

Solar Storage Tank Water Heater Installation Instructions and Use & Care Guide

To obtain technical, warranty or service assistance during or after the installation of this solar storage tank water heater, reference the phone number on the warranty sheet that ships with the water heater.

When calling for assistance, please have the following information ready:

1. Model number
2. Product number
3. Serial number
4. Date of installation
5. Place of Purchase

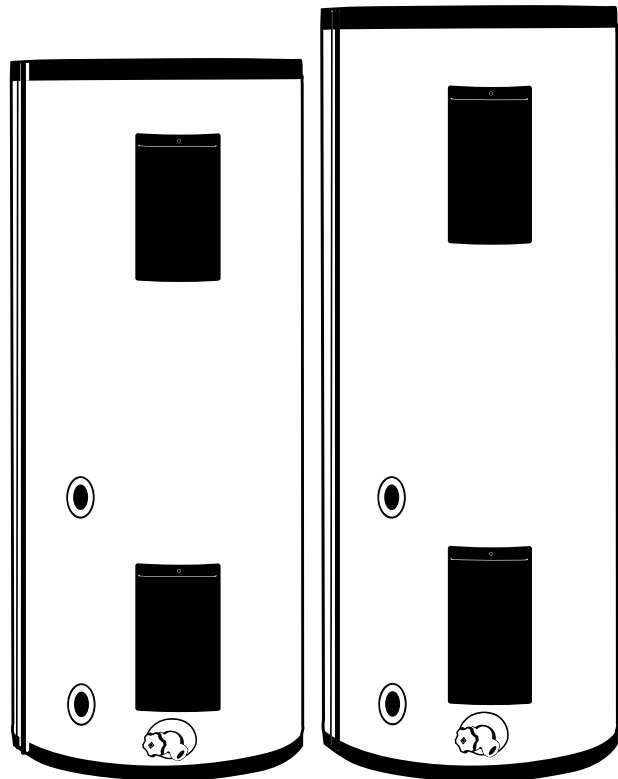


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LOW LEAD
COMPLIANT

WATER HEATER SAFETY

Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol.

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word "DANGER" or "WARNING." These words mean:

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what can happen if the instructions are not followed.

Important Safety Instructions

CAUTION: Hydrogen gas is produced in a hot water system served by this heater that has not been used for a long period of time (2 weeks or more). Hydrogen gas is extremely flammable. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. When hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. There should be no smoking or open flame near the faucet at the time it is open.

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 a chemical 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.

This product is certified to comply with a maximum weighted average of 0.25% lead content as required in some areas.

INSTALLING YOUR WATER HEATER

Consumer Information

This solar storage tank water heater should be installed in accordance with the local code authority having jurisdiction, the power company or electric utility, and this installation manual. In the absence of local code requirements, follow the regulations set forth in the current edition of The National Electric Code, NFPA 70. The National Electric Code is available from the following:

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269

American National Standards Institute
1430 Broadway
New York, NY 10018

Check your phone listings for the local authorities having jurisdiction over your installation.

Consumer Responsibilities

This manual has been prepared to acquaint you with the installation, operation and maintenance of your solar storage tank water heater and to provide important safety information in these areas.

We urge you to read all of the instructions thoroughly before attempting the installation or operation of this solar storage tank water heater. This manual should be kept for future reference.

The manufacturer of this solar storage tank water heater will not be liable for any damages caused by failure to comply with the installation and operating instructions outlined in this manual.

If you lack the necessary skills required to properly install this solar storage tank water heater or you have difficulty following the directions, you should not proceed but have a qualified person perform the installation of this solar storage tank water heater.

Examples of a qualified person include: licensed plumbers, authorized gas company personnel, and authorized service personnel.

Massachusetts code requires this solar storage tank water heater to be installed in accordance with Massachusetts 248-CMR 2.00: State Plumbing Code and 248-CMR 5.00.

A data plate identifying your solar storage tank water heater can be found adjacent to the element door. When referring to your solar storage tank water heater always have the information listed on the data plate readily available.

Retain your original receipt as proof of purchase.

Unpacking the Water Heater

WARNING

Excessive Weight Hazard

Use two or more people to move and install water heater.

Failure to do so can result in back or other injury.

Removing Packaging Materials

IMPORTANT: Do not remove any permanent instructions, labels, or the data label from either the outside of the solar storage tank water heater or on the inside of solar storage tank water heater panels.

- Remove exterior packaging and place installation components aside.
- Inspect all parts for damage prior to installation and start-up.
- Completely read all instructions before attempting to assemble and install this product.
- After installation, dispose of/recycle all packaging materials.

Location Requirements

Site location

Select a location near the center of the water piping system. The solar storage tank water heater must be installed indoors and in a vertical position on a level surface.

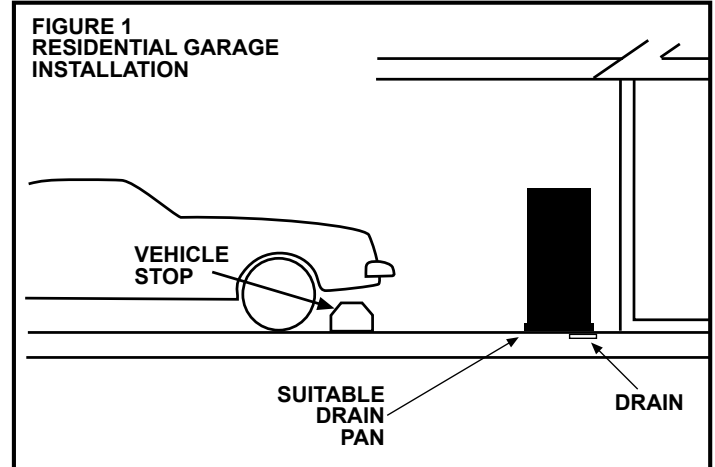
The solar storage tank water heater should be located in an area not subject to freezing temperatures. Solar storage tank water heaters located in unconditioned spaces (i.e., attics, basements, etc.) may require the water piping and drain piping to be insulated to protect against freezing. The drain and controls must be easily accessible for operation and service.

Keep combustibles such as boxes, magazines, clothes, etc., away from the solar storage tank water heater area.

This solar storage tank water does not have sufficient capacity for use with a spa or hot tub.

NOTE: Local codes and requirements in your area may require the installation of your solar storage tank water to be accomplished in a way such that the bottom element is elevated from the floor at least 18 inches.

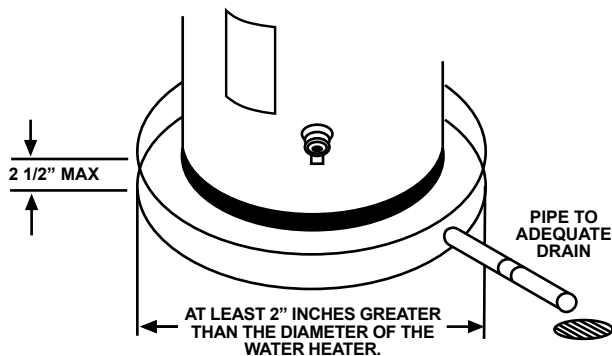
NOTE: The solar storage tank water heater shall be located so it is not subject to physical damage by moving vehicles or area flooding.



