

# Installation Instructions and Use & Care Guide

## Electric Tankless Water Heater

**PLEASE DO NOT RETURN THIS UNIT TO THE  
STORE.**



Read this manual and the labels on the water heater before you install, operate, or service it. If you have difficulty following the directions, or aren't sure you can safely and properly do any of this work yourself:

- Call our Technical Assistance Hotline which is listed on your warranty. We can help you with installation, operations, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater's rating plate.
- Incorrect installation, operation, or service can damage the water heater, your house and other property, and present risks including fire, scalding, electric shock, and explosion, causing serious injury or death.



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Keep this manual near the water heater for future reference whenever maintenance, adjustment or service is required.

Retain your original receipt as proof of purchase.

# IMPORTANT SAFETY INFORMATION

Read and follow all safety messages and instructions in this manual.



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible property damage, serious injury or death. Do not remove any permanent

instructions, labels, or the data plate from either the outside of the water heater or on the inside of the access panels. Keep this manual near the water heater.

## Important information to keep...

Fill out this section and keep this manual for reference.




Date Purchased:

Model number:

Serial number:

Maintenance performed: Date:

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|--|--|
|  <b>DANGER</b>    | <b>DANGER</b> indicates hazardous situation that, if not avoided, will result in death or serious injury.      |
|  <b>WARNING</b>   | <b>WARNING</b> indicates a hazardous situation that, if not avoided, could result in death or serious injury.  |
|  <b>CAUTION</b> | <b>CAUTION</b> indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. |
| <b>NOTICE</b>  | <b>NOTICE</b> indicates practices not related to physical injury.  |

To reduce the risk of property damage, serious injury or death, read and follow the precautions below, all labels on the water heater, and the safety messages and instructions throughout this manual.

### General Requirements

- Install and properly ground the unit in accordance with local codes, or in the absence of local codes, with the current edition of the National Electrical Code: ANSI/NFPA 70 in the USA.
- Follow all applicable plumbing, heating, and air conditioning codes during installation.

### RISKS DURING INSTALLATION AND MAINTENANCE

#### WARNING



#### Electric Shock Risk

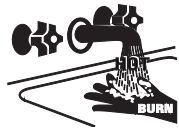
Contact with the electrical parts inside the water heater can result in severe injury or death from electrical shock:

- **Disconnect power by opening the circuit breaker(s) before installing or servicing.**
- **SOME MODELS ARE CONNECTED TO MORE THAN ONE BRANCH CIRCUIT, AND MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT. ALL BRANCH CIRCUITS MUST BE DISCONNECTED PRIOR TO SERVICE.**

- Use a non-contact circuit tester to confirm that power is off before working on or near any electrical parts.
- **Be sure the cover is reinstalled and secured after servicing to reduce the risk of fire and electric shock.**

### RISKS DURING OPERATION

#### WARNING



#### Scalding Risk

This water heater can make water hot enough to cause severe burns instantly, resulting in severe injury or death.

- Feel water before bathing or showering.
- To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point of use. These valves automatically mix hot and cold water to limit the temperature at the tap. Mixing valves are available at your local hardware store or from your plumbing supplier. Follow the manufacturer's instructions for installation and adjustment of the valves.
- For most models, the temperature set point is factory set to 120°F to reduce the risk of scalding.
- Higher temperatures increase the risk of scalding, but even at 120°F, hot water can scald. If you choose a higher temperature, Thermostatic Mixing Valves located at each point of use are particularly important to help avoid scalding.

| Temperature  | Time to Produce a Serious Burn |
|--------------|--------------------------------|
| 120°F (49°C) | More than 5 minutes            |
| 125°F (52°C) | 1½ to 2 minutes                |
| 130°F (54°C) | About 30 seconds               |
| 135°F (57°C) | About 10 seconds               |
| 140°F (60°C) | Less than 5 seconds            |
| 145°F (63°C) | Less than 3 seconds            |
| 150°F (66°C) | About 1½ seconds               |

For information about changing the factory temperature setting, refer to "Water Temperature Adjustment" on page 11.

Even if you set the water heater set point to a low setting, higher temperatures may occur in certain circumstances:

- Water temperature will be hotter if someone adjusted the temperature set point to a higher setting.
- If the water supplied to the water heater is pre-heated (for example, by another water heater), the temperature of the water may be higher than the temperature set point.
- Problems with the UIM or other malfunctions may result in higher than expected water temperatures.

**To reduce the risk of unusually hot water reaching the fixtures in the house, install Thermostatic Mixing Valves at each point of use.**

If anyone in your home is at particular risk of scalding (for example, the elderly, children, or people with disabilities) or if there is a local code or state law requiring a certain water temperature at the hot water tap, then these precautions are particularly important.

According to a national standard, American Society of Sanitary Engineering (ASSE 1070), and most local plumbing codes, the water heater's temperature set point should not be used as the sole means to regulate water temperature and avoid scalds.

Properly adjusted Thermostatic Mixing Valves installed at each point of use allow you to set the water heater's set point to a higher setting without increasing the risk of scalds. A higher temperature can help provide proper water temperatures for appliances such as dishwashers and washing machines.

## WARNING



### Fire Risk

To reduce the risk of a fire that could destroy your home and seriously injure or kill people:

- Do not store things that can burn easily such as paper or clothes next to the water heater.
- Be sure the water heater's cover is in place. This cover keeps debris from entering and potentially being ignited, and helps keep any internal fires from spreading.

- Keep the water heater from becoming wet. Immediately shut the water heater off and have it inspected by a qualified person if you find that the wiring or control board have been exposed to water in any way (e.g., leaks from plumbing or leaks from the water heater itself). Such leaks can damage property and could cause a fire risk. If the water heater is subjected to flood conditions or has been submerged in water, the entire water heater must be replaced.
- Make electrical connections properly according to the instructions on page 10. Use a UL listed or CSA approved strain relief. Connect the ground wire to the ground terminal port of the terminal block. The ground lug is identified by an embossed grounding emblem inside the water heater.

### Water Contamination Risk

Do not use chemicals that could contaminate the potable water supply. Do not use piping that has been treated with chromates, boiler seal, or other chemicals.

# GENERAL INFORMATION

## Introduction

- This manual provides information necessary for the installation, operation, and maintenance of the water heater.
- The model description is listed on the rating plate which is attached to the side panel of the water heater.
- Please read all installation instructions completely before installing this product.
- If you have any problems or questions regarding this equipment, consult the manufacturer or its local representative.

This appliance is an on-demand, electric tankless water heater. It is designed to efficiently supply endless hot water for your needs, when appropriately sized for the application.

A built-in alarm is included. If water leaks onto the leak detection sensor, an alarm will sound to provide warning. Turn off power to the water heater at the circuit breakers, turn off the water supply, then correct the leak.

Your water heater also includes on-board self diagnostics. If the system produces an error code, see the Troubleshooting section found on pages 13-15.

## Component Descriptions

### Temperature and Pressure Relief Valve

In most cases, you are not required to install a temperature and pressure relief valve (T&P valve). However, some local codes do require the installation of a T&P Valve. If a T&P valve must be installed, install it on the hot outlet pipe according to the valve manufacturer's instructions and local code.

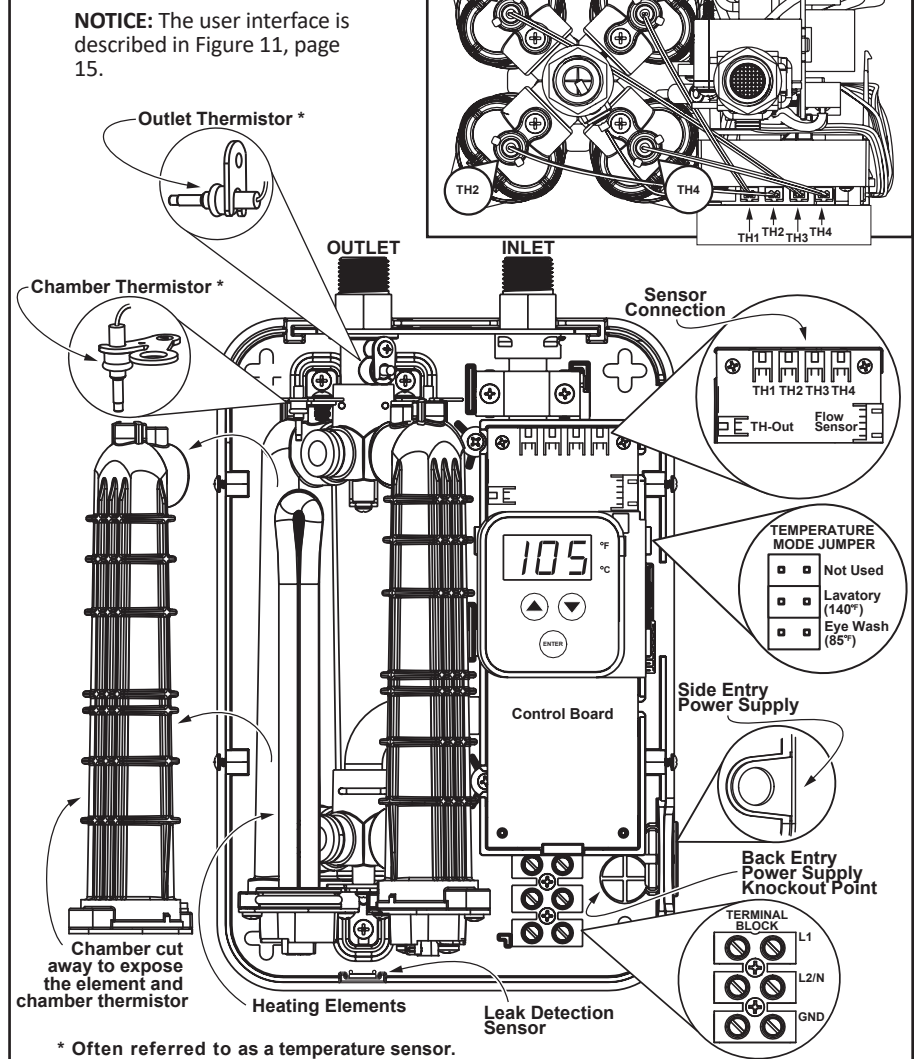
If you install a T&P valve, turn on the water supply to ensure that no water drips from it. Next, operate the valve manually two or three times to purge the trapped air from the top of the heater's chamber, then close the valve. Verify that water has stopped flowing completely before connecting the discharge pipe to the valve.

**NOTICE:** If a temperature and pressure relief valve is installed, the discharge pipe should be at least  $\frac{3}{4}$ " inside diameter and sloped for proper drainage. Install to allow complete

drainage of both the T&P Relief Valve and the discharge pipe. The discharge pipe must not be smaller than the pipe size of the T&P Relief Valve. The pipe must also be able to withstand 250°F (121°C) without distortion. Use only copper or CPVC pipe. Do not use any other type of pipe, such as PVC, iron, flexible plastic pipe, or any type of hose.

**⚠ WARNING!** Do not cap or plug the T&P relief valve or discharge pipe.

Figure 1 - Component Identification:  
Point-of-Use Models



## General Specifications

| Models                                | Point-of-Use:<br>UPV   |                      |
|---------------------------------------|--|----------------------|
| Wiring & Circuit Breaker Requirements | See “Electrical Requirements” on page 7.                             |                      |
| Water Connections                     | 1/2” NPT   |                      |
| Weight<br>lbs. (kg)                   | 2 Chamber  | 4 Chamber            |
|                                       | 6 lbs. (2.7 kg) full   | 8 lbs. (3.6 kg) full |
| Water Heater Dimensions*              | H 12.22” x W 7.65” x D 5.11”<br>(H 31.04cm x W 19.43cm x D 12.98 cm) |                      |

\* Height dimension includes the distance from the bottom of the heater to the highest point of the inlet/outlet.  
Width dimension includes the mounting tabs on the left-hand and right-hand sides (two- and four-element models).

**NOTE:**

- Check the rating plate to ensure this product matches your specifications.
- The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.
- The water supply pressure should not exceed 80 psi. If this occurs, a pressure reducing valve with a bypass should be installed in the cold water inlet line.
- Maximum flow may require water pressure equal to or greater than 40 psi.

## Electrical Requirements

- Follow these steps to determine the electrical requirements for your water heater:

- Find your model number on your water heater's rating plate.
- Locate the model number in the table listed below.

For example, if your model is *UPVA-18K*, find *\*P\*-18K*. Sorted by *Voltage* first, then by total *Wattage (KW)*.

