SOLAR ELECTRIC WATER HEATER & SOLAR STORAGE UNIT

A Spanish language version of these instructions is available by contacting the manufacturer listed on the rating plate.
La version espanla de estas instrucctions se puede obtener al escribirle a la fábrica cuyo nombre aparece in la placa de especificaciones.

INSTALLATION & OPERATING INSTRUCTION MANUAL

THE WARRANTY ON THIS WATER HEATER/STORAGE UNIT IS IN EFFECT ONLY WHEN THE WATER HEATER/STORAGE UNIT IS INSTALLED AND OPERATED IN ACCORDANCE WITH LOCAL CODES AND THESE INSTRUCTIONS. THE MANUFACTURER OF THIS WATER HEATER/STORAGE UNIT WILL NOT BE LIABLE FOR ANY DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THESE INSTRUCTIONS. READ THESE INSTRUCTIONS THOROUGHLY BEFORE STARTING.

For your family's comfort, safety and convenience, we recommend this water heater/storage unit be installed and serviced by a plumbing professional.

238-44965-00H REV 10/14

CONGRATULATIONS!

You have just purchased one of the finest water heaters/storage units on the market today!

This installation and operating instruction manual will explain, in detail, the installation and maintenance of your new Solar Electric Water Heater/Storage Unit. It is strongly recommended that you contact a plumbing professional for the installation of this water heater/storage unit.

You should carefully read this manual, as well as the enclosed warranty, and refer to it when questions arise. If you have any specific questions concerning your warranty, please consult the plumbing professional from whom your water heater/storage unit was purchased. For your records we recommend that you write the model, serial number and installation date of your water heater/storage unit in the maintenance section in the back of this manual.

This manual should be kept with the water heater/storage unit.

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GENERAL INFORMATION

This solar electric water heater's design is certified by INTERTEK (ETL) and listed in accordance with UL 174. CETL listed in accordance with Canadian National Standard C22.2, No. 110-M90.

This water heater/storage unit must be installed in accordance with local codes. In the absence of local codes, install this water heater/storage unit in accordance with the N.E.C. Reference Book (latest edition).

The warranty for this water heater/storage unit is in effect only when the water heater/storage unit is installed, adjusted, and operated in accordance with these Installation and Operating Instructions. The manufacturer will not be held liable for damage resulting from alteration and/or failure to comply with these instructions.

This water heater/storage unit may be used independently when equipped with a heating element or as a storage unit when used in conjunction with an existing water heater or boiler.

This water heater/storage unit has been designed and certified for the purpose of heating potable water. The installation and use of this water heater/storage unit for any purpose other than the heating of potable water, may cause damage to the water heater/storage unit and create a hazardous condition and nullify the warranty.

⚠ CAUTION

Incorrect operation of this appliance may create a hazard to life and property and will nullify the warranty.

Do not use this appliance if any part has been submerged in water. The plumbing professional responsible for the installation of this water heater/storage unit should be contacted to inspect the appliance and to replace and part of the control system, including thermostat (if equipped), which has been submerged in water.

For water heaters equipped with a heating element; make sure that the rating plate on the water heater is referenced for certainty that the correct voltage is being supplied to the water heater.

⚠ DANGER

Do not store or use gasoline or other flammable, combustible, or corrosive vapors and liquids in the vicinity of this or any other appliance.

A sacrificial anode is used to extend tank life. The removal of this anode, for any reason, will nullify the warranty. In areas where water is unusually active, an odor may occur at the hot water faucet due to a reaction between the sacrificial anode and impurities in the water. If this should happen, an alternative anode may be purchased from the supplier that installed this water heater/storage unit. This alternative anode will minimize the odor while protecting the tank. Additionally, the water heater/storage unit should be flushed with appropriate dissolvers to eliminate any bacteria.

IMPORTANT

Before proceeding, please inspect the water heater/storage unit and its components for possible damage. DO NOT install any damaged components. If damage is evident, please contact the supplier where the water heater/storage unit was purchased or the manufacturer listed on the rating plate for replacement parts.

INSTALLATION

Locating the Water Heater/Storage Unit

⚠ WARNING

Water heater/storage units are heat producing appliances. To avoid damage or injury, there shall be no materials stored against the water heater/storage unit and proper care shall be taken to avoid unnecessary contact (especially by children) with the water heater/storage unit. **UNDER NO CIRCUMSTANCES SHALL FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER/STORAGE UNIT OR ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER/STORAGE UNIT.**

This water heater MUST be installed indoors out of the wind and weather.

