

Installation Instructions and Use & Care Guide

Electric Tankless Water Heater



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 the Technical Support 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 data 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.

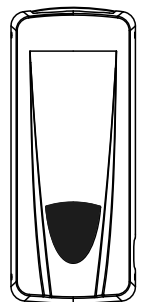
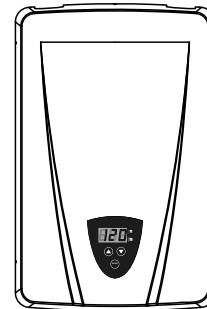
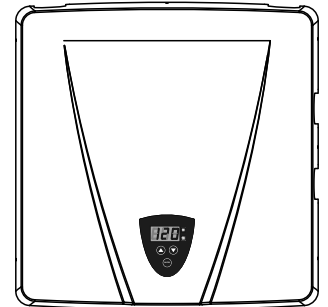


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Keep this manual near the water heater for future reference whenever maintenance, adjustment or service is required.

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:

DANGER	DANGER indicates hazardous situation that, if not avoided, will result in death or serious injury.
WARNING	WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	NOTICE 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 or CSA standard C22.1 Canadian Electrical Code, Part 1 in Canada.
- Follow all applicable plumbing, heating, and air conditioning codes during installation.

RISKS DURING INSTALLATION AND MAINTENANCE

WARNING



Electric Shock Risk

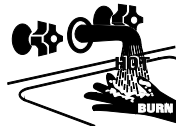
Contact with the electrical parts inside the water heater can result in severe injury or death from electrical shock:

- **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 all models, the temperature set point is factory set to 120°F to reduce the risk of scalding. Exception: single element (point-of-use) models are factory set to approximately 105°F.
- 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
155°F (68°C)	About 1 second

For information about changing the factory temperature setting, refer to “Water Temperature Adjustment” on page 15.

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 (user interface on two- or four-element models) 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:

ously 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 13. Use a UL listed or CSA approved strain relief. Connect the ground wire to the ground lug. (The ground lug is identified by a green and white ground label 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.

A built-in alarm is included. If water leaks inside your electric water heater, an alarm will sound to provide warning. Simply 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 "Troubleshooting" on one of the following pages:

- Point-of-use models: page 17.
- Two- or four-element models: page 19.

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.

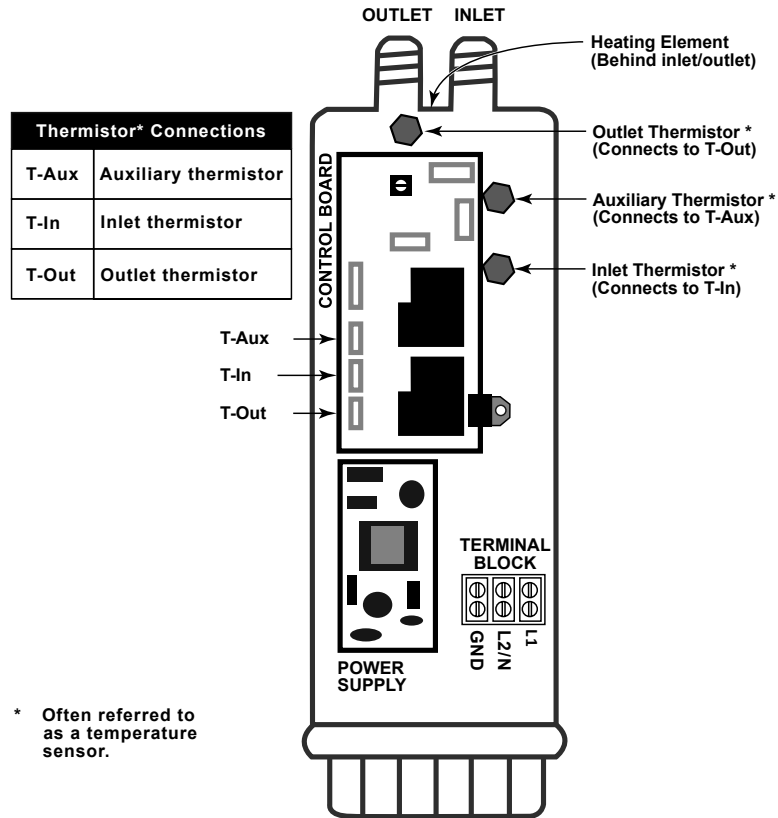
If you install a T&P valve, turn on the water supply to ensure that no water drips from it. Next, operate the valve

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, it must be piped by minimum 1 inch pipe to a suitable drain capable of discharging 10 GPM. A splash cover must be included to protect the area of attachment to the wall. The manufacturer will not be responsible for any water damage that may occur.

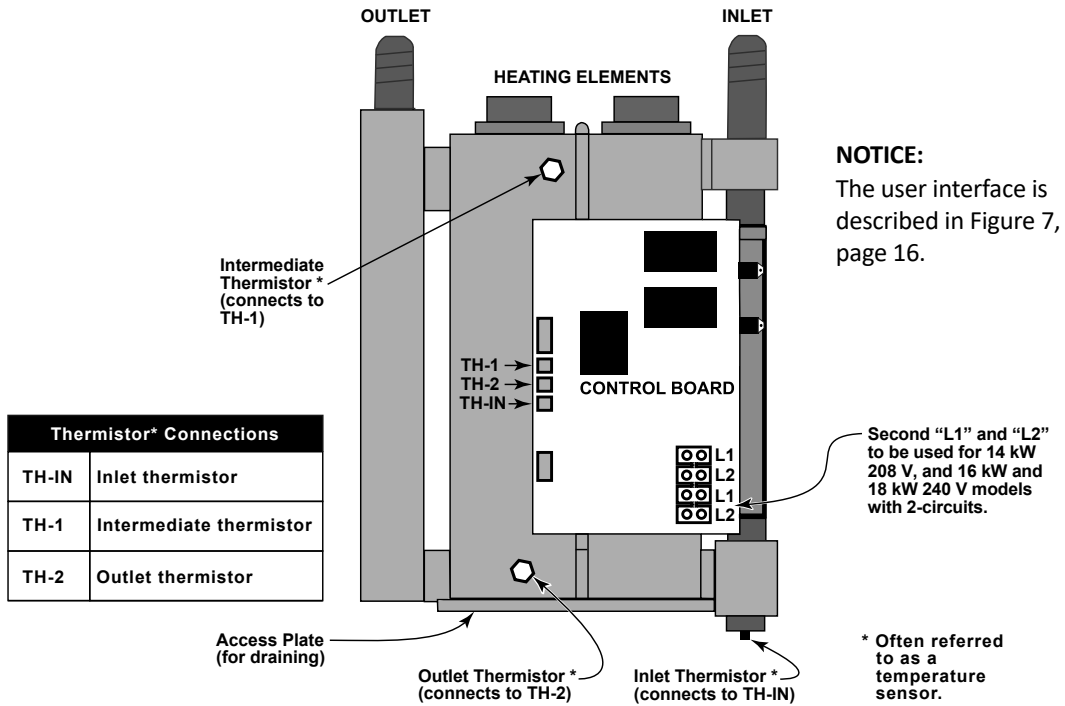
⚠ WARNING! Do not cap or plug the T&P relief valve or discharge pipe.

Component Identification: Point-of-Use Models (RPV, CPV)

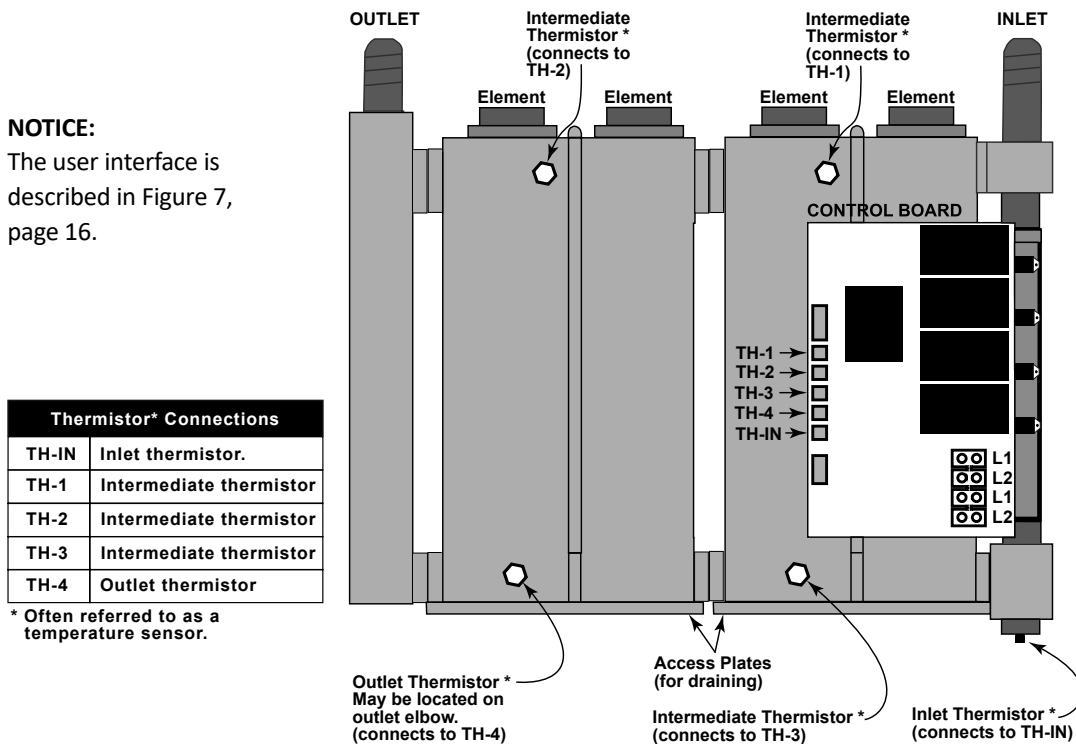


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Component Identification: Two-Element Models (R2V, C2V)



Component Identification: Four-Element Models (R4L, C4L, R4M, C4M)



General Specifications

Models	Point-of-Use: RPV, CPV	Two Element: R2V, C2V	Four Element: R4L, C4L, R4M, C4M
Wiring & Circuit Breaker Requirements	See "Electrical Requirements" on page 8.		
Water Connections	3/4" NPT	3/4" NPT	3/4" NPT
Weight lbs. (kg)	8 lbs. (3.6 kg)	13 lbs. (5.9 kg)	20 lbs. (9 kg)
Water Heater Dimensions*	H 16-5/8" x W 6-1/2" x D 7-3/16" (H 42.2cm x W 16.5cm x D 18.3 cm)	H 17-3/4" x W 11-1/2" x D 6-1/8" (H 45.1 cm x W 29.2 cm x D 15.6 cm)	H 18-1/8" x W 17" x D 6-1/8" (H 46 cm x W 43.2 cm x D 15.6 cm)
<p>* 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).</p> <p>NOTE:</p> <ul style="list-style-type: none"> • 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 maximum working pressure is 150 psi. 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:
 - 1.) Find your model number on your water heater’s rating plate.
 - 2.) Locate that model number in one of the tables listed below.

