

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 Support Hotline:

United States: 1-877-817-6750

Canada: 1-800-265-8520

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.

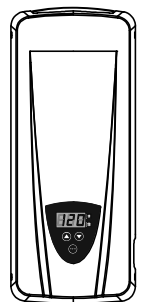
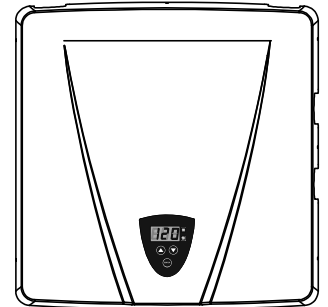


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Keep this manual near the water heater for future reference whenever maintenance, adjustment or service is required.


Retain your original receipt as proof of purchase.





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IMPORTANT SAFETY INFORMATION

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

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

Important information to keep...

Fill out this section and keep this manual for reference.

Date Purchased:

Model number:

Serial number:

Maintenance performed: Date:

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

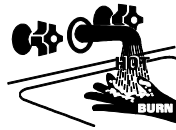
Contact with the electrical parts inside the water heater can result in severe injury or death from electrical shock:

- **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 (including Superchargers), the temperature set point is factory set to 120°F to reduce the risk of scalding. (Exception: 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.
- Problems with the UIM (user interface) or other malfunctions may result in higher than expected water temperatures.
- 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.

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 condi-

tions 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.

It includes on-board self diagnostics. If an error code is displayed on the user interface, see “Troubleshooting” on page 16.

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.

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.

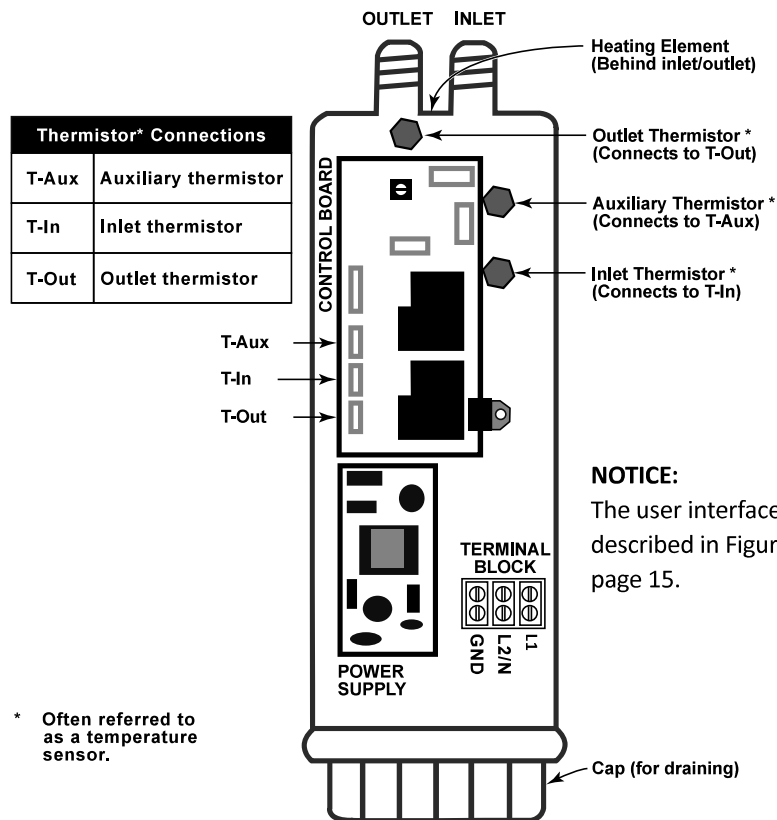
If you install a T&P valve, turn on the water supply to ensure that no water drips from it. Next, operate the valve

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: Single Chamber Models (RPV, CPV, RSV)

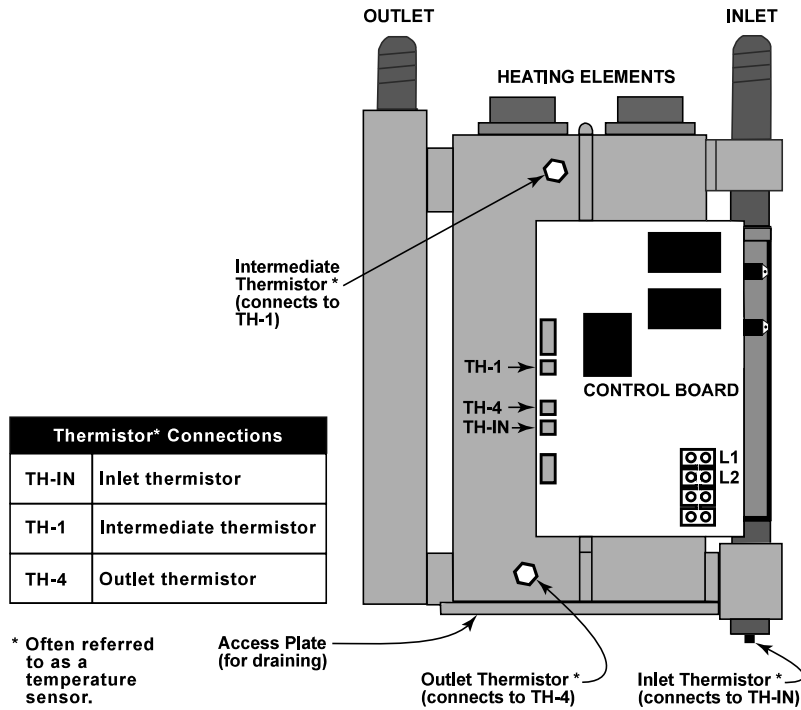


* Often referred to as a temperature sensor.

NOTICE: The user interface is described in Figure 6, page 15.

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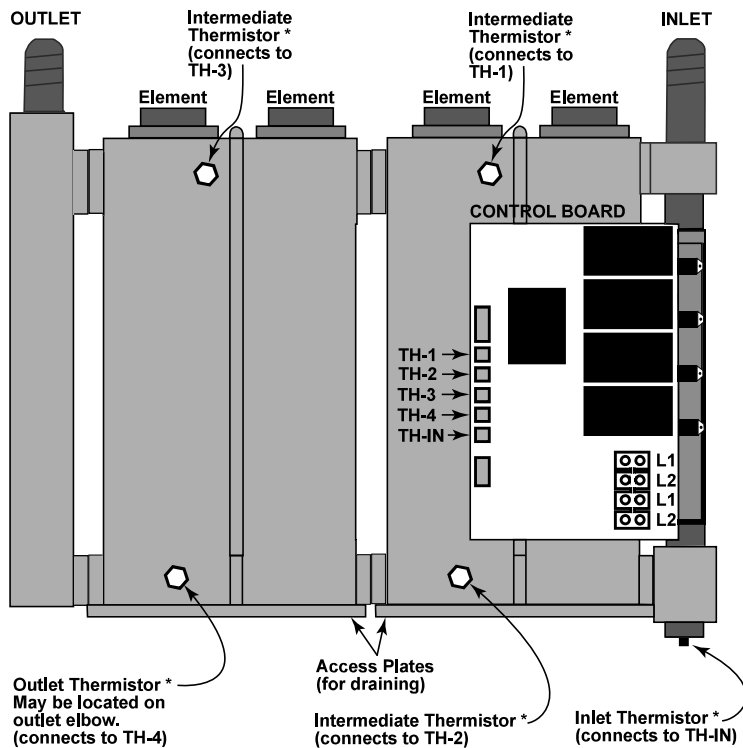
Component Identification: Two-Chamber Models (R2L, R2V, C2V,)



Thermistor* Connections	
TH-IN	Inlet thermistor
TH-1	Intermediate thermistor
TH-4	Outlet thermistor

NOTICE:
The user interface is described in Figure 6, page 15.

Component Identification: Four-Chamber Models (R4L, C4L, C4V)



NOTICE:
The user interface is described in Figure 6, page 15.