This water heater/storage unit shall NOT be installed in any location where gasoline or flammable vapors are likely to be present, unless the installation is such to eliminate the probable ignition of gasoline or flammable vapors.

To comply with NSF requirements this water heater is to be:

a) Sealed to the floor with sealant, in a smooth and easily cleanable way, or
b) Installed with an optional leg kit that includes legs and/or extensions that provide a minimum clearance of 6” beneath the water heater.

Locating the Water Heater/Storage Unit continued-

The location where this water heater/storage unit is to be installed is of the utmost importance. Before installing this water heater/storage unit, consult the installation section of these instructions. After reading these Installation and Operating instructions, select a location for the water heater/storage unit where the floor is level and is easily accessible to a power supply and water connections. It is recommended that the water heater/storage unit be located near the center of greatest hot water usage to prevent heat loss through the pipes. **DO NOT locate the water heater/storage unit where water lines could be subjected to freezing temperatures. Locate the water heater/storage unit so that access panels and drain valves are accessible.**

Water heater/storage unit corrosion and component failure can be caused by the heating and breakdown of airborne chemical vapors. Examples of some typical compounds that are potentially corrosive are: spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride (salts), waxes and process chemicals. These materials are corrosive at very low concentration levels with little or no odor to reveal their presence.

NOTE: DAMAGE TO THE WATER HEATER/STORAGE UNIT CAUSED BY EXPOSURE TO CORROSIVE VAPORS IS NOT COVERED BY THE WARRANTY. DO NOT OPERATE THE WATER HEATER/STORAGE UNIT IF EXPOSURE HAS OR WILL OCCUR. DO NOT STORE ANY POTENTIALLY CORROSIVE COMPOUNDS IN THE VICINITY OF THE WATER HEATER/STORAGE UNIT.

This water heater/storage unit must be located in an area where leakage of the tank or water line connections and the combination temperature and pressure relief valve will not result in damage to the area adjacent to the water heater/storage unit or to lower floors of the structure. When such locations cannot be avoided, a suitable drain pan must be installed under the water heater/storage unit. The drain pan must have a minimum length and width of at least 4 in. (10.2 cm) greater than the diameter of the water heater. The drain pan, as described above, can be purchased from your plumbing professional. The drain pan must be piped to an adequate drain. The piping must be pitched for proper drainage.

Note: For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from the DSA Headquarters Office, 1102 Q Street, Suite 5100, Sacramento CA 95811.

Water Connections

Note: Before proceeding with the installation, close the main water supply valve.

After shutting the main water supply valve, open a faucet to relieve the water line pressure to prevent any water from leaking out of the pipes while making the water connections to the water heater/storage unit. After the pressure has been relieved, close the faucet. Make the proper plumbing connections between the water heater/storage unit and the plumbing system in the house. Install a shut-off valve in the cold water supply line.

⚠ CAUTION

If sweat fittings are to be used, **DO NOT** apply heat to the nipples of the water heater/storage unit. Sweat the tubing to the adapter before fitting the adapter to the water connections. It is imperative that heat is not applied to the nipples containing a plastic liner.

If this water heater/storage unit is installed in a closed water supply system, such as the one having a back-flow preventer in the cold water supply, provisions shall be made to control thermal expansion. DO NOT operate this water heater/storage unit in a closed system without provisions for controlling thermal expansion. Your water supplier or local plumbing inspector should be contacted on how to control this situation.

After installation of the water lines, open the main water supply valve and fill the water heater/storage unit. While the water heater/storage unit is filling, open several hot water faucets to allow air to escape from the water system. When a steady stream of water flows through the faucets, close them and check all water connections for possible leaks. **NEVER OPERATE THE WATER HEATER/STORAGE UNIT WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER.**

⚠ WARNING

For protection against excessive temperatures and pressure, install temperature and pressure protective equipment required by local codes, but not less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the Requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22, and the Standard CAN1-4.4 Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves. The combination temperature and pressure relief valve shall be marked with a maximum set pressure, not to exceed the maximum working pressure of the water heater/storage unit. The combination temperature and pressure relief valve shall also have an hourly rated temperature steam BTU discharge capacity not less than the hourly input rating of the water heater/storage unit.

