple seconds, and then shows the ambient temperature.
5. Remove the PBx-HMC Updater.
6. Verify that the control functions properly.
7. Replace the cover and then tighten the four screws.

Optional accessories and kits

Optional, convenient accessories are available to enhance and extend your PBx-HMC. For more information about accessories and kits, contact your dealer or visit **www.phason.ca**.

PBx-HMC Updater

The optional PBx-HMC Updater is an innovative and easy-to-use product that updates the firmware of PBx-HMCs as new versions become available. The PBx-HMC Updater takes seconds to use and can update all the PBx-HMCs at your site.

Features

- Quick and easy to use
- Compact design, fits in a pocket
- Limited warranty (90 days)

Single-Phase Slave

The Single-Phase Slave (PSU-20) is an affordable way to increase the load capacity of the PBx-HMC. Single-Phase Slaves are easy to install and there is no additional configuration required; all slave units follow the settings of the master control.

The Single-Phase Slave comes with a cable that connects to the **SLAVE 1** connection on the PBx-HMC. You can connect up to 3 Slaves to the PBx-HMC. Each Slave increases the current capacity of the stage by 20 amps.

Features

- One 20-amp variable stage
- Expandable capacity using additional slaves
- NEMA 4X enclosure (corrosion resistant, water resistant, and fire retardant)
- CSA approval
- Limited warranty (two years)

Parts and kits

If your PBx-HMC's control circuit board or display fails, you can replace it with a kit.

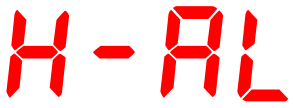
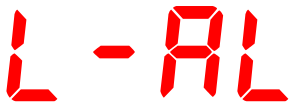
- The **control kit** part number is **K310041**.
- The **display kit** part number is **KPBXHMC-DISPLAY**.
  After replacing the display, you will need to reprogram control.

Appendices

Appendix A: Troubleshooting

- If you see an alarm message and are not sure what it means, look it up in the **Alarm and error messages** table below and then follow the instructions for resolving the alarm condition.
- If you are having a problem using your PBx-HMC, see if the problem is described in the **Troubleshooting** table on page 19. Follow the directions for correcting the problem.

Alarm and error messages

Alarm message	Possible cause	Possible solution
 High temperature alarm	The temperature has gone above the high temperature alarm point.	◇ Try to lower the temperature by turning heat mats down or off. ◇ Check the temperature probes. ◇ Check the alarm settings. For more information, read the section in the **Select Ventilation user manual**.
 Low temperature alarm	The temperature has gone below the low temperature alarm point.	◇ Try to raise the temperature by turning heat mats up or on. ◇ Check the temperature probes. ◇ Check to see if a heat mat has failed. ◇ Check the alarm settings. For more information, read the section in the **Select Ventilation user manual**.
Probe damage alarm	A temperature probe is damaged or disconnected.	◇ Check the wire between the control and the probe. Any wire damage can cause the alarm. ◇ Replace or reconnect the temperature probe. The control should recover automatically.
Error 1 - SAVER error	The PBx-HMC Saver is not in place when trying to save or restore settings	◇ Make sure the PBx-HMC Saver is inserted correctly and then try again.

Troubleshooting

The following table lists some problems that could occur, along with their possible causes and solutions. If you are having a problem with your PBx-HMC, see if the problem is described in the table and then follow the directions to correct the problem.

Problem	Possible cause	Possible solution
Power supply components blown out Burn marks on boards and components	Power surge, brownout, or power outage	◇ Avoid the problem in future by providing proper voltage and protection for the control.
No power and/or display	A circuit breaker at service panel is off or tripped.	◇ Reset the circuit breaker.
	Incorrect incoming power wiring	◇ Correct the wiring.
	The display board connect cable is not plugged into the control board properly.	◇ Plug in the display board cable. For more information, read **PBx-HMC layout** on page 7.
Temperature does not change	The control is in temperature test mode.	◇ Exit test mode. For more information, read **Using temperature test mode** on page 14.
Display showing unusually high or low temperature	The extension cable connected to the temperature probe is providing a poor connection	◇ Check the extension cable connection and re-solder it if necessary.
	Damaged probe	◇ Replace the temperature probe.