Thermistor* Connections	
TH-IN	Inlet thermistor.
TH-1	Intermediate thermistor
TH-2	Intermediate thermistor
TH-3	Intermediate thermistor
TH-4	Outlet thermistor

* Often referred to as a temperature sensor.

General Specifications

Models	Single Chamber: RPV/CPV, RSV	Two Chamber: R2V, C2V	Four Chamber: R4L/C4L, C4V
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-chamber 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-K5*, find **P**-24-K5* 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.
 - Single-chamber models are listed below.
 - Two-chamber models: page 9.
 - Four-chamber models: page 10.
- Use copper conductors only.

Single-Chamber 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**-24-K5	25	120	1	2.4	20.00	10	Single
*P**-30-K5	30	120	1	3	25.00	10	Single
*P**-35-K5	30	120	1	3.5	29.17	10	Single
*P**-40-X5	20	208	1	4	19.23	12	Single
*P**-78-X5	40	208	1	8	38.46	8	Single
*P**-35-E5	20	240 †	1	3.5	14.58	12	Single
*P**-45-E5	20	240 †	1	4.5	18.75	12	Single
*P**-55-E5	25	240 †	1	5.5	22.92	10	Single
*P**-70-E5	30	240 †	1	7	29.17	10	Single
*P**-80-E5	40	240 †	1	8	33.33	8	Single
*P**-90-E5	40	240 †	1	9	37.50	8	Single
*P**-120-E5	60	240 †	1	12	50	6 †	Dual
*P**-140-E5	60	240 †	1	14	58.34	6 †	Dual

* 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.

Single-Chamber 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
*S**-70-E5	30	240 ‡	1	7	29.17	10	Single
*S**-90-E5	40	240 ‡	1	9	37.50	8	Single
*S**-140-E5	60	240 ‡	1	14	58.34	6 †	Dual
*P**-30-Y5	15	277	1	3	10.83	14	Single
*P**-40-Y5	20	277	1	4	14.44	12	Single
*P**-60-Y5	25	277	1	6	21.66	10	Single
*P**-73-Y5	30	277	1	7.3	26.35	10	Single
*P**-90-Y5	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-Chamber 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-X5	40 amps each (2 circuits)	208	2	7	33.65	8	Single
*2**-120-E5	30 amps each (2 circuits)	240	2	6.1	22.92	10	Single
*2**-140-E5	30 amps each (2 circuits)	240	2	7	29.17	10	Single
*2**-160-E5	40 amps each (2 circuits)	240	2	8	33.33	8	Single
*2**-180-E5	40 amps each (2 circuits)	240	2	9	37.5	8	Single

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

Four-Chamber 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-X5	70 amps each (2 circuits)	208	4	7	67.31	6 [†]	Single
*4**-180-E5	40 amps each (2 circuits)	240	4	4.5	37.50	8	Single
*4**-220-E5	50 amps each (2 circuits)	240	4	5.5	45.83	6	Single
*4**-240-E5	60 amps each (2 circuits)	240	4	6	50.00	6 [†]	Single
*4**-280-E5	60 amps each (2 circuits)	240	4	7	58.33	6 [†]	Single
*4**-320-E5	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 8 inches (20.3 cm) bottom clearance. **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.

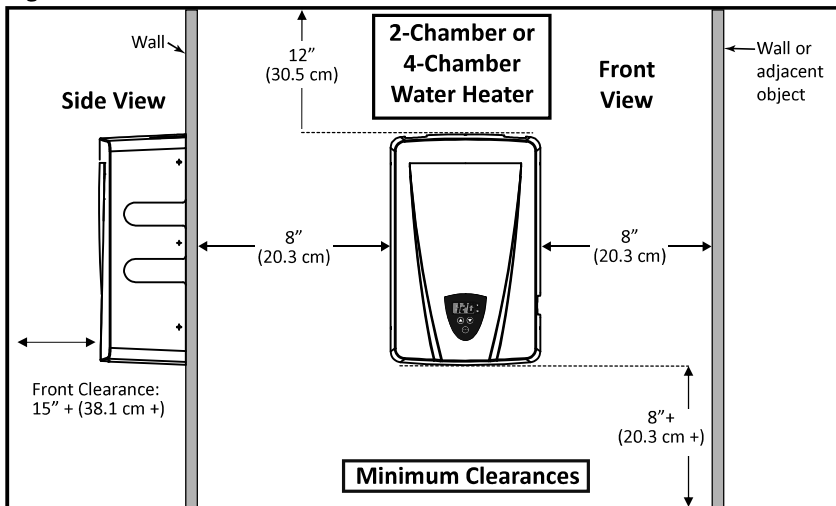
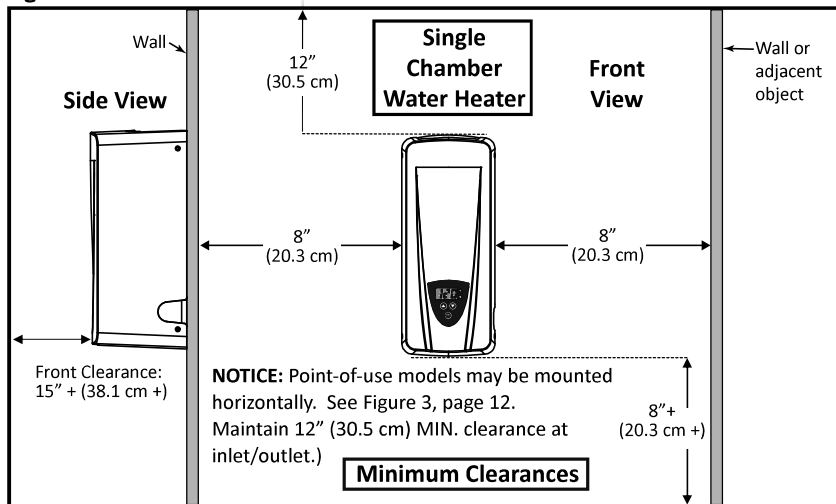


Figure 2.



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, then unplug its ribbon cable from the control board in the water heater.

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.

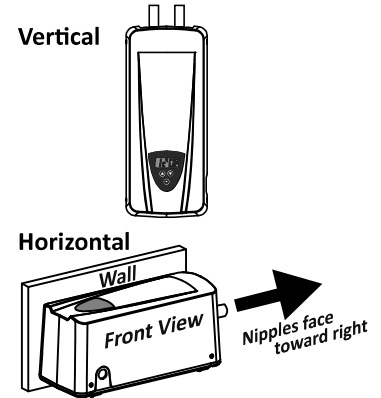
5. If you have a single-chamber model, locate the four mounting holes in the back plate. (If you have a two- or four-chamber model, there are two mounting tabs on each side of your water heater.)
6. **Two- or four-chamber water heaters only:** Apply one standoff bumper to each corner on the back of the water heater. (Standoffs are provided.) **These standoffs must be installed so the water heater can vent properly.**
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: Supercharger, two-chamber, and four-chamber 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 31.

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.
- Supercharger, two-chamber, and four-chamber models must be oriented with the nipples facing upward (vertical).

3 Connect the Water Lines

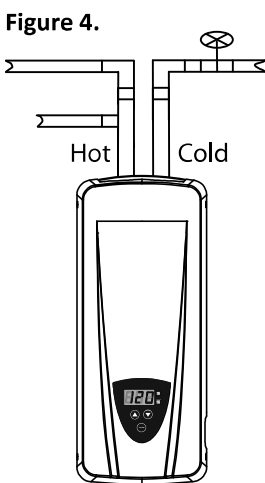
NOTICE:

- **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.
- 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.

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 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 26 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. Take the connector end of the cover’s ribbon cable and plug it 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 26.)

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.