Install the combination temperature and pressure relief valve into the opening provided and marked for this purpose on the water heater/storage unit

Note: Some models may already be equipped or supplied with a combination temperature and pressure relief valve. Verify that the combination temperature and pressure relief valve complies with local codes. If the combination temperature and pressure relief valve does not comply with local codes, replace it with one that does. Follow the installation instructions above on this page.

Install a discharge line so that water discharged from the combination temperature and pressure relief valve will exit within six (6) inches above, or any distance below the structural floor and cannot contact any live electrical part. The discharge line is to be installed to allow for complete drainage of both the temperature and pressure relief valve and the discharge line. The discharge opening must not be subjected to blockage or freezing. DO NOT thread, plug or cap the discharge line. It is recommended that a minimum of four (4) inches (10.2 cm) be provided on the side of the water heater/storage unit for servicing and maintenance of the combination temperature and pressure relief valve.

Do not place a valve between the combination temperature and pressure relief valve and the tank.

IMPORTANT

FAILURE TO INSTALL AND MAINTAIN A NEW, LISTED 3/4" X 3/4" TEMPERATURE-PRESSURE RELIEF VALVE WILL RELEASE THE MANUFACTURER FROM ANY CLAIM WHICH MIGHT RESULT FROM EXCESSIVE TEMPERATURE AND PRESSURES.

⚠ WARNING

Hydrogen gas can be produced in a hot water system served by this water heater/storage unit that has not been used for a long period of time (generally two 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. If 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.

⚠ CAUTION

Under certain conditions, water in this water heater/storage unit may become excessively hot. It is recommended that an ASSE approved mixing valve may be installed in the outlet line to reduce the risk of scald injury by preventing point of discharge water temperatures in excess of 140°F *(60°C)*.

⚠ CAUTION

INCREASING THE THERMOSTAT SETTING (IF APPLICABLE) ABOVE THE PRESET TEMPERATURE MAY CAUSE SEVERE BURNS AND CONSUME EXCESSIVE ENERGY. HOTTER WATER INCREASES THE RISK OF SCALD INJURY.

This water heater/storage unit is designed to be used only with forced circulation. The pump may be mounted directly on top of the unit. The plumbing professional installing the water heater/storage unit has the option of using either the top or side connections (if applicable) for the pump suction and collector return lines. If the side connections are used, the corresponding top connections must be capped (plugged). Some water heater/storage units are manufactured with plugs installed in the side connections MS(80,120). If the side connections are to be used, the plugs installed at the factory must be removed. Connect the inlet side of the pump to the line marked pump suction connection. Connect the outlet of the pump to the inlet of the solar connector. The outlet of the collector should be connected to the fitting marked collector return.

Water Connections continued-

The two fittings on top **not** used for the pump suction and collector return lines are for connecting the cold water inlet supply and the hot water outlet supply.

A bleed valve shall be installed in the system above the level of the pump in order to bleed the air out of the water lines.

IMPORTANT

This water heater/storage unit does not contain a heat exchanger, therefore, only potable water may be allowed to enter the water heater/storage unit.

If this water heater/storage unit is installed on a system utilizing any heat transfer solution other than potable water, a separate heat exchanger must be installed. A qualified heat exchanger must be constructed in such a manner that failure of the heat exchanger will not result in contamination of the potable water. If a separate heat exchanger is used, forced circulation must be used between the heat exchanger and the solar storage unit. Using either the top or side connections (if applicable), connect the inlet of the pump to the pump suction connection and return line from the heat exchanger to the collector return connection.

Do not install a check valve or any other device that would prevent the reverse flow of water unless required by local codes. A closed system will result and frequent operation of the relief valve will occur.

After the installation of all water lines is complete, open the main water supply valve and fill the water heater/storage unit. Open several hot water faucets to allow air to escape from the system while the water heater/storage unit is filling. When water passes through all the faucets, close the faucets and check for possible leaks in the system.

This water heater/storage unit can deliver scalding temperature water at any faucet in the system. Be careful whenever using hot water to avoid scalding injury. Certain appliances such as dishwashers and automatic clothes washers may require increased temperature water. By setting the thermostat on this water heater/storage unit to obtain increased temperature water required by these appliances, you may create the potential for scald injury. To protect against injury, you should install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such lines are available from the local plumbing supplier. Please consult with a plumbing professional.