For example, if your model is *RPVA-24-K*, find **P**-24-K* in the appropriate table.

Models within each table are sorted by *Voltage* first, then by *Wattage per Element (KW)*.
- Follow the requirements listed for your model.
 - Point-of-use models are listed below.
 - Two-element models: page 9.
 - Four-element models: page 10.
- Use copper conductors only.

Point-of-Use Models							
(For potable water heating only. Not for space heating.)							
NOTICE: Models sorted by <i>Voltage</i> , then by <i>Wattage per Element</i> .							
Model	Recommended Breaker Size (Amps)	Voltage	Number of Elements	Wattage per Element (KW)	Current per Breaker (Amps)	Recommended Wire Size* (AWG)	Element Type
*P**-24-K	20	120	1	2.4	20.00	12	Single
*P**-30-K	25	120	1	3	25.00	10	Single
*P**-35-K	30	120	1	3.5	29.17	10	Single
*P**-40-X	20	208	1	4	19.23	12	Single
*P**-78-X	40	208	1	7.8	37.5	8	Single
*P**-35-E	15	240 †	1	3.5	14.58	14	Single
*P**-45-E	20	240 †	1	4.5	18.75	12	Single
*P**-55-E	25	240 †	1	5.5	22.92	10	Single
*P**-70-E	30	240 †	1	7	29.17	10	Single
*P**-80-E	40	240 †	1	8	33.33	8	Single
*P**-90-E	40	240 †	1	9	37.50	8	Single
*P**-120-E	50	240 †	1	12	50	6 †	Dual
*P**-30-Y	15	277	1	3	10.83	14	Single

* All wiring/conductors must be rated for 90°C or greater.
 † Maximum recommended wire size is #6 cu AWG.
 ‡ This model may used with a 208 VAC supply. Use of 208 VAC may require different breaker and/or wire sizes. Follow all code requirements.

Point-of-Use Models

(For potable water heating only. Not for space heating.)

NOTICE: Models sorted by *Voltage*, then by *Wattage per Element*.

Model	Recommended Breaker Size (Amps)	Voltage	Number of Elements	Wattage per Element (KW)	Current per Breaker (Amps)	Recommended Wire Size* (AWG)	Element Type
*P**-40-Y	15	277	1	4	14.44	14	Single
*P**-60-Y	25	277	1	6	21.66	10	Single
*P**-73-Y	30	277	1	7.3	26.35	10	Single
*P**-90-Y	40	277	1	9	32.49	8	Single

* All wiring/conductors must be rated for 90°C or greater.

† Maximum recommended wire size is #6 cu AWG.

‡ This model may used with a 208 VAC supply. Use of 208 VAC may require different breaker and/or wire sizes. Follow all code requirements.

Two-Element Models

(For potable water heating only. Not for space heating.)

NOTICE: Models sorted by *Voltage*, then by *Wattage per Element*.

Model	Recommended Breaker Size (Amps)	Voltage	Number of Elements	Wattage per Element (KW)	Current per Breaker (Amps)	Recommended Wire Size* (AWG)	Element Type
*2**-140-X	40 amps each (2 circuits)	208	2	7	33.65	8	Single
*2**-120-E	60 amps	240	2	6.1	50.83	6 [†]	Single
*2**-140-E	60 amps	240	2	7	58.34	6 [†]	Single
*2**-160-E	40 amps each (2 circuits)	240	2	8	33.33	8	Single
*2**-180-E	40 amps each (2 circuits)	240	2	9	37.5	8	Single

* All wiring/conductors must be rated for 90°C or greater.

† Maximum recommended wire size is #6 cu AWG.

Four-Element Models (Single Phase)

For potable water heating only. Not for space heating.

NOTICE: Models sorted by *Voltage*, then by *Wattage per Element*.

Model	Recommended Breaker Size (Amps)	Voltage	Number of Elements	Wattage per Element (KW)	Current per Breaker (Amps)	Recommended Wire Size* (AWG)	Element Type
*4**-280-X	70 amps each (2 circuits)	208	4	7	67.31	6 [†]	Single
*4**-180-E	40 amps each (2 circuits)	240	4	4.5	37.50	8	Single
*4**-220-E	50 amps each (2 circuits)	240	4	5.5	45.83	6 [†]	Single
*4**-240-E	60 amps each (2 circuits)	240	4	6	50.00	6 [†]	Single
*4**-280-E	60 amps each (2 circuits)	240	4	7	58.33	6 [†]	Single
*4**-320-E	70 amps each (2 circuits)	240	4	8	66.67	6 [†]	Single

* All wiring/conductors must be rated for 90°C or greater.

† Maximum recommended wire size is #6 cu AWG.

INSTALLATION

Getting Started

Clearances

See Figure 1 or Figure 2.

Top Clearance: A minimum of 12 inches (30.5 cm) is required for removal and maintenance of heating elements and 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 8 inches (20.3 cm) for single element models or 15 inches (38.1 cm) for 2- or 4-element models. 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 1 or 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 or CSA standard C22.1 Canadian Electrical Code, Part 1 in Canada.
- 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

Figure 1.

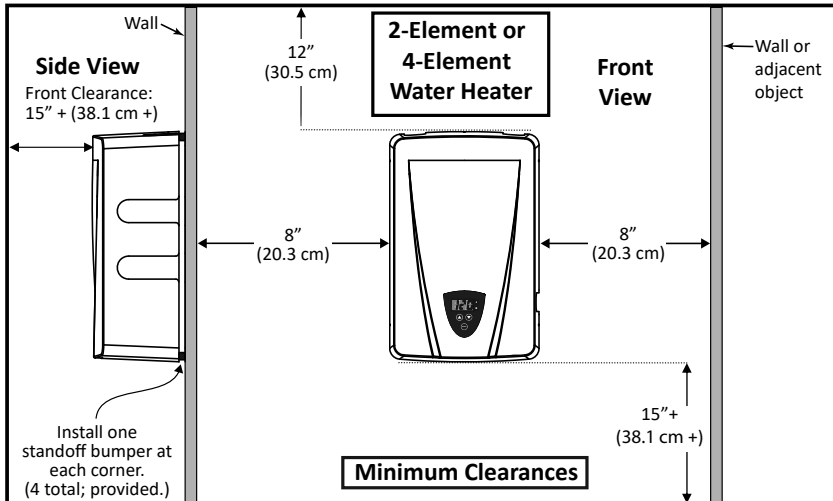
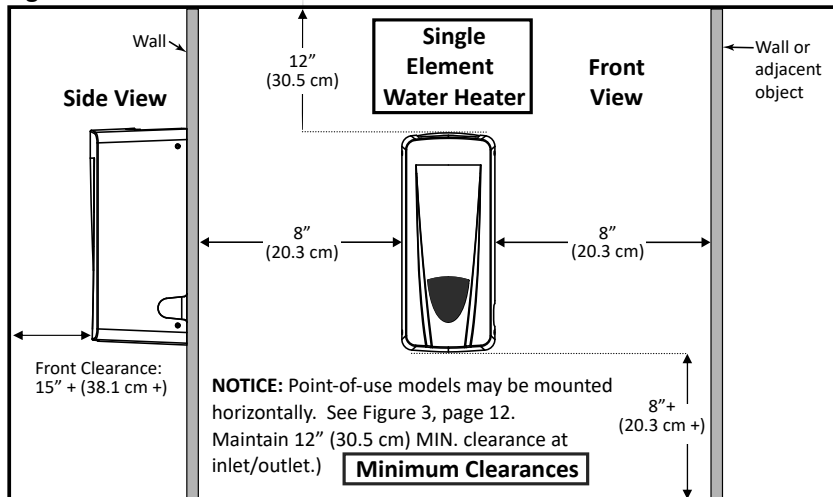


Figure 2.



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 “Clearances” on page 11.

- Do not install your water heater underneath condensate lines.
- 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.

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. If your water heater has a user interface display (UIM), unplug its ribbon cable from the control board in the water heater. (A UIM is shown in Figure 7, page 16.)

NOTICE: Be sure to remember where to plug it back in later. When the time comes to plug the connector back into the control board, it must be oriented correctly. **We recommend marking the connector and board with a**

marker. You will then be able to align the marks later. See also Figure 5, page 14.

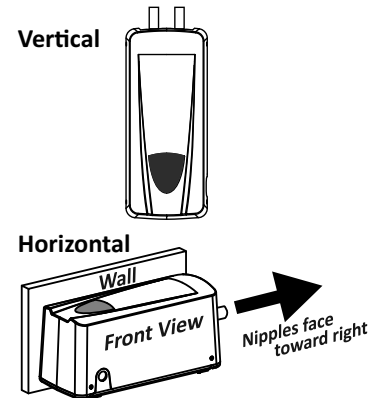
5. If you have a point-of-use model, locate the four mounting holes in the back plate. (If you have a two- or four-element model, there are two mounting tabs on each side of your water heater.)
6. **Two- or four-element water heaters only:**
Apply one standoff bumper to each corner on the back of the water heater. Standoffs are provided. **These standoffs must be installed so the water heater can vent properly.** See Figure 1, page 11.
7. Determine the mounting location on the wall, then verify your clearances. (See “Clearances” on page 11.)
8. Position the unit against the wall. Make sure that the unit is level.