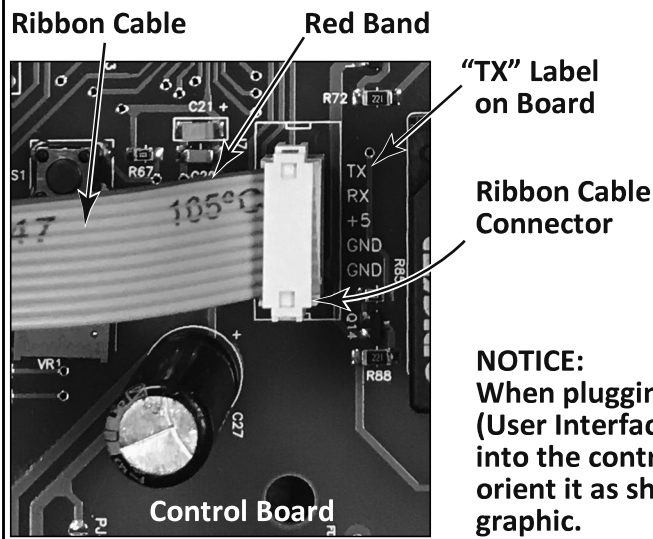
5 Test Water Heater Operation

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. These error codes are displayed on the water heater’s user interface. For more information, see “Troubleshooting” on page 16.

Figure 5.



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.

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 6). 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.

To toggle between Fahrenheit and Celsius,

1. Press and hold the DOWN button for five seconds. See Figure 6.
2. The °F or °C LED will illuminate, and the 7-segment LED will display the temperature set point in the appropriate units.

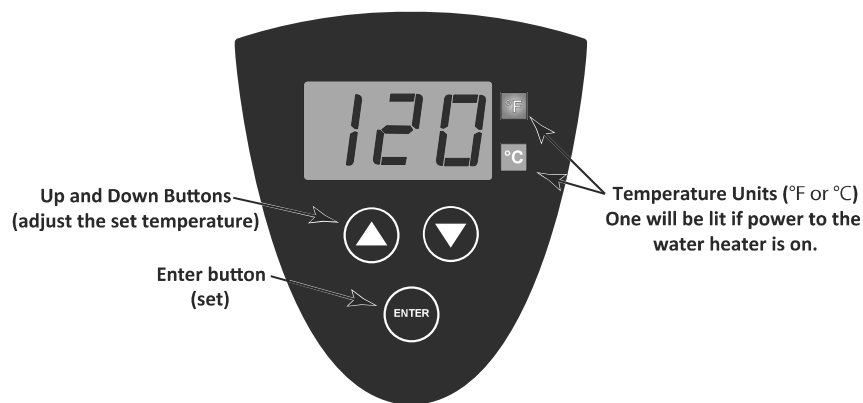
Standby Heating (Point-Of-Use Models Only)

When standby heating is turned on, the point-of-use water heater will pre-heat water to a minimum of 103°F (39.4°C). When it is turned off, water will not be pre-heated.

This pre-heating feature is turned off by default. To pre-heat water, you must turn this feature on.

- Press the ENTER button for approximately five seconds to turn pre-heating on. (A decimal point will light up at the bottom, right-hand corner of the display, indicating that the pre-heating feature is turned on. See Figure 7.)
- To turn the pre-heating feature off again, press the ENTER button for approx. five seconds. (The decimal point at the bottom, right-hand corner of the display will turn off.)

Figure 6.



User Interface Module (UIM)

Figure 7.



Decimal point indicates that the pre-heating feature is turned on.

TROUBLESHOOTING

Error Codes

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. See front cover for contact information.
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. See front cover for contact information.
E06	Software determined that the water temperature is too high.		Turn off power to the water heater. Contact Technical Support. See front cover for contact information.
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 22.
E11	Open thermistor.	2- and 4-Chamber models: TH-1 open.	
		Single-chamber models: T-Out open.	
E12	Open thermistor.	2-Chamber models: Outlet thermistor open.	
		4-Chamber models: TH-2 thermistor open.	
E13	4-Chamber models only: TH-3 thermistor is open.		

TROUBLESHOOTING

Continued on the next page...

Display	Description	Action / Solution	
E14	4-Chamber 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 22. 	
E20	Inlet thermistor shorted.	<p>Replace the temperature sensor that is listed in the left-hand column. See “Thermistor (Temperature Sensor) Replacement” on page 22.</p>	
E21	Shorted thermistor.		2- and 4-Chamber models: TH-1 shorted.
			Single-chamber models: T-Out shorted.
E22	2- and 4-Chamber models: TH-2 thermistor is shorted.		
E23	4-Chamber models only: TH-3 thermistor is shorted.		
E24	4-Chamber 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. See front cover for contact information.	

General Troubleshooting

The following chart provides an overview of basic troubleshooting. Use it in conjunction with the Error Codes chart on page 16.

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.
	High temperature limit switch may be tripped.	Verify if limit switch is tripped. Reset if tripped.
	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).

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 8: 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 single chamber models)
- Pipe wrench or slip joint pliers (for single chamber models only)
- 1-1/2 inch element wrench or adjustable wrench (for element removal; two- and four-chamber 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 9: Heating elements

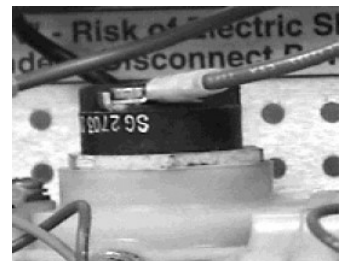


Figure 10: Installed heating element

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

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: When you remove the cover, you must unplug its 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.

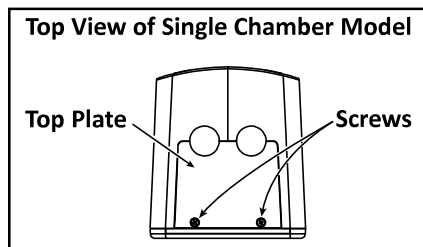
- If you have a single chamber water heater, go to step 6.
- If you have a two- or four-chamber water heater, go to step 7 on page 21.

6 Single chamber water heaters only:

6.1 Remove the heater's top plate:

- A.) Remove both screws which secure the top plate to the water heater. (See Figure 11.)
- B.) Lift and remove the top plate.

Figure 11.



6.2 Drain the single chamber water heater:

- A.) Remove the threaded cap at the bottom of the element's cylinder with a pipe wrench or slip joint pliers. (Refer to Figure 12.) Allow the water to drain into the bucket.
- B.) Clean the cap and seal.

- C.) Ensure that the seal is seated properly, then reinstall the cap. **Do not overtighten.**

Figure 12.

Single chamber models:
Threaded Cap

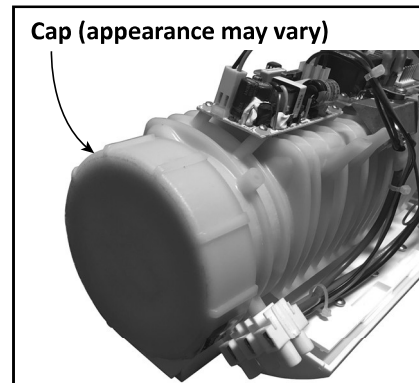
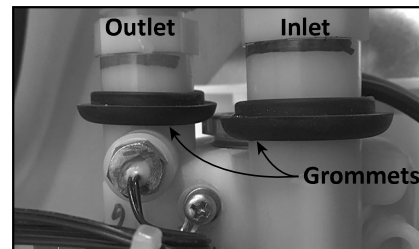


Figure 13.

Single chamber models:
Grommet Orientation



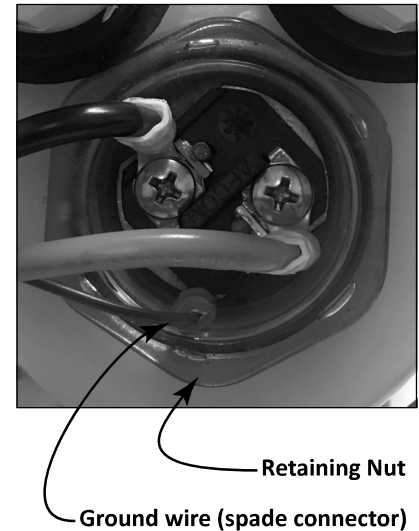
6.3. Remove the old element:

- A.) Remove the grommets from the inlet and outlet (Figure 13).
- B.) 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.)
- C.) 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.