State of California

NOTE: For California installation, this solar storage tank water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. Correct installation procedure instructions may be obtained from California's Office of the State Architect, 1102 Q street, Suite 5100, Sacramento, CA 95811. Instructions can also be downloaded to your computer at www.dsa.dgs.ca.gov/Pubs.

IMPORTANT: The solar storage tank water should be located in an area where leakage of the tank or connections will not result in damage to the area adjacent to the solar storage tank water or to lower floors of the structure. Due to the normal corrosive action of the water, the tank will eventually leak after an extended period of time. Also any external plumbing leak, including those from improper installation, may cause early failure of the tank due to corrosion if not repaired. If the owner/operator is uncomfortable with making the repair a qualified person should be contacted. A suitable drain pan should be installed under the solar storage tank water as shown below, to help protect the property from damage which may occur from condensate formation or leaks in the piping connections or tank. The drain pan must limit the water level to a maximum depth of 2-1/2 inches and be two inches wider than the heater and piped to an adequate drain. Locate the solar storage tank water near a suitable indoor drain. Outside drains are subject to freezing temperatures which can obstruct the drain line. The piping should be at least 3/4" ID and pitched for proper drainage. Under no circumstance will the manufacturer or seller of this solar storage tank water be held liable for any water damage which is caused by your failure to follow these instructions.



Electrical Requirements

⚠ WARNING



Electric Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

⚠ WARNING



Fire Hazard

Use proper size solid copper wire.

Use a UL listed or CSA approved strain relief.

Connect ground wire to green ground screw.

Failure to do so can result in death, fire, or electrical shock.

If you lack the necessary skills required to properly install the electrical wiring to this solar storage tank water heater, do not proceed but have a qualified electrician perform the installation.

When making the electrical connections, always make sure:

- The electrical supply has the proper overload fuse or breaker protection.
- Wire sizes and connections comply with all applicable codes.
- Wiring is enclosed in approved conduit (if required by local codes).
- The solar storage tank water heater and electrical supply are properly grounded.

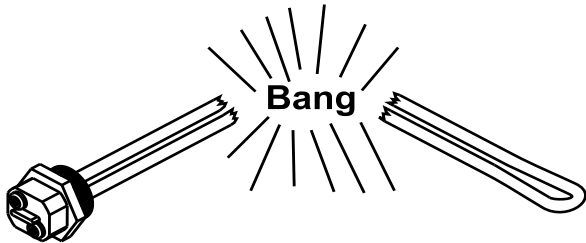
Important: Do not use an extension cord to supply power to this solar storage tank water heater. Be sure the power supply is completely grounded before making connections.

Figures 4, 5, and 6 are provided as reference drawings for the 120/240v 2-wire models only. Always reference the wiring diagram located on the solar storage tank water heater for the correct electrical connections and connect the electrical supply to the solar storage tank water heater in accordance with local utility requirements and codes.

When installing the electrical wiring to the solar storage tank water heater:

1. Be sure tank is completely filled with water before making any electrical connections. (See Figure 2)

**FIGURE 2
HEATING ELEMENT**



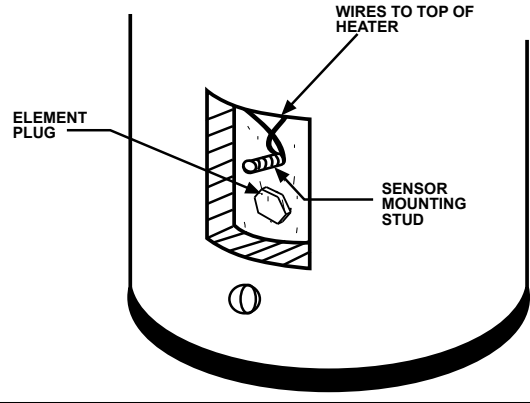
Notice: Applying electrical power to elements that are not submerged in water will destroy them. The manufacturer will not warranty any elements damaged in this manner.

2. Disconnect the electric power.
3. Loosen the screw holding the junction box cover to the top of the solar storage tank water heater and set aside.
4. Connect the electrical supply to the solar storage tank water heater in accordance with local utility requirements and codes.
A standard 1/2 inch opening has been made in the junction box for conduit connections.
5. Connect ground wire to green ground screw in the junction box of the solar storage tank water heater. Reinstall the junction box cover.

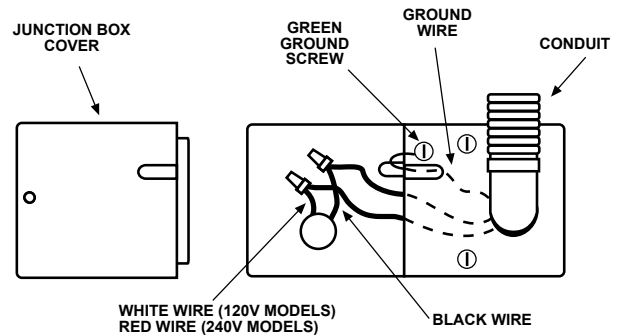
Sensor (Furnished by Installer)

Wires are provided from the sensor mounting stud to the top of the solar storage tank. Attach the tank sensor to these wires and mount the sensor to the solar storage tank using the stud provided. The stud is located behind the lower electrical access cover (See Figure 3). Connect the two wires that exit through the top of the solar storage tank enclosure to the solar control. These wires are designed to be connected to an NEC CLASS II circuit only.