- Follow the requirements listed for your model.
- Use copper conductors only.

| <b>Point-of-Use Models</b><br>(For potable water heating only. Not for space heating.)<br>NOTICE: Models sorted by <i>Voltage</i> , then by <i>Wattage per Element</i> .   |         |                    |                  |                     |                           |   |                       |
|--|---------|--------------------|------------------|---------------------|---------------------------|---|-----------------------|
| Model Number   | Voltage | Number of Elements | Total Input (KW) | Wattage per Element | Total Current Draw (Amps) | Recommended U. S. Circuit Breaker Size (Amps) | Conductor Size (AWG)^ |
| UPV*-18K   | 120     | 2                  | 1.75             | 0.88                | 14.58                     | 15  | 14                    |
| UPV*-24K   | 120     | 2                  | 2.40             | 1.20                | 20.00                     | 20  | 12                    |
| UPV*-30K   | 120     | 2                  | 3.00             | 1.50                | 25.00                     | 25  | 10                    |
| UPV*-35K   | 120     | 2                  | 3.50             | 1.75                | 29.17                     | 30  | 10                    |
| UPV*-35E   | 240 †   | 2                  | 3.50             | 1.75                | 14.58                     | 15  | 14                    |
| UPV*-45E   | 240 †   | 2                  | 4.50             | 2.25                | 18.75                     | 20  | 12                    |
| UPV*-55E   | 240 †   | 2                  | 5.50             | 2.75                | 22.92                     | 25  | 10                    |
| UPV*-70E   | 240 †   | 4                  | 7.00             | 1.75                | 29.17                     | 30  | 10                    |
| UPV*-90E   | 240     | 4                  | 9.00             | 2.25                | 37.50                     | 40  | 8                     |
| UPV*-110E  | 240     | 4                  | 11.00            | 2.75                | 45.83                     | 50  | 8                     |
| UPV*-40Y   | 277     | 2                  | 4.00             | 2.00                | 14.44                     | 15  | 14                    |
| UPV*-55Y   | 277     | 2                  | 5.50             | 2.75                | 19.86                     | 20  | 12                    |
| UPV*-80Y   | 277     | 4                  | 8.00             | 2.00                | 28.88                     | 30  | 10                    |
| UPV*-110Y  | 277     | 4                  | 11.00            | 2.75                | 39.71                     | 40  | 8                     |
| ^All wiring/conductors must be rated for 90°C or greater.<br>† This model may be connected to a 208 VAC supply. Connection to 208 VAC may require different breaker and/or wire size than shown in the table.<br>NOTICE: Incoming line voltage variations may result in nuisance breaker trips. Contact Technical Support if there are multiple breaker trips when the recommended breaker size is in use. |         |                    |                  |                     |                           |   |                       |

# INSTALLATION

## Getting Started

### Clearances

**Top Clearance:** A minimum of 12 inches (30.5 cm) is required to provide access for plumbing connections.

**Side Clearance:** Allow an 8 inch (20.3 cm) minimum horizontal space for the heater. This horizontal clearance will allow for the removal of protective cover screws and provide access to electrical wires that will enter the heater from the side.

**Bottom Clearance:** At a minimum, maintain a bottom clearance of 12 inches (30.5 cm) to allow for removal and maintenance of heating elements. Do not store any items underneath the water heater.

**Front Clearance:** Maintain a minimum clearance of 8 inches (20.3 cm). In the absence of a door or removable access panel in front of the heater, allow a minimum of 15 inches (38.1 cm) front clearance. This will allow for cover removal and ease of service. See Figure 2.

### Code Compliance

- Install and properly ground the unit in accordance with local codes, or in the absence of local codes, with the current edition of the National Electrical Code: ANSI/NFPA 70 in the USA.
- Follow all other applicable plumbing, heating, and air conditioning codes during installation.

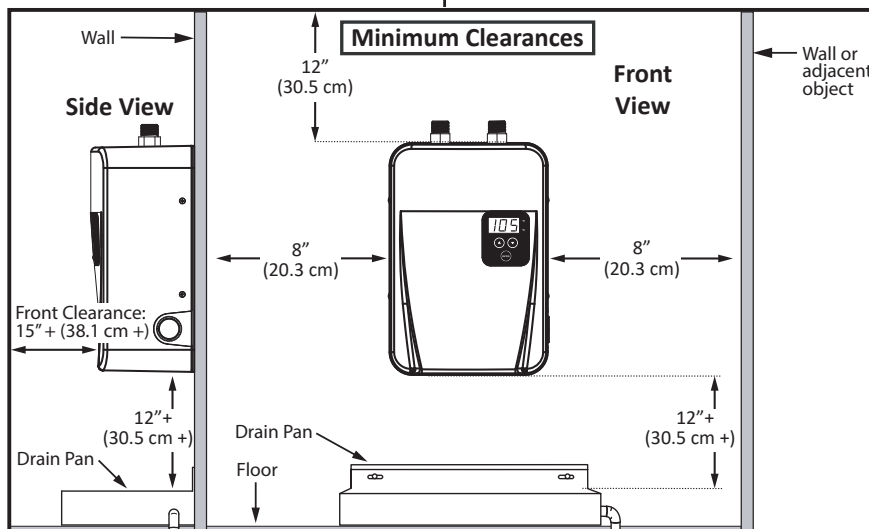
## 1 Choose a Location

- Your water heater is designed to be installed indoors only.
- Locate your water heater in a clean, dry area that is as close to the point of use as possible. Do not install it in a bath enclosure or shower stall.
- Your water heater and water lines must be protected from freezing. Do not install your water heater where it may be subjected to freezing temperatures.
- Avoid locations that are prone to dampness, high humidity, moisture, or dust. Such locations

include crawl space under a house or building, in the garage (in regions prone to high humidity) and in the attic (unless the attic has been converted to a living space).

- Locate your water heater where it will not be accessible to children.  
**⚠ WARNING!** This water heater can make water hot enough to cause severe burns instantly, resulting in severe injury or death.
- Be sure that your water heater is accessible and that minimum clearances are observed. Do not store any items underneath the water heater, and do not store flammable liquids or other flammable materials near the water heater. This is important for safety and future service. See Figure 2.
- Do not install your water heater where condensate may drip onto the water heater.
- A drain pan, or other means of protection against water damage, is recommended to be installed under the water heater in case of leaks. In addition, you may install an active water leak detector with a shutoff valve which can turn off the water supply in the event of a leak. The manufacturer is not responsible for damage due to water leaks. See Figure 2.

Figure 2 - Clearance Specifications



## 2 Mount Your Water Heater

1. Unpack the heater from the shipping carton, but do not cut the shipping carton with a sharp instrument.
2. Stand the unit upright and remove the plastic wrap.



3. Remove the screws that secure the protective cover.
4. Remove the cover.
5. Locate the four mounting holes in the back plate. Locate and use the point-of-use mounting template, located on page 32.
6. Determine the mounting location on the wall, then verify your clearances. (See "Clearances" on page 8.)
7. Position the unit against the wall. Make sure that the unit is level. **NOTICE:** All models must be oriented with the inlet and outlet facing upward. See Figure 3.
8. Secure the water heater to the wall or other suitable structure with screws, bolts, or anchors as appropriate. Ensure the mounting surface and fasteners will support the weight of the water heater. See General Specifications for unit weights, page 6. (You will reinstall the water heater's protective cover later.)

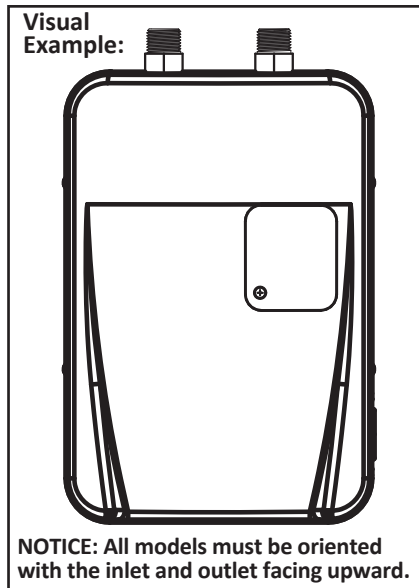


Figure 3 - Point of-Use Orientation

### 3 Connect the Water Lines

**NOTICE:**

- **DO NOT** apply heat to the water lines, nipples, or any fitting on the water heater. Heat from soldering may damage the water heater.
- Thread sealing tape (plumber's tape) is the only sealer that may be used on the threads of the inlet and outlet fittings. **DO NOT use pipe dope or PVC/CPVC primer and glue on the threads of the inlet and outlet fittings.** Exposure to these compounds will damage the nipples, causing leaks.
- The POU water heaters have a retaining plate that keeps the inlet and outlet nipples from turning freely. Use only one wrench when attaching the hot and cold water lines to the heater.
- Flexible water supply hoses are recommended for your installation.
- Well water must be treated.
- Only potable water can be used with this water heater. Do not introduce pool or spa water, or any chemically treated water into the water heater.
- Do not connect to a salt-regenerated water softener or a water supply of salt water.
- The warranty will not cover damage caused by water quality.
- Recommended operating pressure: 50 to 60 psi. Higher pressures require a pressure reducing valve.
- Installations above the ceiling or in an attic require a bleed air separator.
- A properly-sized arrestor should be installed where water hammer exists.

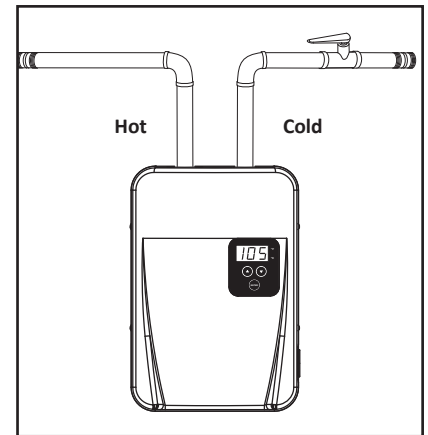


Figure 4 - Hot and Cold Water Lines Installed

**NOTICE:** Do not supply electrical power to your water heater yet. If you do so at this point, you will damage your heating element(s).

1. Make sure that the water supply is turned off.
2. Connect the hot water line to the hot outlet of the water heater. (Figure 4.)
3. Connect the cold water line to the cold inlet of the water heater. (Figure 4.)
4. Open the valve on the main water line to supply water to the heater.
5. Open several hot water fixtures and allow water to run through the water heater for several minutes to purge air from the water lines.
6. Check for water leaks. Correct any that are found.
7. If you installed a T&P valve to meet local code requirements, operate it manually several times to allow any trapped air to escape.

**NOTICE:** Failure to purge air from the water lines can leave air pockets, causing damage to the heating elements when power is applied.

## 4 Install Electrical Service

**⚠ WARNING!** Failure to observe these warnings could lead to an improper installation, and the risks include fire, electrical shock, and/or death:

- Installation must be performed by a qualified installer. The installer (licensed professional) is responsible for the correct installation of the water heater and for compliance with all national, state / provincial, and local codes.
- Refer to the electrical requirements and electrical schematic during installation and service.
- Turn off power service at the main circuit breaker(s) prior to installation. Working on an energized circuit can result in severe injury or death from electrical shock.
- Some models may be connected to more than one branch circuit, and more than one disconnect switch may be required to de-energize the equipment. All branch circuits must be disconnected during installation or service.
- Install and properly ground the unit in accordance with local codes, or in the absence of local codes, with the current edition of the National Electrical Code: ANSI/NFPA 70.

**NOTICE:** When using stranded wire, make sure that all strands are secure inside the terminal block. A loose strand can cause a short circuit and damage the circuit board.

1. Be sure the electrical power to the water heater is turned OFF at the circuit breaker panel (or remove the circuit's fuses).
2. Using a non-contact circuit tester, check the wiring to make certain the power is OFF.
3. Check the water heater's rating plate and ensure that the electrical service's voltage, wiring size (ampacity) and circuit breaker rating/type are correct for this water heater.

**NOTICE:** The electrical requirements for your model are listed in "Electrical Requirements," page 7.

4. Connect the electrical service as described in "Electrical Requirements," page 7.  
  
There is a wiring diagram label on the inside of your water heater's protective cover. See also "Wiring Diagrams," pages 28 and 29.
5. Do the following:
  - Check all electrical connections to make sure that they are correct and secure.
  - Make sure that the supply voltage, wiring size (ampacity), circuit breaker rating and type are correct. Refer to "Electrical Requirements," page 7.
  - Label all breakers/connections to the water heater.
6. Ensure that all air has been purged from the water lines by opening several hot water fixtures near the water heater. Run water through the water heater until all air is purged from the lines.
7. Reinstall the water heater's cover.

**⚠ WARNING!** Be sure the cover is secured to reduce the risk of fire and electric shock.

8. Turn on power to the water heater.
9. Verify proper operation. Operating instructions are listed on page 11.

## 5 Test Water Heater Operation

**NOTICE:** Before performing the following steps, ensure the air is purged from the water lines leading to the faucet. Refer to "Installation," step 3, page 9.

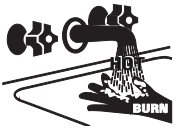
1. At the faucet, install the recommended faucet aerator provided with this Point-Of-Use electric tankless water heater for optimal performance. The aerator may enable more consistent output and flow of hot water regardless of available water pressure.
- NOTICE:** Sediment is found in many water systems. Periodic inspection is recommended, and cleaning of the faucet aerator may be necessary.
2. At the hot water faucet, turn the water on medium-low.
  - You should hear a "click" as the heater's relays engage.
  - You may hear a hissing or crackling noise from the heat exchanger after the unit begins to heat water. This is normal.
3. Check water at the fixtures to make sure that the water is being heated.

**NOTICE:** Your water heater includes on-board self diagnostics. If water heater powers up but does not heat water, shut off power to the unit. Reverse the top pair of L1 and L2 leads on the terminal strip. Apply power and check again. See "Troubleshooting" for more information (pages 13 - 15).

# OPERATION

## Water Temperature Adjustment

### ⚠ WARNING



#### Scalding Risk

This water heater can make water hot enough to cause severe burns

instantly, resulting in severe injury or death. Before attempting to adjust the temperature set point, read "RISKS DURING OPERATION" on page 3. If the instructions are not clear, contact a qualified service technician.

To adjust the temperature settings, refer to one of the following procedures.

**NOTICE:** If installing a point of use (POU) water heater as a secondary or standby unit, the max inlet water temperature coming into the POU unit cannot exceed 135 °F. The thermostat setpoint on the primary water heater will need to be adjusted accordingly.

The point of use model has two modes, designed to meet specific demands and uses: Lavatory and Emergency Eye Wash.

### Lavatory Mode (Factory PreSet)

The factory water temperature set point when in lavatory mode is 105°F (+/-1°F). The water temperature set point can be adjusted within a range of 80°F (27°C) and 150°F (66 °C).