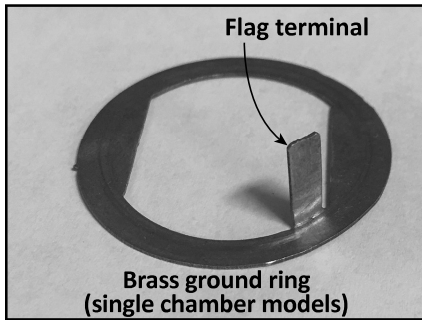
Element in single chamber heater



- D.) 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 the Technical Support number on the cover of this manual for ordering information.
- E.) 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.
- F.) Remove the brass ground ring from the top of the element. (See Figure 15: Brass ring and flag terminal on page 21.) Set it aside for later use.

Continued on the next page...

Figure 15: Brass ring and flag terminal



6.4 Install the new element:

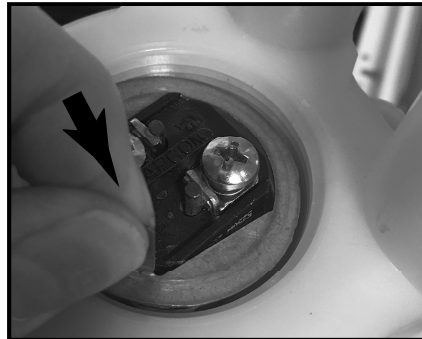
NOTICE: Ensure that there is an O-ring installed above the threads of the element. (See Figure 20, page 22.)

- A.) Insert the new element into its water heater opening.
- B.) 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.)
- C.) Secure the element by installing and tightening the retaining nut (Figure 14, page 20). **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 single chamber water heater:

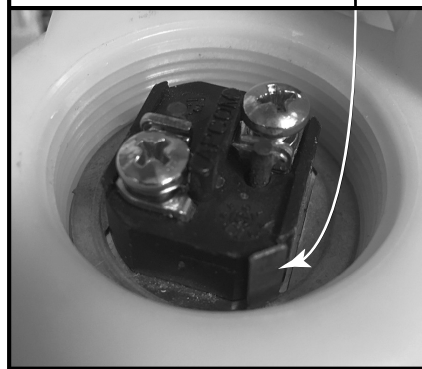
- A.) Reinstall both grommets as shown in Figure 17. Orient them as shown, and ensure that their flat surfaces press firmly against the top plate when you reinstall it.

Figure 16. Brass ring on single chamber models.



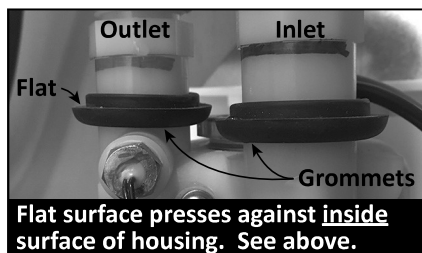
Place brass ground ring on top of element.

Keep flag terminal accessible.



- B.) Reinstall the top plate and secure it with the two screws that you removed earlier. (See Figure 11, page 20.)
- C.) Go to step 8 on page 22.

Figure 17. Single chamber models: Grommet Orientation



7 Two- or four-chamber water heaters only:

7.1 Drain the two- or four-chamber 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.)

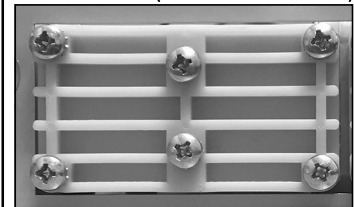
Figure 18.

Access Plates:

Two- or Four-Chamber models only

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

Access Plate (bottom of heater)

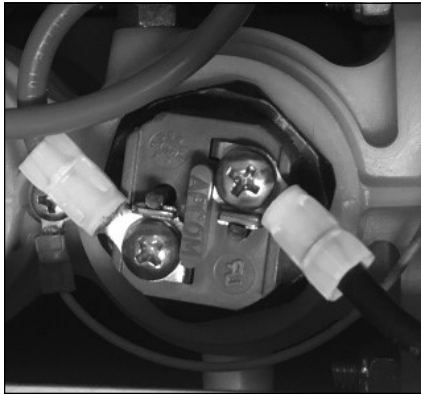


7.2 Remove the old element:

- A.) Remove the screws that secure the red and black wires to the top of the heating element (Figure 19, page 22). 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.

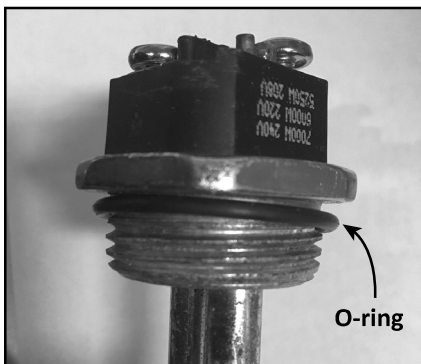
Figure 19.
Top view of element
(two- or four-chamber model)



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.) 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 26.)

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)

1 Turn off power to the water heater.

2 Drain the water heater as described in the draining instructions (page 24).

Continued on page 24.

Figure 21.
Thermistor locations
(Single-chamber models)

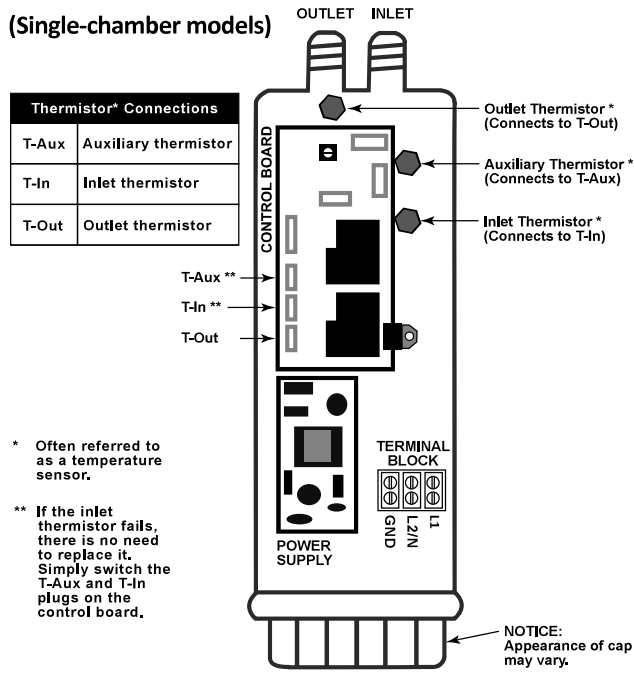


Figure 22.
Thermistor locations
(Two-chamber models)