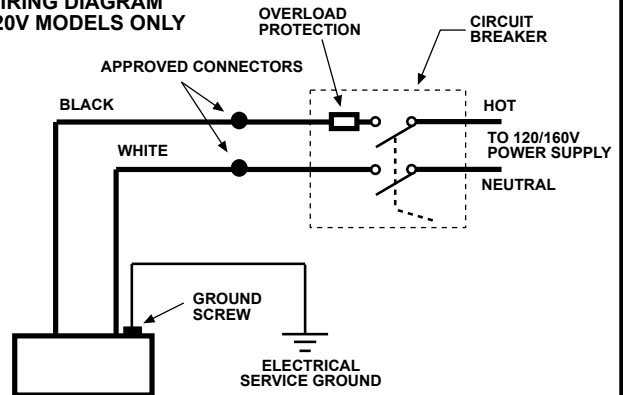
**FIGURE 3
SENSOR MOUNTING STUD**



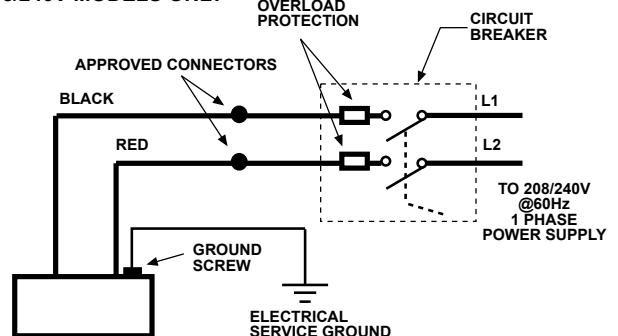
**FIGURE 4
120/240V 2-WIRE MODELS**



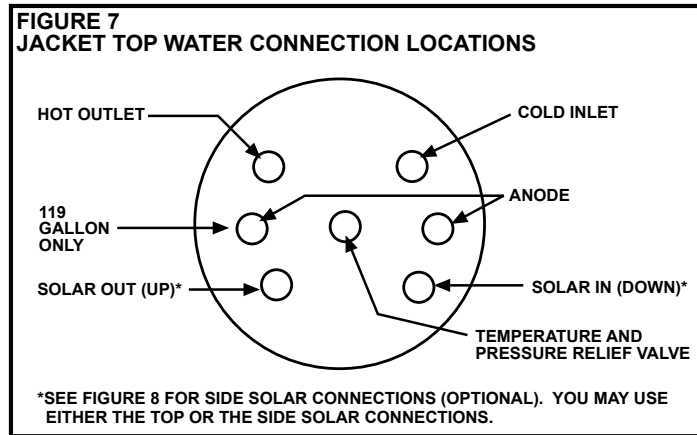
**FIGURE 5
WIRING DIAGRAM
120V MODELS ONLY**



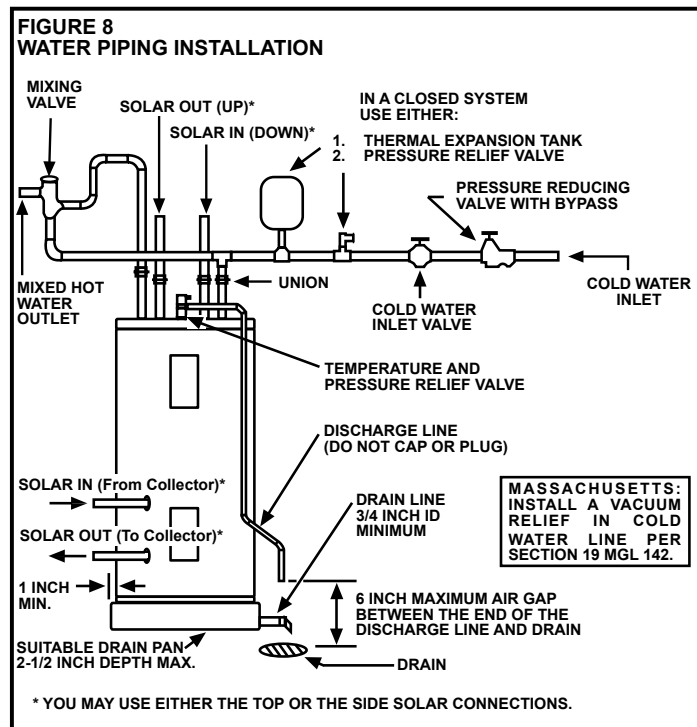
**FIGURE 6
WIRING DIAGRAM
208/240V MODELS ONLY**



Water System Piping



Piping, fittings, and valves should be installed according to the installation drawing (Figure 8). If the indoor installation area is subject to freezing temperatures, the water piping must be properly insulated.



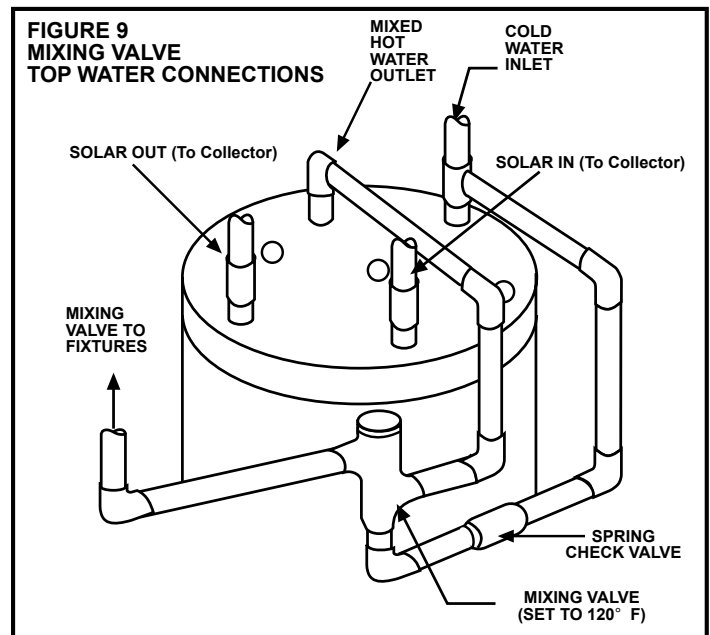
The water supply pressure should not exceed 80 psi. If this occurs, a pressure reducing valve with a bypass should be installed in the cold water inlet line. This should be placed on the supply to the entire house in order to maintain equal hot and cold water pressures.

IMPORTANT:

- Heat must not be applied to the water fittings on the heater as they may contain nonmetallic parts. If solder connections are used, solder the pipe to the adapter before attaching the adapter to the hot and cold water fittings.
- Always use a good grade of joint compound and be certain that all fittings are tight.

Piping Installation

1. Install the water piping and fittings as shown in Figure 8. Connect the cold water supply (3/4" NPT) to the fitting marked "Cold Water In". Connect the hot water supply (3/4" NPT) to the fitting marked "Hot Water Out". **IMPORTANT:** Some models may contain energy saving heat traps to prevent the circulation of hot water within the pipes. Do not remove these inserts.
2. The installation of unions in both the hot and cold water supply lines are recommended for ease of removing the solar storage tank water heater for service or replacement.
3. The manufacturer of this solar storage tank water heater recommends installing a mixing valve or an anti-scald device in the domestic hot water line as shown in Figure 9. These valves reduce the point-of-use temperature of the hot water by mixing cold and hot water and are readily available. Contact a licensed plumber or the local plumbing authority. Install a spring check valve in the cold water inlet to the mixing valve (See Figure 9). Connect the piping that will carry the water from the solar storage tank to the solar collectors, then to the fitting marked "SOLAR OUT." Connect the return line from the solar collectors to the fitting marked "SOLAR IN." **You may use either the top connections or the side connections (see Figure 8).** **IMPORTANT:** Cap or plug the solar connections that are not used.



4. Recirculation return lines should be connected to an auxiliary solar storage tank water heater (see Figure 10, Page 7). **DO NOT** connect recirculation lines to the solar storage tank. Recirculation pumps should be controlled by a timer which will stop circulation at night or any time hot water is not being used.
5. If components in the solar control system have maximum working pressures that are lower than the maximum water supply pressure, a pressure reducing valve with an integral strainer and by-pass should be installed in a cold water supply line. The pressure

reducing valve must be adjusted to the lowest working pressure of the solar control components.