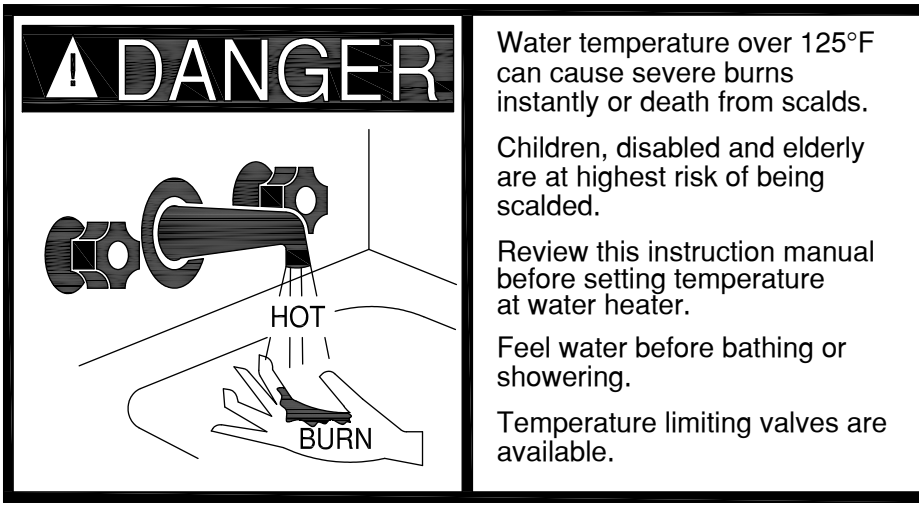


Figure 1

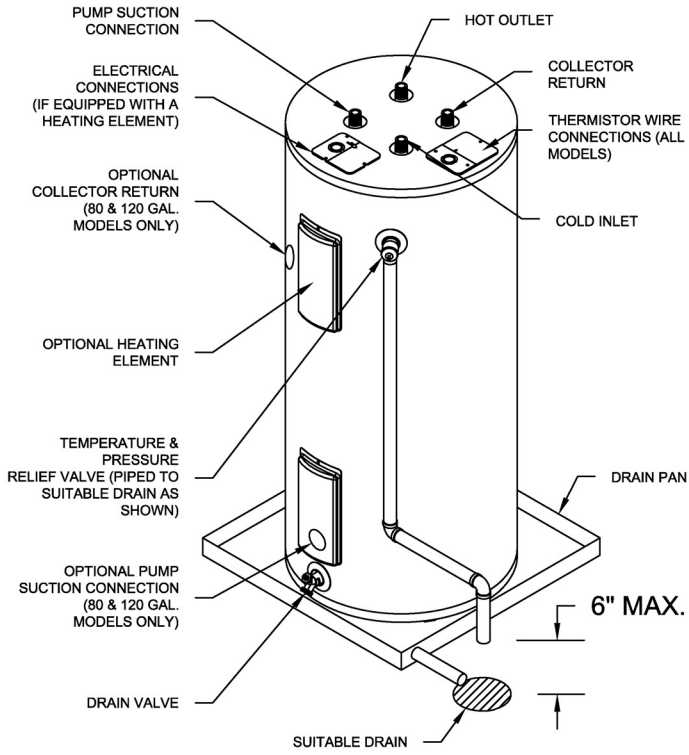


Figure 2

Electrical Connections

This section applies to water heaters equipped with a heating element.

Before any electrical connections are made, be sure that the water heater is full of water and that the valve in the cold water supply line is open. Check the rating plate and wiring diagram before proceeding. This solar electric water heater was built and wired in accordance with the INTERTEK testing approvals requirements. The temperature limiting device is of the manual reset, trip-free type and has been factory installed to interrupt all ungrounded power supply conductors in the event of thermostat failure. Thermostats are factory set and wired in accordance with the wiring diagram fastened to the inside of the top access panel. The plumbing supplier in your area ordered this water heater wired at the factory to comply with existing area codes, but local utility codes may require or allow other circuitry. Consult your local power company to determine the correct electrical hook-up in order to meet local utility and building codes and in order to obtain the most economical rates. Also check to find out if you are required to obtain a permit before starting the installation. The maximum wattage and rated voltage are shown on the water heater data plate. The water heater must be well grounded. **A green ground screw is provided at the electrical connection point for connecting a ground wire.**

If this water heater is equipped with a 240V, 4500W heating element, the recommended fuse size is 30A.

