Installation Instructions and Use & Care Guide

Residential Electric Water Heater

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 your Lowe’s® store to have this water heater installed. Lowe’s® Professional Installation is available for this product and the work is guaranteed.

• Schedule an appointment with a qualified person to install your water heater.

• Call our Technical Assistance Hotline at 1-800-999-9515. 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 in the pocket on heater for future reference whenever maintenance, adjustment or service is required. Retain your original receipt as proof of purchase.

January 2015
Energy Smart Module, Electronic Thermostat and Upper Element

Lower Element and Thermostat access

Hot water line

Cold water line

Expansion tank

Electrical junction box

T&P relief valve

T&P discharge pipe

Drain valve

Drain pan discharge pipe

Drain pan

Drain

Water shut off
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.

**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.

The California Safe Drinking Water and Toxic Enforcement Act requires the Governor of California to publish a list of substances known to the State of California to cause cancer, birth defects, or other reproductive harm, and requires businesses to warn of potential exposure to such substances.

**WARNING! This product contains one or more chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

This appliance can cause low-level exposure to some of the substances included in the act.

**Important information to keep**

Fill out this section and keep this manual in the pocket of the water heater for reference.

Date Purchased:

Model number:

Serial number:

Maintenance performed:* Date:

*Drain and flush tank and remove and inspect anode rod after first six months of operation and at least annually thereafter. Operate the Temperature and Pressure Relief Valve (T&P) annually and inspect T&P valve every 2-4 years (see the label on the T&P valve for maintenance schedule). See the Maintenance section for more information about maintaining this water heater.
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.

**RISKS DURING INSTALLATION AND MAINTENANCE**

**Lifting Risk**

⚠️ **WARNING!** The water heater is heavy. Follow these precautions to reduce the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

- Use at least two people to lift the water heater.
- Be sure you both have a good grip before lifting.
- Use an appliance dolly or hand truck to move the water heater.

**RISKS DURING OPERATION**

**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 from Lowe’s®. Follow manufacturer’s instructions for installation and adjustment of the valves.

The thermostat(s) on this water heater have been factory set to approximately 120°F to reduce the risk of scalding. Higher temperatures increase the risk of scalding, but even at 120°F, hot water can scald.

If you choose a higher temperature, Thermostatic Mixing Valves located at each point-of-use are particularly important to help avoid scalding.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time to Produce a Serious Burn</th>
</tr>
</thead>
<tbody>
<tr>
<td>120°F (49°C)</td>
<td>More than 5 minutes</td>
</tr>
<tr>
<td>125°F (52°C)</td>
<td>1½ to 2 minutes</td>
</tr>
<tr>
<td>130°F (54°C)</td>
<td>About 30 seconds</td>
</tr>
<tr>
<td>135°F (57°C)</td>
<td>About 10 seconds</td>
</tr>
<tr>
<td>140°F (60°C)</td>
<td>Less than 5 seconds</td>
</tr>
<tr>
<td>145°F (63°C)</td>
<td>Less than 3 seconds</td>
</tr>
<tr>
<td>150°F (66°C)</td>
<td>About 1½ seconds</td>
</tr>
<tr>
<td>155°F (68°C)</td>
<td>About 1 second</td>
</tr>
</tbody>
</table>

For information about changing the factory thermostat setting(s), refer to the “Adjusting Temperature” section in this manual (“Step 10” on page 15).

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

In some cases, repeated small draws of water can cause the hot and cold water in the tank to “stack” in layers. If this happens, the water can be as much as thirty degrees hotter than the thermostat setting. This temperature variation is the result of your usage pattern and is not a malfunction.

Water temperature will be hotter if someone adjusted the thermostat(s) to a higher setting.

Problems with the thermostat(s), or other malfunctions may result in higher than expected water temperatures.

If the water heater is in a hot environment, the water in the tank can become as hot as the surrounding air, regardless of the thermostat setting.

If the water supplied to the water heater is pre-heated (for example, by a solar system) the temperature in the tank may be higher than the water heater’s thermostat setting.

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 thermostat 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 tank temperature to a higher setting without increasing risk of scalds. A higher temperature setting allows the tank to provide much more hot water and can help provide proper water temperatures for appliances such as dishwashers and washing machines. Higher tank temperatures (140°F) also kill bacteria that cause a condition known as “smelly water” and can reduce the levels of bacteria that cause water-borne diseases.

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.

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 junction box cover and the access door covers are in place. These covers keep debris from entering and potentially being ignited, and help 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, thermostat(s) or surrounding insulation have been exposed to water in any way (e.g., leaks from plumbing, leaks from the water heater itself can damage property and could cause a fire risk). If the water heater is subjected to flood conditions or the thermostat(s) have been submerged in water, the entire water heater must be replaced.

- Make electrical connections properly, according to the instructions on page 14. Use 10 gauge solid copper wire. Use a UL listed or CSA approved strain relief. Connect ground wire to green ground screw.

Explosion Risk
High temperatures and pressures in the water heater tank can cause an explosion resulting in property damage, serious injury or death. A new Temperature and Pressure (T&P) Relief Valve is included with your water heater to reduce risk of explosion by discharging hot water. Additional temperature and pressure protective equipment may be required by local codes.

A nationally recognized testing laboratory maintains periodic inspection of the valve production process and certifies that it meets the requirements for Relief Valves for Hot Water Supply Systems, ANSI Z21.22. The T&P Relief Valve’s relief pressure must not exceed the working pressure rating of the water heater as stated on the rating plate.

Maintain the T&P Relief Valve properly. Follow the maintenance instructions provided by the manufacturer of the T&P Relief Valve (label attached to T&P Relief Valve) and the procedure that starts on page 32.

An explosion could occur if the T&P Relief Valve or discharge pipe is blocked. Do not cap or plug the T&P Relief Valve or discharge pipe.

Fire and Explosion Risk if Hot Water is Not Used for Two Weeks or More

⚠️ CAUTION! Hydrogen gas builds up in a hot water system when it is not used for a long period (two weeks or more). Hydrogen gas is extremely flammable. If the hot water system has not been used for two weeks or more, open a hot water faucet for several minutes at the kitchen sink before using any electrical appliances connected to the hot water system. Do not smoke or have an open flame or other ignition source near the faucet while it is open.
GETTING STARTED

1. Review all of the instructions before you begin work.
   If you aren’t sure that you can safely and properly do this work yourself, call your Lowe’s® store to arrange for Professional Installation (you may also call a qualified person of your choice, such as a licensed plumber or electrician, to have the work done). Improper installation can damage the water heater, your home and other property, and can present risks of serious injury or death.

2. Check with your local and state authorities for any local or state codes that apply to your area. In the absence of local and state codes, follow National Fire Protection Association (NFPA-70) and the current editions of the National Electric Code (NEC) and the International Plumbing Code (IPC). The instructions in this manual comply with national codes, but the installer is responsible for complying with local codes.

   Massachusetts code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00 and 248-CMR 5.00: State Plumbing Code. Other local and state authorities may have similar requirements or other codes applicable to the installation of this water heater.

   Before you start, be sure you have, and know how to use, the following tools and supplies:

   • Plumbing tools and supplies appropriate for the type of water pipes in your home
   • Threaded connectors (figure 1) for the cold and hot water pipes
   • For homes plumbed with plastic pipe, use threaded connectors suitable for the specific type of plastic pipe used: CPVC and PEX (cross-linked polyethylene). Do not use PVC pipe.

   • For homes with copper pipes, you may purchase connector kits with compression fittings that don’t require soldering (figure 1). Compression fittings are easier to install than soldering copper pipes.
   • Teflon® tape or pipe joint compound approved for potable water
   • Tools to make the electrical connections (for example, screwdrivers, wire strippers)
   • Non-Contact circuit tester to check for power (figure 2)
   • Water Pressure Gauge (see next page, figure 4)

   Recommended Accessories:
   • Suitable drain pan (see page 8, figure 6)
   • Automatic leak detection and shut-off device
   • Pressure Reducing Valve (figure 3)
   • Thermal Expansion Tank (see next page, figure 5)
   • Point-of-use Thermostatic Mixing Valves (see page 8, figure 7)

Figure 1 - Flexible connectors use compression fittings and do not require soldering.