Appendix B: Surge suppression and electrical noise

Understanding power surges and surge suppression

Power surges can be caused by external influences (for example, lightning or utility distribution problems) or they can be caused internally (for example, starting and stopping inductive loads such as motors).

One of the most common causes of power surges is lightning. When lightning strikes the ground, it produces an enormously powerful electromagnetic field. This field affects nearby power lines, which transmit a surge to any device connected to it, such as lights, computers, or environmental controls like your PBx-HMC. Lightning does not have to strike a power line to transmit a surge.

Surge suppression devices offer some protection from power surges. Because it is not possible to internally protect this product completely from the effects of power surges and other transients, Phason **highly recommend** that you install external surge suppression devices. For specific recommendations, see your electrical contractor. If you do not take these precautions, you acknowledge your willingness to accept the risk of loss or injury.

Reducing electrical noise using filters

Electrical noise is caused by high voltage transients created when inductive loads, such as power contactors, are switched on or off. The strength of the transients can be over 1000 volts and can vary with the type of equipment and wiring, as well as several other factors.

Visible symptoms of electrical noise include erratic control operation, communication problems, and more. However, **the effects of electrical noise are not always visible**. Over time, electrical noise can cause electronic circuits, relay contacts, and power contactors to deteriorate.

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Limited warranty

This warranty applies only to the Phason PBx-HMC. If you need warranty service, return the product and original proof of purchase to your dealer.

Phason Inc. (Phason) warrants the PBx-HMC subject to the following terms and conditions.

This warranty is valid only to the original purchaser of the product, for two years from the manufacturing date. The manufacturing date is stated in the first eight digits of the serial number in the form year-month-day.

Phason hereby warrants that should the PBx-HMC fail because of improper workmanship, Phason will repair the unit, effecting all necessary parts replacements without charge for either parts or labor.

Conditions

- Installation must be done according to our enclosed installation instructions.
- The product must not have been previously altered, modified, or repaired by anyone other than Phason.
- The product must not have been involved in an accident, misused, abused, or operated or installed contrary to the instructions in our user and/or installation manuals. Phason's opinion about these items is final.
- The person requesting warranty service must be the original purchaser of the unit, and provide proof of purchase upon request.
- All transportation charges for products submitted for warranty must be paid by the purchaser.

Except to the extent prohibited by applicable law, no other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose, shall apply to the PBx-HMC. Any implied warranties are excluded.

Phason is not liable for consequential damages caused by the PBx-HMC.

Phason does not assume or authorize any representatives, or other people, to assume any obligations or liabilities, other than those specifically stated in this warranty.

Phason reserves the right to improve or alter the PBx-HMC without notice.

Service and technical support

Phason will be happy to answer all technical questions that will help you use your **PBx Power Block.** Before contacting Phason, check the following:

- Read this manual for information about the feature with which you are having trouble.
- If you see an alarm message and are not sure what it means, look it up in the **Alarm and error messages** table on page 18 and then follow the instructions for resolving the alarm condition.
- If you are having a problem using your control, look in the **Troubleshooting** table on page 19 and then follow the directions for correcting the problem.
- If you still have a problem with your PBx-HMC, collect the following information:
  - The serial number
  - Any messages displayed
  - A description of the problem
  - A description of what you were doing before the problem occurred

- ◇ Phason controls are designed and manufactured to provide reliable performance, but they are not guaranteed to be 100 percent free of defects. Even reliable products can experience occasional failures and the user should recognize this possibility.
- ◇ If Phason products are used in a life-support ventilation system where failure could result in loss or injury, the user should provide adequate back up ventilation, supplementary natural ventilation, or an independent failure-alarm system. The user's lack of such precautions acknowledges their willingness to accept the risk of such loss or injury.

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