NOTICE: Two-element and four-element models must be oriented with the inlet and outlet facing upward. However, point-of-use (POU) models may be oriented horizontally as described in Figure 3. To mount a POU water heater horizontally, follow the instructions on page 34.

9. Secure the water heater to the wall or other suitable structure with screws, bolts, or anchors as appropriate. Ensure that the mounting surface and fasteners will support the weight of the water heater. (You will reinstall the water heater’s protective cover later.)

Figure 3.

Acceptable orientations for mounting a point-of-use (POU) water heater:



NOTICE:

- Use mounting brackets (provided) for horizontal mounting. Nipples must point toward the right.
- Two-chamber and four-chamber models must be oriented with the nipples facing upward (vertical).

3

Connect the Water Lines

NOTICE:

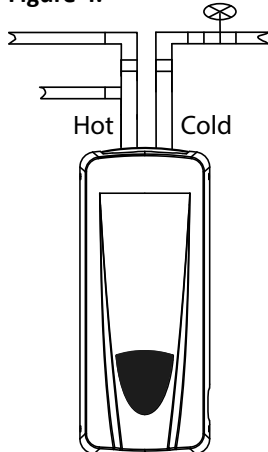
- **DO NOT** apply heat to the water lines, nipples, or any fitting on the water heater. Heat from soldering may damage the heat exchanger.
- Thread sealing tape (plumber’s tape) is the only sealer that may be used on the threads of the inlet and outlet fittings. **DO NOT** use pipe dope or PVC/CPVC primer and glue on the threads of the inlet and outlet fittings. Exposure to these compounds will damage the nipples, causing leaks.
- Use two wrenches when attaching the hot and cold water lines to

the heater. The second wrench must be used to hold the heater's fittings securely because they are designed to turn freely.

- 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.
- 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.

NOTICE: Do not supply electrical power to your water heater yet. If you

Figure 4.



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 must 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 in the USA or CSA standard C22.1 Canadian Electrical Code, Part 1 in Canada.**

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” which starts on page 8.

4. Connect the electrical service as described in “Electrical Requirements” (starting on page 8).

There is a wiring diagram label on the inside of your water heater’s protective cover. See also “Wiring Diagrams” on page 29 of this manual.

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” which starts on page 8).
 - 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. **Two- and four-element models only:** Plug the connector end of the cover’s ribbon cable into the control board. **See Figure 5.** (Plug it in where you see two rows of header pins close together, five pins in each row.) If necessary, refer to the “DISPLAY” callout in the wiring diagram for your

model. (See “Wiring Diagrams” on page 29.)

If you marked the board and connector during earlier steps, align the marks when plugging the connector in.

NOTICE: The plug must be oriented correctly. If you plug it in backwards, it will not cause damage, but the display will not work. If the display does not work after you have completed installation, follow these steps:

- A.) Disconnect power at all branch circuits.
 - B.) Disconnect the plug.
 - C.) Rotate the plug 180 degrees, then plug it back in.
8. Reinstall the water heater’s cover.
 - ▲ **WARNING! Be sure the cover is secured to reduce the risk of fire and electric shock.**
 9. Turn on power to the water heater.
 10. Verify proper operation.

Operating instructions are listed on page 15.

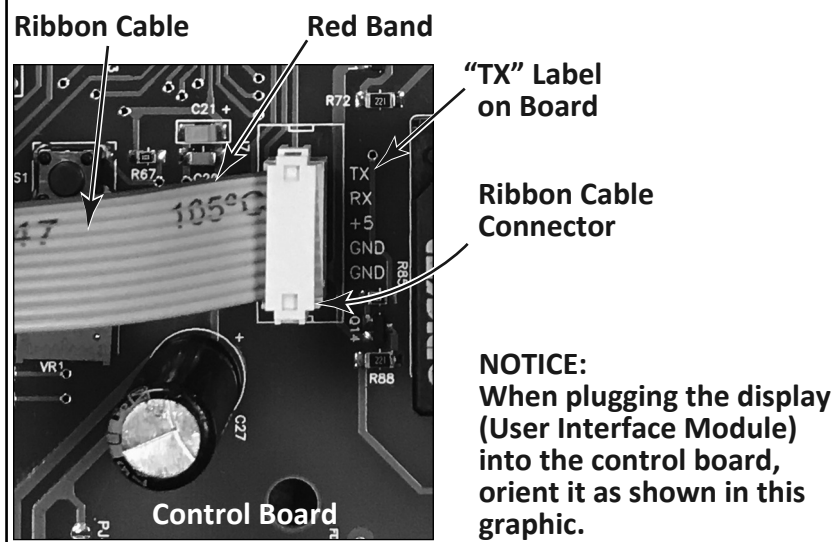
5 Test Water Heater Operation

1. At nearby hot water faucets, turn 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.
2. 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 (page 17 or 19).

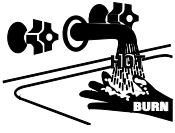
Figure 5. Two- and four-element models only:



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 your temperature setting, refer to one of the following procedures.

Point -of-use models only:

To adjust the temperature setting,

turn the temperature adjustment knob as described below. This knob can be found at the top of the circuit board next to the plumbing connections. (Figure 6.)

The factory setting is approximately 105°F (+/-1°F).

- To decrease the set temperature, turn the knob to the left (counter clockwise).
- To increase the set temperature, turn the knob to the right (clockwise).
- Use a small flat blade screwdriver to turn the knob.

The water temperature set point can be adjusted within a range of 90°F (32C) and 140°F (60 °C).

Two- or four-element models only:

The water temperature set point can be adjusted within a range of 90°F (32C) and 140°F (60 °C).

To change the set temperature,

1. Press and release either the UP or DOWN button (Figure 7, page 16). The display will blink and allow you to adjust the temperature set point.
2. Press and hold the UP or DOWN button to scroll through the temperatures quickly. Single presses will adjust the temperature setting one degree at a time.
3. Press the ENTER button to confirm.

Continued on the next page...

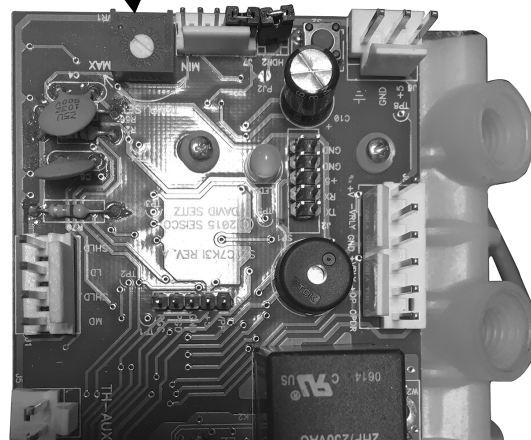
Figure 6.

POINT-OF-USE MODELS ONLY: TEMPERATURE ADJUSTMENT KNOB ON INTERNAL CIRCUIT BOARD

PLUMBING CONNECTIONS
BEHIND CIRCUIT BOARD

TEMPERATURE ADJUSTMENT KNOB

- DECREASE SET TEMPERATURE:
TURN KNOB TOWARD LEFT
(COUNTER-CLOCKWISE ↶)
- INCREASE SET TEMPERATURE:
TURN KNOB TOWARD RIGHT
(CLOCKWISE ↷)
- USE A SMALL FLAT BLADE
SCREWDRIVER.

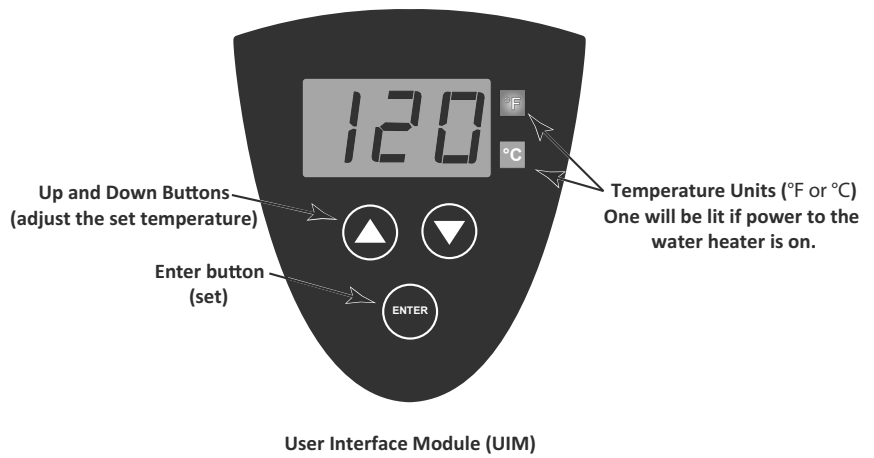


To toggle between Fahrenheit and Celsius,

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.