Figure 2 - Use a non-contact circuit tester to insure that the power is off before you work on a circuit.

Figure 3 - Install a Pressure Reducing Valve set to 50 to 60 PSI.
INSTALLATION

Follow these steps for proper installation:

Step 1:

Verify that your home is equipped and up-to-date for proper operation

Installing a new water heater is the perfect time to examine your home’s plumbing system and make sure the system is up to current code standards. There have likely been plumbing code changes since the old water heater was installed. We recommend installing the following accessories and any other needed changes to bring your home up to the latest code requirements.

Use the checklist below and inspect your home. Install any devices you need to comply with codes and assure that your new water heater performs at its best. Check with your local plumbing official for more information.

Water pressure

We recommend checking your home’s water pressure with a pressure gauge (figure 4). Most codes allow a maximum incoming water pressure of 80 psi. We recommend a working pressure no higher than 50-60 psi.

HOW: Purchase an inexpensive water pressure gauge available at your Lowe’s®. Connect the Water Pressure Gauge to an outside faucet and measure the maximum water pressure experienced throughout the day (highest water pressures often occur at night).

To limit your home’s water pressure: Locate your home’s Pressure Reducing Valve (PRV) on the main incoming (cold) water supply line and adjust the water pressure control to between 50 and 60 psi. If your home does not have a Pressure Reducing Valve, install a PRV on the home’s main water supply line and set it to between 50 and 60 psi. Pressure Reducing Valves are available at Lowe’s®.

BACKGROUND: Over the years, many utilities have increased water supply pressures so they can serve more homes. In some homes today, pressures exceed 100 psi. High water pressures can damage water heaters, causing premature leaks. If you have replaced toilet valves, had a water heater leak, or had to repair appliances connected to the plumbing system, pay particular attention to your home’s water pressure. When purchasing a PRV, make sure the PRV has a built-in bypass.

Water pressure increase caused by thermal expansion

Verify that you have a properly sized Thermal Expansion Tank (figure 5). We recommend installing an expansion tank if your home does not have one. Codes require a properly pressurized, properly sized Thermal Expansion Tank in almost all homes. (See photo on inside front cover.)
BACKGROUND: Water expands when heated, and the increased volume of water must have a place to go, or thermal expansion will cause large increases in water pressure (despite the use of a Pressure Reducing Valve on the home’s main water supply line). The Safe Drinking Water Act of 1974 requires the use of backflow preventers and check valves to restrict water from your home reentering the public water system. Backflow preventers are often installed in water meters and may not be readily visible. As a result, most all plumbing systems today are now “closed,” and almost all homes now need a Thermal Expansion Tank.

A Thermal Expansion Tank is a practical and inexpensive way to help avoid damage to the water heater, washing machine, dishwasher, ice maker and even toilet valves. If your toilet occasionally runs for no apparent reason (usually briefly at night), that may be due to thermal expansion increasing the water pressure temporarily.

Water pipe and tank leaks
Leaks from plumbing pipes or from the water heater itself can damage property and could cause a fire risk.
• Install an automatic leak detection and shutoff device (available at Lowe’s®). These devices can detect water leaks and can shut off the water heater’s water supply if a leak occurs.
• Install a suitable drain pan (available at Lowe’s®) under the water heater (figure 6) to catch condensation or leaks in the piping connections or tank. Most codes require and we recommend installing the water heater in a drain pan that is piped to an adequate drain. The drain pan must be at least two inches wider than the diameter of the water heater. Install the drain pan so the water level would be limited to a maximum depth of 1-3/4”.

Water temperature regulation
Install Thermostatic Mixing Valves (figure 7) to regulate the temperature of the water supplied to each point-of-use (for example, kitchen sink, bathroom sink, bath, shower). Consult the valve manufacturer’s instructions or a qualified person.

WARNING! Even if the water heater thermostat is set to a relatively low temperature, hot water can scald. Install Thermostatic Mixing Valves at each point-of-use to reduce the risk of scalding (see page 4).

BACKGROUND: A Thermostatic Mixing Valve, installed at each point-of-use, mixes hot water from the water heater with cold water to more precisely regulate the temperature of hot water supplied to fixtures. If you aren’t sure if your plumbing system is equipped with properly installed and adjusted Thermostatic Mixing Valves at each point where hot water is used, contact a qualified person for more information.
Verify that the location is appropriate

Before installing your water heater, ensure that:

1. The water heater will be:
   - Installed indoors close to the center of the plumbing system.
   - In a suitable drain pan piped to an adequate floor drain or external to the building (See page 8, figure 6).
   - In an area that will not freeze
   - In an area that is suitable for installing the water heater vertically

2. The location has adequate space (clearances) for periodic servicing.

3. The floor can support the weight of a full water heater.

4. Your area is not prone to earthquakes. If it is, use special straps as required by local building codes.

NOTICE: The state of California requires bracing, anchoring, or strapping the water heater to avoid its moving during an earthquake. Contact local utilities for code requirements in your area, visit http://www.dsa.dgs.ca.gov, or call 1-916-445-8100 and request instructions. Other locations may have similar requirements. Check with your local and state authorities.

5. The location is not prone to physical damage by vehicles, flooding, or other risks.

   ![Diagram of vehicle stop](Image)

   In a garage, install a vehicle stop to avoid water heater damage.

6. Avoid locations such as attics, upper floors, or where a leak might damage the structure or furnishings. Due to the normal corrosive action of water, the tank will eventually leak. To minimize property damage from leaks, inspect and maintain your water heater in accordance with this manual’s instructions. Install a suitable drain pan under the water heater piped to an adequate drain. Inspect the drain pan, pipes, and surrounding area regularly and fix any leaks found. Drain pans are available at Lowe’s®. Leaks are frequently in the plumbing system itself and not the water heater.

Removing the old water heater

1. Read each installation step and decide if you have the necessary skills to install the water heater. Only proceed if you can safely perform the work. If you are not comfortable, have a qualified person perform the installation.

2. Locate the water heater’s circuit breaker and turn it OFF (or remove the circuit’s fuses).

3. On the old water heater, remove the electrical junction box access panel. Using a non-contact circuit tester, check the wiring to make certain the power is OFF.

   ▲ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock.

4. Disconnect the electrical wires.

5. Open a hot water faucet and let the hot water run until it is cool (This may take 10 minutes or longer).

   ![Image of water being drained](Image)

   Let the hot water run until it is cool.

   ▲ WARNING! Be sure the water runs cool before draining the tank to reduce the risk of scalding.

6. Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or a bucket. (Note that sediment in the bottom of the tank may clog the valve and prevent it from draining. If you can’t get the
INSTALLATION

tank to drain, contact a qualified person.)

7 Turn the cold water supply valve OFF.

8 Open the drain valve on the water heater.

9 Also open a hot water faucet to help the water in the tank drain faster.

10 When the tank is empty, disconnect the Temperature & Pressure (T&P) Relief Valve discharge pipe. You may be able to reuse the discharge pipe, but do not reuse the old T&P Relief Valve. A new T&P Relief Valve comes installed on your water heater (or on some models, is in the carton with the water heater).

11 Disconnect the water pipes. Many water pipes are connected by a threaded union which can be disconnected with wrenches. If you must cut the water pipes, cut the pipes close to the water heater’s inlet and outlet connections, leaving the water pipes as long as possible. If necessary, you can make them shorter later when you install the new water heater.

12 Remove the old water heater.

WARNING! Use two or more people to remove or install water heater. Failure to do so can result in back or other injury.

Step 4:
Installing the new water heater

1 Completely read all instructions before beginning. If you are not sure you can complete the installation, DO NOT RETURN THIS UNIT TO THE STORE. Seek assistance from any of the following sources:

- Lowe’s® Professional Installation is available for this product and the work is guaranteed. Call your Lowe’s® store to have this water heater installed.
- Schedule an appointment with a qualified person to install your water heater.
- Call our Technical Assistance Hotline at 1-800-999-9515.

2 Install a suitable drain pan that is piped to an adequate drain.

3 Set the water heater in place taking care not to damage the drain pan.

NOTICE: Most codes require setting the water heater in a suitable drain pan piped to an adequate drain. The drain pan helps avoid property damage which may occur from condensation or leaks in the piping connections or tank. The drain pan must be at least two inches wider than the diameter of the water heater. Install the drain pan so the water level is limited to a maximum depth of 1-3/4”.