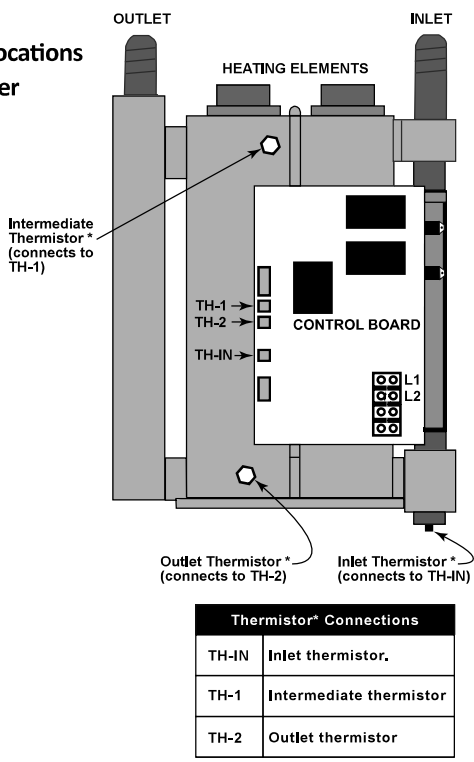
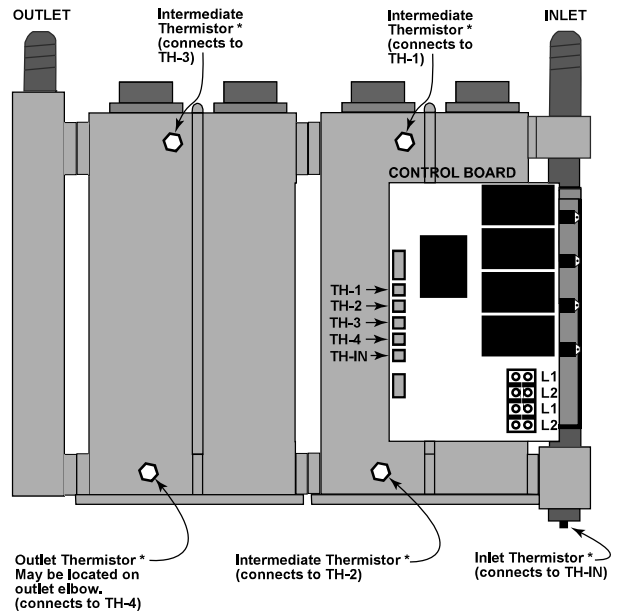
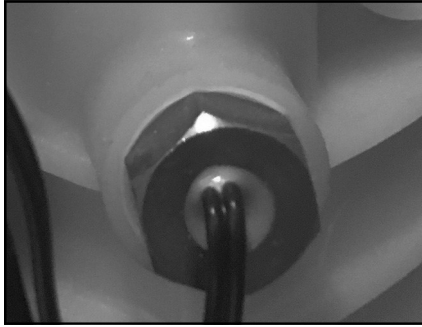


Figure 23.
Thermistor locations (Four-chamber models)



- 3** Locate the thermistor that was identified by the error code. Refer to the appropriate figure on page 23.

Figure 24.
Thermistor



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

- 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 23.

- 8** Return the water heater to service. To do so, follow the instructions in "Returning the Water Heater to Service," page 25.

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: When you remove the cover, you must unplug its 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.

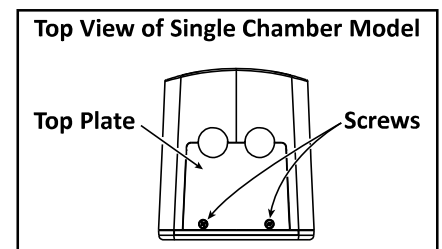
- If you have a single chamber water heater, go to step 5.
- If you have a two- or four-chamber water heater, go to step 6.

5 Single chamber water heaters only:

Drain the single chamber water heater:

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

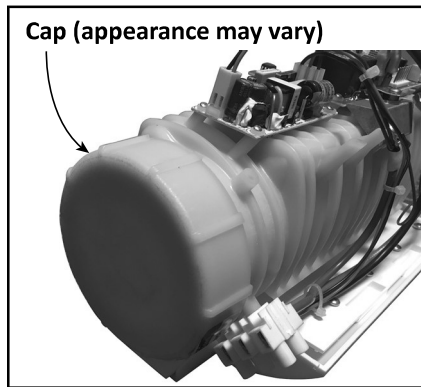
Figure 25.



- B.) Lift and remove the top plate. (Removing it will protect it from damage.)
- C.) Remove the threaded cap at the bottom of the element's cylinder with a pipe wrench or slip joint pliers. (Refer to Figure 26, page 25.) Allow the water to drain into the bucket.
- D.) Clean the cap and seal.
- E.) Ensure that the seal is seated properly, then reinstall the cap. **Do not overtighten.**
- F.) Reinstall the top plate and secure it with the two screws that you removed earlier (Figure 25).
- G.) **Go to step 7.**

Continued on page 25.

Figure 26.



6

Two- or four-chamber water heaters only:

Drain the two- or four-chamber water heater:

- A.) Remove all six screws that secure the access plate beneath the element (at the bottom of the water heater). See Figure 27.
- 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.

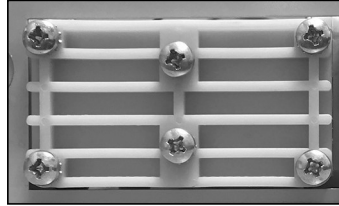
Figure 27.

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.) 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 26).

NOTICE: The plug must be oriented 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.

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.

WIRING DIAGRAMS

The wiring diagrams for various models are listed in this section. Locate the one that corresponds with your model.

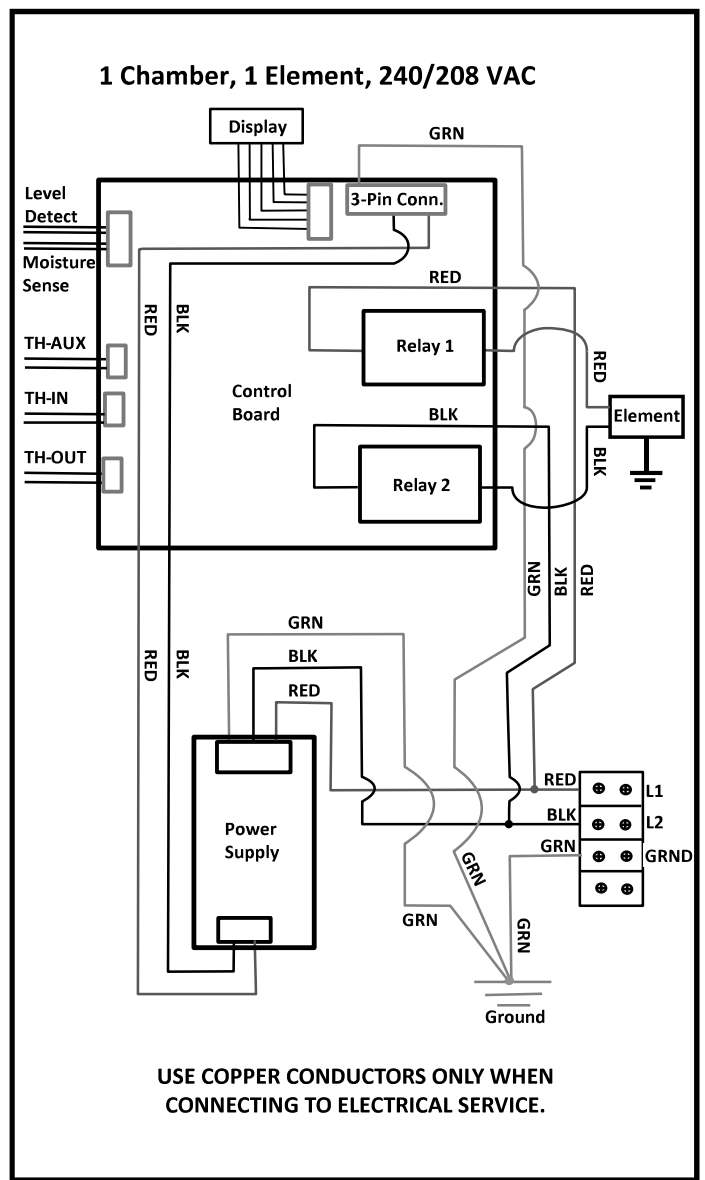
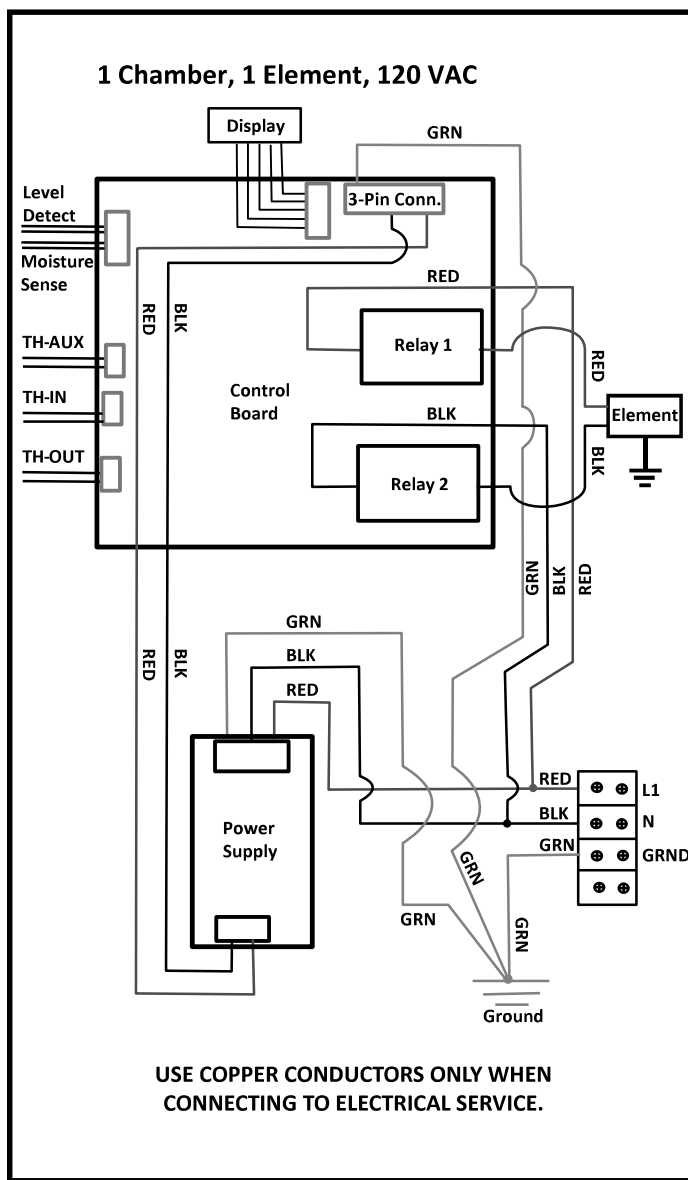
NOTICE: The correct wiring diagram for your model can be found on the inside of your water heater's cover.