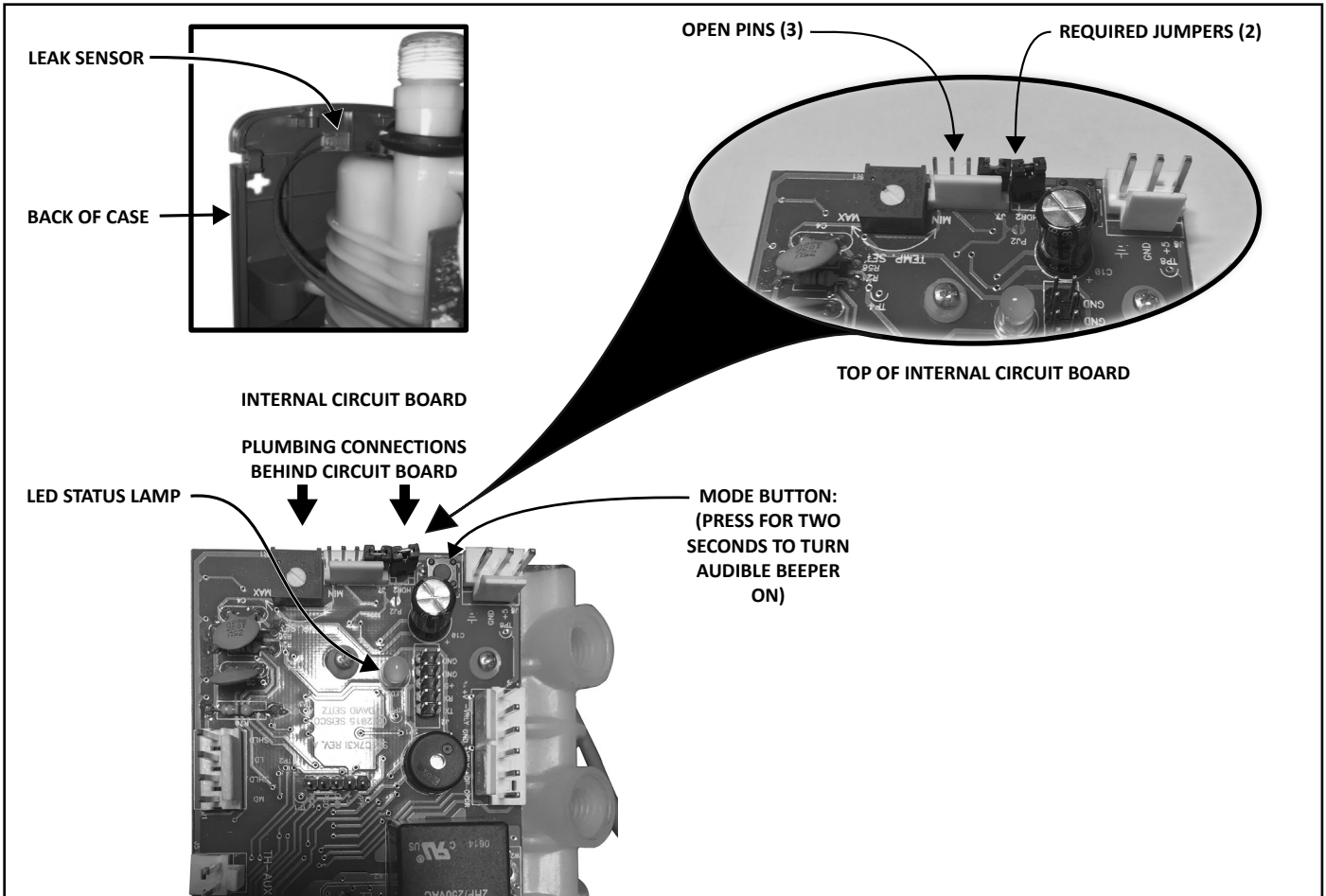
Figure 7.

Two and Four Element Models Only:



Flash Code Sequence	Description	Action / Solution
1-8	Leak detected.	Shut off all power to the water heater. Check for water leaks. Correct any leaks found. Dry the leak sensor (Figure 8), then dry the circuit board completely before restoring power.
2-1	Tank is not full of water.	Ensure that the heater is filled with water and that there is no air trapped inside. Make sure that the back flow preventer or check valve is operating properly and is not blocking the water heater's water supply. If the heater is filled and there are no leaks, connect level detect spades on the circuit board to ground. If the code is accompanied by a clicking sound that is present when water is running, check the elements.
3-4	Critical error (displayed when other errors are triggered)	Follow the Action/Solution for the other errors that are displayed.
3-6	Freeze Warning (T-In thermistor detects that incoming water is lower than 40°F). This error may also occur when an open thermistor is detected.	<ol style="list-style-type: none"> 1. Check wiring to the T-In thermistor. Ensure that the T-In thermistor is not faulty. 2. If incoming water is below 40°F, Turn off power to the water heater, close off its water supply, then drain the water heater. Wait until the incoming water is above 40°F, then restore service.

Figure 8.



Error Codes for Two and Four Element Models

If you have a point-of-use model, see page 17.

⚠ 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.

Display	Description		Action / Solution
E02	Hardware determined that the heated water has exceeded the temperature limit.		Turn off power to the water heater. Contact Technical Support.
E03	Low water level in heater.		<ol style="list-style-type: none"> 1. Turn off power to the water heater. 2. Turn on a nearby hot water faucet to flush air out of the water line. 3. When water runs uninterrupted from the hot water fixture, turn on power to the water heater.
E04	Moisture/leak detected in heater.		Turn off power and water supply to the water heater. Contact Technical Support.
E06	Software determined that the water temperature is too high.		This error may appear when the unit is powered up. Turn on a hot water tap to run water through the water heater. The error should clear. If not, turn off the power to the water heater. Contact Technical Support.
E10	Inlet temperature sensor is open.		<ol style="list-style-type: none"> 1. Turn off power to the water heater. 2. Check the connections of the thermistor in question. 3. Disconnect the thermistor, then reconnect it. 4. Turn on power to the water heater. 5. Does the error code reoccur? If yes, turn off power and replace the thermistor that is listed in the left-hand column. See “Thermistor (Temperature Sensor) Replacement” on page 25.
E11	Open thermistor.	2- and 4-Element models: TH-1 open.	
		Point-of-use models: T-Out open.	
E12	Open thermistor.	2-Element models: Outlet thermistor open.	
		4-Element models: TH-3 thermistor open.	
E13	4-Element models only: TH-2 thermistor is open.		

Continued on the next page...

Display	Description	Action / Solution	
E14	4-Element models only: Outlet thermistor open (TH-4).	<ol style="list-style-type: none"> 1. Turn off power to the water heater. 2. Check the connections of the thermistor in question. 3. Disconnect the thermistor, then reconnect it. 4. Turn on power to the water heater. 5. Does the error code reoccur? If yes, turn off power and replace the thermistor that is listed in the left-hand column. See "Thermistor (Temperature Sensor) Replacement" on page 25. 	
E20	Inlet thermistor shorted.	Replace the temperature sensor that is listed in the left-hand column. See "Thermistor (Temperature Sensor) Replacement" on page 25.	
E21	Shorted thermistor.		2- and 4-Element models: TH-1 shorted.
			Point-of-use models: T-Out shorted.
E22	2-Element models: TH-2 thermistor is shorted.		
	4-Element models: TH-3 thermistor is shorted.		
E23	4-Element models only: TH-2 thermistor is shorted.		
E24	4-Element models only: TH-4 thermistor is shorted.		
E51 & E52	Communications Failure. The user interface has lost connection with the control board.	Turn off power to the water heater. Contact Technical Support.	

General Troubleshooting

The following chart provides an overview of basic troubleshooting.

Symptom	Possible Cause	Corrective Action
Unit “clicks” periodically when no hot water is being used.	Cold water used causes reverse flow through water heater.	Install check valve on outlet.
	Unit has been in standby for an extended period with no hot water use.	NORMAL OPERATION. Unit will activate as needed to maintain a reference temperature to ensure quick start-up on next use.
Hot water supply is warm, but it does not get hot.	Temperature set point too low.	Increase the temperature set point.
	Flow is too high.*	Reduce flow.
	One of the main circuit breakers may be tripped. (For units with more than one branch circuit only.)	Check power panel. Reset breaker if tripped.
	Failed heating element or temperature sensor.	Replace element or sensor (thermistor).
Hot water supply is cold.	Flow is too high.*	Reduce flow.
	The circuit breaker(s) may be tripped.	Check power panel. Reset breaker if tripped.
	Failed heating element or temperature sensor.	Replace element or sensor (thermistor).
	Control board failure.	Contact Technical Support.
Hot water temperature fluctuates.	Flow is too high*	Reduce flow.
	One of the main circuit breakers may be tripped. (For units with more than one branch circuit only.)	Check power panel. Reset breaker if tripped.
	Failed heating element or temperature sensor.	Replace element or sensor (thermistor).
No hot water after installation.	Control not able to read phase.	Reverse the top pair L1 and L2 leads on the terminal strip.

TROUBLESHOOTING

* If your water heater runs out of hot water too quickly, it may be too small for your needs. Consider replacing it with a larger model or adding additional heater(s) to meet flow demand. Please refer to the product specification sheet for proper flow rates based on incoming water temperature.



⚠ 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:

- Disconnect power by opening the circuit breaker 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.
- Use a non-contact circuit tester to confirm that power is off before working on or near any electrical parts.
- Replace the water heater's cover after servicing to reduce the risk of fire and electric shock.

NOTICE:

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

Element Removal and Replacement

⚠ 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

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

- Phillips head screwdriver
- Adjustable wrench (for point-of-use models)
- Pipe wrench or slip joint pliers (for point-of-use models only)
- 1-1/2 inch element wrench or adjustable wrench (for element removal; two- and four-element models)
- 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.



Figure 10: Heating elements



Figure 11: Installed heating element

2

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

3

Open a nearby **hot** water faucet and run the water until it is cool.

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

4

Close the inlet valve to the water heater, but leave the hot water faucet open to relieve pressure.

Continued...

- 5** Remove the heater's front cover, then place a bucket under the water heater to catch any water that spills.

NOTICE: If you have a two- or four-element model, you must unplug the cover's ribbon cable from the control board. When you plug it back in later, it must be oriented correctly. (See Figure 5, page 14.) We recommend marking the connector and board with a marker. You will then be able to align the marks.

- If you have a point-of-use water heater, go to step 6.
- If you have a two- or four-element water heater, go to step 7 on page 24.

6 Point-of-use water heaters only:

6.1 Remove the heater's top plate:

- Remove both screws which secure the top plate to the water heater. (See Figure 12.)
- Lift and remove the top plate.

Figure 12.