Connect Solar Controller and Thermistors

Sensor wires are provided for connection to the controller in a separate junction box located on top of the water heater. The brown twisted wires provide thermistor wiring from the controller to the lower control cover. The orange twisted wires provide thermistor wiring from the controller to the upper control cover. The orange wiring would be used for controllers that have connections for a second tank location.

NOTICE

A solar control and thermistors are not supplied with this water heater. The Tekmar 156, when installed according to manufacturer's instructions, is an acceptable controller. Other solar controller manufacturers such as Steca and Resol provide controllers appropriate for use with this water heater. Thermistors are not included with the water heater. Thermistors must be purchased with the solar controller to ensure capability with the selected control. Contact the solar controller manufacturer for details.

Refer to Figure 3 for connecting the thermistor and pressing it against the tank. This figure illustrates the opening under the upper and lower control covers. While the lower control location does not hold a thermostat, the process is the same.

1. Positively assure all electrical connections are unpowered whenever removing the control covers.
2. Strip the twisted wire ends and use wire nuts to securely connect the thermistor wires.
3. With a flat blade screwdriver or similar device used as a wedge, pull the sensor plate away slightly from the water heater tank.
4. Slide the thermistor between the plate and the water heater tank. The solar thermistor should be inserted as shown in the upper portion of the plate.
5. Verify that the sensor plate provides enough pressure to hold the thermistor in place.
6. To assure that the thermistor does not move, apply a small amount of high temperature silicon sealant in the gap produced where the thermistor has been inserted.
7. Return power to the water heater once the covers are in place.

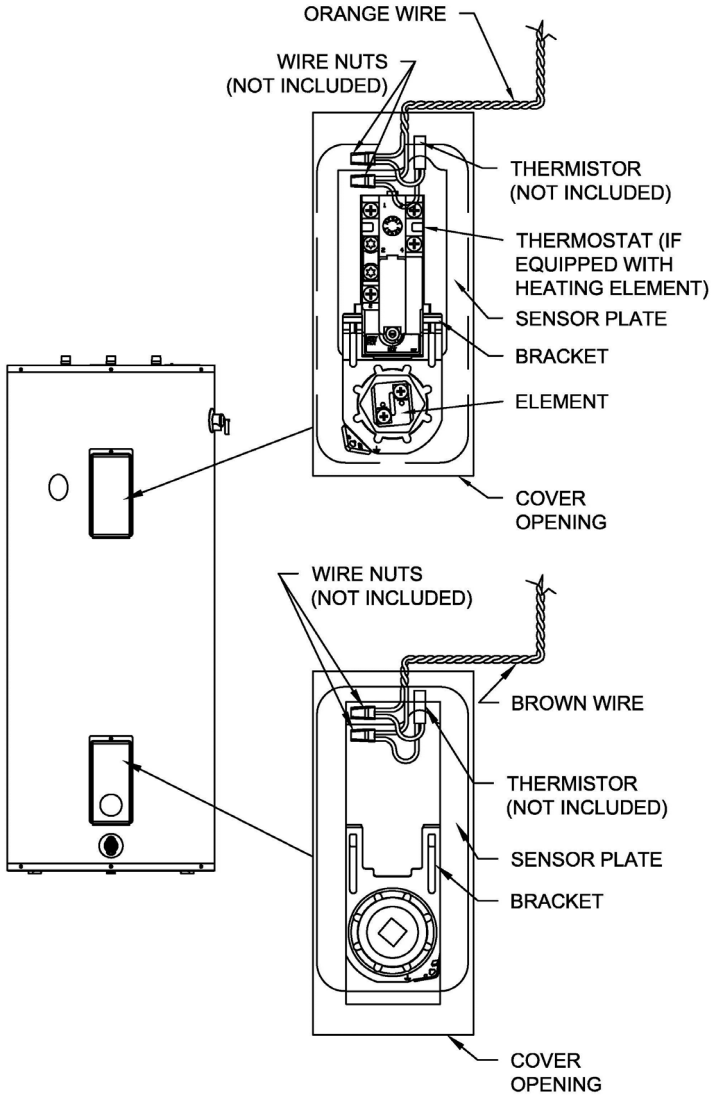


Figure 3
Wiring and Placement for the Solar Control Thermistor

GENERAL OPERATION

Before closing the switch to allow electric current (if applicable) to flow to the water heater, make certain that the water heater is full of water and that the cold water inlet valve is open. Complete failure of the heating element (if applicable) will result if they are not totally immersed in water at all times. When the switch is closed, the operation of this solar electric water heater is automatic. The thermostat (if applicable) are preset to the "HOT" setting to provide a water temperature of approximately 120°F *(49°C)* to reduce the risk of scald injury.