### Emergency Eye Wash Mode (Optional)

The emergency eye wash mode water temperature is factory preset to 85 °F (29 °C) and is Non-adjustable.

### Manually switching between modes:

1. Remove the front cover on the point-of-use unit by removing the two screws from the left and two from the right of the cover. With the screws removed, gently pull the cover away from the unit and place the cover out of the way. See Figure 5.

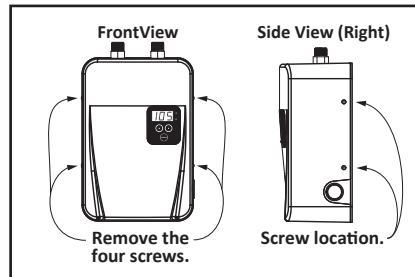


Figure 5 - Removing the front cover.

2. Locate and remove the jumper. Place the jumper on the pins corresponding to the desired mode. Test the operation of the water heater to ensure that it is operating as desired. See Figure 6.

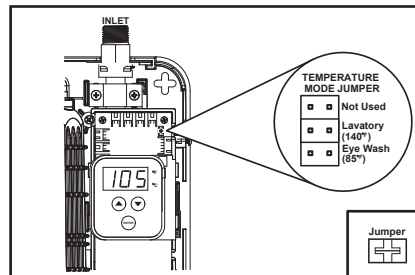


Figure 6 - Temperature mode jumper.

### Adjusting Water Temperature

**NOTICE:** Water temperatures at the hot water fixture may be lower than the water heaters set point, depending on the distance from the water heaters outlet to the hot water fixture.

The water temperature set point can be adjusted within a range of 80°F (27°C) and 150°F (66 °C) while in lavatory mode. To adjust the temperature setting for all point of use models in lavatory mode:

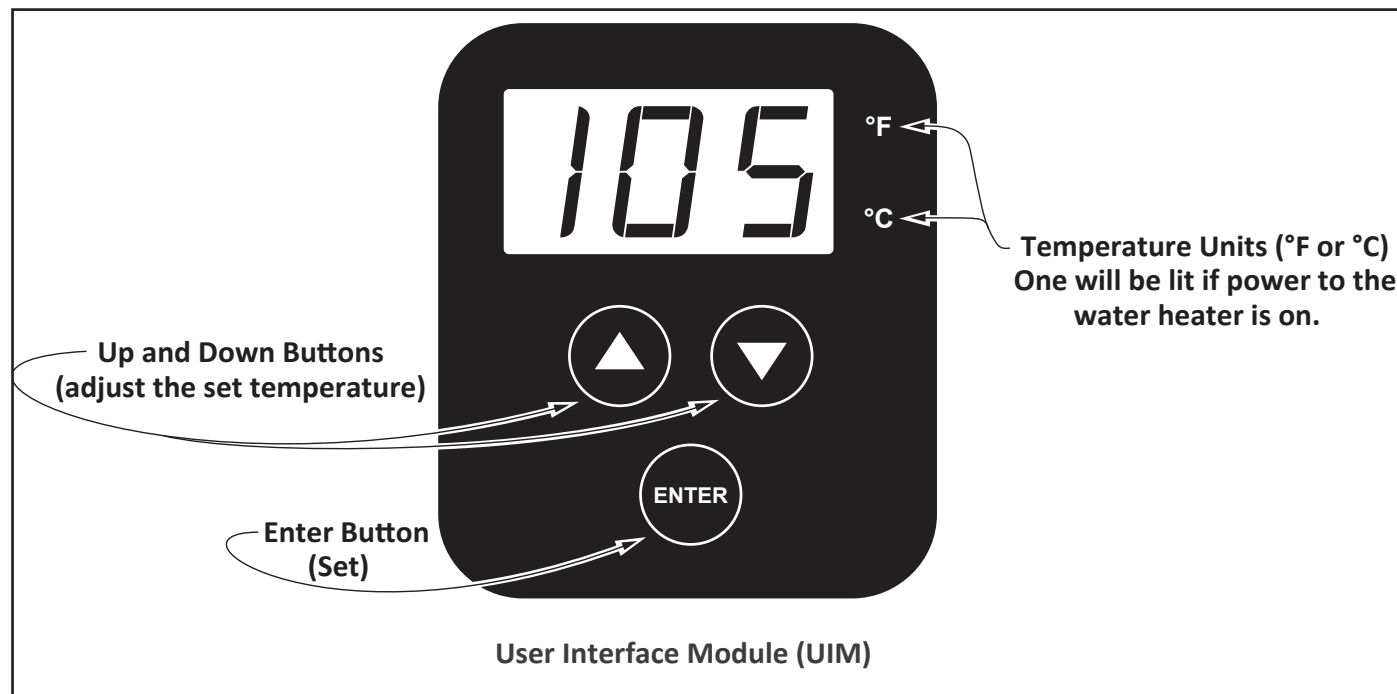
1. Press and release either the UP or DOWN button. The display will blink and allow you to adjust the temperature set point. Press the UP or DOWN button to scroll through the temperatures. See Figure 7.
2. Press the ENTER button to confirm.

To toggle between Fahrenheit and Celsius:

1. Press and hold the DOWN button for five seconds. See Figure 7.
2. The °F or °C LED will illuminate, and the 7-segment LED will display the temperature set point in the appropriate units.

**NOTICE:** When toggling back and forth from °F to °C, the set point may be reduced slightly below the desired temperature (due to decimal rounding during conversion calculations). To adjust the set point temperature, follow steps 1 and 2 for Adjusting Water Temperature.

Figure 7 - Point of Use Display



### Need Assistance?

Call our Technical Assistance Hotline at **1-877-817-6750**. We can help you with installation, operation, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater's data plate.

# TROUBLESHOOTING

## Error Codes for Point-of-Use Models

### WARNING



#### Electric Shock Risk

Contact with the electrical parts inside the water heater can result in severe injury or death from electrical shock:

- Disconnect power by opening the circuit breaker(s) or removing the fuses before installing or servicing.
- Some models are connected to more than one branch circuit, and more than one disconnect switch may be required to de-energize the equipment. All branch circuits must be disconnected prior to service.

On the point of use unit, the 7-segment display will show an error code when a fault is found in the control board. See Figure 8, page 15. After you identify the fault code, locate its description and solution in the table.

#### NOTICE:

- There may be multiple codes; verify all sequences.
- If there are multiple fault codes, the display will pause between each one. The fault codes will then repeat.

| Display Fault Code | Description  | Action / Solution  |
|--------------------|--|--|
| 002                | <b>Overheat:</b> <ul style="list-style-type: none"><li>• Heat is above the software's desired limit.</li></ul>   | <ol style="list-style-type: none"><li>1. If the water heater is in Lavatory mode reduce the set point temperature.</li><li>2. If problem persists turn off all power to the water heater.</li><li>3. Open a nearby hot water fixture and allow water to run through the heater for about 5 minutes.</li><li>4. Check the resistance of the temperature sensors (thermistors). If one of the thermistors has a resistance that is much higher than the others, replace that thermistor.</li><li>5. If problem persists turn off all power to the water heater.</li><li>6. Drain the water heater.</li><li>7. Remove the elements and inspect the housings for scale buildup. Remove any clogs that are present.</li></ol> |
| 003                | <b>Chamber 1 Thermistor:</b> <ul style="list-style-type: none"><li>• Chamber 1 thermistor shows open.</li><li>• Chamber 1 thermistor shows a short.</li></ul>  | <ol style="list-style-type: none"><li>1. Turn off power to the water heater.</li><li>2. Check the connections of the thermistor in question.</li><li>3. Disconnect the thermistor, then reconnect it.</li><li>4. Turn on power to the water heater.</li><li>5. If the fault code remains or reoccurs, replace the thermistor.</li></ol>  |
| 004                | <b>Chamber 2 Thermistor:</b> <ul style="list-style-type: none"><li>• Chamber 2 thermistor shows open.</li><li>• Chamber 2 thermistor shows a short.</li></ul>  | <ol style="list-style-type: none"><li>1. Turn off power to the water heater.</li><li>2. Check the connections of the thermistor in question.</li><li>3. Disconnect the thermistor, then reconnect it.</li><li>4. Turn on power to the water heater.</li><li>5. If the fault code remains or reoccurs, replace the thermistor.</li></ol>  |
| 005                | <b>Software Error:</b> <ul style="list-style-type: none"><li>• A software timing error has been detected.</li></ul>  | <ol style="list-style-type: none"><li>1. Turn off power to the water heater.</li><li>2. The circuit board will need to be replaced. Contact Technical Support.</li></ol>   |
| 006                | <b>Hardware Error:</b> <ul style="list-style-type: none"><li>• The power supply output is too low.</li><li>• An issue with software interrupts is detected.</li><li>• An issue with process registers is detected.</li><li>• An issue with program counter is detected.</li><li>• An issue with the clock is detected.</li><li>• The flash CRC check has failed.</li></ul> | <ol style="list-style-type: none"><li>1. Turn off power to the water heater.</li><li>2. The circuit board will need to be replaced. Contact Technical Support.</li></ol>   |

Continued on the next page...

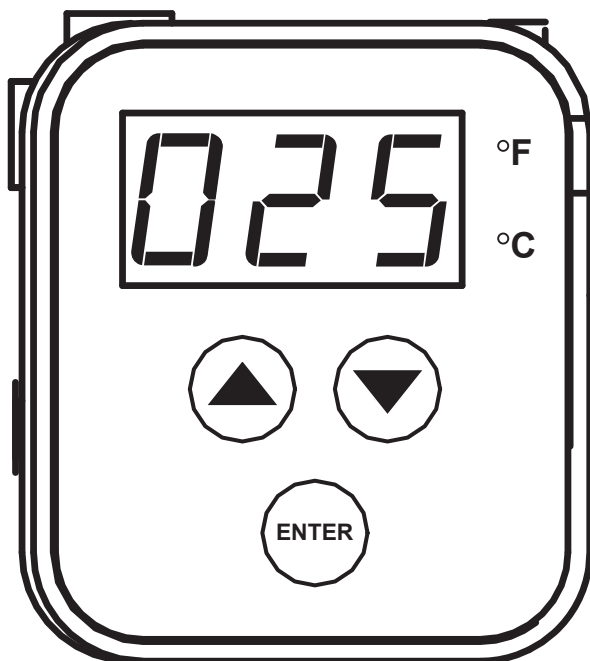
| Display Fault Code | Description   | Action / Solution   |
|--------------------|---|---|
| 006                | <b>Hardware Error:</b> <ul style="list-style-type: none"> <li>An issue with RPM memory is detected.</li> <li>An issue with heater control circuit is found.</li> <li>The user flash check has failed.</li> <li>Mode selection jumper missing or shorted.</li> </ul> | <ol style="list-style-type: none"> <li>Turn off power to the water heater and contact Technical Support</li> </ol>  |
| 008                | <b>User Interface:</b> <ul style="list-style-type: none"> <li>Button malfunction detected.</li> </ul>   | <ol style="list-style-type: none"> <li>Turn off power to the water heater and contact Technical Support</li> </ol>  |
| 009                | <b>AC Supply:</b> <ul style="list-style-type: none"> <li>Line frequency too high or too low.</li> </ul>   | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check the AC wiring connections.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains or reoccurs, contact Technical Support.</li> </ol>  |
| 025                | <b>Chamber 3 Thermistor:</b> <ul style="list-style-type: none"> <li>Chamber 3 thermistor shows open.</li> <li>Chamber 3 thermistor shows a short.</li> </ul>  | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check the connections of the thermistor in question.</li> <li>Disconnect the thermistor, then reconnect it.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains or reoccurs, replace the thermistor.</li> </ol>  |
| 026                | <b>Chamber 4 Thermistor:</b> <ul style="list-style-type: none"> <li>Chamber 4 thermistor shows open.</li> <li>Chamber 4 thermistor shows a short.</li> </ul>  | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check the connections of the thermistor in question.</li> <li>Disconnect the thermistor, then reconnect it.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains or reoccurs, replace the thermistor.</li> </ol>  |
| 027                | <b>Outlet Thermistor:</b> <ul style="list-style-type: none"> <li>Outer thermistor shows open.</li> <li>Outer thermistor shows a short.</li> </ul>   | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check the connections of the thermistor in question.</li> <li>Disconnect the thermistor, then reconnect it.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains or reoccurs, replace the thermistor.</li> </ol>  |
| 031                | <b>Leak Detect:</b> <ul style="list-style-type: none"> <li>Leak detected.</li> </ul>  | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check for plumbing leaks and correct accordingly.</li> <li>If the water heater is leaking, replace the unit.</li> <li>Dry the leak sensor and circuit board completely before restoring power.</li> <li>Turn on power to the water heater. Check for plumbing leaks and correct accordingly.</li> </ol> |
| 043                | <b>Flow Sensor:</b> <ul style="list-style-type: none"> <li>Flow sensor not detected.</li> </ul>   | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Check the wire connections to the flow sensor.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains or reoccurs, replace the flow sensor.</li> </ol>  |
| 331                | <b>Scale Build Up Error:</b> <ul style="list-style-type: none"> <li>Scale has built up inside the chamber</li> </ul>  | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Drain and Clean the water heater as shown in the Scale Buildup Cleaning Instructions under the Service and Maintenance Section.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains, contact Technical Support.</li> </ol>   |
| 332                | <b>Scale Build Up Error - 4 Chamber:</b> <ul style="list-style-type: none"> <li>Scale has built up inside chamber 1 or 2.</li> <li>Unit will continue to operate off of chamber 3 and 4.</li> </ul>   | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Drain and Clean the water heater as shown in the Scale Buildup Cleaning Instructions under the Service and Maintenance Section.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains, contact Technical Support.</li> </ol>   |

Continued on the next page...

| Display Fault Code | Description   | Action/Solution   |
|--------------------|---|---|
| 333                | <b>Scale Build Up Error - 4 Chamber:</b> <ul style="list-style-type: none"> <li>Scale has built up inside chamber 3 or 4.</li> <li>Unit will continue to operate off of chamber 1 and 2.</li> </ul> | <ol style="list-style-type: none"> <li>Turn off power to the water heater.</li> <li>Drain and Clean the water heater as shown in the Scale Buildup Cleaning Instructions under the Service and Maintenance Section.</li> <li>Turn on power to the water heater.</li> <li>If the fault code remains, contact Technical Support.</li> </ol> |

\* These instructions are brief and intended as guidance for a qualified person. If you lack the necessary skills to perform these procedures call the Technical Assistance Hotline which is listed on the water heater's warranty sheet for assistance.