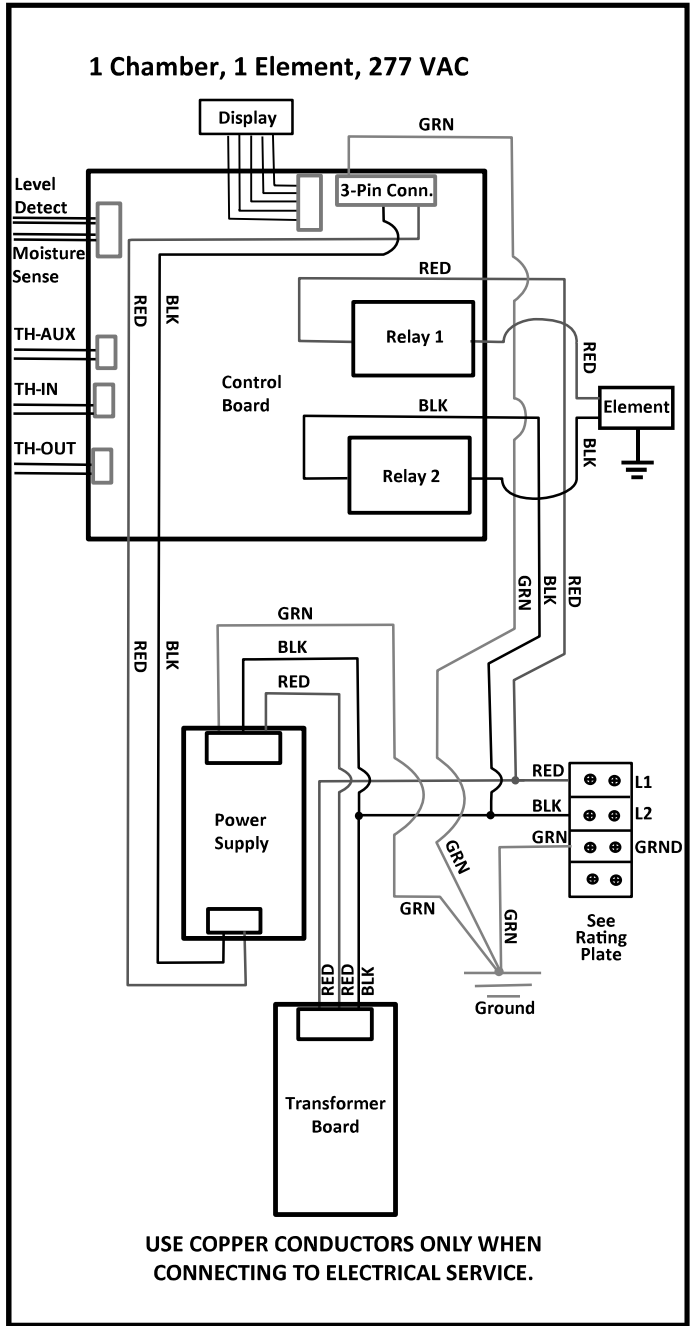
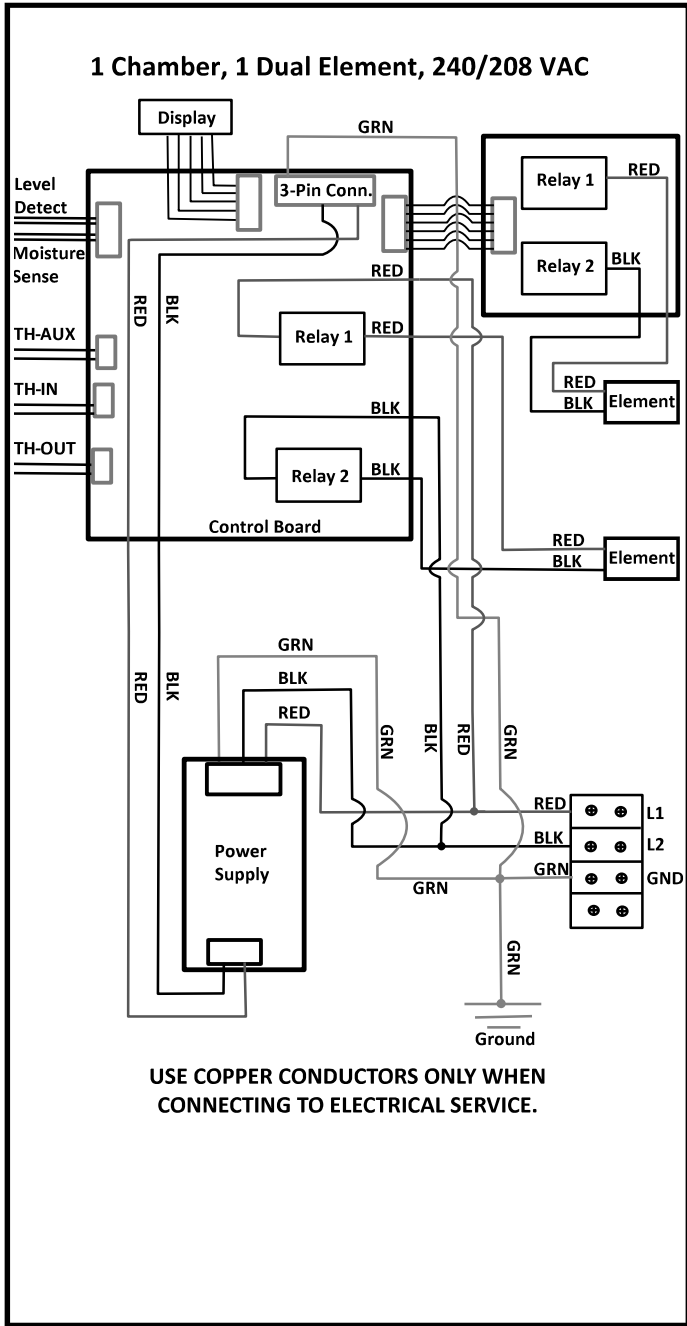
The wiring diagrams are listed as follows:

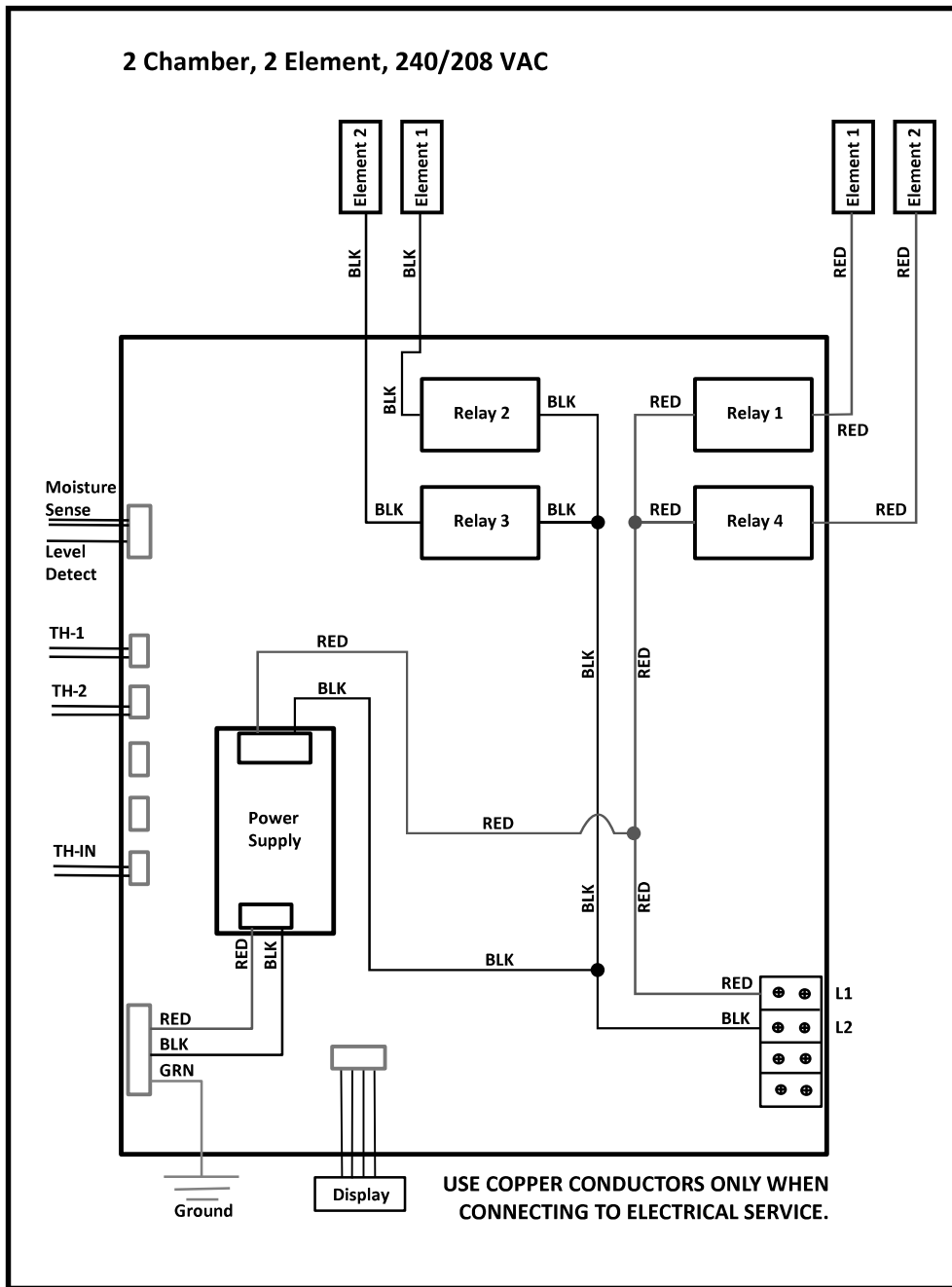
- 1 Chamber, 1 Element, 120 VAC (see below).

- 1 Chamber, 1 Element, 240/208 VAC (see below).
- 1 Chamber, 1 Dual Element, 240/208 VAC, p. 27.
- 1 Chamber, 1 Element, 277 VAC, p. 27.
- 2 Chamber, 2 Element, 240/208 VAC (other than 16kW or 18kW), p. 28.
- 2 Chamber, 2 Element, 240/208 VAC (16 kW & 18kW only), p. 29.

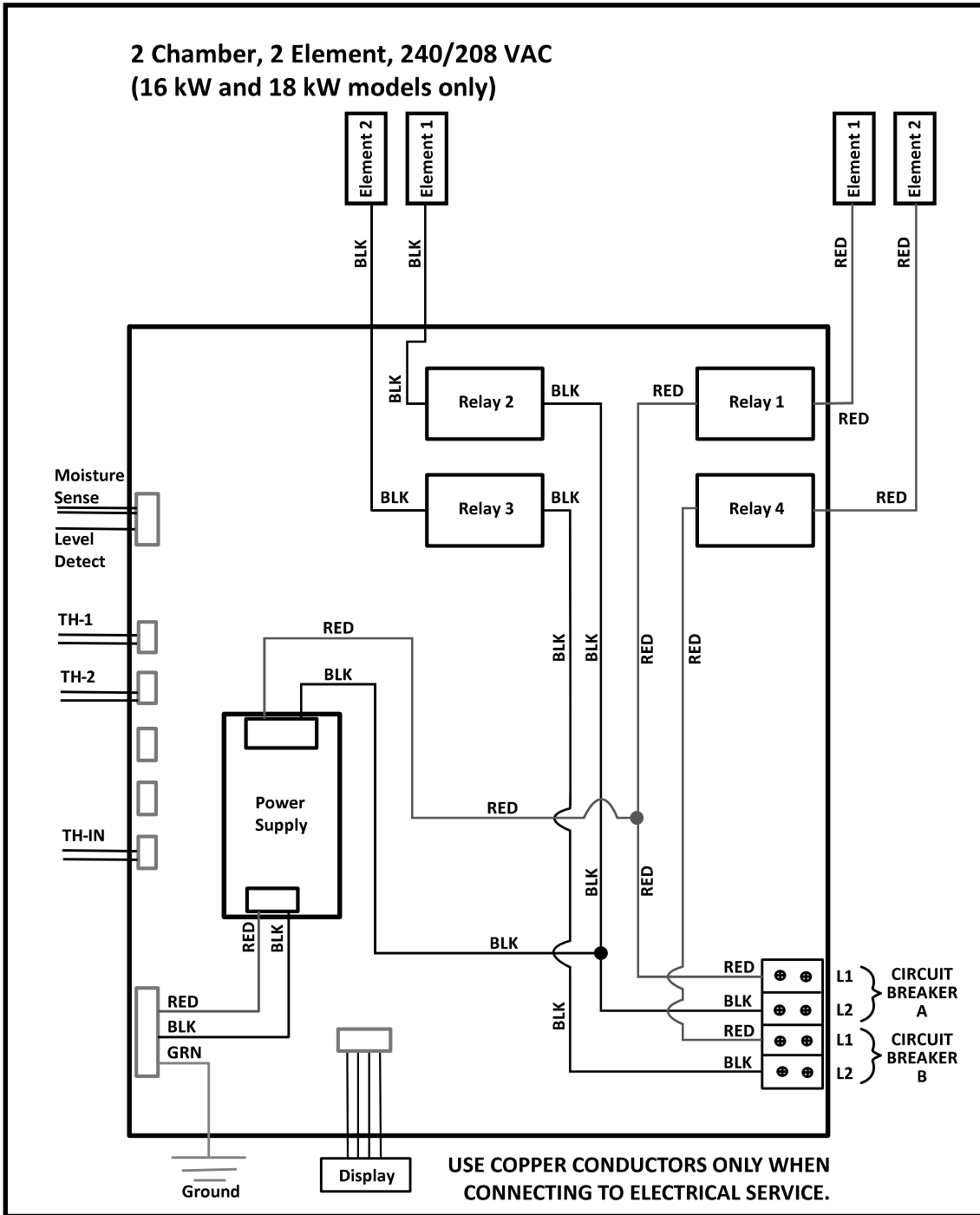
- 4 Chamber, 4 Element, 240/208 VAC, p. 30.
- See also "Electrical Requirements" on page 8.