⚠ CAUTION

Scalding may occur within five (5) seconds at a temperature setting of 140°F *(60°C)*.

Care must be taken whenever using hot water to avoid scalding injury. Certain appliances require high temperature hot water (such as dishwashers and automatic clothes washers).

TO FILL THE WATER HEATER/STORAGE UNIT:

1. Close the water heater drain valve by turning the knob clockwise.
2. Open the cold water supply shut-off valve.
3. Open several hot water faucets to allow air to escape from the system.
4. When a steady stream of water flows from the faucets, the water heater is filled. Close the faucets and check for water leaks at the water heater drain valve, combination temperature and pressure relief valve and the hot and cold water connections.

TO DRAIN THE WATER HEATER/STORAGE UNIT:

Should it become necessary to completely drain the water heater/storage unit, make sure you follow the steps below:

1. Disconnect the power supply to the water heater (if applicable). Consult the plumber or electric company in your area for service.
2. Close the cold water supply shut-off valve.
3. Open the drain valve on the water heater/storage unit by turning the knob counter-clockwise. The drain valve has threads on the end that will allow connection of a standard hose coupling.
4. Open a hot water faucet to allow air to enter the system.

To refill the water heater/storage unit, refer to "TO FILL THE WATER HEATER/STORAGE UNIT".

Thermostat Adjustment

This section applies to water heaters equipped with a heating element.

⚠ CAUTION

Before adjusting thermostat, turn off power supply to the water heater.

The temperature of the water can be changed by adjusting the thermostat. Before any work is done on the water heater, disconnect all power to the water heater by opening the switch at the main electrical circuit breaker or fuse box. Remove the access panels or front panel on table tops, fold the insulation outward away from the controls. Set the thermostat to the desired water temperature using a screw driver to move the thermostat pointer. The thermostat has been factory preset to approximately 120°F *(49°C).* Rotate the temperature dial clockwise to increase water temperature. Replace the insulation making sure that the controls are well covered and that the plastic terminal shield has not been displaced; replace the access panel. The water heater is now ready for operation and the main switch can be closed.

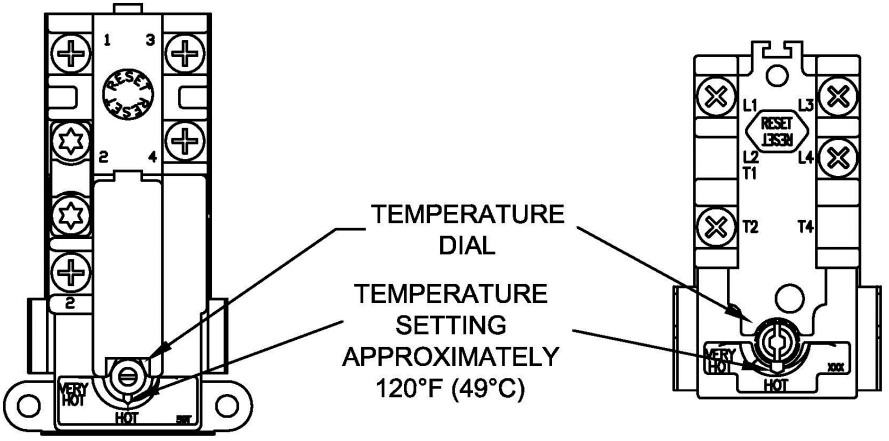


Figure 4

⚠ DANGER

Hotter water increases the risk of scald injury. Scalding may occur within five (5) seconds at a temperature setting of 140°F (60°C). To protect against hot water injury, install an ASSE approved mixing valve in the water system. This valve will reduce point of discharge water temperatures by mixing cold and hot water in branch water lines. A licensed plumbing professional or local plumbing authority should be consulted.