6. If installing the solar storage tank water heater in a closed water system, install an expansion tank as specified under "Closed System / Thermal Expansion."
7. Install a shut off valve in the cold water inlet line. It should be located close to the solar storage tank water heater and be easily accessible. Know the location of this valve and how to shut off the water to the heater.
8. Install a temperature and pressure relief valve and discharge line in the opening marked "T & P RELIEF VALVE". Install as specified under "Temperature and Pressure Relief Valve."
9. After piping has been properly connected to the solar storage tank water heater, open the nearest hot water faucet and allow the tank to completely fill with water. To purge the lines of any excess air and sediment, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained. Close the faucet and check all connections for leaks.

General Information

Please note the following:

DO NOT install this solar storage tank water heater with iron piping. The system should be installed only with new piping that is suitable for potable (drinkable) water such as copper, CPVC, or polybutylene. **DO NOT** use PVC water piping.

DO NOT use any pumps, valves, or fittings that are not compatible with potable water.

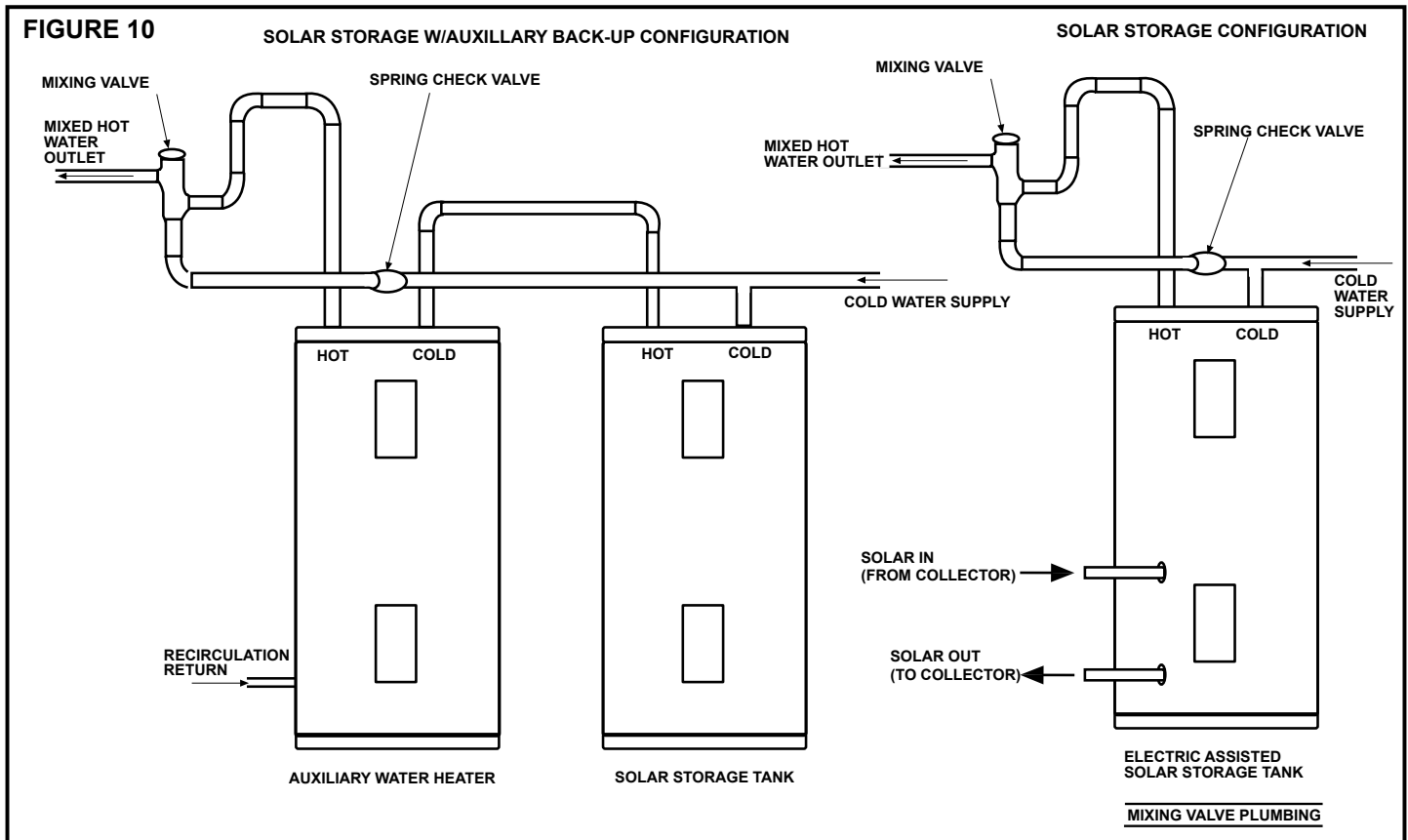
DO NOT use valves that may cause excessive restriction to water flow. Use full flow ball or gate valves only.

DO NOT use 50/50 tin-lead solder (or any lead based solder) in potable water lines. Use 95/5 tin-antimony or other equivalent material.

DO NOT tamper with the thermostat, heating elements, electrical connections, or temperature and pressure relief valve. Tampering voids all warranties. Only qualified technicians should service these components.

DO NOT use with piping that has been treated with chromate's, boiler seal, or other chemicals.

DO NOT add any chemicals to the system piping which will contaminate the potable water supply.



Closed System/Thermal Expansion

As water is heated, it expands (thermal expansion). In a closed system, the volume of water will increase. As the volume of water increases, there will be a corresponding increase in water pressure due to thermal expansion. Thermal expansion can cause premature tank failure (leakage). This type of failure is not covered under the limited warranty. Thermal expansion can also cause intermittent temperature-pressure relief valve operation: water discharged from the valve due to excessive pressure build up. The temperature-pressure relief valve is not intended for the constant relief of thermal expansion. This condition is not covered under the limited warranty.

A properly-sized thermal expansion tank should be installed on all closed systems to control the harmful effects of thermal expansion. Contact a plumbing service agency or your retail supplier regarding the installation of a thermal expansion tank.

Do not plug the temperature and pressure relief valve.

Solar Control Systems


Solar control systems used with this solar storage tank must not allow temperatures in the tank to exceed 180°F and must protect the system from freeze damage when the temperatures approach freezing.

This solar storage tank does not contain a heat exchanger; therefore, only potable (drinkable) water may be allowed to enter the tank. If this solar storage tank is installed in a system using any heat transfer fluid other than potable water, a separate heat exchanger must be installed. Heat exchangers used in conjunction with this solar storage tank must provide adequate protection of contamination of potable water by toxic fluids used in heat exchange systems.

If this water heater is used as a solar storage heater or as a backup for the solar storage system, the water supply temperatures to the water heater tank may be in excess of 120°F. A mixing valve or other temperature limiting device should be installed in the water supply line to limit the supply temperature to 120°F.

Temperature and Pressure Relief Valve

! WARNING



Explosion Hazard

If the temperature and pressure relief valve is dripping or leaking, have a qualified person replace it.