4 Verify that the water heater is set in place properly. Check that:

- The T&P Relief Valve will not be in contact with any electrical parts.
- There is adequate space to install the T&P Relief Valve discharge pipe and that it can be piped to a separate drain (and not into the drain pan).
- There is adequate access and space around the water heater for future maintenance.
Step 5:

Connect the Temperature and Pressure (T&P) Relief Valve/Pipe

Most T&P Relief Valves are pre-installed at the factory. In some cases, they are shipped in the carton and must be installed in the opening marked and provided for this purpose and according to local codes.

⚠️ WARNING! To avoid serious injury or death from explosion, install a T&P Relief Valve according to the following instructions:

1. If your water heater does not have a factory installed T&P Relief Valve, install the new T&P Relief Valve that came with your water heater. Do not reuse an old T&P Relief Valve. Install a T&P Relief Valve discharge pipe according to local codes and the following guidelines:

   • The discharge pipe must withstand 250°F (121°C) without distortion. Use only copper or CPVC pipe. Do not use any other type of pipe, such as PVC, iron, flexible plastic pipe, or any type of hose.

   • Do not place any valve or other restriction between the tank and T&P Relief Valve. Do not cap, block, plug, or insert any valve between the T&P Relief Valve and the end of the discharge pipe. Do not insert or install any reducer in the discharge pipe.

   • The T&P Relief Valve discharge pipe must be installed properly and piped to an adequate drain.

   • Terminate the discharge pipe a maximum of six inches above a floor drain or outside the building. Do not drain the discharge pipe into the drain pan; instead pipe it separately to an adequate drain. In cold climates, terminate the discharge pipe inside the building to an adequate drain. Outside drains could freeze and obstruct the drain line. Protect the drain from freezing.

   • The end of the T&P Relief Valve discharge pipe must stop no more than six inches above a floor drain or outside.
**INSTALLATION**

**Step 6:**

**Install shutoff and tempering valves**

1. If one is not already installed, install a manual shutoff valve in the cold water line that supplies the water heater. Install the shutoff valve near the water heater so that it is readily accessible. Only use valves that are compatible with potable water. Use only full-flow ball or gate valves. Other types of valves may cause excessive restriction to the water flow.

2. Install a Thermostatic Mixing Valve at each point-of-use (for example, kitchen sink, bathroom sink, bath, shower). Consult the valve manufacturer’s instructions or a qualified person.

3. For water heaters that are fed by a solar water heating system (or any other pre-heating system), always install a Thermostatic Mixing Valve or other temperature limiting device in the inlet water supply line to limit water supply inlet temperature to 120°F. Solar water heating systems can supply water with temperatures exceeding 170°F and may result in water heater malfunction.

**WARNING!** Hot water provided by solar heating systems can cause severe burns instantly, resulting in severe injury or death (see page 4).

**Step 7:**

1. **Connect the water supply**

   Determine the type of water pipes in your home. Most homes use copper water pipes, but some use CPVC or cross-linked polyethylene (PEX). Use fittings appropriate for the type of pipe in your home. Do not use iron or PVC pipe — they are not suitable for potable water.

2. Connect the cold water supply using 3/4 inch National Pipe Thread “NPT” to the fitting marked “C” (COLD). For ease of removing the water heater for service or replacement, connect the water pipes with a coupling called a union. We recommend using a dielectric-type union (available at Lowe’s®). Dielectric unions can help prevent corrosion caused by tiny electric currents common in copper water pipes and can help extend the life of the water heater.

**IF YOU HAVE COPPER PIPES:**

If your home has copper water pipes, you can solder the water pipe connections or use compression fittings which don’t require soldering. Compression fittings are easier to install than soldering pipe. Check with local plumbing officials to determine what types of pipe materials are suitable for your location. Do not use lead-based solder.

**NOTICE:** Do not solder pipes while they are attached to the water heater. The water heater’s inlet and outlet connections contain non-metallic parts which could be damaged. The proper way to connect the water heater to copper water pipes is as follows:

- Solder a short length of pipe (about a foot or so) to a threaded adapter using only 95/5 tin-antimony or equivalent solder. Attach the threaded adapters to the water heater’s connections (using Teflon® tape or pipe joint compound). Connect the home’s water pipes by soldering, keeping the connections at the water heater cool with wet rags.
Heat traps installed in the inlet and outlet connections help save energy.

NOTICE: Most water heater models contain energy saving heat traps in the inlet and outlet connections to avoid the circulation of hot water within the pipes. Do not remove the heat traps.

3. Connect the hot water supply using 3/4 inch NPT to the fitting marked “H” (HOT). Follow the same connection guidelines as for the cold water supply.

4. Install insulation (or heat tape) on the water pipes especially if the indoor installation area is subject to freezing temperatures. Insulating the hot water pipes can increase energy efficiency.

5. Double check to make sure the hot and cold water pipes are connected to the correct hot and cold water fittings on the water heater.

6. If needed, install (or adjust) the home’s Pressure Reducing Valve to 50-60 psi and install a Thermal Expansion Tank.

A Pressure Reducing Valve is required if your home’s water pressure is above 80 psi.

The Thermal Expansion Tank should be pressurized with air, to match the home’s incoming water pressure.

Step 8:
Verify connections and completely fill tank

To remove air from the tank and allow the tank to fill completely with water, follow these steps:

1. Remove the aerator at the nearest hot water faucet. This allows any debris in the tank or plumbing system to be washed out.

2. Turn the cold water supply back on.

3. Open a hot water faucet and allow the water to run until it flows with a full stream.

4. Let the water run full stream for three full minutes.

5. Close the hot water faucet and replace the aerator.

6. Check inlet and outlet connections and water pipes for leaks. Dry all pipes so that any drips or leaks will be apparent. Repair any leaks. Almost all leaks occur at connections and are not a tank leak.
INSTALLATION

Step 9:
Make electrical connections

⚠️ WARNING! Working on an energized circuit can result in severe injury or death from electrical shock.

NOTICE: Do not turn electrical power on unless you are sure all of the air is out of the tank and the tank is completely full of water. If power is applied before the tank is completely full of water, the upper element will burn out (Dry Fire).

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 data plate and ensure that the home’s voltage, wiring size (ampacity) and circuit breaker rating and type are correct for this water heater. Refer to the wiring diagram located on the water heater for the correct electrical connections. Ensure that wire sizes, type, and connections comply with all applicable local codes. In the absence of local codes, follow NFPA-70 and the current edition of the National Electric Code (NEC).

4. Remove the cover on the electrical junction box on the top of the water heater.

5. Install wiring in an approved conduit (if required by local codes). Use a UL listed or CSA approved strain relief to secure the electrical wiring to the water heater.

6. Connect the ground wire to the green ground screw. Connect the home’s two power wires to the water heater’s four power wires (black to black, red to red). Use suitable wire nuts or other approved means to make the power connections.

NOTICE: The tank must be completely empty of air and full of water before connecting electrical power to avoid “Dry Firing.” Dry Firing may result in the upper element burning out. This is a common installation mistake. After you make the water connections, but before you connect the electrical power, open a hot water faucet and let the water run full until all the air is removed. Let the “hot” water run full for three minutes or longer before connecting any electrical wires. A Dry Fired upper heating element is an installation error and is not covered under warranty.

If Dry Firing occurs, replace the upper heating element according to the instructions on page 30.
Step 10: Adjusting the Temperature

With the installation steps completed, you may adjust the water heater’s temperature setting if desired.

1. Set the thermostat(s) to desired temperature. The thermostat(s) on this water heater have been factory set to approximately 120°F to reduce the risk of scald injury. You may wish to set a higher temperature to provide hot water for automatic dishwashers or laundry machines, to provide more hot water capacity, and to reduce bacterial growth. Higher tank temperatures (140°F) kill bacteria that cause a condition known as “smelly water” and can reduce the levels of bacteria that cause water-borne diseases.

WARNING! Higher temperatures increase the risk of scalding, but even at 120°F, hot water can scald (see page 4).

If you increase the water heater’s temperature setting, install Thermostatic Mixing Valve(s) at each point-of-use to reduce the risk of scalding.