Figure 8 - Fault Code Display Example





# MAINTENANCE

## Routine Maintenance

Routine maintenance will help your water heater last longer and function properly. If you cannot perform these routine maintenance tasks yourself, contact a qualified person.

**IMPORTANT!** Failure to perform required or recommended maintenance as described in the following section may void the warranty.

## Water Heater Maintenance

After the first six months, drain and clean the water heater and inspect the elements, chambers, and chamber thermistors. Depending on the hardness of your water, repeat this process at least annually, or more frequently if needed.



### ⚠ WARNING!

#### Electric Shock Risk

Servicing should be performed on this water heater only after it has been disconnected from the power supply circuit(s). Failure to do so can result in severe injury or death from electrical shock:

### ⚠ WARNING!

- Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off.
- Some models are connected to more than one branch circuit. Disconnect **all** branch circuits before servicing unit.
- Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

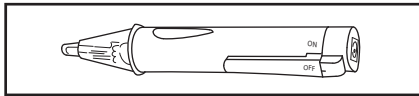


Figure 9 - Non-Contact circuit tester

## Accessing Heating Elements

- 1 Confirm that power is off by checking the wires with a non-contact circuit tester.
- 2 Open a nearby **hot** water faucet and run the water until it is cool.

**⚠ WARNING!** Be sure the water runs cool before draining the water heater to reduce the risk of scalding.

- 3 Close the inlet valve to the **water heater**, but leave the **hot** water faucet open to relieve pressure.
- 4 Cover the top of the water heater with towels (to prevent water from dripping through the openings) and place a bucket under the water heater to catch any water that might spill. After the towels and bucket are in place, disconnect the inlet and outlet water lines from the water heater.

**NOTICE:** There is a retaining plate around the inlet and outlet nipples. A single wrench is all that's necessary to unscrew the inlet and outlet lines.

- 5 Remove the top two access plugs located next to the outlet nipple with a flat head screwdriver. See Figure 10.

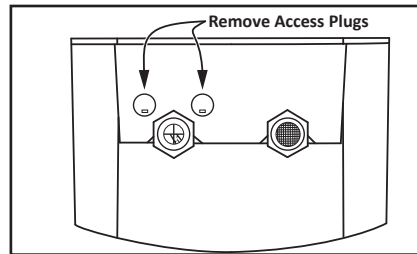


Figure 10 - Removing access plugs.

- 6 Use a Phillips screwdriver to remove the four screws securing the front cover. Remove the heater's front cover. See Figure 11.

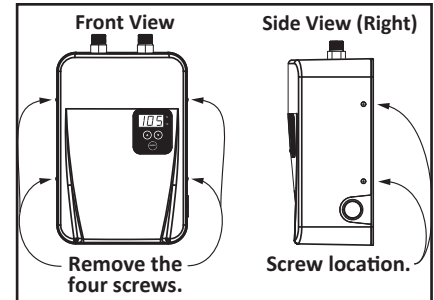


Figure 11 - Accessing Point-of-Use Control Board

## Element Removal

If you are not comfortable removing the heating elements yourself, contact a qualified person. To remove the heating elements, you'll need the following tools and supplies:

- Phillips head screwdriver
- Bucket
- Rag
- Hair dryer or compressed air

- 1 Viewing the bottom of the unit with the front cover removed, take a moment to note how the elements are installed. See Figure 12.

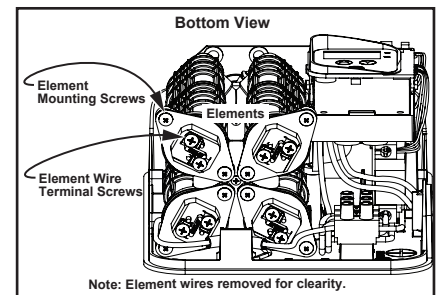


Figure 12 - Bottom view, element(s).

- 2 Using a Phillips screwdriver, loosen the two element wire terminal screws and disconnect the element wires. Bend the element wires out of the way.  
**NOTICE:** Use masking tape to label the red and black element chamber wires to the corresponding chamber. For the unit to function properly, it is crucial the elements are installed and wired in the correct orientation. Refer to the wire diagram found inside the front cover or in this manual.



**3** With the element wires out of the way, use a Phillips screwdriver to remove the two mounting screws securing the element in the chamber. Place the tip of a flat head screwdriver between the element mounting bracket and chamber housing to gently pry the element away from the chamber. Pull the element down and out of the chamber. Use a towel to clean up any water that might spill from the chamber. See Figure 13.

**NOTICE:** Protect the circuit board from any water. Complete the following steps before the removal and cleaning of additional elements.

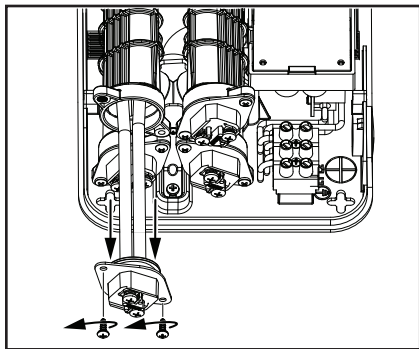


Figure 13 - Removing the element(s).

**4** Inspect the elements and the chambers for any scale buildup. If any scale has formed on the elements or the interior of the chambers, clean the unit as described in the "Cleaning Heating Elements and Chambers Section."

**5** Inspect the copper sheathing of the elements. If the copper sheathing has splits or cracks, replace it with a new element. See the "Element Removal and Replacement Section."

**6** Inspect the chambers for dark brown or black spots. This is an indication of chamber overheating. If dark brown or black spots are present, contact Technical Support.

## Cleaning Heating Elements and Chambers

**IMPORTANT!** At least annually, inspect elements, chambers, and thermistors for scaling or damage caused by corrosive water conditions and mineral deposits after the first inspection performed six months after initial installation of the unit.

Use a soft bristle brush to remove scale from the elements and a non metal bristle pipe cleaner to remove any scale buildup from inside the chambers. If necessary, soak the elements in cider vinegar for two hours to remove scale. **NOTICE:** At this time, we recommend inspecting the thermistors and cleaning them with a soft bristle brush. DO NOT soak thermistors in cider vinegar. Reference "Chamber Thermistor Replacement," (page 21) for instructions on how to remove and reinstall the chamber thermistors.

**IMPORTANT!** Failure to clean scaling from elements and chambers can lead to scale buildup and premature failure (leaks) in the chambers resulting in property damage. Replace the heating elements if necessary. If dark brown or black spots are present on the chambers, contact Technical Support.

## Install the Elements

**1** Before installing the elements, make sure the O-ring is lubricated with dish soap or a food safe silicon lubricant and properly installed onto the element.

**2** Install the element, mating the element slot with the chamber alignment notch. Secure the element by sequentially tightening the mounting bracket screws. DO NOT overtighten screws. See Figure 14.

**NOTICE:** To prevent damage to the element mounting bracket do NOT tighten the screws down completely one at a time.

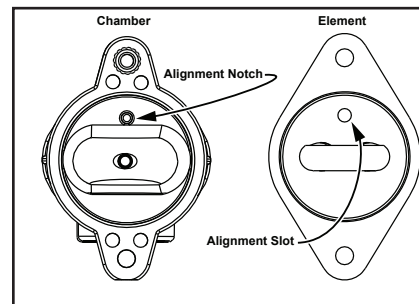


Figure 14 - Chamber Alignment Notch, Element Slot.

**3** Secure the red and black wires to the corresponding heating element(s). Use the two screws previously loosened.

**4** Return the heater to service by follow the instructions in "Returning the Water Heater Back to Service" (page 18).

**5** Turn on a nearby hot water faucet to fill the heater with water. Continue until all air has been expelled from the heater and pipes. If a T&P valve is installed, operate it manually several times to allow any trapped air to escape.

**6** Check for water leaks and correct any leaks that are found.

**NOTICE:** Most leaks occur at connections and are not a chamber leak. Do not proceed to the next step until the circuit board and components are completely dry.

**7** Reinstall the front cover reusing the four screws previously removed along with the top access plugs.

**8** The water heater is now ready for normal operation. Turn the electric power on at the circuit breaker panel, or fuse box to energize the water heater. Once complete, proceed to the Operations section of the owner's manual.

**NOTICE:** If the system diagnostic yields any codes, check wire connections. Reference the diagnostic codes section in the manual if code(s) are still present.

## Servicing the Water Heater

### ⚠ WARNING!

- Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off.
- Some models are connected to more than one branch circuit. Disconnect **all** branch circuits before servicing unit.
- Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

### Draining the Water Heater

- 1 Confirm that power is off by checking the wires with a non-contact circuit tester.
- 2 Open a nearby **hot** water faucet and run the water until it is cool.

⚠ **WARNING!** Be sure the water runs cool before draining the water heater to reduce the risk of scalding.

- 3 Close the inlet valve to the water heater, but leave the hot water faucet open to relieve pressure.
- 4 If needed, remove the top two access plugs located next to the outlet nipple with a flat head screwdriver. See Figure 15.

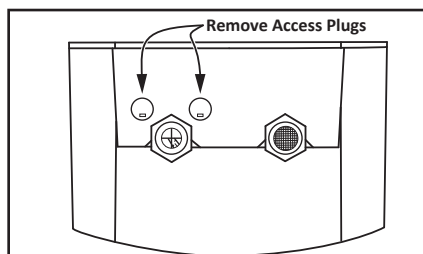


Figure 15 - Removing access plugs.

- 5 Use a Phillips screwdriver to remove the four screws securing the front cover. Remove the heater's front cover. See Figure 16.

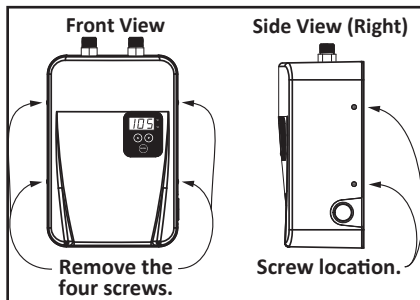


Figure 16 - Accessing Point-of-Use Control Board

- 6 Cover the top of the water heater with heavy towels (to prevent water from dripping through the openings) and place a bucket under the water heater to catch any water that might spill. After the towels and bucket are in place, disconnect the inlet and outlet water lines from the water heater.  
**NOTICE:** There is a retaining plate around the inlet and outlet nipples. A single wrench is all that's necessary to unscrew the inlet and outlet lines.

- 7 Remove the heating elements as described in "Element Removal and Replacement," (pages 19 - 20).

- 8 Inspect the elements, thermistors, and the chambers for any scale buildup. If any scale has formed on the elements, thermistors, or the interior of the chambers, clean the unit as described in the "Cleaning Heating Elements and Chambers Section," (page 17).

**IMPORTANT!** Failure to clean scaling from elements and chambers can lead to corrosion and premature failure (leaks) in the chambers resulting in property damage. Replace the heating elements if necessary. If dark brown or black spots are present on the chambers, contact Technical Support.

- 9 Reinstall the heating elements as described in "Element Removal and Replacement," (pages 19 - 20).

- 10 Reinstall the front cover followed by the inlet and outlet water lines to the water heater.

### Returning the Water Heater to Service

- 1 Turn on the **WATER** supply to the heater.
- 2 Turn on a nearby **hot** water faucet to fill the heater with water. Continue until all air has been expelled from the heater and pipes. If a T&P valve is installed, operate it manually several times to allow any trapped air to escape.
- 3 Check for water leaks and correct if found.

**NOTICE:** Do not restore power until the circuit board and components are completely dry. If water has dripped anywhere inside the heater, dry it with a hair dryer or compressed air. **Be sure to dry behind the circuit board.**

- 4 If there are no water leaks, reinstall the water heater's cover and access plugs (if removed).

⚠ **WARNING!** Be sure the cover is reinstalled and secured to reduce the risk of fire and electric shock.

- 5 Restore power to the water heater. Verify proper operation.

## Replacement Parts

The following parts may be ordered through your retailer or local plumbing wholesaler:

- Heating Elements
- Outlet and/or Chamber Thermistors (temperature sensors)
- Flow Sensor
- Control Board
- Nipples (inlet and/or outlet)

When ordering replacement parts, please be ready to provide the water heater model and serial numbers.



### ⚠ WARNING!

#### Electric Shock Risk

Servicing should be performed on this water heater only after it has been disconnected from the power supply circuit(s). Failure to do so can result in severe injury or death from electrical shock:

### ⚠ WARNING!

- **Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off.**
- **Some models are connected to more than one branch circuit. Disconnect all branch circuits before servicing unit.**
- **Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.**

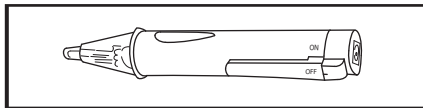


Figure 17 - Non-Contact circuit tester

**NOTICE:** A built-in alarm is also included. If water leaks inside your electric water heater, an alarm will sound to provide warning. Turn off power to the water heater at the circuit breakers, turn off the water supply, then correct the leak.