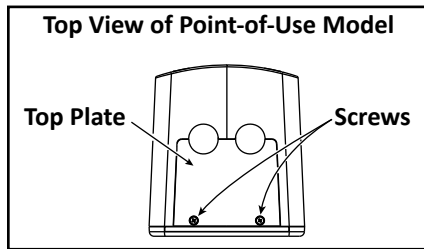
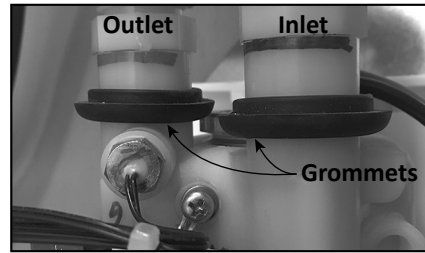


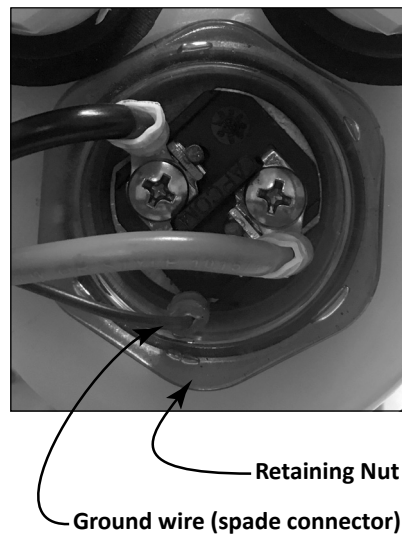
Figure 13. Point-of-use models: Grommet Orientation



6.3. Remove the old element:

- Slide the inlet and outlet grommets upward to provide clearance. (Figure 13).
- Remove the screws that secure the red and black wires to the top of the heating element. (Use the Phillips screwdriver. Save both screws for later use.)
- Disconnect the green ground wire from the heating element. (See Figure 14.) It is secured with a spade connector. Pull it straight up from the element to slide it off the terminal.

Figure 14. Element in point-of-use heater

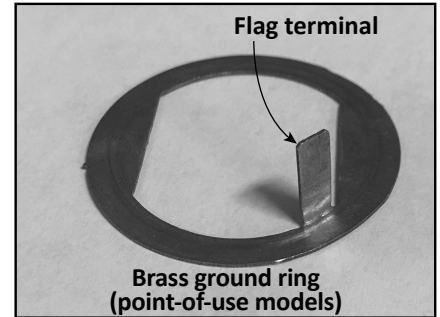


- Unscrew and remove the retaining nut that secures the heating element (See Figure 14). Use an adjustable wrench. You may also purchase an element replacement kit which includes a thin-walled socket. Call Technical Support for ordering information.

NOTICE: During the next step, protect the circuit board from dripping water!

- Lift the element out of the water heater. **NOTICE:** As you lift the element out of the opening, wrap it with a rag to keep water from dripping onto the circuit board.
- Remove the brass ground ring from the top of the element. (See Figure 15: Brass ring and flag terminal.) Set it aside for later use.

Figure 15: Brass ring and flag terminal



6.4 Install the new element:

NOTICE: Ensure that there is an O-ring installed above the threads of the element. (See Figure 20, page 25.)

- Insert the new element into its water heater opening.
- Place the brass ground ring on top of the element. Make sure that the flag terminal is positioned so that the ground wire can be reconnected easily (Figure 16.)

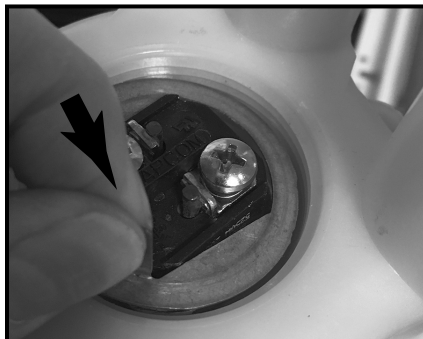
Continued...

- C.) Secure the element by installing and tightening the retaining nut (Figure 14, page 23). **Do not overtighten.**
- D.) Secure the red and black wires onto the top of the heating element. Use the two screws that you removed earlier.
- E.) Reconnect the green ground wire to the element's ground terminal (flag terminal).

6.5 Reassemble the point-of-use water heater:

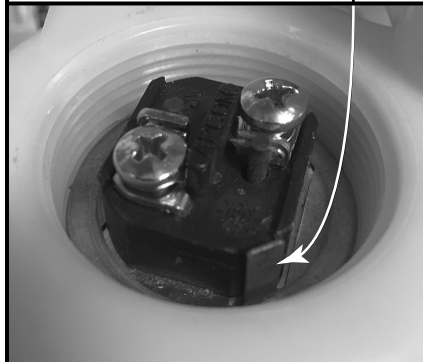
- A.) Reposition both grommets as shown in Figure 17. Ensure that their flat surfaces press firmly against the top plate when you reinstall it.

Figure 16.
Brass ring on point-of-use models.



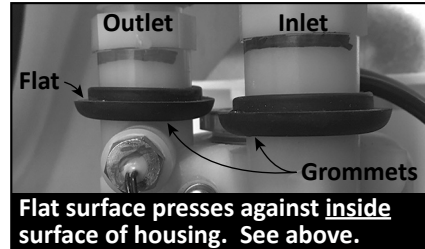
Place brass ground ring on top of element.

Keep flag terminal accessible.



- B.) Reinstall the top plate and secure it with the two screws that you removed earlier. (See Figure 12, page 23.)
- C.) Go to step 8 on page 25.

Figure 17.
Point-of-use models:
Grommet Orientation

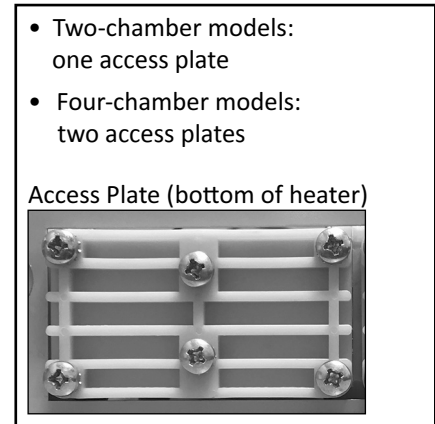


7 Two- or four-element water heaters only:

7.1 Drain the two- or four-element water heater:

- A.) Remove all six screws that secure the access plate beneath the element (at the bottom of the water heater). See Figure 18.
- B.) Remove the access plate and allow the water to drain into the bucket.
- C.) Clean the access plate and both seals.
- D.) Make sure that both seals are seated properly, then reinstall the access plate. (Use all six screws that you removed earlier.)

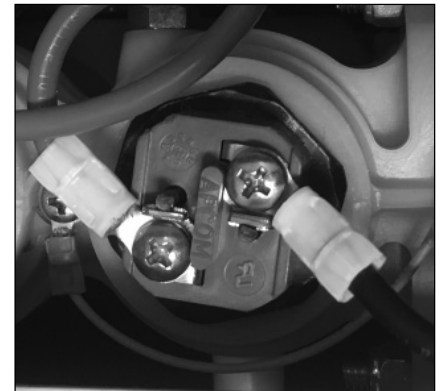
Figure 18.
Access Plates:
Two- or Four-Element models only



7.2 Remove the old element:

- A.) Remove the screws that secure the red and black wires to the top of the heating element (Figure 19). Use the Phillips screwdriver. Save both screws for later use.
- B.) Remove the heating element with an element wrench.
- C.) Lift the element out of the water heater. **NOTICE:** As you lift the element and O-ring out of the opening, wrap them with a rag to keep water from dripping onto the circuit board.

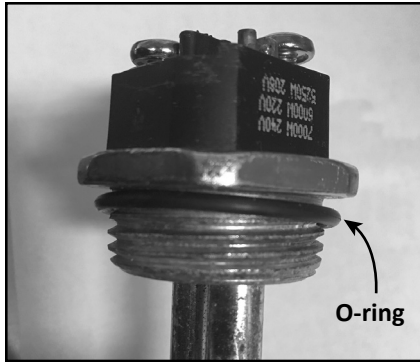
Figure 19.
Top view of element
(two- or four-element model)



7.3 Install the new element:

- A.) Insert the new element into its water heater opening. **Make sure that the O-ring is positioned properly.** (See Figure 20.)

Figure 20.



- B.) Tighten the element with an element wrench until it is snug, then tighten for 1/4 turn more.
- C.) Secure the red and black wires onto the top of the heating element. Use the two screws that you removed earlier. Proceed to step 8.

8 Turn on the **WATER** supply to the heater.

9 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.

10 Check for water leaks. Correct any leaks that are found.

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

11 If there are no water leaks, complete these steps:

- A.) **Two- or four-element water heaters only:** Take the connector end of the cover's ribbon cable and plug it into the control board. (Plug it in where you see two rows of header pins close together, five pins in each row.) If necessary, refer to the "DISPLAY" callout in the wiring diagram for your model. (See "Wiring Diagrams" on page 29.)

NOTICE: The plug must be oriented correctly. (The correct orientation is shown in Figure 5, page 14.)

If you plug it in backwards, it will not cause damage, but the display will not work. If the display does not work after you have completed installation, 1.) disconnect power at all branch circuits, 2.) disconnect the plug, 3.) rotate it 180-degrees, then 4.) plug it back in.

- B.) Reinstall the water heater's cover. **⚠ WARNING! Be sure the cover is reinstalled and secured to reduce the risk of fire and electric shock.**
- C.) Restore power to the water heater.
- D.) Run hot water from a faucet to make sure that the water heater is working as expected.

Thermistor (Temperature Sensor) Replacement

⚠ 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.

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

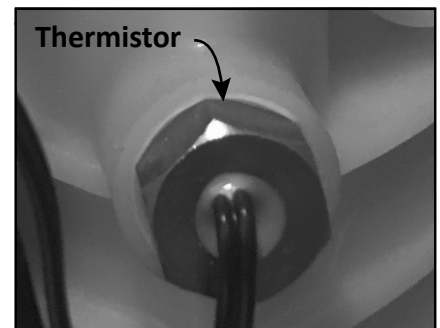
- Phillips head screwdriver
- 1/2-inch open end wrench
- Bucket (for draining the heater)
- Siphon transfer pump & towels

1 Turn off power to the water heater.

2 Drain the water heater as described in the draining instructions (page 27).

3 Locate the thermistor (temperature sensor) that was identified by the error code. **Refer to the appropriate figure on page 26.**

Figure 21.