Examples of a qualified person include:

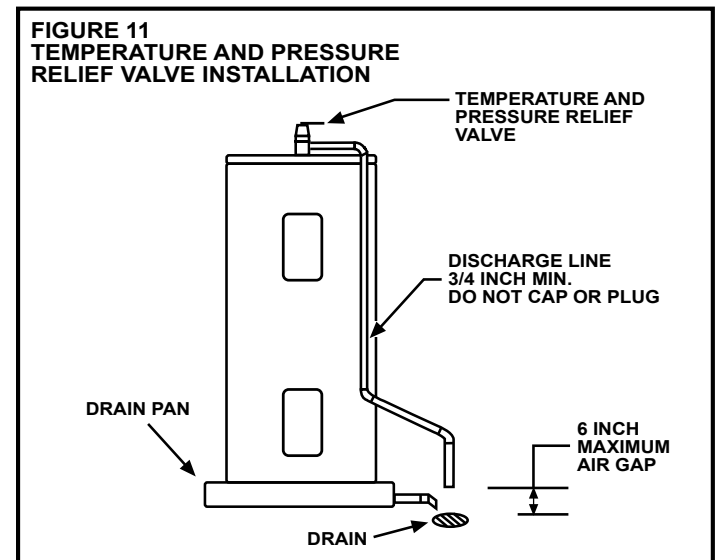
licensed plumbers, authorized gas company personnel, and authorized service personnel.

Do not plug valve.

Do not remove valve.

Failure to follow these instructions can result in death or explosion.

For protection against excessive pressures and temperatures, a temperature and pressure relief valve must be installed in the opening marked "T & P RELIEF VALVE" (See Figure 11).



Caution: To reduce the risk of excessive pressures and temperatures in this solar storage tank water heater, install temperature and pressure relief protective equipment required by local codes, but no less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of the production of listed equipment or materials, as meeting the requirements for Relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22 - current edition.

This valve must be marked with the maximum set pressure not to exceed the marked maximum working pressure of the solar storage tank water heater. Install the valve into an opening provided and marked for this purpose in the solar storage tank water heater, and orient it or provide tubing so that any discharge from the valve exits only within 6 inches above, or at any distance below, the structural floor, and does not contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstance.

Important: Only a new temperature and pressure relief valve should be used with your solar storage tank water heater. Do not use an old or existing valve as it may be damaged or not adequate for the working pressure of the new solar storage tank water heater. Do not place any valve between the relief valve and the tank.

The Temperature & Pressure Relief Valve:

- Must not be in contact with any electrical part.
- Must be connected to an adequate discharge line.
- Must not be rated higher than the working pressure shown on the data plate of the solar storage tank water heater.

The Discharge Line:

- Must not be smaller than the pipe size of the relief valve or have any reducing coupling installed in the discharge line.
- Must not be capped, blocked, plugged or contain any valve between the relief valve and the end of the discharge line.
- Must terminate a maximum of six inches above a floor drain or external to the building. In cold climates, it is recommended that the discharge pipe be terminated at an adequate drain inside the building.
- Must be capable of withstanding 250°F (121°C) without distortion.
- Must be installed to allow complete drainage of both the valve and discharge line.

Installation Check List

Solar storage tank water heater Location

- Centrally located with the water piping system.
- Located indoors and in a vertical position. Protected from freezing temperatures.
- Provisions made to protect the area from water damage. Suitable drain pan installed and piped to an adequate drain.
- Sufficient room to service the solar storage tank water heater.

Water System Piping

- Temperature and pressure relief valve properly installed with a discharge line run to an open drain and protected from freezing.
- All piping properly installed and free of leaks.
- Heater completely filled with water. (See Figure 2)
- Closed system pressure buildup precautions installed.
- Mixing valve installed per manufacturer's instructions.

Electrical Connections

- Wiring and connections comply with all applicable codes.
- Solar storage tank water heater and electrical supply are properly grounded.
- Proper overload fuse or circuit breaker protection installed.

OPERATING YOUR WATER HEATER

Before Using

1. Make sure the solar storage tank water heater has been properly installed. See “Installing Your Water Heater” section.
2. Completely fill the tank with water. (See Figure 2)
3. After the solar storage tank water heater tank is completely filled with water, connect electrical power to the solar storage tank water heater.
4. Read the “Water Temperature Regulation” section of this manual. If the instructions are not clear, contact a qualified person.
5. Adjust the thermostat to the desired temperature setting as described under “Adjusting the Thermostat/High Limit Control” section.

IMPORTANT: Do not attempt to operate this solar storage tank water heater if the thermostat(s), or surrounding insulation has been exposed to water in any way. Immediately call a qualified person to inspect the solar storage tank water heater and replace any thermostat or insulation that has been exposed to water.

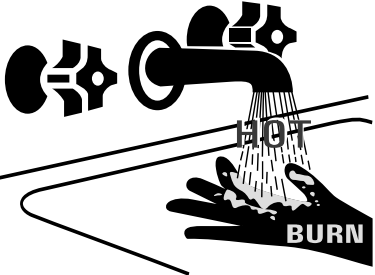
Do not attempt to repair these parts. Solar storage tank water heaters subjected to flood conditions or any time the thermostat(s) have been submerged in water require replacement of the entire solar storage tank water heater.

Safety Shut-off

This solar storage tank water heater is designed to automatically shut-off in the event that the water temperature exceeds 170°F or 77°C (190°F or 88°C in LDCE Models). A high limit control switch is used to shut off the power to the elements if the water temperature exceeds 170°F or 77°C (190°F or 88°C in LDCE Models). The high limit control can be reset by firmly pushing in the red reset button located on the thermostat. Follow the instructions under “Adjusting the Thermostat/High Limit Control”, section to properly reset the high limit control. If the high limit control switch continues to shut-off the water heater contact a qualified person for service.

Water Temperature Regulation

⚠ WARNING



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

Feel water before bathing or showering.

Temperature limiting valves are available.

The thermostat is adjusted to a temperature setting of 120°F or lower when it is shipped from the factory. Water temperature can be regulated by adjusting the thermostat to the preferred setting as shown in “Adjusting the Thermostat /High Limit Control.” **The preferred starting point is 120°F. There is a hot water scald potential if the thermostat is set too high.**

IMPORTANT: Adjusting the thermostat past 120°F on the thermostat will increase the risk of scald injury in the times shown below.

Water Temperature °F	Time for 1st Degree Burn (Less Severe Burns)	Time for Permanent Burns 2nd & 3rd Degree (Most Severe Burns)
110	(normal shower temp.)	
116	(pain threshold)	
116	35 minutes	45 minutes
122	1 minute	5 minutes
131	5 seconds	25 seconds
140	2 seconds	5 seconds
149	1 second	2 seconds
154	instantaneous	1 seconds

(U.S. Government Memorandum, C.P.S.C., Peter L. Armstrong, Sept. 15, 1978)

NOTE: During low demand periods when hot water is not being used, a lower thermostat setting will reduce energy losses and may satisfy your normal hot water needs. If hot water use is expected to be more than normal, a higher thermostat setting may be required to meet the increased demand.