## Element Removal and Replacement

If you are not comfortable replacing a heating element yourself, contact a qualified person. To replace the heating element, you'll need the following tools and supplies:

- Phillips head screwdriver
- Bucket
- Rag
- Hair dryer or compressed air

1

Check your water heater's data plate for the correct wattage and voltage. Verify that your new heating element has the correct wattage rating and is sized correctly for your water heater. Reference "Electrical Requirements Table," (page 7).

### Point-of-use Models

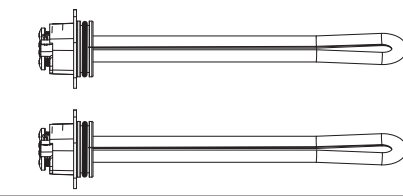


Figure 18 - Heating elements

2

Confirm that power is off by checking the wires with a non-contact circuit tester.

3

Follow the instructions on page 18 for draining the water and removing the front cover to the unit.

**⚠ WARNING! To reduce the risk of scalding, make sure the water runs cool before you proceed.**

4

Viewing the bottom of the unit with the front cover removed, take a moment to note how the elements are installed. See Figure 19.

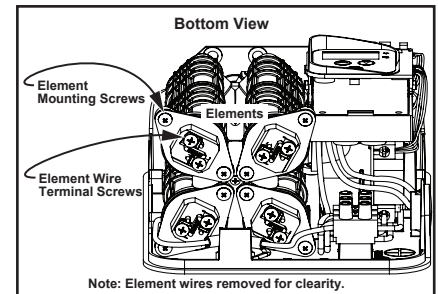


Figure 19 - Bottom view, element(s).

5

Using a Phillips screwdriver, loosen the two element wire terminal screws and disconnect the element wires. Bend the element wires out of the way.

**NOTICE:** If replacing more than one element, use masking tape to label the red and black element wires to the corresponding chamber. For the unit to function properly, it is crucial the elements are installed and wired in the correct orientation. Refer to the wire diagram found inside the front cover and/or in the manual.

6

With the element wires out of the way, use a Phillips screwdriver to remove the two mounting screws securing the element in the chamber. Place the tip of a flat head screwdriver between the element and chamber housing to gently pry the element away from the chamber. Pull the element down and out of the chamber. Use a towel to clean up any water that might spill from the chamber. See Figure 20.

**NOTICE:** Protect the circuit board from any water. If replacing additional elements, complete the following steps before the removal and replacement of additional elements.

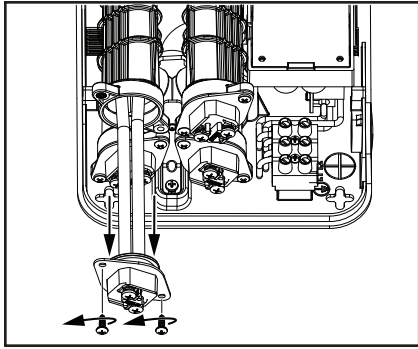


Figure 20 - Removing the element(s).

### Installing The New Element(s)

**1** Before installing the new element, make sure the o-ring is lubricated with dish soap or a food safe silicon lubricant and properly installed onto the element.

**2** Install the element, mating the element slot with the chamber alignment notch. Secure the element by sequentially tightening the mounting bracket screws. DO NOT overtighten screws. See Figure 21.

**NOTICE:** To prevent damage to the element mounting bracket do NOT tighten the screws completely one at a time, alternate tightening each screw. If replacing the element with the ground wires sharing the same mounting screw, remember to reinstall the ground wires previously removed.

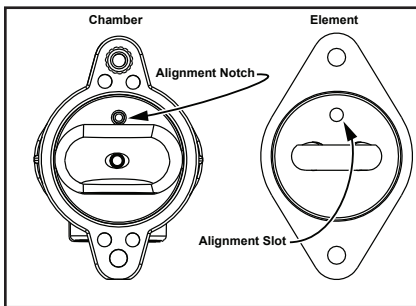


Figure 21 - Chamber Alignment Notch, Element Slot.

**3** Secure the red and black wires to the corresponding heating element(s). Use the two screws previously loosened.

**4** Return the heater to service by follow the instructions in "Returning the Water Heater Back to Service" (page 18).

**5** Turn on a nearby hot water faucet to fill the heater with water. Continue until all air has been expelled from the heater and pipes. If a T&P valve is installed, operate it manually several times to allow any trapped air to escape.

**6** Check for water leaks and correct any leaks that are found.

**NOTICE:** Most leaks occur at connections and are not a chamber leak. Do not proceed to the next step until the circuit board and components are completely dry.

**7** Reinstall the front cover reusing the four screws previously removed along with the top access plugs.

**8** The water heater is now ready for normal operation. Turn the electric power on at the circuit breaker panel, or fuse box to energize the water heater. Once complete, proceed to the Operations section of the owner's manual.

**NOTICE:** If the system diagnostic yields any codes, check wire connections. Reference the diagnostic codes section in the manual if code(s) are still present.

### Outlet Thermistor (Temperature Sensor) Replacement

If you are not comfortable replacing a thermistor yourself, have this work done by a qualified person. To replace an outlet thermistor, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Non-Contact Circuit Tester
- Needle Nose Pliers
- Bucket (for draining the heater)
- Towels

**NOTICE:** Reference the illustration on page 30 for a larger view of the thermistor locations.

- 1** Turn off power to the water heater.
- 2** Drain the water heater and remove the front cover as described in "draining the water heater," page 18.
- 3** With the front cover removed, take a moment to note how the outlet thermistor is installed and which control board terminal the wire harness is plugged into. See Figure 22.

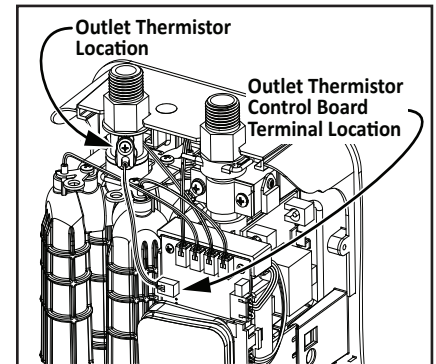


Figure 22 - Chamber thermistor location.

- 4** Unplug the thermistor's wire connector from the control board. See Figure 23.

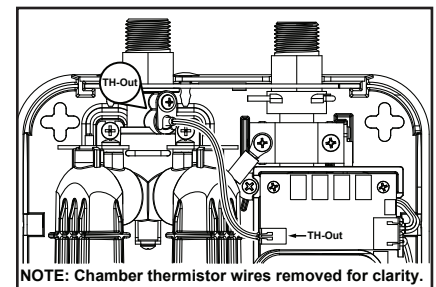


Figure 23 - Proper outlet thermistor installation.



5

Use a Phillips screwdriver to remove the screw securing the outlet thermistor retainer to the chamber.

6

Gently remove the outlet thermistor with a pair of needle nose pliers, grabbing only the metal body of the thermistor and not the wire.

**NOTICE:** Make sure the O-ring is removed with the chamber thermistor.

### Installing The New Outlet Thermistor

1

Before installing the new outlet thermistor, make sure the O-ring is lubricated and properly installed. See Figure 24.

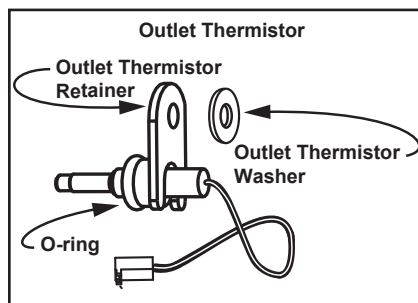


Figure 24 - Outlet thermistor with o-ring..

2

Install the outlet thermistor and properly position the retainer in place. Insert the washer onto the screw and use a Phillips screwdriver to tighten the screw (included with kit) snugly against the chamber thermistor retainer.

3

Plug the outlet thermistor's wire connector into the control board. See Figures 22 and 23, page 20.

4

Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 18.

## Chamber Thermistor (Temperature Sensor) Replacement

If you are not comfortable replacing a thermistor yourself, have this work done by a qualified person. To replace a chamber thermistor, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Flat Head Screwdriver
- Non-Contact Circuit Tester
- Needle Nose Pliers
- Bucket (for draining the heater)
- Towels

**NOTICE:** Reference the illustration on page 27 for a larger view of the thermistor locations.

1

With the front cover removed, take a moment to record or photograph how the chamber thermistor is installed and which control board terminal the wire harness is plugged into. See Figure 25.

**⚠ WARNING! Miswiring the control board upon reinstallation can result in water hotter than the thermostat setting, increasing the risk of scalding, severe burns, serious injury and death.**

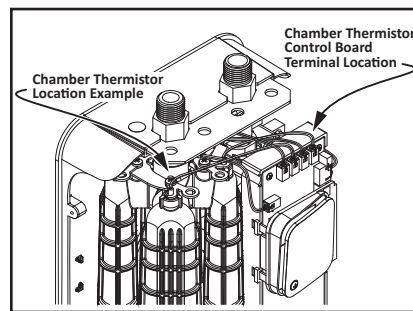


Figure 25 - Chamber thermistor location.

2

Unplug the chamber thermistor wire harnesses from the control board.

**NOTICE:** If replacing multiple chamber thermistors, use masking tape to label the chamber to the corresponding control board terminal. See Figure 26.

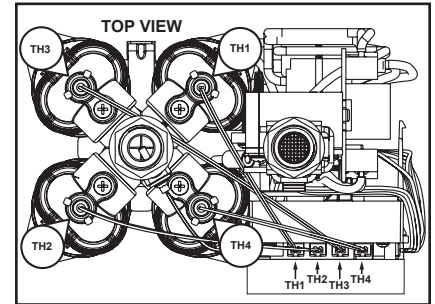


Figure 26 - Proper chamber thermistors installation.

3

Use a Phillips screwdriver to remove the screw securing the chamber thermistor retainer to the chamber.

4

Gently remove the chamber thermistor with a pair of needle nose pliers, grabbing only the metal body of the thermistor and not the wire.

**NOTICE:** Make sure the O-ring is removed with the chamber thermistor.

### Installing The New Chamber Thermistor

1

Before installing the new chamber thermistor, make sure the o-ring is lubricated and properly installed. See Figure 27.

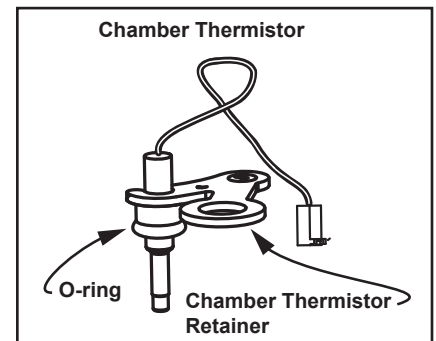


Figure 27 - Chamber thermistor with o-ring.

2

Install the chamber thermistor and properly position the retainer in place. Hand tighten the screw snugly against the chamber thermistor retainer with a Phillips screwdriver.

**3** Properly plug the chamber thermistor wire connector(s) into the control board. Make sure the chamber thermistor wire harness connections are connected to the proper control board terminals. See Figures 25 and 26.

**4** Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 18.

## Flow Sensor Replacement

If you are not comfortable replacing the flow sensor yourself, have this work done by a qualified person. To replace a flow sensor, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Flat Head Screwdriver
- Non-Contact Circuit Tester
- Needle Nose Pliers
- 12 inch Adjustable Crescent Wrench
- Bucket (for draining the heater)
- Towels

**1** Turn off power to the water heater.

**2** Drain the water heater and remove the front cover as described in "draining the water heater," page 18.

**3** With the front cover removed, take a moment to record or photograph how the sensors and triac(s) are installed and which control board terminals the wire harnesses are plugged into. See Figure 28.

**⚠ WARNING! Miswiring the control board upon reinstallation can result in water hotter than the thermostat setting, increasing the risk of scalding, severe burns, serious injury and death.**

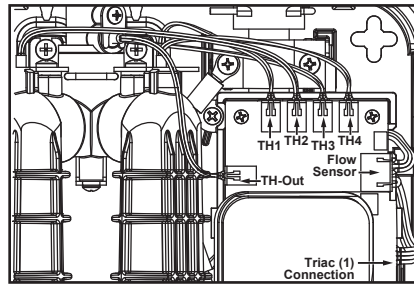


Figure 28 - Sensors control board terminal locations.

**4** Unplug all the sensors and the triac(s) connectors from the control board. Use a cable tie or other method to secure the wires out of the way of the control board and chambers, to avoid possible damage. See Figure 29.  
**NOTICE:** If the unit is a two or four chamber unit, use masking tape to label the chamber thermistor wires and their corresponding control board terminal.

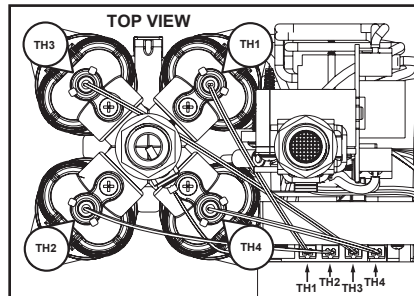


Figure 29 - Thermistor wire configuration.

**5** Locate and remove all the mounting screws (7 total) with a Phillips screwdriver. See Figure 30. **IMPORTANT:** In accordance with UL 499, DO NOT remove the lower mounting bracket screw securing the ground wire.