4 Unplug the thermistor's wires from the control board.

Continued on page 27.

Figure 22.
Thermistor locations
(Point-of-use models)

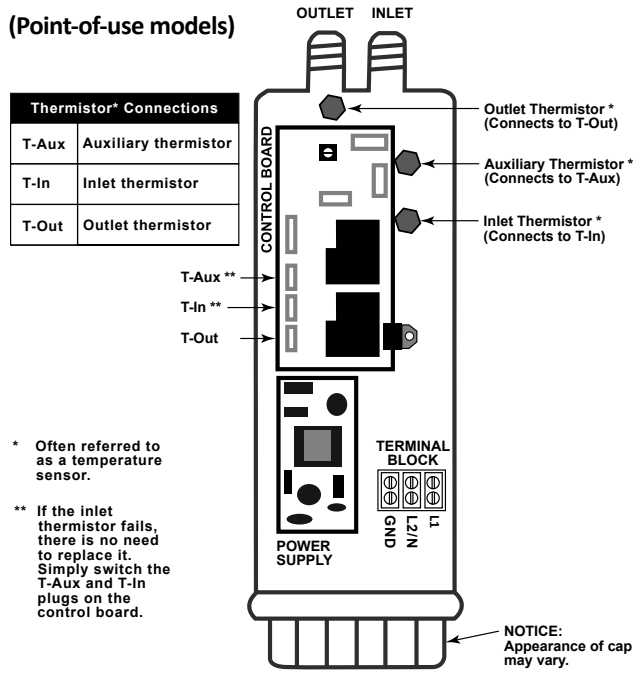


Figure 23.
Thermistor locations
(Two-element models)

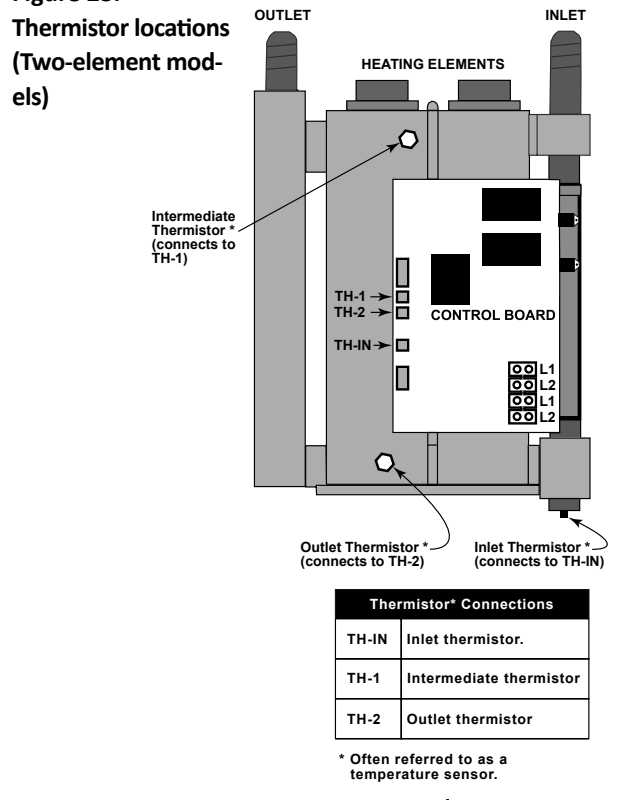
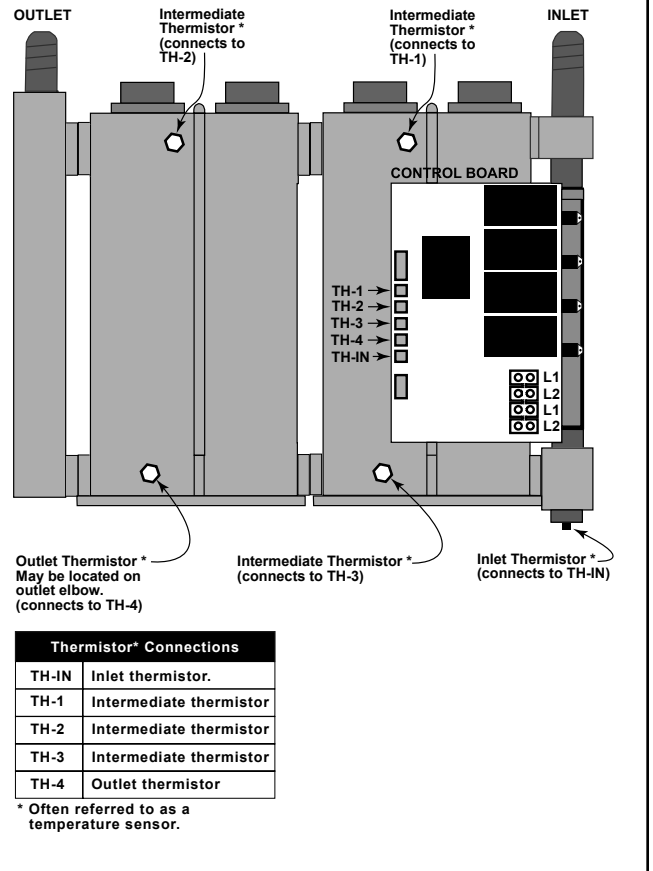


Figure 24.
Thermistor locations (Four-element models)



- 5 Remove the thermistor by turning it counter-clockwise with a 1/2-inch open end wrench.
- 6 Install the new thermistor in the opening by turning it clockwise with a 1/2-inch open end wrench.
 - Make sure that the O-ring is in place before you install the thermistor.
 - Tighten the thermistor hand tight, then carefully tighten it with a wrench until it is seated. Do not overtighten.
- 7 Plug the thermistor's wires into the control board. **The proper location is shown in one of the figures on page 26.**
- 8 Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 28.

Draining 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 Remove the heater's cover, then place a bucket under the water heater to catch any water that spills.

NOTICE: If you have a two- or four-element model, you must unplug the cover's ribbon cable from the control board. When you plug it back in later,

it must be oriented correctly. We recommend marking the connector and board with a marker. You will then be able to align the marks. See also Figure 5, page 14.

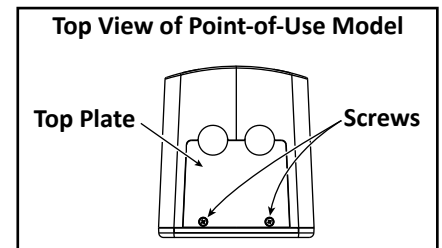
- If you have a point-of-use water heater, go to step 5.
- If you have a two- or four-element water heater, go to step 6.

5 Point-of-use water heaters only:

Drain the point-of-use water heater:

- A.) Remove both screws which secure the top plate to the water heater. (See Figure 25.)

Figure 25.



- B.) Lift and remove the top plate. (Removing it will protect it from damage.)
- C.) Cover the top of the water heater with heavy towels (to prevent water from dripping through the openings).
 - After the towels are in place, disconnect the inlet and outlet water lines from the water heater.
- D.) Remove the heating element as described in "Element Removal and Replacement" (page 22).
- E.) Insert a pump hose into the water heater's chamber and pump all of the water out.
- F.) Reinstall the heating element as described in "Element Removal and

Replacement” (page 22).

G.) Reinstall the inlet and outlet water lines to the water heater.

H.) **Go to step 7.**

6 Two- or four-element water heaters only:

Drain the two- or four-element water heater:

- A.) Remove all six screws that secure the access plate beneath the element (at the bottom of the water heater). See Figure 26.
- B.) Remove the access plate and allow the water to drain into the bucket.
- C.) Clean the access plate and both seals.
- D.) Make sure that both seals are seated properly, then reinstall the access plate. (Use all six screws that you removed earlier.)
- E.) Repeat steps A through D for each access plate.
- F.) **Go to step 7.**

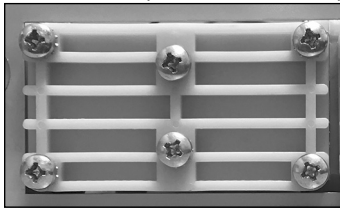
Figure 26.

Access Plates:

Two- or Four-Chamber models only

- Two-chamber models: one access plate
- Four-chamber models: two access plates

Access Plate (bottom of heater)



Returning the Water Heater to Service

7 When you are ready to return the water heater to service, turn on the **WATER** supply to the heater.

8 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.

9 Check for water leaks. Correct any leaks that are 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.**

10 If there are no water leaks, complete these steps:

A.) **Two- or four-element models only:** Take the connector end of the cover’s ribbon cable and plug it into the control board. (Plug it in where you see two rows of header pins close together, five pins in each row.) If necessary, refer to the “DISPLAY” callout in the wiring diagram for your model. (See “Wiring Diagrams” on page 29).

NOTICE: If you have a two- or four-element model, you must orient the plug as shown in Figure 5, page 14. If you plug it in backwards, it will not cause damage, but the display will not work. If the display does not work after you have completed installation, 1.) disconnect power at all branch

circuits, 2.) disconnect the plug, 3.) rotate it 180-degrees, then 4.) plug it back in.

B.) Reinstall the water heater’s cover. **▲ WARNING! Be sure the cover is reinstalled and secured to reduce the risk of fire and electric shock.**

C.) Restore power to the water heater. Verify proper operation.