Note: This water heater/storage unit is equipped with an energy cut out device to prevent overheating. Should overheating occur, turn off the electrical supply (if applicable) to the water heater/storage unit and contact a qualified service technician.

APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS IN SCALDS	
120°F *(49°C)*	More than 5 minutes
125°F *(52°C)*	1½ to 2 minutes
130°F *(54°C)*	About 30 seconds
135°F *(57°C)*	About 10 seconds
140°F *(60°C)*	Less than 5 seconds
145°F (*63°C*)	Less than 3 seconds
150°F *(66°C)*	About 1½ seconds
155°F *(68°C)*	About 1 second

Table 1

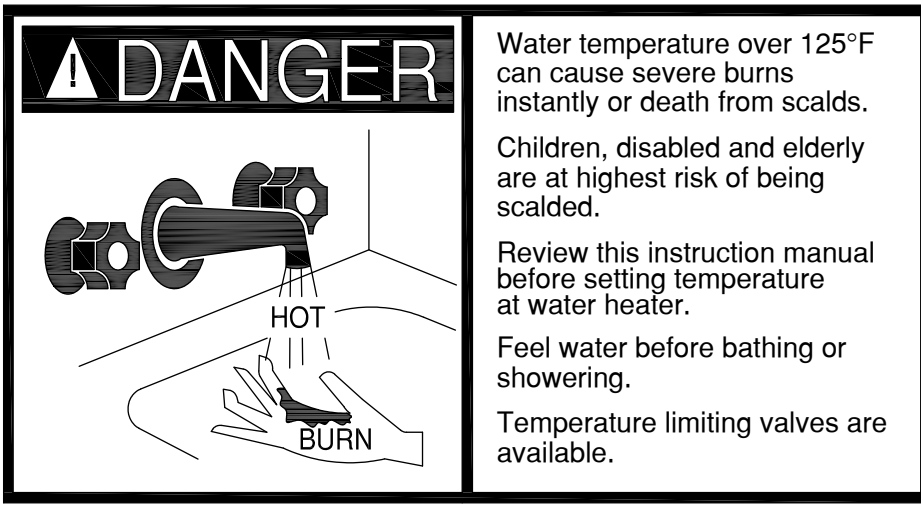


Figure 5

MAINTENANCE

IMPORTANT

The water heater/storage unit should be inspected at a minimum of annually by a qualified service technician for damaged components. **DO NOT** operate this water heater/storage unit if any part is found damaged.

Shut off the electric power (if applicable) whenever the water supply is turned off. Shut off the electric power (if applicable) and water supply, drain the heater completely to prevent freezing whenever the building is left unoccupied during the cold weather months.

The following maintenance should be performed by a qualified service technician at the minimum periodic intervals suggested below. In some installations, the maintenance interval may be more frequent depending on the amount of use and the operating conditions of the water heater/storage unit. Regular inspection and maintenance of the water heater/storage unit will help to insure safe and reliable operation.

1. Annually check the operation of the thermostat (if applicable).
2. Bi-annually check the seal around the heating element for leaks (if applicable). If there is any sign of leaking, disconnect the power supply to the water heater and contact the plumbing professional that installed this water heater or a qualified service technician.

⚠ WARNING

When lifting lever of temperature-pressure relief valve, hot water will be released under pressure. Be certain that any released water does not result in bodily injury or property damage.

3. At least once a year, check the combination temperature and pressure relief valve to insure that the valve has not become encrusted with lime. Lift the lever at the top of the valve several times until the valve seats properly without leaking and operates freely.
4. If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the combination temperature and pressure relief valve outlet.
5. Monthly drain off a gallon of water from the water heater/storage unit to remove silt and sediment.

⚠ WARNING

THIS WATER MAY BE HOT.

6. A combination sacrificial anode rod has been installed to extend tank life. The anode rod should be inspected periodically and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the water heater/storage unit or the manufacturer listed on the rating plate for anode replacement information.

⚠ CAUTION

FOR YOUR SAFETY, **DO NOT** ATTEMPT TO REPAIR THERMOSTAT, HEATING ELEMENTS, OR ELECTRICAL WIRING (IF APPLICABLE). REFER SUCH REPAIRS TO A QUALIFIED SERVICE TECHNICIAN.