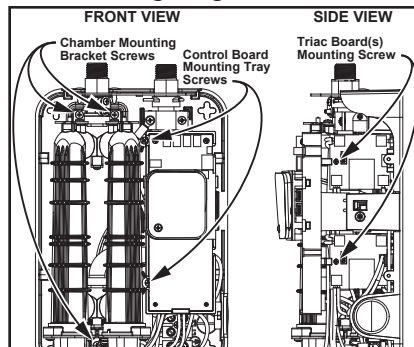


Figure 30 - Mounting screw locations.

**6** With the control board and triac board(s) mounting screws removed, gently pull the control board with tray away and down from the assembly. Secure the control board out of the way.

**NOTICE:** DO NOT pull or place stress on any of the wires still connected to the control board.

**7** Locate the four mounting screws securing the heat-sink/inlet tube mounting brackets. Use a Phillips screwdriver to remove the four screws and place the brackets to the side. The assembly can now move freely. See Figure 31.

**NOTICE:** Secure the heat-sinks in place for the next step by reinstalling the two left side bracket screws. DO NOT tighten screws.

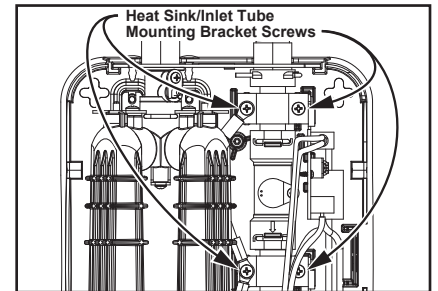


Figure 31 - Heat-sink/inlet tube mounting bracket screws.

**8** Remove the nipple retaining plate by gently pulling the top of the assembly until the nipple retaining plate has cleared the back plate. Remove the nipple retainer plate and place it out of the way. See Figure 32.

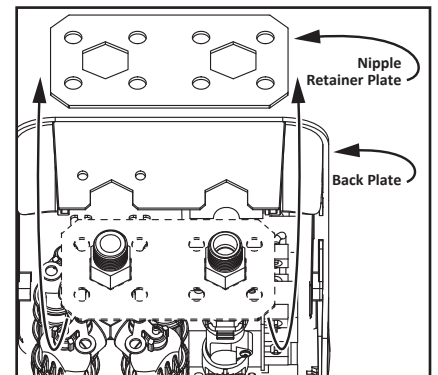


Figure 32 - Nipple retainer plate removal.

## Removing The Flow Sensor

**9** Using a flat head screwdriver and/or needle nose pliers, locate and remove the retainer pins securing the flow sensor to the upper and lower inlet tubes. See Figure 33.

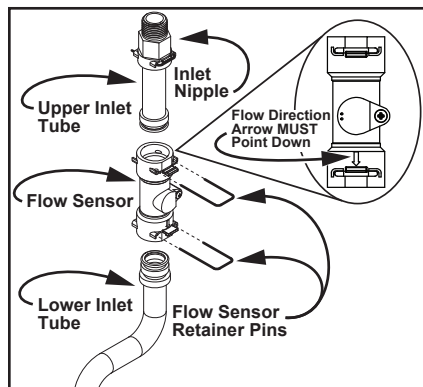


Figure 33 - Disassembling the inlet components and removing the flow sensor.

**10** With the flow sensor retainer pins removed, gently pull the upper inlet tube out and away from the flow sensor.

**11** Remove the flow sensor off and away from the lower inlet tube and set the flow sensor to the side.

## Installing The New Flow Sensor

**1** Before installing the new flow sensor, make sure the new o-rings on the upper and lower inlet tubes are properly lubricated.

**2** Install the flow sensor onto the lower inlet tube and secure it in place with one of the new flow sensor retainer pins, previously removed. See Figure 33.  
**NOTICE:** The flow direction arrow on the flow sensor **MUST** be pointing down.

**3** Install the upper inlet tube into the flow sensor and secure the upper inlet tube to the flow sensor with second flow sensor retainer pin. Insure the retainer pins are fully seated against the body of the flow sensor. See Figure 33.

**4** Reinstall the nipple retainer plate and position/seat the assembly into place. See Figure 32, page 22.

**NOTICE:** The inlet nipple and flow sensor can be rotated after installation of the retainer pins for proper alignment into the nipple retainer plate.

**5** Secure the inlet in place with the heat-sink/inlet tube brackets. Hand tighten the Phillips screws in place, **DO NOT** over tighten. See Figure 32, page 22.

**6** Secure the chamber in place by reinstalling the three chamber mounting bracket screws. Hand tighten the Phillips screws in place, **DO NOT** over tighten. See Figure 30.

**7** Using a crescent wrench, reconnect the water lines to the inlet and outlet nipples. **DO NOT** over tighten.

**8** Reinstall the control board assembly into place. Reusing the screws previously removed, secure the control board into place. Hand tighten the screws in place, **DO NOT** over tighten. See Figure 26, page 20.

**9** Properly reconnect the sensor and triac(s) to the control board, making sure the sensor, triacs, and wire harness connections are connected to the proper control board terminals. See Figures 28 and 29, page 22.

**10** Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 18.

## Inlet Nipple Replacement

If you are not comfortable replacing the inlet nipple yourself, have this work done by a qualified person. To replace a inlet nipple, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Flat Head Screwdriver

- Non-Contact Circuit Tester
- Needle Nose Pliers
- 12 inch Adjustable Crescent Wrench
- Bucket (for draining the heater)
- Towels

**1** Turn off power to the water heater.

**2** Drain the water heater and remove the front cover as described in "draining the water heater," page 15.

**3** With the front cover removed, take a moment to record or photograph how the sensors and triac(s) are installed and which control board terminals the wire harnesses are plugged into. See Figure 34.

**⚠ WARNING! Miswiring the control board upon reinstallation can result in water hotter than the thermostat setting, increasing the risk of scalding, severe burns, serious injury and death.**

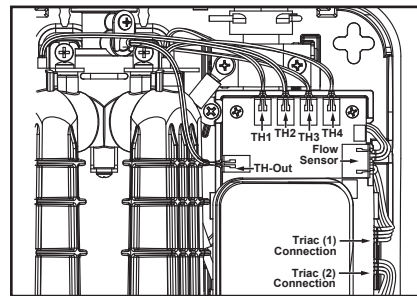


Figure 34 - Sensors control board terminal locations.

**4** Unplug all the sensors and the triac(s) connectors from the control board. Use a cable tie or other method to secure the wires out of the way of the control board and chambers, to avoid possible damage. See Figure 35.  
**NOTICE:** If the unit is a two or four chamber unit, use masking tape to label the chamber thermistor wires and their corresponding control board terminal.

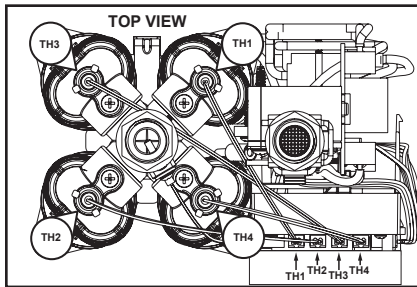


Figure 35 - Thermistor wire configuration.

- 5** Locate and remove all the mounting screws (7 total) with a Phillips screwdriver. See Figure 36.

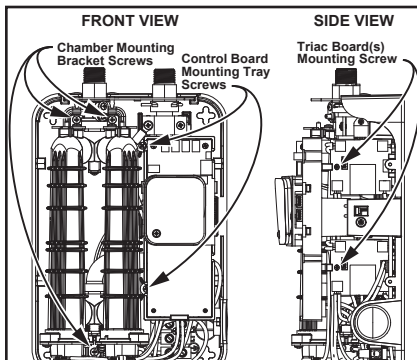


Figure 36 - Mounting screw locations.

- 6** With the control board and triac board(s) mounting screws removed, gently pull the control board with tray away and down from the assembly. Secure the control board out of the way.  
**NOTICE:** DO NOT pull or place stress on any of the wires still connected to the control board.

- 7** Locate the four mounting screws securing the heat-sink/inlet tube mounting brackets. Use a Phillips screwdriver to remove the four screws and place the brackets to the side. The assembly can now move freely. See Figure 37.  
**NOTICE:** Secure the heat-sinks in place for the next step by reinstalling the two left side bracket screws. DO NOT tighten screws.

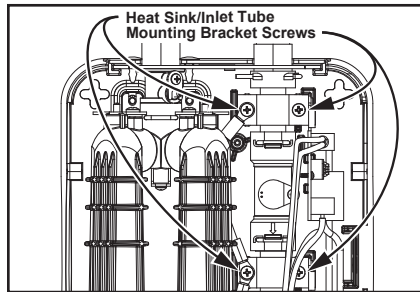


Figure 37 - Heat-sink/inlet tube mounting bracket screws.

- 8** Remove the nipple retaining plate by gently pulling the top of the assembly until the nipple retaining plate has cleared the back plate. Remove the nipple retaining plate and place it out of the way. See Figure 38.

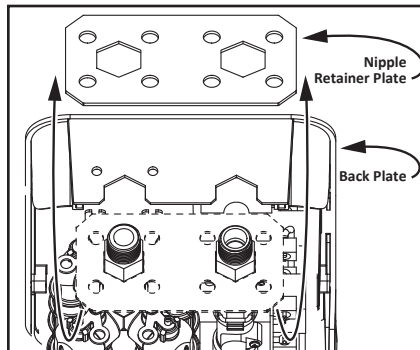


Figure 38 - Nipple retaining plate removal.

### Removing The Inlet Nipple

- 1** Using a flat head screwdriver and/or needle nose pliers, locate and remove the retainer pin securing the inlet nipple to the upper inlet tube. See Figure 39.

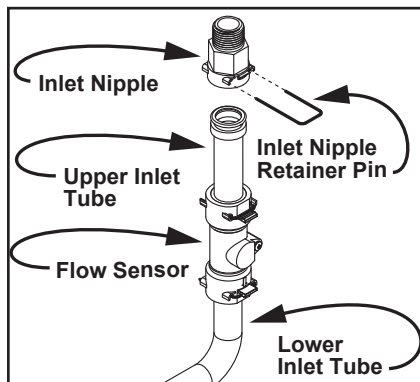


Figure 39 - Disassembling and removing the inlet nipple.

- 2** With the inlet nipple retainer pin removed, gently pull the inlet nipple out and away from the upper inlet tube.

### Installing The New Inlet Nipple

- 1** Before installing the new inlet nipple, make sure the new O-ring on the upper inlet tube is properly lubricated.

- 2** Install the inlet nipple onto the upper inlet tube and secure in place with the inlet nipple retainer pin previously removed. Insure the retainer pin is fully seated against the body of the inlet nipple. See Figure 38.

- 3** Reinstall the nipple inlet plate and position/seat the assembly into place. See Figure 39.

**NOTICE:** The inlet nipple can be rotated after installation of the retainer pin for proper alignment into the nipple retainer plate.

- 4** Secure the inlet in place with the heat-sink/inlet tube brackets. Hand tighten the Phillips screws in place, DO NOT over tighten. See Figure 37.

- 5** Secure the chamber in place by reinstalling the three chamber mounting bracket screws. Hand tighten the Phillips screws in place, DO NOT over tighten. See Figure 36.

- 6** Using a crescent wrench, reconnect the water lines to the inlet and outlet nipples. DO NOT over tighten.

- 7** Reinstall the control board assembly into place. Reusing the screws previously removed, secure the control board into place. Hand tighten the screws in place, DO NOT over tighten. See Figure 36.



8

Properly reconnect the sensor and triac(s) to the control board, making sure the sensor, triacs, and wire harness connections are connected to the proper control board terminals. See Figures 34 and 35, page 23.

9

Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 1

## Outlet Nipple Replacement

If you are not comfortable replacing the outlet nipple yourself, have this work done by a qualified person. To replace the outlet nipple, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Flat Head Screwdriver
- Non-Contact Circuit Tester
- Needle Nose Pliers
- 12 inch Adjustable Crescent Wrench
- Bucket (for draining the heater)
- Towels

1

Turn off power to the water heater.

2

Drain the water heater and remove the front cover as described in "draining the water heater," page 18.

3

With the front cover removed, take a moment to record or photograph how the sensors and triac(s) are installed and which control board terminals the wire harnesses are plugged into. See Figure 40.

**⚠ WARNING! Miswiring the control board upon reinstallation can result in water hotter than the thermostat setting, increasing the risk of scalding, severe burns, serious injury and death.**

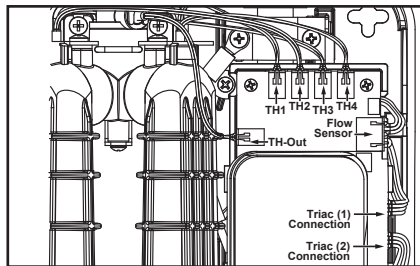


Figure 40 - Sensors control board terminal locations.

4

Unplug all the sensors and the triac(s) connectors from the control board. Use a cable tie or other method to secure the wires out of the way of the control board and chambers, to avoid possible damage. See Figure 41.

**NOTICE:** If the unit is a two or four chamber unit, use masking tape to label the chamber thermistor wires and their corresponding control board terminal.

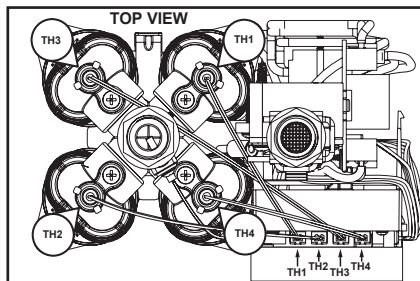


Figure 41 - Thermistor wire configuration.