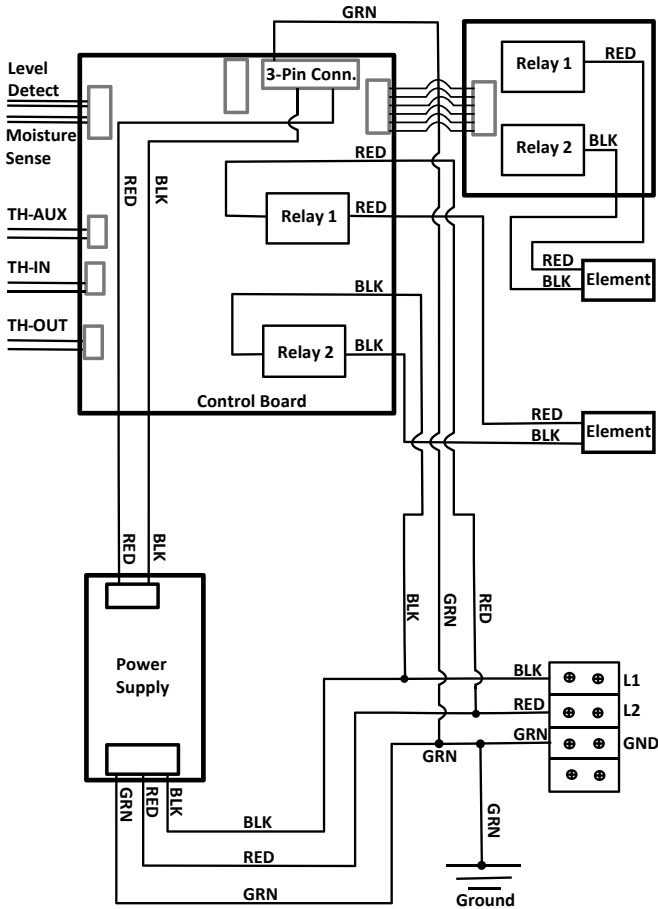
Replacement Parts

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

- Heating Elements
- Thermistors (temperature sensors)

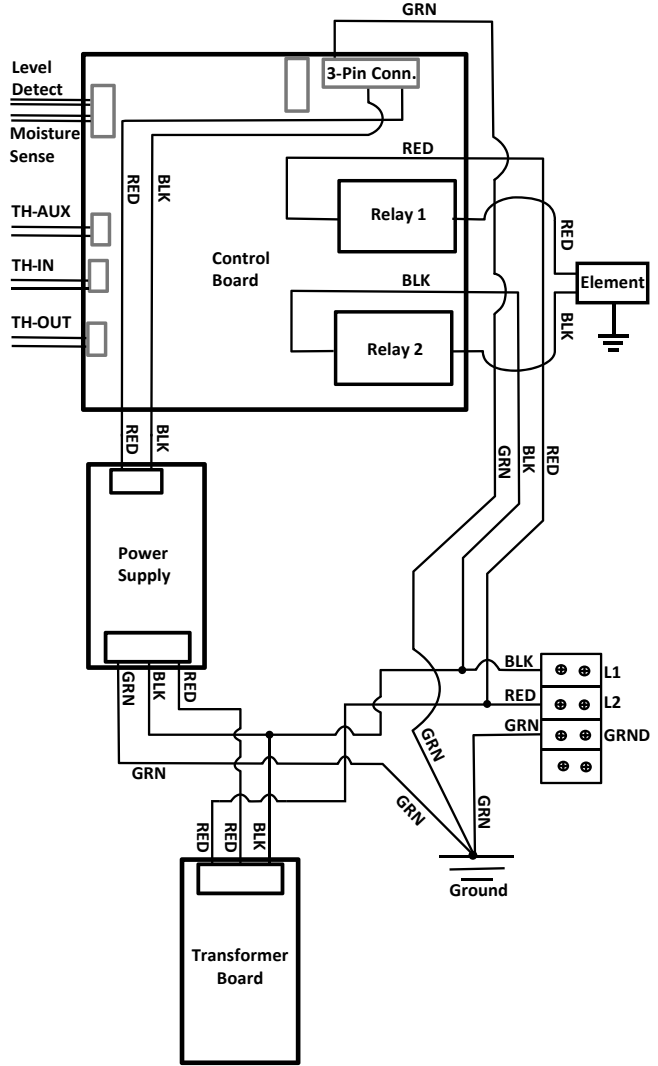
When ordering replacement parts, please be ready to provide your water heater model and serial number.

1 Chamber, 1 Dual Element, 240/208 VAC

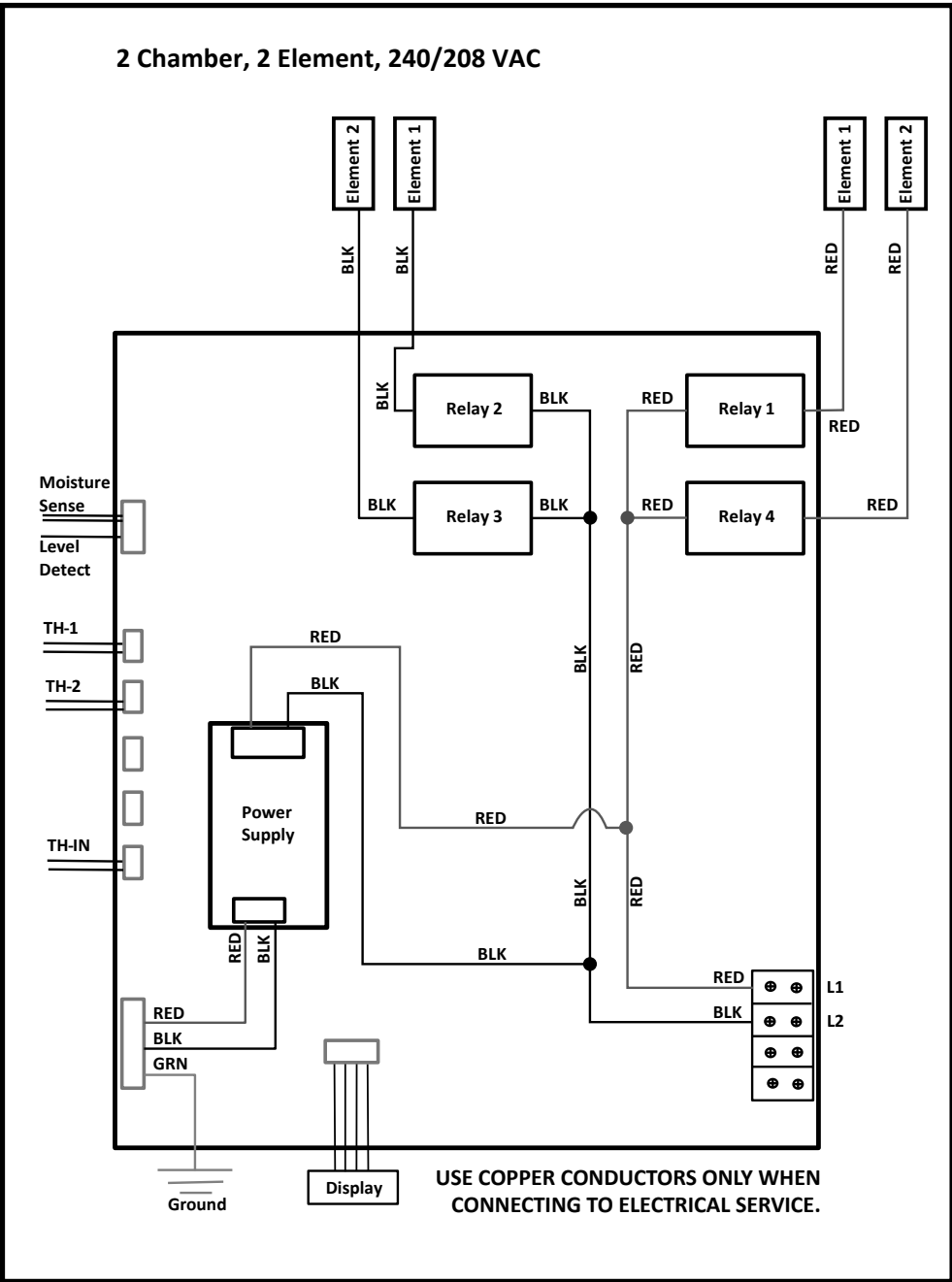


USE COPPER CONDUCTORS ONLY WHEN CONNECTING TO ELECTRICAL SERVICE.