Contact your supplier or plumbing professional for replacement parts or contact the company at the address displayed on the rating plate of the water heater/storage unit. For faster and better service, please provide the part name, model, and serial number(s) of the water heater(s)/storage unit(s) when ordering parts.

READ THE WARRANTY FOR A FULL EXPLANATION OF THE LENGTH OF TIME THAT PARTS AND THE WATER HEATER/STORAGE UNIT ARE WARRANTED.

Manufactured under one or more of the following U.S. Patents: 5,277,171; 5,341,770; 5,372,185; 5,485,879; 5,574,822; 5,596,952; 5,660,165; 5,682,666; 5,761,379; 5,943,984; 5,954,492; 5,988,117; 6,056,542; 6,142,216; 6,442,178; 6,684,821; 6,935,280; 7,063,132; 7,063,133; 7,007,748; 7,270,087; 7,334,419; 7,337,517; 7,409,925; 7,458,341; 7,559,293; 7,621,238; 7,634,976; 7,650,859; 7,665,210; 7,665,211; 7,699,026; 7,866,168; 7,900,589; 7,971,560; 7,992,526 8,082,888; 8,146,772; Other U.S. and Foreign patent applications pending. Current Canadian Patents: 2,092,105; 2,107,012; 2,108,186; 2,112,515; 2,143,031; 2,239,007; 2,262,174; 2,314,845; 2,409,271; 2,476,685; 2,504,824; 2,548,958

Complete the following information and retain for future reference:

Model No:_____

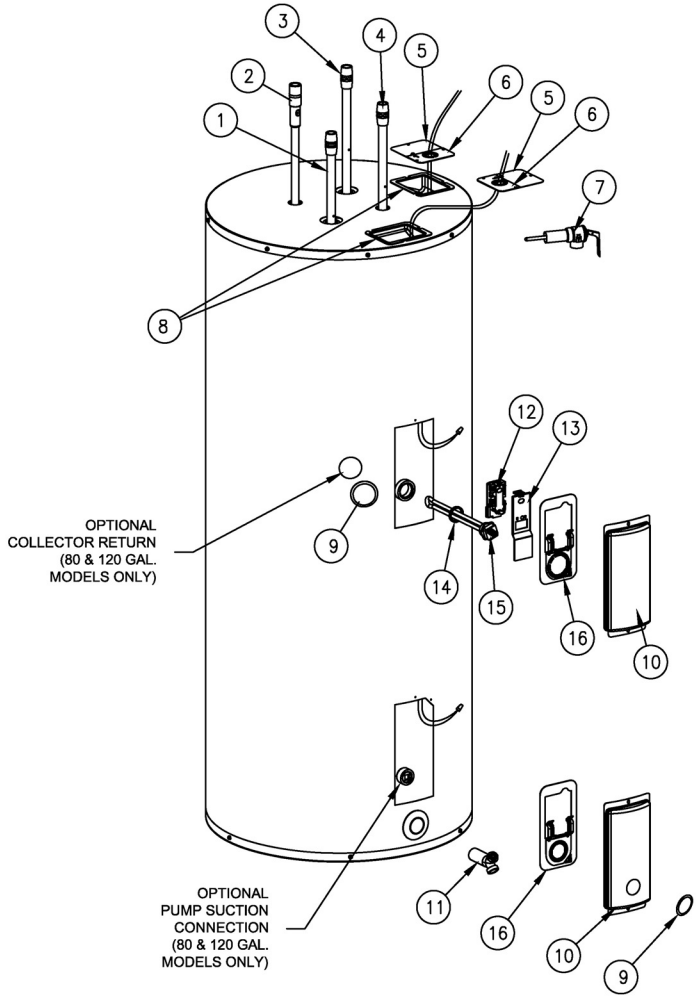
Serial No:_____

Service Phone
Days: _____Nights:_____

Address:_____

Supplier:_____

Supplier Phone No:_____



PARTS LIST
Figure 6

Item and Description					
1	Tube–Pump suction	7	T & P valve	13	Thermostat cover
2	Anode/Outlet Nipple	8	Elec. Junction box	14	Element gasket
3	Tube–Collector return	9	Hole closure	15	Heating element
4	Diptube-Inlet	10	Access cover	16	Thermostat bracket
5	Junction box cover	11	Drain valve		
6	Junction box cover	12	Thermostat		

Note: Items “12” through “15” apply only to water heaters equipped with a heating element.

NOTES