5

Locate and remove all the mounting screws (7 total) with a Phillips screwdriver. See Figure 42. **IMPORTANT:** In accordance with UL 499, DO NOT remove the lower mounting bracket screw securing the ground wire.

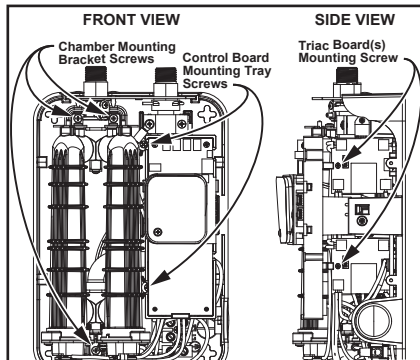


Figure 42 - Mounting screw locations.

6

With the control board and triac board(s) mounting screws removed, gently pull the control board with tray away and down from the assembly. Secure the control board out of the way. **NOTICE:** DO NOT pull or place stress on any of the wires still connected to the control board.

7

Locate the four mounting screws securing the heat-sink/inlet tube mounting brackets. Use a Phillips screwdriver to remove the four screws and place the brackets to the side. The assembly can now move freely. See Figure 43. **NOTICE:** Secure the heat-sinks in place for the next step by reinstalling the two left side bracket screws. DO NOT tighten screws.

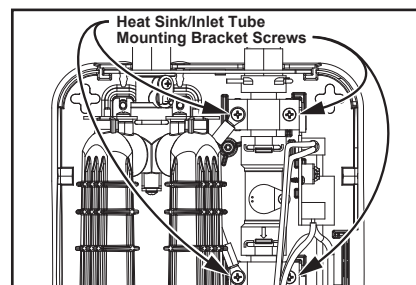


Figure 43 - Heat-sink/inlet tube mounting bracket screws.

8

Remove the nipple retaining plate by gently pulling the top of the assembly until the nipple retaining plate has cleared the back plate. Remove the nipple retainer plate and place it out of the way. See Figure 44.

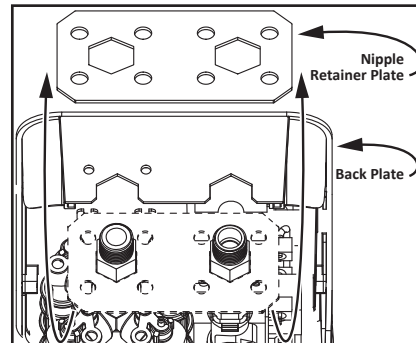


Figure 44 - Nipple retainer plate removal.

## Removing The Outlet Nipple

**1** Locate and remove the screw and washer securing the outlet thermistor bracket to the outlet nipple. Remove the outlet bracket. Gently pull out the outlet thermistor with O-ring from the outlet nipple. See Figure 45.

**NOTICE:** Pull the outlet thermistor out by grabbing the metal body of the thermistor and not the wire.

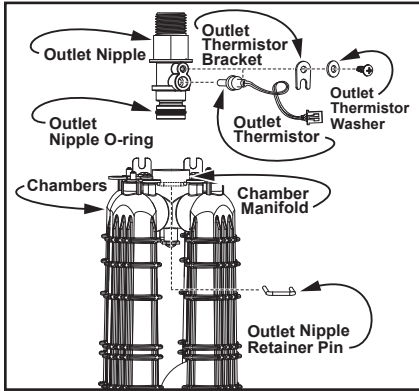


Figure 45 - Disassembling and removing the outlet nipple

**2** Using a flat head screwdriver and/or needle nose pliers, locate and remove the retainer pin securing the outlet nipple to the chamber manifold. See Figure 45.

**3** With the outlet nipple retainer pin removed, gently pull the outlet nipple out from the chamber manifold.

## Installing The New Outlet Nipple

**1** Before installing the new outlet nipple, make sure the O-ring is lubricated and properly installed.

**2** Install the outlet nipple into the chamber manifold and secure the outlet nipple to the chamber manifold with the retainer pin, previously removed. Insure the retainer pin is fully seated against the

body of the outlet nipple. The outlet nipple can be rotated after the retainer pin has been installed for proper alignment. See Figure 45.

**3** Reinstall the outlet thermistor with O-ring. Secure the thermistor in place with the outlet thermistor bracket. Insert the washer onto the screw and hand tighten the screw into place. DO NOT over tighten. See Figure 45.

**4** Reinstall the nipple inlet plate and position/seat the assembly into place. See Figure 44, page 25.

**5** Secure the inlet in place with the heat-sink/inlet tube brackets. Hand tighten the Phillips screws in place, DO NOT over tighten. See Figure 43, page 25.

**6** Secure the chamber in place by reinstalling the three chamber mounting bracket screws. Hand tighten the Phillips screws in place, DO NOT over tighten. See Figure 42, page 25.

**7** Using a crescent wrench, reconnect the water lines to the inlet and outlet nipples. DO NOT over tighten.

**8** Reinstall the control board assembly into place. Reusing the screws previously removed, secure the control board into place. Hand tighten the screws in place, DO NOT over tighten. See Figure 42, page 25.

**9** Properly reconnect the sensor and triac(s) to the control board, making sure the sensor, triacs, and wire harness connections are connected to the proper control board terminals. See Figures 40 and 41, page 25.

**10** Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 18.

## Control Board Replacement

If you are not comfortable replacing the control board yourself, have this work done by a qualified person. To replace the control board, you'll need the following tools/supplies:

- Phillips Screwdriver (Magnetic)
- Flat Head Screwdriver
- Non-Contact Circuit Tester

**1** Turn off power to the water heater.

**2** Remove the front cover as described in "draining the water heater," page 18.

**NOTICE:** There is no need to drain the water heater, only remove the front cover.

**3** With the front cover removed, take a moment to record or photograph how the control board is installed and where each components wire connection is located. See Figure 46.

**⚠ WARNING! Miswiring the control board upon reinstallation can result in water hotter than the thermostat setting, increasing the risk of scalding, severe burns, serious injury and death.**

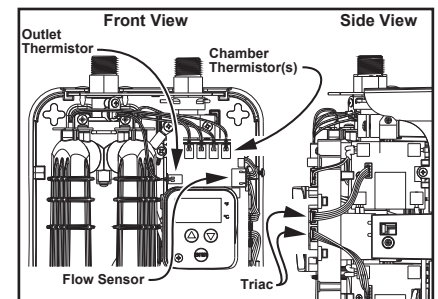


Figure 46 - Control Board Component Connections

4

Disconnect the chamber thermistor(s), outlet thermistor, and flow sensor from the control board. If jumper is present on the temperature mode, remove and place on new control board for the correct mode. See Figure 47.

**NOTICE:** The number of chamber thermistors will depend on the number of chambers.

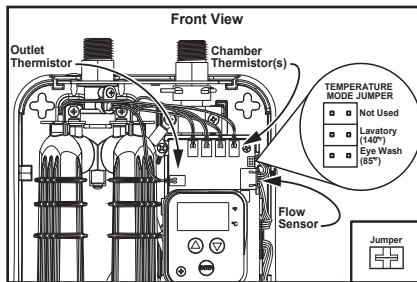


Figure 47 - Thermistors, flow sensor, and jumper.

5

Disconnect the triac connections from the control board and the secondary pin connection from the lower triac. See Figure 48.

**NOTICE:** 2 chamber units only have one triac.

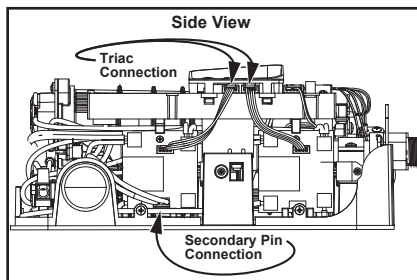


Figure 48 - Triac(s) and secondary pin pin connection.

6

With all the components disconnected from the control board, remove the display cover by pressing in the two side tabs on the left and right, and gently pull away from the control board. See Figure 50.

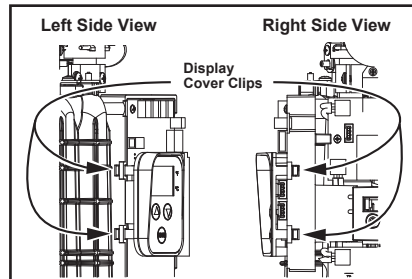


Figure 49 - Display Cover Mounting Tabs.

7

Using a Phillips screwdriver locate and remove the two screws securing the control board to the mounting tray and the screw securing the ground wire to the top heat sink. See Figure 50.

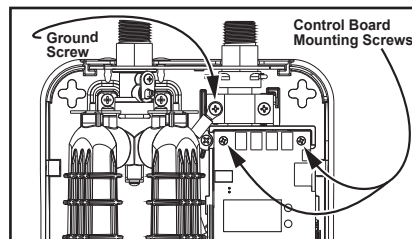


Figure 50 - Ground Wire & Control Board Mounting Screws.

8

Locate and gently remove the leak detection sensor, using a flathead screwdriver. Clean the area with rubbing alcohol to remove any remaining adhesive. See Figure 51.

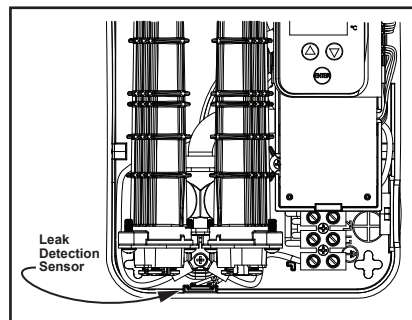


Figure 51 - Leak Detection Sensor Location.

## Installing The New Control Board

1

With the new control board in hand, adhere the hardwired leak detection sensor in the designated location. See Figure 51.

2

Install the ground wire to the heat-sink bracket, reusing the larger screw removed in step 7. See Figure 50.

3

Install the new control board in the mounting tray and secure it into place with the two smaller screws removed in step 7. See Figure 50.

4

Reinstall the display cover. See Figure 49

5

Reconnect the triac harnesses to the control board and the secondary pin connection. See Figure 48.

6

Properly reconnect the thermistor and flow sensor wire harnesses to the new control board. Make sure the flow sensor and thermistor wire harness connections are connected to the proper control board terminal. See Step 3, Figures 46 and 47.

7

Reinstall the front cover, reusing the four screws previously removed.

8

The water heater is now ready for normal operation. Turn the electric power on at the circuit breaker panel, or fuse box to energize the water heater. Once complete, proceed to the Operations section of the owner's manual.

**NOTICE:** If the system diagnostic yields any codes, ensure all wires are properly connected before referencing the diagnostic codes section in the manual.

# WIRING DIAGRAMS

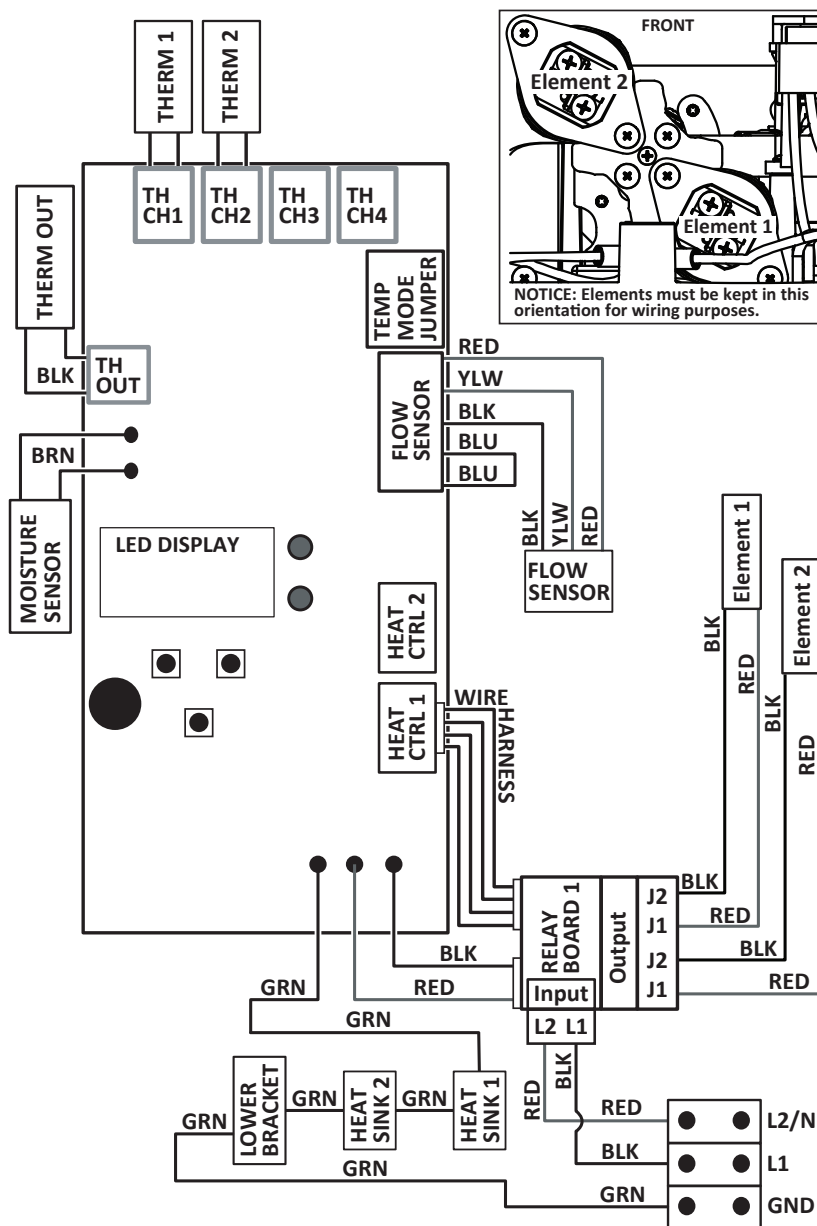
The wiring diagrams for the various models are listed in this section. Locate the correct wiring diagram that corresponds with your model. The correct wiring diagram for your model can be found on the inside of your water heater's cover.