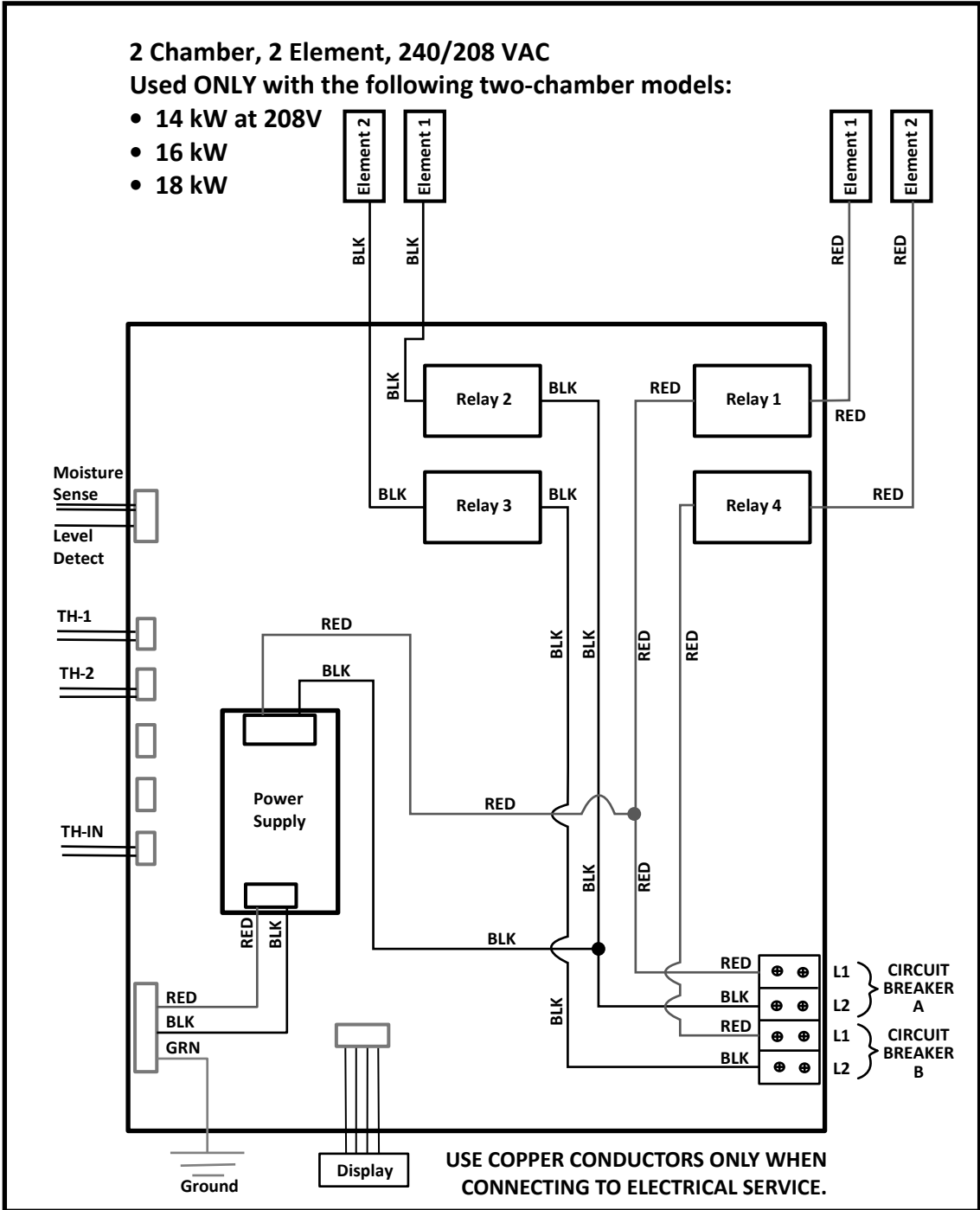
1 Chamber, 1 Element, 277 VAC



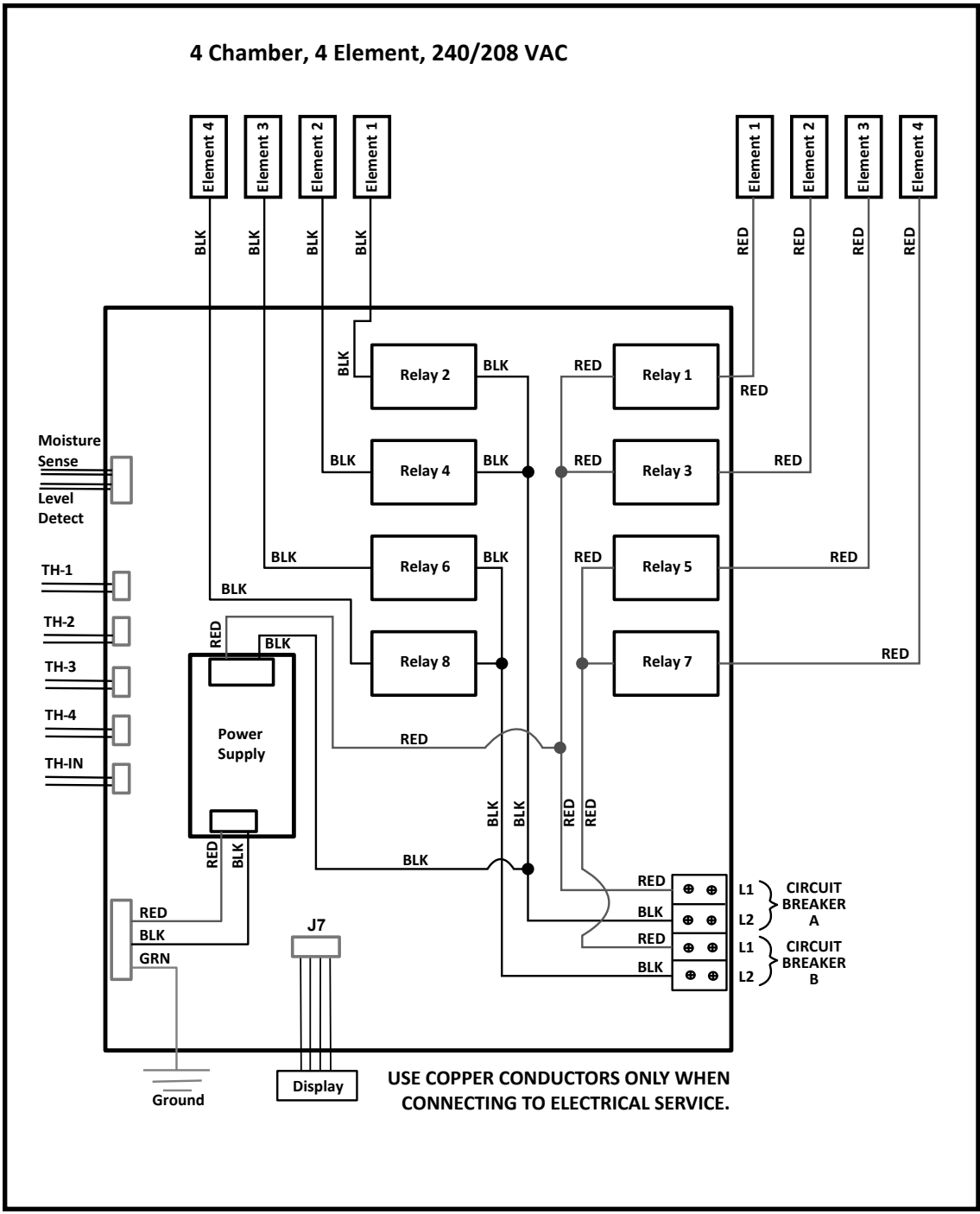
USE COPPER CONDUCTORS ONLY WHEN CONNECTING TO ELECTRICAL SERVICE.



NOTICE: 16 kW and 18 kW two-element models DO NOT use this configuration.
 14kW, 208V models DO NOT use this configuration.
 For two circuit, two-element models, see page 32. Failure to observe this notice can result in equipment malfunction.



NOTICE: This wiring diagram applies to the following two-element models only: 16 kW, 18 kW, and 14 kW/208 V. If you have a two-element model that is rated other than 16 kW, 18 kW, or 14 kW/208V, refer to page 31. Failure to observe this notice can result in equipment malfunction.



APPENDIX: HORIZONTAL MOUNTING OF POU MODELS

As stated on page 12, point-of-use (POU) models may be mounted horizontally. Note the following:

- If a POU model is to be mounted horizontally, it must be mounted with brackets (provided). The nipples must face toward the right as shown in Figure 27.
- Two-element and four-element models cannot be mounted horizontally. They must be mounted vertically (nipples facing upward).
- This procedure is a supplement to “Mount Your Water Heater,” page 12.

NOTICE: Read “Minimum Clearances” (Figure 2, page 11) before you start.

- 1** Complete the installation steps on pages 11 and 12. Stop when you have completed step 7 on page 12.
- 2** Secure both brackets to the wall. (See Figure 28.) Use screws, bolts, or anchors as appropriate. **NOTE:** To drill pilot holes for the #10 screws that are provided, use a 7/64” drill bit.

Ensure that the mounting surface and fasteners will support the weight of the water heater.

Continued on the next page.

Figure 27.
Horizontally-mounted POU water heater:

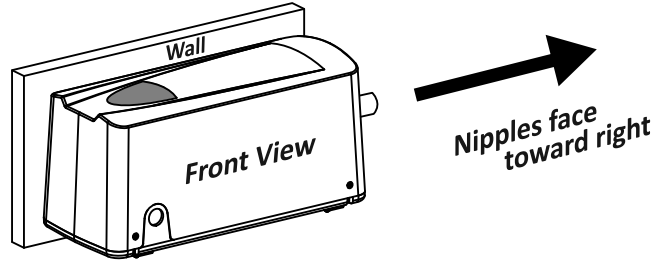


Figure 28.
Mount the brackets to the surface as shown.

See Figure 29 for fastener locations.

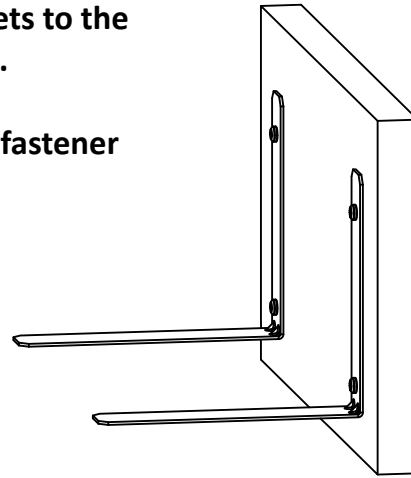
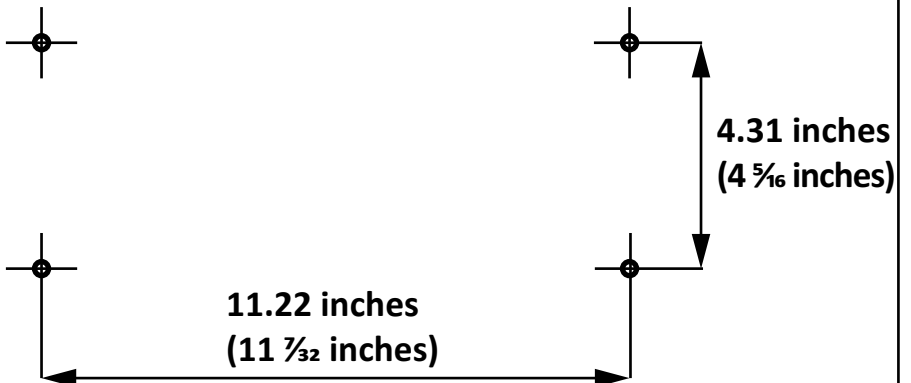


Figure 29.
Pilot hole center distances:



3 Set the water heater on the brackets, base plate down, and secure it with four sets of bolts and nuts. See Figure 30 and Figure 31.

NOTICE: Ensure that the nipples face toward the right as shown in Figure 27, page 34.

4 Return to page 12 to complete the water heater installation.