2. Turn the electric power back on.

3. Wait for the water to heat up. It may take several hours for a tank of cold water to heat up. If you have no hot water after two hours, refer to the Troubleshooting Section (see page 24).

WARNING! If you have increased the temperature setting and the Thermostatic Mixing Valves are not set properly (or not installed) you could scald yourself while checking the temperature.

4. Check water temperature at several points of use in your home (for example, bathtub faucet, shower, or lavatory sink) and adjust the Thermostatic Mixing Valves as needed. If you aren’t sure how to adjust the Thermostatic Mixing Valve settings, or aren’t sure if you have Thermostatic Mixing Valves, contact a qualified person.

To adjust the water heater’s thermostat:

- Be sure the electrical power to the water heater is turned OFF at the circuit breaker panel (or remove the circuit’s fuses).

WARNING! Working near an energized circuit can result in severe injury or death from electrical shock. Check wires with a circuit tester to make sure power is off.

- Remove the upper and lower access panels and fold away the insulation.

- Turn the water temperature dial clockwise (>>) to increase the temperature, or counter clockwise (<<) to decrease the temperature. Adjust both thermostats to the same temperature setting. To avoid a shortage of usable hot water, do not adjust the upper thermostat to a temperature setting that is higher than the lower thermostat’s temperature setting.

NOTE: Most models have two thermostats, but some models may only have one. If your water heater has only one thermostat, it is located behind the lower access panel.
- Fold the insulation back in place and replace the access panels.

WARNING! Be sure panels are secured to reduce the risk of fire and electric shock.
Step 11:

Operation
The water heater is now ready for normal operation. To keep your water heater working safely and efficiently and extend its life, perform maintenance according to the schedule on page 29.

Vacation
To save energy, lower the temperature setting on the thermostat(s) if you plan to be gone for an extended time. Follow the instructions in Step 10 for adjusting the thermostat to a lower temperature setting before you leave and to properly raise the temperature setting when you return.

▲ CAUTION! Hydrogen gas builds up in a hot water system when it is not used for a long period (two weeks or more). Hydrogen gas is extremely flammable. If the hot water system has not been used for two weeks or more, open a hot water faucet for several minutes at the kitchen sink before using any electrical appliances connected to the hot water system. Do not smoke or have an open flame or other ignition source near the faucet while it is open.

Need Assistance?

Call our Technical Assistance Hotline at 1-800-999-9515. We can help you with installation, operation, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater’s data plate.
Operating Mode Descriptions

The operating modes can be changed by touching the desired mode icon on the Energy Smart® Module (See Figure 8). NOTE: All buttons on the Energy Smart® Module are touch sensitive and require only a light touch to actuate.

ENERGY SMART® - This mode is used to save energy by monitoring usage and adjusting the set point to match the water draw usage pattern (Temperature set point can be changed).

STANDARD - Pressing this button will allow the temperature set point to be set directly.

VACATION MODE - The controller adjusts the set point to approximately 60°F. This mode is recommended when the water heater is not in use for a long period of time. This mode minimizes energy consumption and prevents the water heater from freezing during cold weather.

GRID ENABLED - Pressing this button will enable or disable a request for grid control (see page 19).

CONTROL PANEL LOCK - Holding this button for more than 3 seconds switches the lock mode on or off. When the User Module is locked, a symbol and “Lock” text will be visible on the display.

°F/°C - This button switches the display to show the set temperature in Fahrenheit or Celsius.

Element Functioning Icon - indicates power is on at either upper or lower element circuits and both are working properly.

Fault condition will display an “E” followed by two digit fault code with Alert Icon flashing. (see diagnostic code chart page 20).

NOTE: The Electronic Thermostat (ET) is designed so that it may control the water heater without the Energy Smart® Module (ESM) being operated, see page 18.
INSTALLATION

The Electronic Thermostat

IMPORTANT: The Energy Smart® Module (ESM) must be removed before attempting to access the thermostat. NOTE: for the Electronic Thermostat (ET) changes to remain in effect the Energy Smart® Module (ESM) must not be reconnected, also read the “Water Temperature Regulation” under the “Operating Your Water Heater” section. If the instructions are not clear, contact a qualified service technician.

The Energy Smart® Module (ESM) is intended to serve as the primary interface for operating the water heater; however, the Electronic Thermostat (ET) may control the water heater in the absence of the Energy Smart® Module (ESM).

The Electronic Thermostat consists of an electronics box that contains a low voltage power supply, the thermostat set point knob, relays to switch between the upper and lower heating elements, one control thermistor, a connector for the lower element control thermistor, microelectronics to convert the thermistor signals and perform switching and other logic functions, and a connector to tie the Electronic Thermostat (ET) to the Energy Smart® Module (ESM) located on the front of the water heater jacket. The majority of the self-diagnostics are located in the Electronic Thermostat (ET), including the dry-fire protection intelligence. The thermostat circuit is designed so that when the upper heating element calls for heat, the power is directed to that element even if the lower element is also calling for heat.

Diagnostic LED Light

The Green/Red LED light indicates the status of the electronic thermostat (See Figure 9).

⚠️ WARNING! Electrical Shock Hazard
Do not remove the plastic guard from over wiring.
Do not touch electrical wiring.
Failure to do so can result in death or electrical shock.

After the 5 seconds are completed, the fault indication cycle is repeated starting with the first 1/2 second-flash. The flash sequence will be repeated as long as the fault remains. Only one fault can be declared at a time. NOTE: the green LED is turned off when a fault code is being displayed, even though the heater may be operating in limp mode with an element on. See diagnostic code chart section in this manual.

Overriding The Energy Smart® Module (ESM)

If the Energy Smart® Module (ESM) is not working, simply unplug the interface module and turn the set point knob on the Electronic Thermostat (ET) to the desired temperature (See Figures 9 & 10). To replace a broken or damaged ESM module, see page 36 for ordering information.

⚠️ WARNING! Electrical Shock Hazard
Do not remove the plastic guard from over wiring.
Do not touch electrical wiring.
Failure to do so can result in death or electrical shock.

After the last 1/2 second “on” period, the LED will remain off until a total of 5 seconds has elapsed for the fault indication cycle (there is a 5 seconds delay before the fault flash pattern repeats).
Smart Grid Technology

The electric Smart Grid will enable significant improvements in electric power reliability and quality through reduction of peak power demand, while providing consumers the knowledge and ability to manage their energy consumption and utility costs.

According to the Department of Energy (DOE), since 1982 the growth in peak electricity demand has exceeded power transmission growth. This has caused more frequent blackouts and service interruptions, as well as an increase in the costly reserve capacity the power grid requires to meet higher peak demands. The increased demand for electrical power across the nation has also led to higher peak utility costs.

Smart appliances are one way to help mitigate this problem. By using advanced digital communication technologies, smart appliances will be able to communicate with local power company or home energy management systems, and react accordingly to save energy and money. For example, during peak demand periods the water heater may pause or delay its power consumption and thus reduce the load on the smart utility grid.

After this connection has been made, simply press the “Grid Enabled” button to enable and/or disable a request for Smart Grid Control. See Figure 12. Enabling this feature will allow acceptance of the power company communication of grid management requests. Disabling this feature will allow the water heater to ignore grid management requests.

NOTE: Smart Grid will be disabled when the Energy Smart® Module (ESM) is disconnected from the junction box wiring harness (see page 18).

WARNING! Electrical Shock Hazard
Disconnect power before servicing.
Replace all parts and panels before operating.
Failure to do so can result in death or electrical shock.
**DIAGNOSTIC CODE CHART**  
*Energy Smart® Module (ESM)*

**IMPORTANT:** Before attempting to adjust the thermostat, read the “Important Safety Information” section page 4.

The Electronic Thermostat (ET) is designed so that it may control the water heater without the Energy Smart® Module (ESM) being operated, see page 18.

If the instructions are not clear, contact a qualified person.