The wiring diagrams are listed as follows:

- 2 Chamber, 2 Element, 120/208/240/277 VAC (see below)

- 4 Chamber, 4 Element, 208/240/277 VAC, p. 29.
- See also "Electrical Requirements," page 7.

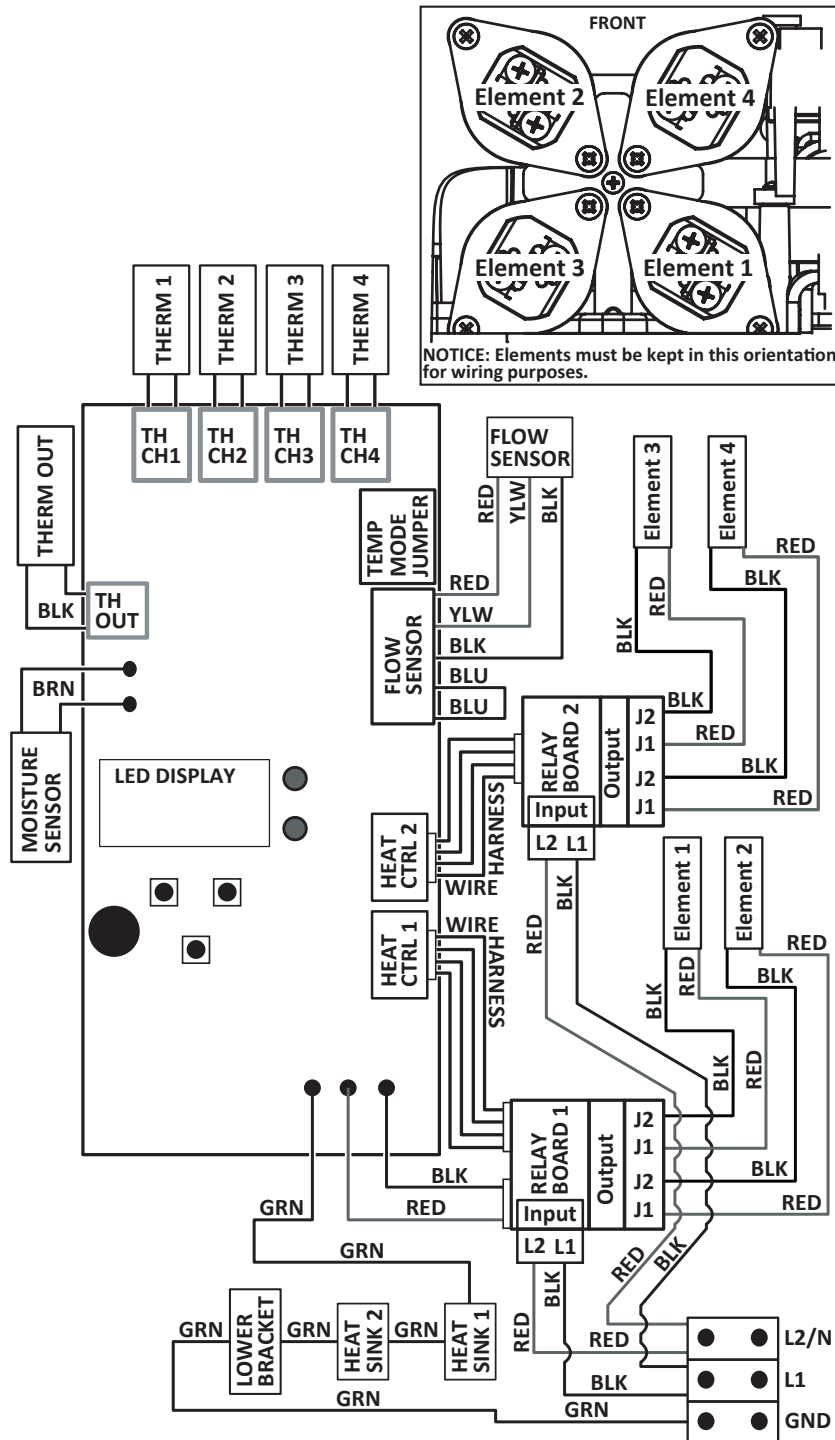
## POU 2 CHAMBER, 2 ELEMENT WIRING DIAGRAM



OPERATING FREQUENCY RANGE: 50-60 Hz

USE ONLY COPPER CONDUCTORS WHEN CONNECTING TO ELECTRICAL SERVICE.

## POU 4 CHAMBER, 4 ELEMENT WIRING DIAGRAM

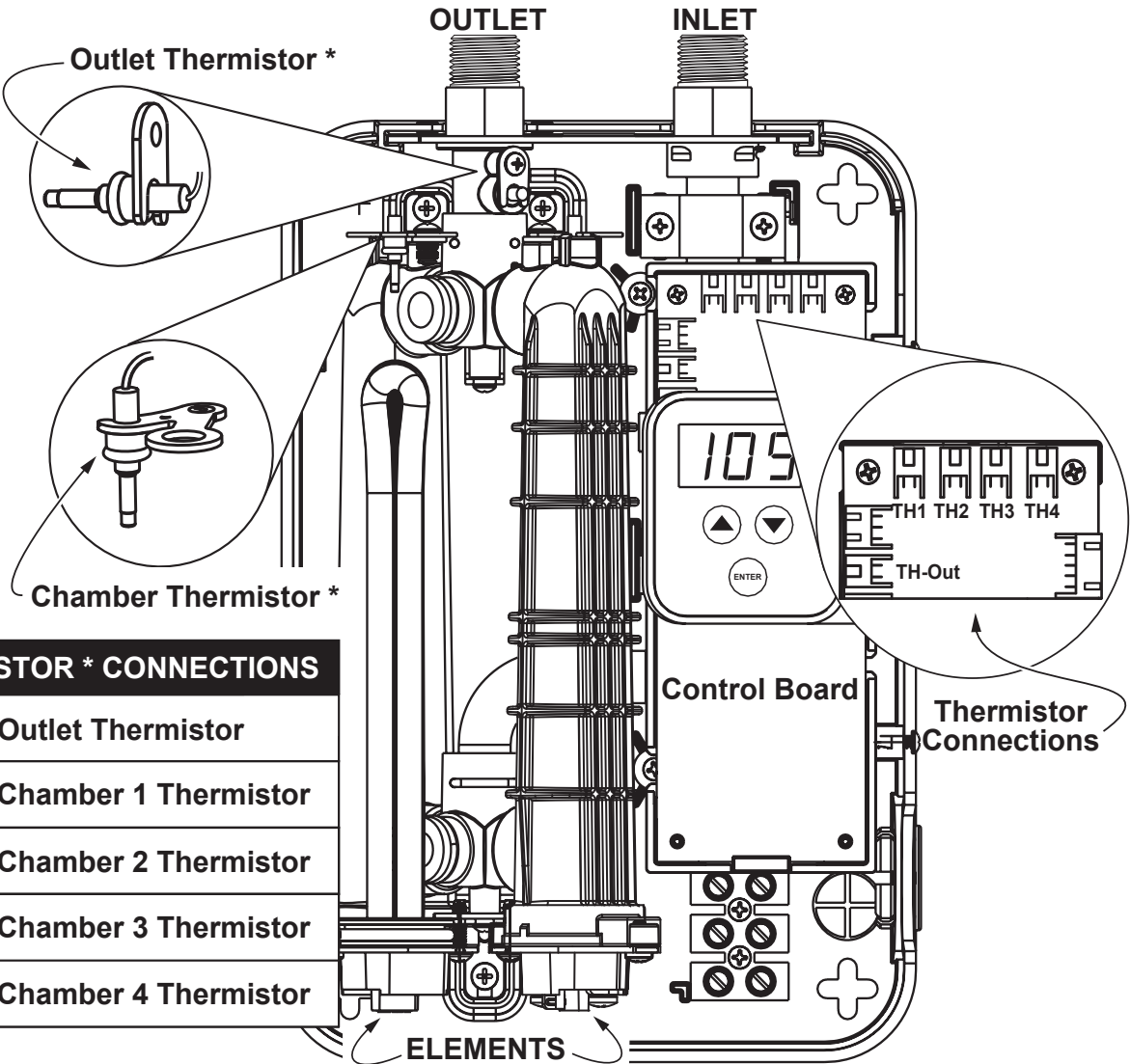
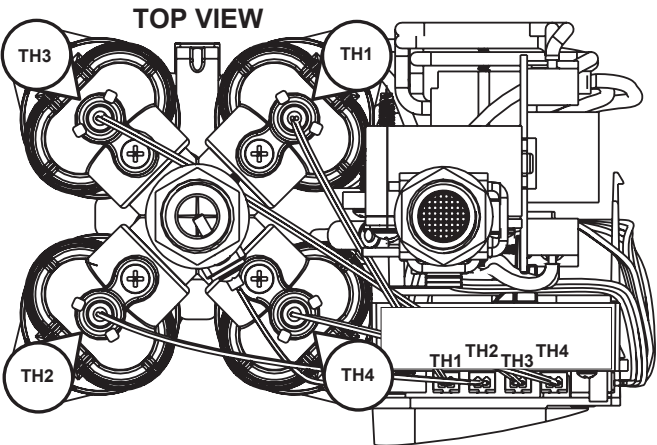


OPERATING FREQUENCY RANGE: 50-60 Hz

USE ONLY COPPER CONDUCTOR WHEN CONNECTING TO ELECTRICAL SERVICE.



\* Often referred to as a temperature sensor.



| THERMISTOR * CONNECTIONS |                      |
|--------------------------|----------------------|
| TH-OUT                   | Outlet Thermistor    |
| TH-1                     | Chamber 1 Thermistor |
| TH-2                     | Chamber 2 Thermistor |
| TH-3                     | Chamber 3 Thermistor |
| TH-4                     | Chamber 4 Thermistor |

## POU Mounting Instructions

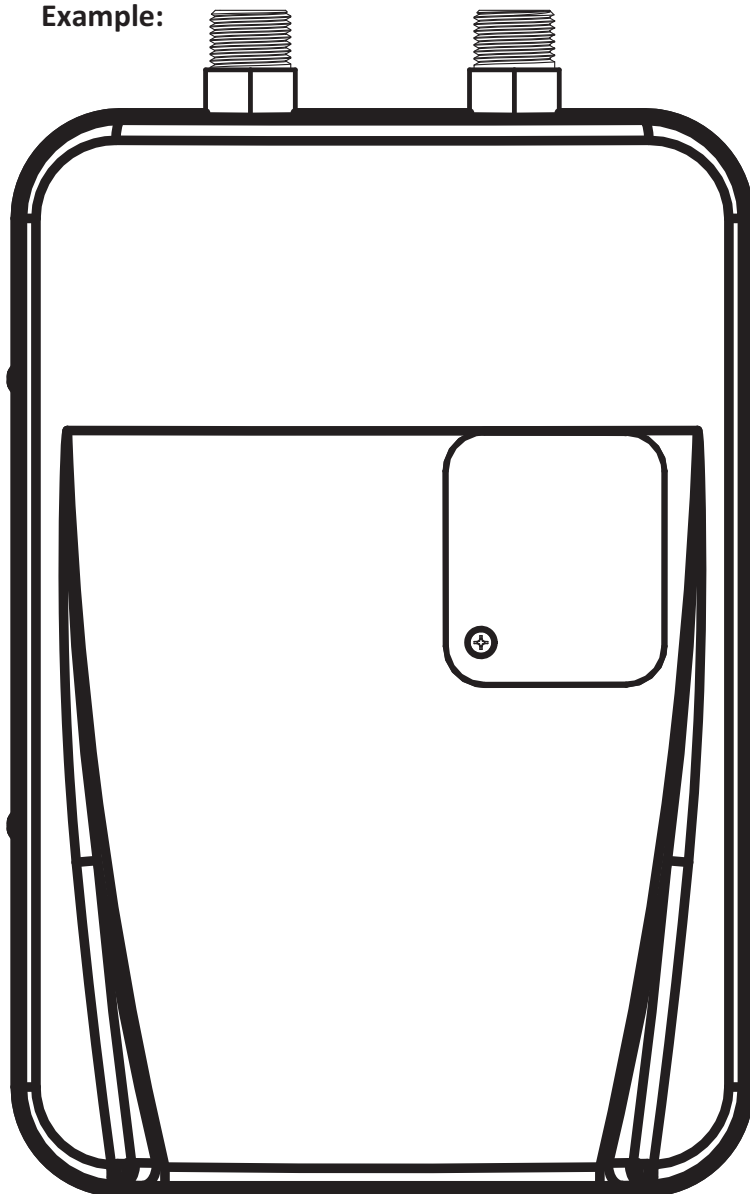
As stated on page 8, the point-of-use (POU) models MUST be mounted in the orientation as illustrated in Figures 2 and 3. To ensure the leak detection sensor functions properly and effectively, it is crucial the leak detection sensor NOT be removed from the leak detection sensor shelf. See Figure 1, page 5.

Use the mounting template on the next page.

**NOTICE:** Read “Minimum Clearances” (Figure 2, page 8) before you start.

The point-of-use models must be oriented with the inlet and outlet facing upward.

Visual Example:



**NOTICE:**

- Point-of-use models must have the leak detection sensor mounted on the leak detection sensor shelf. See illustration on page 5.