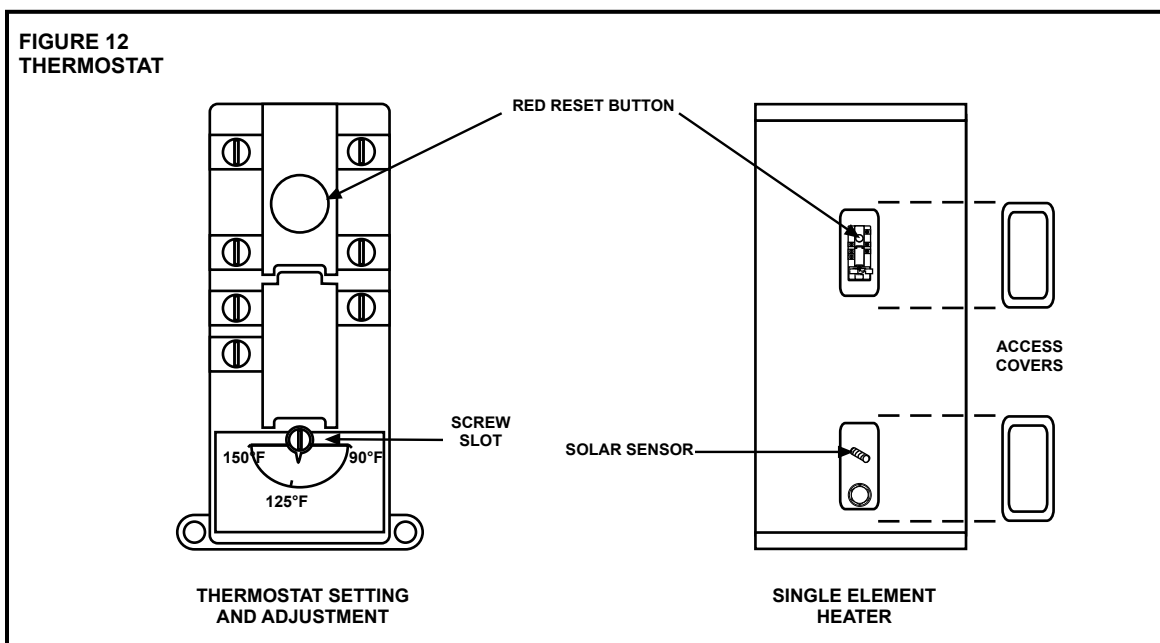
When leaving your home for extended periods (vacations, etc.) turn the thermostat to its lowest setting. This will maintain the water at low temperatures with minimum energy losses and prevent the tank from freezing during cold weather.

Adjusting the Thermostat/High Limit Control

This water heater is equipped with one or more adjustable temperature regulating thermostats and a manual reset high limit control. The following procedures must be performed when changing the temperature of the stored water or resetting the high limit control.

Before attempting to adjust the thermostat, make sure that you read and understand the “Water Temperature Regulation” section. Any other adjustments must be made by qualified service personnel.

1. Disconnect the electric power.
2. Remove the access cover and fold up the insulation from the thermostat. Do not remove the plastic cover.
3. Using a screwdriver to adjust the thermostat pointer, set the thermostat to the desired water temperature. Be sure the RED reset button (High Limit Control) is pushed in. If needed, push in firmly to reset.
4. Fold the insulation down, making sure the thermostat is well covered. Replace the access cover.
5. Reconnect power.



Operational Conditions

Anode Rod/Water Odor

Each water heater contains at least one anode rod, which will slowly deplete (due to electrolysis) prolonging the life of the water heater by protecting the glass-lined tank from corrosion. Adverse water quality, hotter water temperatures, high hot water usage, hydronic heating devices, and water softening methods can increase the rate of anode rod depletion. Once the anode rod is depleted, the tank will start to corrode, eventually developing a leak.

Certain water conditions will cause a reaction between the anode rod and the water. The most common complaint associated with the anode rod is a “rotten egg smell” produced from the presence of hydrogen sulfide gas dissolved in the water. **IMPORTANT:** Do not remove this anode rod permanently as it will void any warranties. A special anode rod may be available if water odor or discoloration occurs. **NOTE:** This anode rod may reduce but not eliminate water odor problems. The water supply system may require special filtration equipment from a water conditioning company to successfully eliminate all water odor problems.

Artificially softened water is exceedingly corrosive because the process substitutes sodium ions for magnesium and calcium ions. The use of a water softener may decrease the life of the water heater tank.

The anode rod should be inspected after a maximum of three years and annually thereafter until the condition of the anode rod dictates its replacement. **NOTE:** Artificially softened water requires the anode rod to be inspected annually.

The following are typical (but not all) signs of a depleted anode rod:

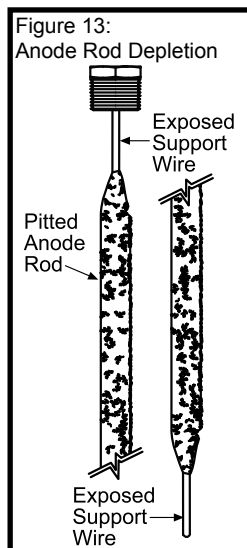
- The majority of the rods diameter is less than 3/8”.
- Significant sections of the support wire (approx. 1/3 or more of the anode rod’s length) are visible.

If the anode rod shows signs of either or both it should be replaced.

NOTE: Whether reinstalling or replacing the anode rod, check for any leaks and immediately correct if found.

In replacing the anode:

1. Turn off power to the water heater.
2. Shut off the water supply and open a nearby hot water faucet to depressurize the water tank.
3. Drain approximately 5 gallons of water from tank (Refer to the “Draining and Flushing” section for proper procedures). Close drain valve.
4. Remove old anode rod.



5. Use Teflon® tape or approved pipe sealant on threads and install new anode rod.
6. Turn on water supply and open nearby hot water faucet to purge air from water system. Check for any leaks and immediately correct any if found.
7. Restart the water heater as directed under the “Operating Your Water Heater” section. See the “Repair Parts Illustration” section for anode rod location.

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Water Heater Sounds

During the normal operation of the water heater, sounds or noises may be heard. These noises are common and may result from the following:

1. Normal expansion and contraction of metal parts during periods of heat-up and cool-down.
2. Sediment buildup in the tank bottom will create varying amounts of noise and may cause premature tank failure. Drain and flush the tank as directed under the “Draining and Flushing” section.

Stratification

Temperature stratification may occur as water from the solar collectors flows into the water heater tank. Since this water may be hotter than the thermostat setting, the temperature at the hot water outlet may be higher than expected. An anti-scald device is recommended in the hot water supply line to reduce the risk of scald injury.

MAINTENANCE OF YOUR WATER HEATER

Temperature and Pressure Relief Valve

⚠ WARNING



Explosion Hazard

If the temperature and pressure relief valve is dripping or leaking, have a qualified person replace it.

Examples of a qualified person include: licensed plumbers, authorized gas company personnel, and authorized service personnel.

Do not plug valve.

Do not remove valve.