<table>
<thead>
<tr>
<th>(ESM) ERROR CODE</th>
<th>INDICATES</th>
<th>CORRECTIVE ACTION*</th>
</tr>
</thead>
</table>
| E01 with an alert Icon flashing. | Dry-fire, electrical power on with the tank not completely full of water. | 1. Turn off electrical power at breaker, add water.  
2. Turn on electrical power at breaker.  
| E02 with an alert Icon flashing. | Water temperature exceeded high limit. | 1. Turn off electrical power at the breaker.  
2. Press the reset button (see Figure 9).  
3. Turn on electrical power at breaker.  
4. If error returns call a service technician for assistance. |
| E03 with an alert Icon flashing. | Upper thermistor sensor failure. (Note: Upper thermistor sensor is part of the ET) | 1. Turn off electrical power at the breaker.  
2. Replace Electronic Thermostat (ET).  
3. Turn on electrical power at breaker. |
| E04 with an alert Icon flashing. | Upper element circuit failure. (Note: Lower element is still operable) | 1. Turn off electrical power at the breaker.  
2. Check element circuits for resistance of 5-25 ohms (replace if required).  
3. Check wires at elements and Electronic Thermostat (ET) for damage.  
4. If this 4 flashes condition continues, replace Electronic Thermostat (ET).  
5. Turn on electrical power at breaker. |
| E05 with an alert Icon flashing. | Lower element circuit failure. (Note: Upper element is still operable) | 1. Turn off electrical power at the breaker.  
2. Check element circuits for resistance of 5-25 ohms (replace if required).  
3. Check wires at elements and Electronic Thermostat (ET) for damage.  
4. If this 5 flashes condition continues, replace Electronic Thermostat (ET).  
4. Turn on electrical power at breaker. |
| E06 with an alert Icon flashing. | Electronic Thermostat (ET) failure (Internal processor). | 1. Turn off electrical power at the breaker. Now turn on electrical power to see if error clears. If error has not cleared, replace Electronic Thermostat (ET).  
2. Turn on electrical power at breaker. |
| E07 with an alert Icon flashing. | Lower thermistor sensor failure. | 1. Turn off electrical power at the breaker.  
2. Check electrical connections at Electronic Thermostat (ET).  
3. Replace Lower Thermistor Sensor.  
4. Turn on electrical power at breaker. |
| E08 with an alert Icon flashing. | Energy Smart® Module (ESM) failure. | 1. Turn off electrical power.  
2. Check wires at the interface module for damage.  
3. If this 8 flashes condition continues, replace module (ESM).  
4. See “Overriding The Interface Module (ESM)” by unplugging from the Electronic Thermostat (ET) on page 18. NOTE: Electronic Thermostat (ET) will continue to be operate, hot water will still be available.  
5. Turn on electrical power at breaker. |
| E09 with an alert Icon flashing. | Electronic Thermostat (ET) error. | 1. Turn off electrical power.  
2. Check wiring at Electronic Thermostat (ET) for damage.  
3. Turn on electrical power at breaker.  
4. If this code flashes condition continues, replace the Electronic Thermostat (ET). |
<table>
<thead>
<tr>
<th>(ESM) ERROR CODE</th>
<th>INDICATES</th>
<th>CORRECTIVE ACTION*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E51</strong> with an alert Icon flashing.</td>
<td>A failure to communicate with the Electronic Thermostat (ET).</td>
<td>1. Turn off electrical power at the breaker, check all electrical connections, and wiring for damage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Replace the Electronic Thermostat (ET).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Turn on electrical power at breaker.</td>
</tr>
<tr>
<td><strong>E52</strong> with an alert Icon flashing.</td>
<td>Energy Smart® Module (ESM) is receiving the wrong data from the Electronic Thermostat (ET).</td>
<td>1. Turn off electrical power at the breaker, check all electrical connections, and wiring for damage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Replace the Energy Smart® Module (ESM), if this does not correct the problem, also replace Electronic Thermostat (ET).</td>
</tr>
<tr>
<td><strong>E71</strong> with an alert Icon flashing.</td>
<td>Energy Smart® Module (ESM) thermistor failure.</td>
<td>1. Turn off electrical power at the breaker, check all electrical connections, and wiring for damage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Turn on electrical power at breaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. If error returns call service technician for assistance.</td>
</tr>
</tbody>
</table>

*These instructions are brief and intended as guidance for a qualified person. If you lack the necessary skills to perform these procedures call 1-800-999-9515 for assistance.
**Diagnostic Code Chart**

**Electronic Thermostat (ET)**

**Important:** Before attempting to adjust the thermostat, read the “Important Safety Information” section page 4.

The Electronic Thermostat (ET) is designed so that it may control the water heater without the Energy Smart® Module (ESM) being operated, see page 18.

If the instructions are not clear, contact a qualified person.

### Troubleshooting

**WARNING!** Electrical Shock Hazard

Do not remove the plastic guard from over wiring.

Do not touch electrical wiring. Failure to do so can result in death or electrical shock.

<table>
<thead>
<tr>
<th>(ESM) Error Code</th>
<th>(ET) Diagnostic LED</th>
<th>Indicates</th>
<th>Corrective Action*</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT ON (Green Flash)</td>
<td>Normal operation.</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
| NO LIGHT | No electrical power to control board or diagnostic LED light burned out. | 1. Check for blown fuses or tripped breaker.  
2. If diagnostic LED light is burned out, replace Electronic Thermostat (ET). |
| E01 1 FLASH (Red) | Dry-fire, electrical power on with the tank not completely full of water. | 1. Turn off electrical power at breaker, add water.  
2. Turn on electrical power at breaker.  
| E02 2 FLASHES (Red) | Water temperature exceeded high limit. | 1. Turn off electrical power at the breaker.  
2. Press the reset button (see Figure 9).  
3. Turn on electrical power at breaker.  
4. If error returns call a service technician for assistance. |
| E03 3 FLASHES (Red) | Upper thermistor sensor failure. (Note: Upper thermistor sensor is part of the ET) | 1. Turn off electrical power at the breaker.  
2. Replace Electronic Thermostat (ET).  
3. Turn on electrical power at breaker. |
| E04 4 FLASHES (Red) | Upper element circuit failure. (Note: Lower element is still operable) | 1. Turn off electrical power at the breaker.  
2. Check element circuits for resistance of 5-25 ohms (replace if required).  
3. Check wires at elements and Electronic Thermostat (ET) for damage.  
If this 4 flashes condition continues, replace Electronic Thermostat (ET).  
4. Turn on electrical power at breaker. |
| E05 5 FLASHES (Red) | Lower element circuit failure. (Note: Upper element is still operable) | 1. Turn off electrical power at the breaker.  
2. Check element circuits for resistance of 5-25 ohms (replace if required).  
3. Check wires at elements and Electronic Thermostat (ET) for damage.  
If this 5 flashes condition continues, replace Electronic Thermostat (ET).  
4. Turn on electrical power at breaker. |
| E06 6 FLASHES (Red) | Electronic Thermostat (ET) failure (Internal processor). | 1. Turn off electrical power at the breaker.  
2. Turn on electrical power at breaker. Now turn on electrical power to see if error clears. If error has not cleared, replace Electronic Thermostat (ET).  
2. Turn on electrical power at breaker. |
| E07 7 FLASHES (Red) | Lower thermistor sensor failure. | 1. Turn off electrical power at the breaker.  
2. Check electrical connections at Electronic Thermostat (ET).  
3. Replace Lower Thermistor Sensor.  
4. Turn on electrical power at breaker. |
| E08 8 FLASHES (Red) | Energy Smart® Module (ESM) failure. | 1. Turn off electrical power.  
2. Check wires at the interface module for damage.  
3. If this 8 flashes condition continues, replace module (ESM).  
4. See “Overriding The Interface Module (ESM)” by unplugging from the Electronic Thermostat (ET) on page 18. NOTE: Electronic Thermostat (ET) will continue to be operate, hot water will still be available.  
5. Turn on electrical power at breaker. |
<table>
<thead>
<tr>
<th>(ESM) ERROR CODE</th>
<th>(ET) DIAGNOSTIC LED</th>
<th>INDICATES</th>
<th>CORRECTIVE ACTION*</th>
</tr>
</thead>
</table>
| E9               | 9, 10, 11 or 12 FLASHES (Red) | Electronic Thermostat (ET) error | 1. Turn off electrical power.  
2. Check wiring at Electronic Thermostat (ET) for damage.  
3. Turn on electrical power at breaker.  
4. If this code flashes condition continues, replace the Electronic Thermostat (ET). |
| E10              |                     |           |                    |
| E11              |                     |           |                    |
| E12              |                     |           |                    |