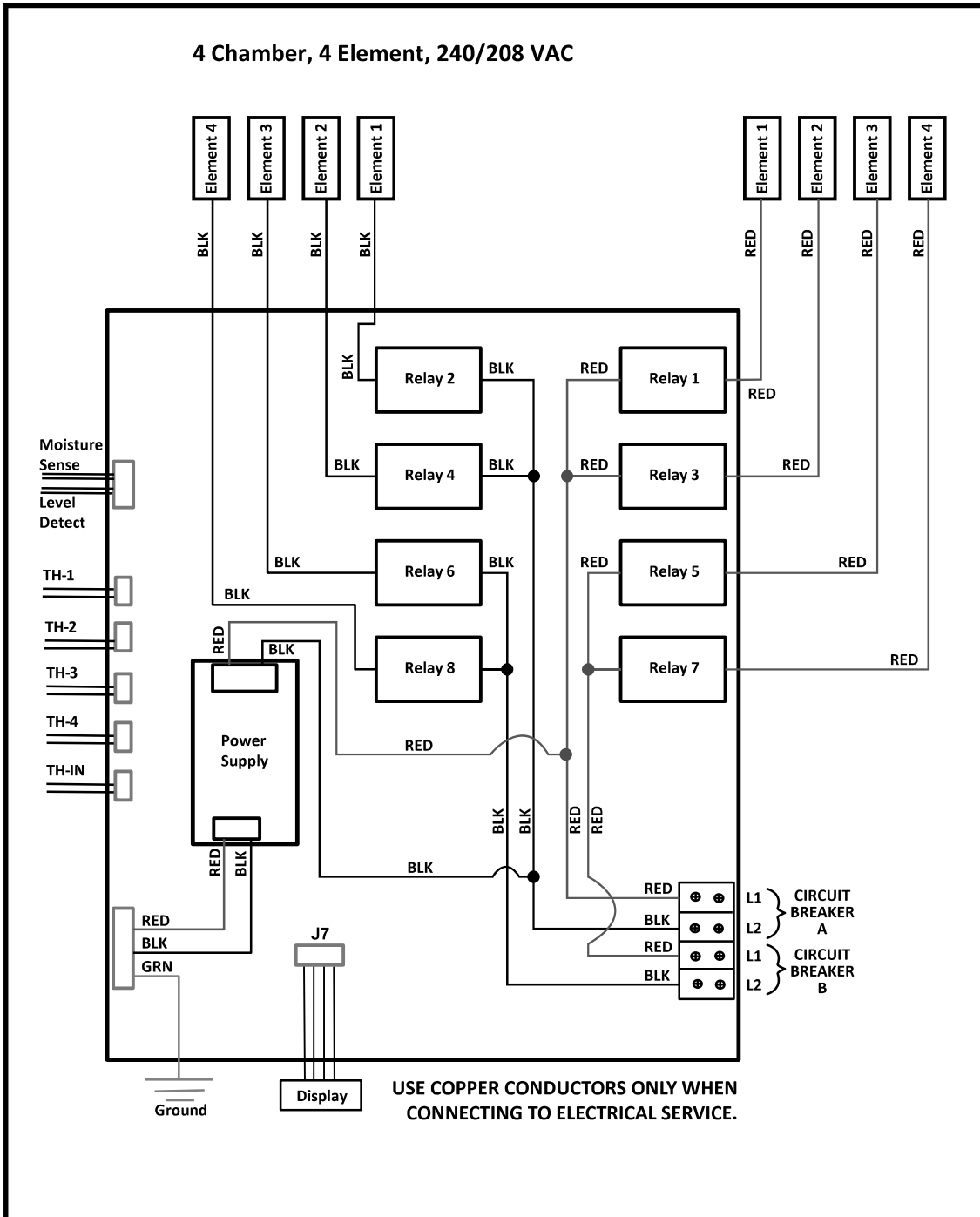




NOTICE: 16 kW and 18 kW two-chamber models DO NOT use this configuration. For 16 kW and 18 kW two-chamber models, see page 29. Failure to observe this notice can result in equipment malfunction.



NOTICE: This wiring diagram applies to 16 kW and 18 kW two-chamber models only. If you have a two-chamber model that is rated other than 16 kW or 18 kW, refer to page 28. 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 28.
- Supercharger, two-chamber, and four-chamber 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 29.) 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 28.
Horizontally-mounted POU water heater:

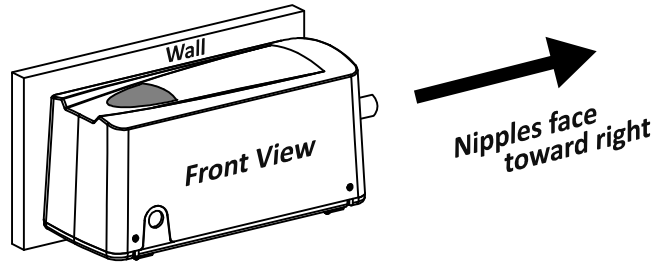


Figure 29.
Mount the brackets to the surface as shown.

See Figure 30 for fastener locations.

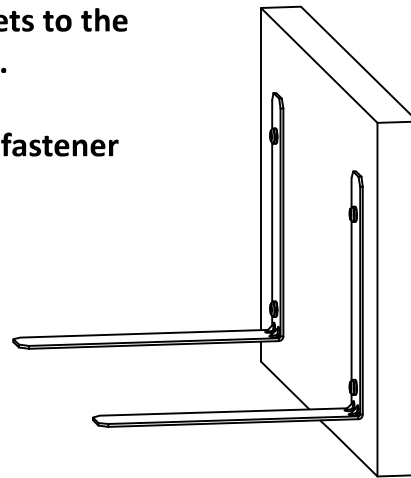
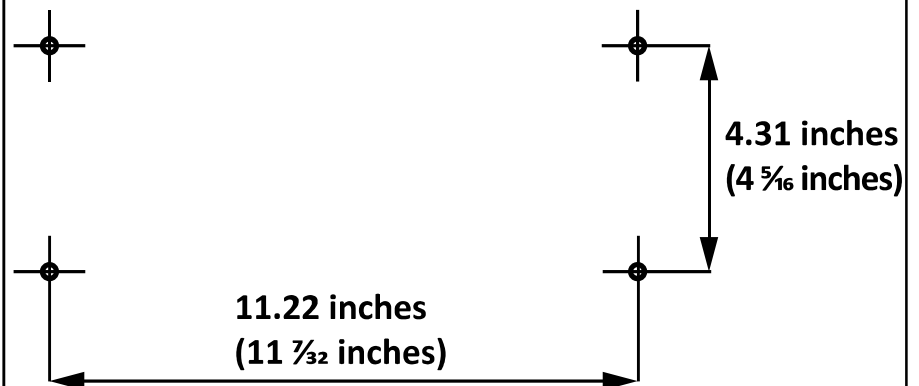


Figure 30.
Pilot hole center distances:



3 Set the water heater on the brackets, base plate down, and secure it with four sets of bolts and nuts. See Figure 31 and Figure 32.

NOTICE: Ensure that the nipples face toward the right as shown in Figure 28, page 31.

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