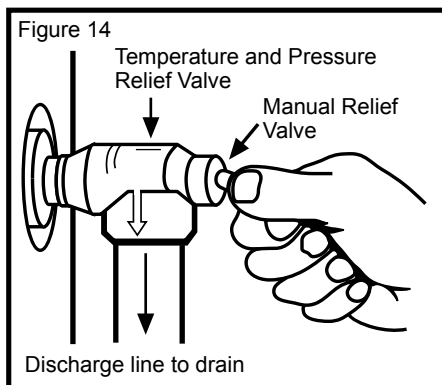
Failure to follow these instructions can result in death or explosion.

Manually operate the temperature and pressure relief valve at least once a year to make sure it is working properly.

To prevent water damage, the valve must be properly connected to a discharge line which terminates at an adequate drain.

Standing clear of the outlet (discharged water may be hot), slowly lift and release the lever handle on the

temperature and pressure relief valve to allow the valve to operate freely and return to its closed position. If the valve fails to completely reset and continues to release water, immediately disconnect the electrical power, close the cold water inlet valve and call a qualified person.



Draining and Flushing

The water heater should be drained if being shut down during freezing temperatures. It is recommended that the tank be drained, and flushed every 6 months to remove sediment which may buildup during operation. To drain the tank perform the following steps:

1. Turn off power to the water heater.
2. Open a hot water faucet until water is no longer hot.
3. Close the cold water inlet valve.
4. Connect a hose to the drain valve and terminate it to an adequate drain or external to the building.
5. Open the water heater drain valve and the nearest hot water faucet. Allow all the water to drain from the tank. Flush the tank with water as needed to remove sediment.
6. Close the drain valve and completely refill the water heater tank.

CAUTION: Do not turn on power to the water heater unless it is completely filled with water. To ensure that the tank is full, open a hot water faucet and allow the water to run until the air is purged and the water flows uninterrupted from the faucet.

7. Reconnect electrical power to the water heater.

If the water heater is going to be shut down for an extended period, the drain valve should be left open.

Heating Element Replacement

⚠ WARNING



Electric Shock Hazard

Disconnect power before servicing.

Replace all parts and panels before operating.

Failure to do so can result in death or electrical shock.

Replacement heating elements must be of the same style and voltage/wattage rating as the ones presently in the water heater. This information can be found on the flange or terminal block of the element or on the water heater data plate.

1. Disconnect the electrical power to the water heater.
2. Drain the water heater as directed in the "Draining and Flushing" section.
3. Remove the access cover. Fold up the insulation from the heater element. Remove the plastic thermostat cover from the thermostat making sure to disengage the attachment point from the thermostat.
4. Disconnect the electrical wires from the heating element by loosening the screws (Figure 15). Remove the screw-in element by turning the element counterclockwise with a 1-1/2 inch socket wrench. Remove the existing gasket.

Figure 15

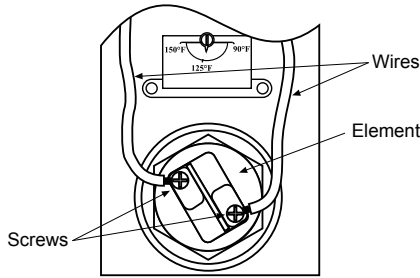
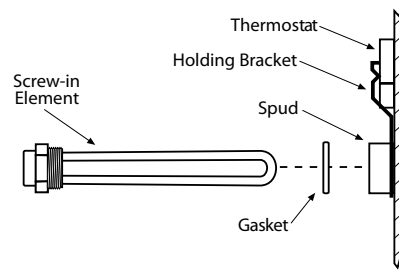


Figure 16



5. Clean the area where the gasket fits to the tank. If you are replacing the bottom element, remove any accumulated sediment on the bottom of the tank.
6. Make sure the replacement element has the correct voltage and wattage rating by matching it to the rating plate on the water heater. Position the new gasket on the element and insert it into the water heater tank (Figure 16). Tighten the element until it is secure by turning it clockwise with a 1-1/2 inch socket wrench.
7. Close the drain valve. Open the nearest hot water faucet and allow the tank to fill completely with water.

To purge the lines of any excess air and sediment, keep the hot water faucet open for 3 minutes after a constant flow of water is obtained.

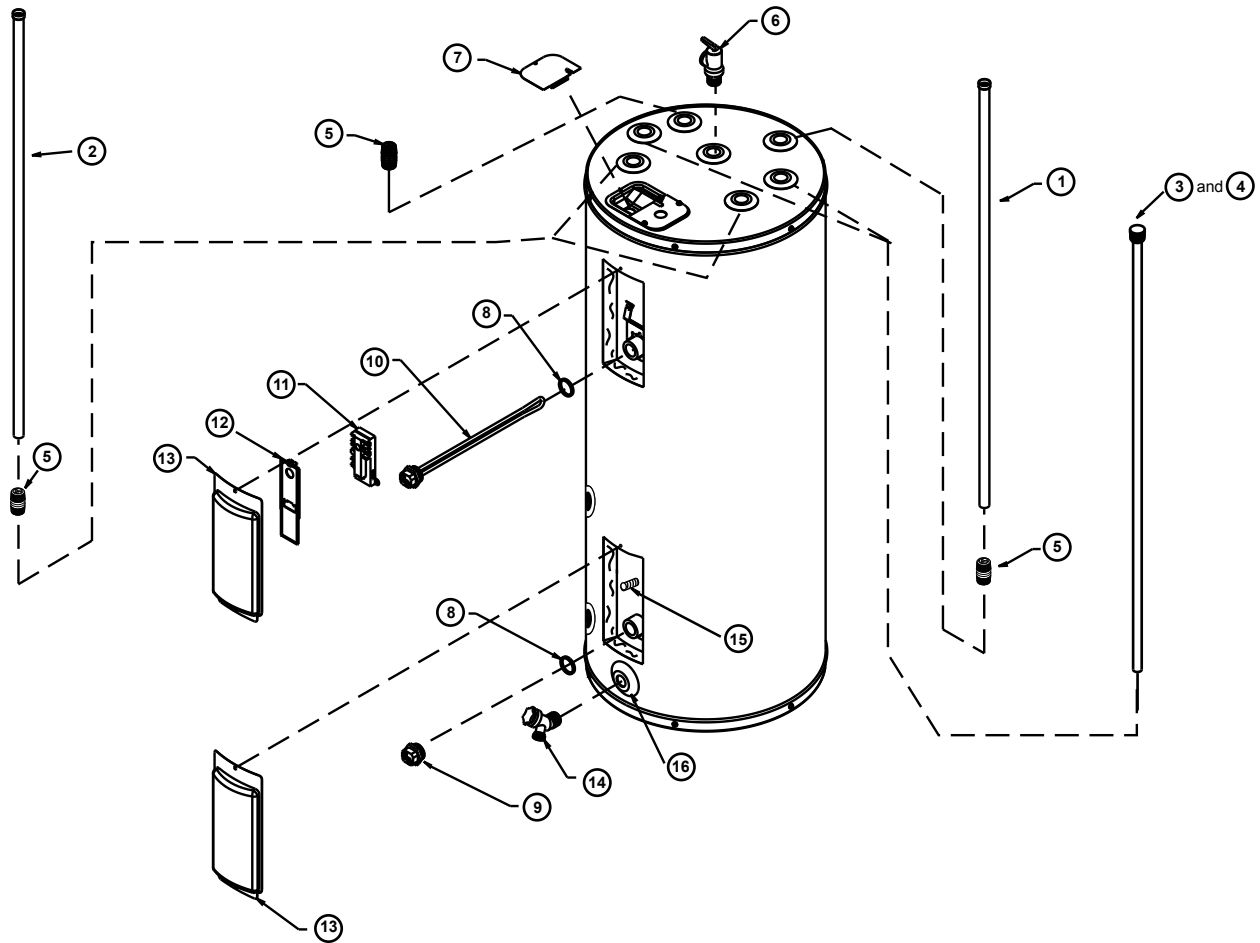
8. Check for leaks around the element.
9. Reconnect the electrical wires to the element and securely tighten the screws. Replace the plastic thermostat cover making sure the attachment points are engaged on the thermostat.
10. Replace the access cover.
11. Make certain the tank is filled with water. Applying electric current to heater elements not submerged in water will destroy them.
12. Reconnect electrical power to the water heater.

TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
NO HOT WATER	<ol style="list-style-type: none"> 1. No power to heater 2. High Temperature Limit Switch open 3. Non-Functioning thermostat 	<ol style="list-style-type: none"> 1. Turn on electrical switch. Check for blown fuses or tripped breaker 2. Reset. Check for source of trouble and correct 3. Replace thermostat
INSUFFICIENT HOT WATER	<ol style="list-style-type: none"> 1. Non-Functioning thermostat 2. Non-Functioning element 3. Improper calibration 4. Thermostats set too low 5. Sediment or lime in tank 6. Heater too small for job 7. Wrong piping connections 8. Leaking faucets 9. Wasted hot water 10. Long runs of exposed pipe 11. Hot water piping on outside wall 	<ol style="list-style-type: none"> 1. Replace thermostat 2. Replace element 3. Replace thermostat 4. Set thermostats to desired temperature 5. Drain/flush tank. Provide water treatment if needed 6. Install adequately-sized water heater 7. Correct piping 8. Repair faucets 9. Advise customer 10. Insulate piping 11. Insulate piping
HIGH OPERATION COSTS	<ol style="list-style-type: none"> 1. Improper Calibration 2. Thermostats set too high 3. Sediment or lime in tank 4. Heater too small for job 5. Wrong piping connections 6. Leaking faucets 7. Wasted hot water 8. Long runs of exposed piping 9. Hot water piping in exposed wall 	<ol style="list-style-type: none"> 1. Replace thermostats 2. Set thermostat to desired setting 3. Drain/flush tank. Provide water treatment if needed 4. Install adequately-sized water heater 5. Correct piping 6. Repair faucets 7. Advise customer 8. Insulate piping 9. Insulate piping
SLOW HOT WATER RECOVERY	<ol style="list-style-type: none"> 1. Non-Functioning element 	<ol style="list-style-type: none"> 1. Replace element
DRIP FROM RELIEF VALVE	<ol style="list-style-type: none"> 1. Excessive water pressure 2. Closed system 	<ol style="list-style-type: none"> 1. Check system water pressure. verify 50-60 psi. Use appropriate pressure reducing valve to set correct water pressure. Check Thermal expansion tank. 2. See "Closed System/Thermal Expansion" section
THERMOSTAT DOES NOT SHUT OFF	<ol style="list-style-type: none"> 1. Non-Functioning thermostat 2. Improper calibration 	<ol style="list-style-type: none"> 1. Replace thermostat 2. Replace thermostat
WATER ODOR	<ol style="list-style-type: none"> 1. Sulfides in the water 	<ol style="list-style-type: none"> 1. See "Anode Rod/Water Odor" section

NOTE: The chart above only applies to the solar storage tank water heater. This storage tank is only one part of the total system. If the problem does not originate with the storage tank, the chart above cannot isolate the problem. In such cases, a qualified solar technician should troubleshoot the system.

REPAIR PARTS ILLUSTRATION



REPAIR PARTS

Repair parts may be ordered through your plumber, local distributor, home improvement center, or by calling the phone number on the warranty sheet that ships with the water heater. When ordering repair parts always give the following information:

1. Model, serial and product number
2. Item number
3. Parts description

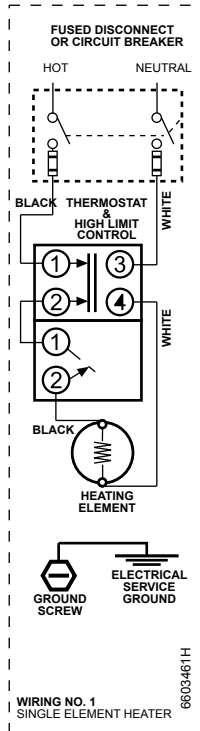
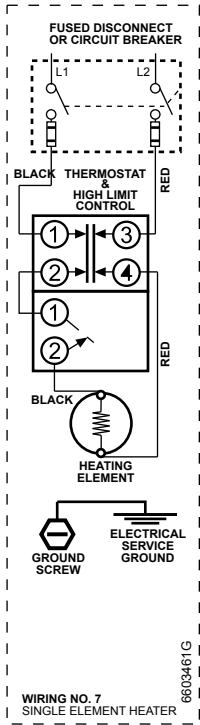
REPAIR PARTS LIST

LEGEND

- ◆ Not supplied on some models
- Electrical Assisted only

ITEM NO.	PARTS DESCRIPTION
1	COLD INLET NIPPLE/DIPTUBE
2	SOLAR INLET/OUTLET DIPTUBE
3	ANODE ROD (65 & 80 GALLON 1 ANODE)
4	ANODE ROD (120 GALLON 2 ANODES)
5	NIPPLE
6	TEMPERATURE AND PRESSURE RELIEF VALVE ◆
7	JUNCTION BOX COVER
8	ELEMENT GASKET
9	ELEMENT PLUG
10	ELEMENT ■
11	THERMOSTAT ■
12	THERMOSTAT COVER ■
13	ELECTRICAL ACCESS COVER
14	DRAIN VALVE
15	SENSOR STUD
16	FLANGE

THERMOSTAT WIRING DIAGRAM



BRANCH CIRCUIT SIZING GUIDE						
Based on N.E.C. NFPA NO. 70 - 1999						
WATT LOAD	Recommend Over Current Protection Rating			Copper Wire Size AWG Based on N.E.C. Table 310 - 16 (60°C)		
	120 V	208 V	240 V	120 V	208 V	240 V
1500*	15	15	15	12	14	14
2000	20	15	15	10	14	14
2500	30	15	15	10	14	14
3000	30	20	15	8	12	12
3500	-	20	20	-	10	12
4000	-	25	20	-	10	10
4500	-	30	25	-	10	10
5000	-	30	30	-	10	10
5500	-	35	30	-	8	10
6000	-	35	30	-	8	8
9000	-	50	45	-	6	6
12000	-	70	60	-	3	4

* Wattages less than 1500 may be wired 14 gage with 15 amp protection

Important: Read and understand the *Electrical Requirements* section on page 4.