*These instructions are brief and intended as guidance for a qualified person. If you lack the necessary skills to perform these procedures call 1-800-999-9515 for assistance.
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE(S)</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO HOT WATER (page 26)</td>
<td>• No power to water heater</td>
<td>Check for blown fuses or tripped circuit breaker. Check for power.</td>
</tr>
<tr>
<td></td>
<td>• Burned out upper heating element (Dry Fired)</td>
<td>Replace upper heating element.</td>
</tr>
<tr>
<td></td>
<td>• Energy Cut Off Switch tripped</td>
<td>See page 27, step 5.</td>
</tr>
<tr>
<td></td>
<td>• Faulty Thermostatic Mixing Valve</td>
<td>Check hot water at other faucets.</td>
</tr>
<tr>
<td></td>
<td>• Non-Functioning upper thermostat</td>
<td>Check/replace upper thermostat. (See page 31)</td>
</tr>
<tr>
<td></td>
<td>• Leak in plumbing system</td>
<td>Check hot water side of home’s plumbing system for leaks.</td>
</tr>
<tr>
<td>INSUFFICIENT HOT WATER (page 27)</td>
<td>• Thermostats set too low</td>
<td>Set thermostats to desired temperature. See page 17.</td>
</tr>
<tr>
<td></td>
<td>• Non-Functioning lower heating element</td>
<td>Replace lower heating element. (See page 30)</td>
</tr>
<tr>
<td></td>
<td>• Water heater’s capacity too small (or usage too high)</td>
<td>Install adequately sized water heater (or reduce usage).</td>
</tr>
<tr>
<td></td>
<td>• Thermostatic Mixing Valve faulty/set too low</td>
<td>Check hot water at other faucets.</td>
</tr>
<tr>
<td></td>
<td>• Non-Functioning lower thermostat</td>
<td>Replace lower thermostat. (See page 31)</td>
</tr>
<tr>
<td></td>
<td>• Hot and cold pipe connections reversed</td>
<td>Correct piping.</td>
</tr>
<tr>
<td></td>
<td>• Leak in plumbing system</td>
<td>Check hot water side of home’s plumbing system for leaks.</td>
</tr>
<tr>
<td></td>
<td>• Melted dip tube</td>
<td>Check/replace dip tube.</td>
</tr>
<tr>
<td>SLOW HOT WATER RECOVERY (page 27)</td>
<td>• Low supply voltage</td>
<td>Check power (voltage).</td>
</tr>
<tr>
<td></td>
<td>• Malfunctioning lower heating element</td>
<td>Check lower element and replace if burned out. (See page 30)</td>
</tr>
<tr>
<td>TEMPERATURE TOO HIGH (page 28)</td>
<td>• Non-functioning thermostat</td>
<td>Replace thermostat. (See page 31)</td>
</tr>
<tr>
<td></td>
<td>• Grounded/shorted heating element</td>
<td>Replace heating element. (See page 30)</td>
</tr>
<tr>
<td></td>
<td>• Thermostatic Mixing Valve faulty/set too high</td>
<td>Check hot water at other faucets.</td>
</tr>
<tr>
<td>LOW WATER PRESSURE (page 28)</td>
<td>• Partially closed supply valve.</td>
<td>See Low Water Pressure section on page 28.</td>
</tr>
<tr>
<td>DRIPS FROM T&amp;P RELIEF VALVE (page 28)</td>
<td>• Excessive water pressure</td>
<td>Use Pressure Reducing Valve set to 50-60 psi.</td>
</tr>
<tr>
<td></td>
<td>• Thermal expansion</td>
<td>Install a Thermal Expansion Tank.</td>
</tr>
<tr>
<td></td>
<td>• Debris under valve seat</td>
<td>See page 28.</td>
</tr>
<tr>
<td>WATER ODOR (page 28)</td>
<td>• Bacteria in the water</td>
<td>See Water Odor section on page 28.</td>
</tr>
</tbody>
</table>
Notes:

Need Assistance?

Call our Technical Assistance Hotline at 1-800-999-9515. We can help you with installation, operation, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater’s data plate.
WARNING! Working near an energized circuit can result in severe injury or death from electrical shock.

WARNING! When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

No Hot Water
The most likely reasons for an electric water heater to produce NO hot water are:

• No electric power—a common problem with new installations
• Burned out upper element (Dry Fired) — a common problem with new installations
• Tripped Energy Cut Off (red button on upper thermostat)
• The water heater’s inlet and outlet connections are reversed (usually only in new installations)
• Broken upper thermostat (or wiring)
• A leak in the hot water side of the plumbing system that exceeds the water heater’s heating capacity and makes it appear that the water heater is producing little to no hot water

Follow these steps to diagnose and correct common electrical problems:

1. Check the electric power to the water heater. No hot water is often caused by a problem with the home’s electrical wiring or circuit breakers. You’ll need a non-contact circuit tester. Follow these guidelines:
   • Locate the water heater’s circuit breaker and turn it off (or remove the circuit’s fuses).

2. Check the upper heating element. If the water heater is getting electrical power, check to see if the upper heating element has burned out. If the upper element is burned out, you’ll have no hot water. To check the upper element, you’ll need a multimeter capable of reading resistance.
   • Turn the power OFF at the circuit breaker or remove fuses.
   • Remove the upper access panel.
   • Remove the insulation to access the upper thermostat and heating element.

3. Check the top two screws of the upper thermostat using a non-contact circuit tester and confirm that power is off (screw terminals 1 and 3 in photo on next page).
   • With the electrical power off, remove the two power wires from the upper heating element.

4. Check the resistance of the upper heating element using a multimeter. Measure the resistance between the two screw terminals on the upper heating element. A good element will have a resistance ranging between 5 and 25 Ohms. If the resistance is:
   • Outside this range. Replace the element (see the Routine Maintenance section on page 29). On a new water heater, a burned out upper heating element is almost always caused by turning the power on before the tank was completely full of water (Dry Fire). (See Step 8 in the Installation section.)
   • Within this range. Reattach the power wires, making sure the wires are in good condition and the connections are clean and tight. Next, check the following:
Check/Reset Energy Cut Off (ECO) Button.

The Energy Cut Off (ECO) shuts off power to the water heater’s elements if the temperature of the water in the tank gets too hot. If the ECO has tripped, you’ll have no hot water. A tripped ECO can usually be reset, but you should have a qualified person investigate the cause of the overheating and repair the problem. Do not turn the power back on until the cause of the overheating has been identified and repaired.

To check the Energy Cut Off (ECO)

• Turn off the power to the water heater.

⚠️ WARNING! Working near an energized circuit can result in severe injury or death from electrical shock. Check power wires in the electrical junction box with a non-contact circuit tester to make sure power is off.

• Press the red ECO reset button (see photo above).

• The ECO was tripped if you hear a click when it is reset. In most cases, a tripped ECO indicates that the tank overheated due to a problem with one of the elements or thermostats—have a qualified person check the upper and lower elements and thermostats and replace if necessary.

• The ECO was not tripped if you didn’t hear a click. In that case, the upper thermostat should be checked by a qualified person.

• Replace the insulation and the upper access panel.

⚠️ WARNING! Be sure all covers are secured to reduce the risk of fire and electric shock.

Insufficient Hot Water or Slow Hot Water Recovery

⚠️ WARNING! Because of the increased risk from scalding, if you set the water heater’s thermostat(s) higher than 120°F, Thermostatic Mixing Valves at each point-of-use are particularly important (see page 4).

If the hot water is simply not warm enough, there are several possible causes:

• Faulty Thermostatic Mixing Valve in a faucet or shower control (check other faucets in the house for hot water)

• One (or both) of the thermostats set too low

• Water heater’s capacity too small (or usage too high)

• Reversed plumbing connections or melted dip tube (usually found soon after new installation)

• Plumbing leak

• Bad lower heating element (or lower thermostat)

• Low supply voltage

Thermostatic Mixing Valves. If the hot water is simply not warm enough, make sure the faucet you are checking doesn’t have a defective Thermostatic Mixing Valve. Many shower controls now have built-in mixing valves. If these devices fail, they can reduce the amount of hot water the shower or faucet delivers even though there is plenty of hot water in the tank. Always check the water temperature at several faucets to make sure the problem is not in a faucet or shower control.

Thermostats set too low. If the water temperature at several faucets is too cool, adjust the thermostat(s) according to the instructions in Step 10 of the Installation section of this manual.

Undersized water heater. If your water heater runs out of hot water too quickly, it may be too small for your needs. If the water heater is old, consider replacing it with a larger model. If the water heater is in good condition, you may be able to meet your family’s hot water needs with the existing water heater by installing Thermostatic Mixing Valves at each point-of-use and then turning the thermostat(s) to a higher setting. See page 15, step 10.

You can also reduce your home’s hot water needs by washing clothes in cold water, installing flow restrictors on shower heads, repairing leaky faucets, and taking other conservation steps.

Reversed connections or melted dip tube. Check the hot and cold connections and make sure your home’s hot water pipe is connected to the hot water outlet on the water heater. Usually, reversed connections are found soon after the installation of a new unit. If copper pipes were soldered while they were attached to the water heater, the dip tube may have melted. The dip tube is a long plastic tube inside the tank attached to the cold water inlet. If the dip tube has melted, it can be replaced by removing the cold water inlet connection, removing the old dip tube and installing a new one.

Plumbing leak. Even a small leak in the hot water side of the home’s plumbing system can make it appear that the water heater is producing little to no hot water. Locate and repair the leak.

Lower heating element not working. If the lower heating element (or, more
rarely, the lower thermostat is not working, you will have some hot water but not as much as before. Because the lower element does most of the work, the lower element usually wears out before the upper element. Replace the lower element and/or thermostat if necessary (see page 30-31).

**Temperature Too High**

If the water temperature is too hot:

- Install or adjust the Thermostatic Mixing Valves for each point-of-use (see manufacturer’s instructions), or
- Adjust the thermostat(s) on the water heater (see Step 10 in the installation section of this manual).

A nonfunctioning thermostat or a shorted heating element can cause extremely hot water. If the Temperature and Pressure Relief Valve (T&P Valve) releases large amounts of very hot water, it is likely due to a shorted heating element, or more rarely a nonfunctioning thermostat, or the thermostat does not fit snugly against the tank. Very high water temperatures can also cause the Energy Cut Off (ECO) to trip (see page 27). Turn power off until this problem is fixed.

**Low Water Pressure**

Check both the cold and hot water at a sink to determine if the lower pressure is only on the hot water side. If both hot and cold faucets have low pressure, call your local water utility. If the low pressure is only on the hot water side, the primary causes of this are:

- Melted heat traps or dip tube. Soldering copper pipes while they are connected to the water heater can melt the heat traps inside the hot and cold water connections or the dip tube (cold water side). Melted heat traps or a melted dip tube can restrict the flow of hot water. If that’s the case, replace the heat traps or dip tube.
- Partially closed supply valve. Open the water heater’s supply valve fully.

**Drips from T&P Relief Valve Discharge Pipe**

A small amount of water dripping from the Temperature and Pressure (T&P) Relief Valve usually means the home’s water pressure is too high or you need a properly sized and pressurized Thermal Expansion Tank. Refer to Step 1 in the Installation section of this manual for more information. A large amount of hot water coming from the T&P discharge pipe may be due to the tank overheating.

⚠️ **WARNING!** Do not cap or plug the T&P relief valve or discharge pipe, and do not operate the water heater without a functioning T&P Relief Valve - this could cause an explosion.

**Water pressure too high.** High water pressure can cause the T&P Relief Valve to drip. Install a Pressure Reducing Valve (PRV) on the main cold water supply line. Adjust the PRV to between 50 and 60 psi.

**Thermal Expansion Tank.** Install a Thermal Expansion Tank. If a Thermal Expansion Tank is already installed and the T&P Relief Valve discharge pipe drips, the Thermal Expansion Tank may be pressurized to the wrong pressure or the internal bladder may be defective. Refer to the instructions that came with the Thermal Expansion Tank for more information.

**Debris.** In rare cases, debris can stick inside the T&P Relief Valve preventing the valve from seating fully. In that case, the T&P Relief Valve discharge pipe will drip. You may be able to clear debris from the T&P Relief Valve by manually operating the valve, allowing small quantities of water to flush out the debris. See the label on the T&P Relief Valve for instructions.

If the water pressure is between 50 and 60 psi, a Thermal Expansion Tank is installed and properly pressurized, and the valve has been cleared of any debris, and it still drips, the valve may be broken—have a qualified person replace the T&P relief valve.

**Water Odor**

Harmless bacteria normally present in tap water can multiply in water heaters and give off a “rotten egg” smell. Although eliminating the bacteria that causes “smelly water” with a Chlorination system is the only sure treatment, in some cases, the standard anode rod that came with your water heater can be replaced with a special zinc anode rod which may help reduce or eliminate the odor. Contact a qualified person.

**NOTE:** To protect the tank, an anode rod must be installed in the water heater at all times or the warranty is void.

In cases where the “rotten egg” smell is pronounced, you can raise the tank temperature to 140°F in order to reduce bacteria growth in the tank.

⚠️ **WARNING!** Because higher temperatures increase the risk of scalding, if you set the thermostat(s) higher than 120°F, Thermostatic Mixing Valves at each point-of-use are particularly important (see page 4).
Routine Maintenance

Routine maintenance will help your water heater last longer and work better. If you can’t perform these routine maintenance tasks yourself, contact a qualified person.

Water Heater Maintenance

After the first six months, drain and flush the water heater and inspect the anode rod. Depending on the hardness of your water, repeat this process at least annually, or more frequently if needed. From time to time you may need to replace a heating element or a thermostat. All three maintenance tasks are described below.

Draining and Flushing the Water Heater

Tap water contains minerals that can form lime deposits on heating elements or sediment in the bottom of the tank. The amount of lime deposits or sediment depends on the hardness of your tap water. The rate at which sediment builds up depends on water quality and hardness in your area, the temperature settings, and other variables. We recommend draining and flushing the water heater after the first six months of operation to determine the amount of sediment build up. Draining sediment extends the life of the tank, heating elements, and drain valves.

- In areas with very hard water, remove and check the heating elements whenever you drain the tank. If you have heavy lime deposits on heating elements, you will need to replace them more often.
- Sediment may form large masses that can prevent the tank from draining. Have a qualified person use a de-liming agent suitable for potable water to remove the sediment buildup.

To drain and flush the tank:

1. Locate the water heater’s circuit breaker and turn it OFF (or remove the circuit’s fuses).
2. Open a hot water faucet and let the hot water run until it is cool.
3. Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.
4. Turn the cold water supply valve OFF.
5. Open the drain valve on the water heater.
6. Open a hot water faucet to help the water in the tank drain faster.
7. Remove and inspect the anode rod (see Repair Parts Illustration on back cover for location of the anode rod). Replace the anode rod if it is depleted. Turn power off. Run hot water until it’s cool. Turn cold water supply valve off. Open a hot water faucet to depressurize tank. Locate and remove the black plastic cover marked “Anode Rod”. Use a “key hole” saw or similar tool to remove the foam insulation covering the anode rod. Once the anode rod is exposed, use a 11/16” socket wrench with an extension to remove it. Inspect the anode rod and replace if depleted. Apply Teflon® tape or pipe joint compound and reinstall the anode rod tightly. It is not necessary to replace the foam removed to access the anode. Turn cold water supply valve on. When hot water runs full, close hot water faucet. Check for leaks and repair if necessary. Turn power on.

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

- Connect a garden hose to the drain valve and place the other end of the hose in a drain, outside, or in buckets.
- Turn the cold water supply valve OFF.

Anode Rod. The anode rod is a sacrificial metal rod that helps reduce corrosion and premature failure (leaks) in the tank.

The anode rod is a consumable item. Inspect the anode rod after the first six months of operation when you drain and
flush the tank. Replace the anode rod if it is substantially worn out or depleted. Thereafter, inspect the anode rod annually or more frequently if needed. If you use a water softener, your anode rod will deplete faster than normal. Inspect the anode rod more frequently, replacing the anode rod as needed. Obtain new anode rods from Lowe’s® or have a qualified person replace it. (Anode rods are a consumable item and are not covered under warranty).

8. If the sediment was present when the tank was drained, flush the tank by opening the cold water supply valve and letting the water run until no more sediment drains from the tank. Close the drain valve when you are done.

**NOTICE:** Do not turn power back on until the tank is completely full of water. For complete instructions on filling the tank, follow Step 8 in the Installation section.

9. Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

10. Restore power to the water heater. It may take two hours for the tank to heat up.

**Replacing the Heating Element**

**WARNING!** Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off. 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 heating element or thermostat yourself, have this work done by a qualified person. To replace the heating element, you’ll need the following tools and supplies:

- Always turn power OFF and check the power wires with a non-contact circuit tester before working on the water heater.

**Steps for Replacing the Heating Element:**

1. Turn the power OFF at the circuit breaker or remove fuses.

2. Open the electrical junction box on top of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is OFF.

3. Open a hot water faucet and let the hot water run until it is cool.

**WARNING!** Be sure the water runs cool before draining the tank to reduce the risk of scalding.
4. Connect a garden hose to the drain valve and place the other end of the hose in a drain or outside (or use buckets). Turn OFF the cold water valve that supplies the water heater. Open the drain valve on the water heater. Opening a hot water faucet will help the tank drain faster.

5. Remove the upper or lower access panel on the water heater, and then fold back the insulation and remove the plastic element/thermostat cover.

6. With the tank drained and power off, remove the power wires from the element you intend to replace.

7. Remove the bad element using an element wrench.

8. Make sure the new element is the correct replacement by referring to the water heater’s data plate for voltage and wattage information.

9. Clean the threads in the tank opening with a rag. Insert the new element equipped with a rubber gasket. NOTE: Use a drop of hand dishwashing liquid to lubricate the gasket to help avoid damaging the gasket as it is being tightened. Tighten with an element wrench.

NOTICE: Do not turn power back on until the tank is completely full of water. For complete instructions on filling the tank, follow Step 8 in the Installation section.

10. Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is open and the drain valve is closed. Allow the hot water to run full for at least three minutes to make sure the tank has all the air removed and is completely full of water. Failure to perform this step can cause the upper heating element to burn out. Once you are certain the tank is completely full of water, close the hot water faucet.

11. Check the newly installed element for leaks. If a leak is present, tighten the element until the leak stops. If you cannot stop the leak, drain the tank and remove the element. Inspect the gasket for damage. If the gasket is damaged, replace the gasket and re-install the element.

12. Once the element is successfully installed and there are no leaks, replace the power wires, thermostat cover, insulation, and access panel. Make sure all wire connections are tight. Replace the cover on the electrical junction box.

13. Restore power to the water heater. It may take two hours for the tank to heat up.

Replacing the Thermostat

WARNING! Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off. 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.

To replace the thermostat, you’ll need the following tools and supplies:

- A non-contact circuit tester. Always turn power OFF and check with a non-contact circuit tester before working on the water heater.
- A replacement thermostat (available at Lowe’s®). Take the old thermostat to the store to ensure the replacement thermostat is correct.
- A business card to check the gap between the thermostat and the tank
- Tape and a permanent marker to mark the wires
- A flat blade and a Phillips screwdriver

Steps for Replacing the Thermostat:

1. Turn the power OFF at the circuit breaker or remove fuses.

NOTICE: It is not necessary to drain the tank to replace a thermostat.

2. Open the electrical junction box on top of the water heater. Using a non-contact circuit tester, check the power wires to make certain the power is OFF.
MAINTENANCE

3. Remove the upper or lower access panel on the water heater and carefully fold back the insulation and plastic element/thermostat cover.

4. Make sure the replacement thermostat matches the original thermostat.

5. Mark the wires with tape so you’ll know how to put them back on.

6. Disconnect the wires from the bad thermostat and remove the thermostat from the metal mounting clip.

7. Install the new thermostat in the metal mounting clip.

8. Make sure the new thermostat fits snugly against the tank. You should NOT be able to slip a business card between the thermostat and the tank. If you can, bend the thermostat mounting clip until the thermostat fits tightly against the tank.

9. Attach the wires following the wiring diagram on the water heater’s label. Make sure all wire connections are tight.

10. Replace the plastic element/thermostat cover, insulation, and access panel.

11. Replace the cover on the electrical junction box.

12. Restore power to the water heater. It may take two hours for the tank to heat up.

**T&P Relief Valve Maintenance**

Read and follow the operating and annual maintenance instructions provided by the manufacturer of the T&P Relief Valve (yellow label attached to T&P Relief Valve). Minerals in the water can form deposits that cause the valve to stick or create blocked passages, making the T&P Relief Valve inoperative. Follow these guidelines:

- At least annually, operate the T&P Relief Valve manually to ensure the waterways are clear and the valve mechanism moves freely (above). Before operating the valve manually, check that it will discharge in a place for secure disposal. If water does not flow freely from the end of the discharge pipe, turn OFF the power to the water heater. Call a qualified person to determine the cause.

**WARNING!** Hot water will be released. Before operating the T&P relief valve manually, check that it will discharge in a safe place. If water does not flow freely from the end of the discharge pipe, turn the power to the water heater OFF. Call a qualified person to determine the cause.

- At least every five years, have a qualified person inspect the T&P Relief Valve and discharge pipe. Damage caused by corrosive water conditions, mineral deposits, or other problems can only be determined when a qualified person removes and inspects the valve and its components.

- Note that a dripping T&P Relief Valve is usually caused by the home’s water pressure being too high or the lack of a Thermal Expansion Tank. If your T&P Relief Valve drips, see page 28.

**T&P Relief Valve Maintenance**

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- Note that a dripping T&P Relief Valve is usually caused by the home’s water pressure being too high or the lack of a Thermal Expansion Tank. If your T&P Relief Valve drips, see page 28.
Notes:

Need Assistance?

Call our Technical Assistance Hotline at 1-800-999-9515. We can help you with installation, operation, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater’s data plate.
Thermostat Wiring Diagram

BRANCH CIRCUIT SIZING GUIDE
Based on N.E.C. NFPA NO. 70 - 1999

<table>
<thead>
<tr>
<th>WATT LOAD</th>
<th>Recommend Over Current Protection Rating</th>
<th>Copper Wire Size AWG Based on N.E.C. Table 310-16 (60°C)</th>
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<tr>
<td></td>
<td>120 V</td>
<td>208 V</td>
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<tr>
<td>1500*</td>
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</tr>
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<tr>
<td>5500</td>
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</tr>
</tbody>
</table>

* Wattages less than 1500 may be wired 14 gage with a maximum 15 amp protection.
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Repair Parts

Repair parts may be ordered through your plumber, local distributor, home improvement center, or by calling 1-800-999-9515. When ordering repair parts, always give the following information:
1. Model, serial and product number
2. Item number
3. Parts description

Repair Parts List

Legend
◆ Special anode rod (See page 29)
■ Temperature and Pressure Relief Valve is required, but may not be factory installed.
▲ Specify element type when ordering.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PARTS DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>ENERGY SMART MODULE (ESM) W/ WIRING HARNESS</td>
</tr>
<tr>
<td>2</td>
<td>UPPER ELEMENT</td>
</tr>
<tr>
<td>3</td>
<td>ELEMENT GASKET</td>
</tr>
<tr>
<td>4</td>
<td>ELECTRONIC THERMOSTAT (ET)</td>
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<tr>
<td>5</td>
<td>ACCESS DOOR</td>
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<td>6</td>
<td>LOWER ELEMENT</td>
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<tr>
<td>7</td>
<td>DRAIN VALVE</td>
</tr>
<tr>
<td>8</td>
<td>TEMPERATURE AND PRESSURE RELIEF VALVE</td>
</tr>
<tr>
<td>9</td>
<td>JUNCTION BOX COVER</td>
</tr>
<tr>
<td>10</td>
<td>DIP TUBE (INCLUDES NIPPLE AND HEAT TRAP)</td>
</tr>
<tr>
<td>11</td>
<td>ANODE ROD</td>
</tr>
<tr>
<td>12</td>
<td>THERMISTOR SENSOR</td>
</tr>
<tr>
<td>13</td>
<td>SMART GRID WIRE HARNESS ASSEMBLY</td>
</tr>
</tbody>
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