

American Standard®

WATER HEATERS



OWNER'S AND OPERATION MANUAL

Residential Electric Heat Pump Water Heater

Thank you for purchasing our product HPWH50G-AS

Before using your unit, please carefully read this manual and keep it for future reference.



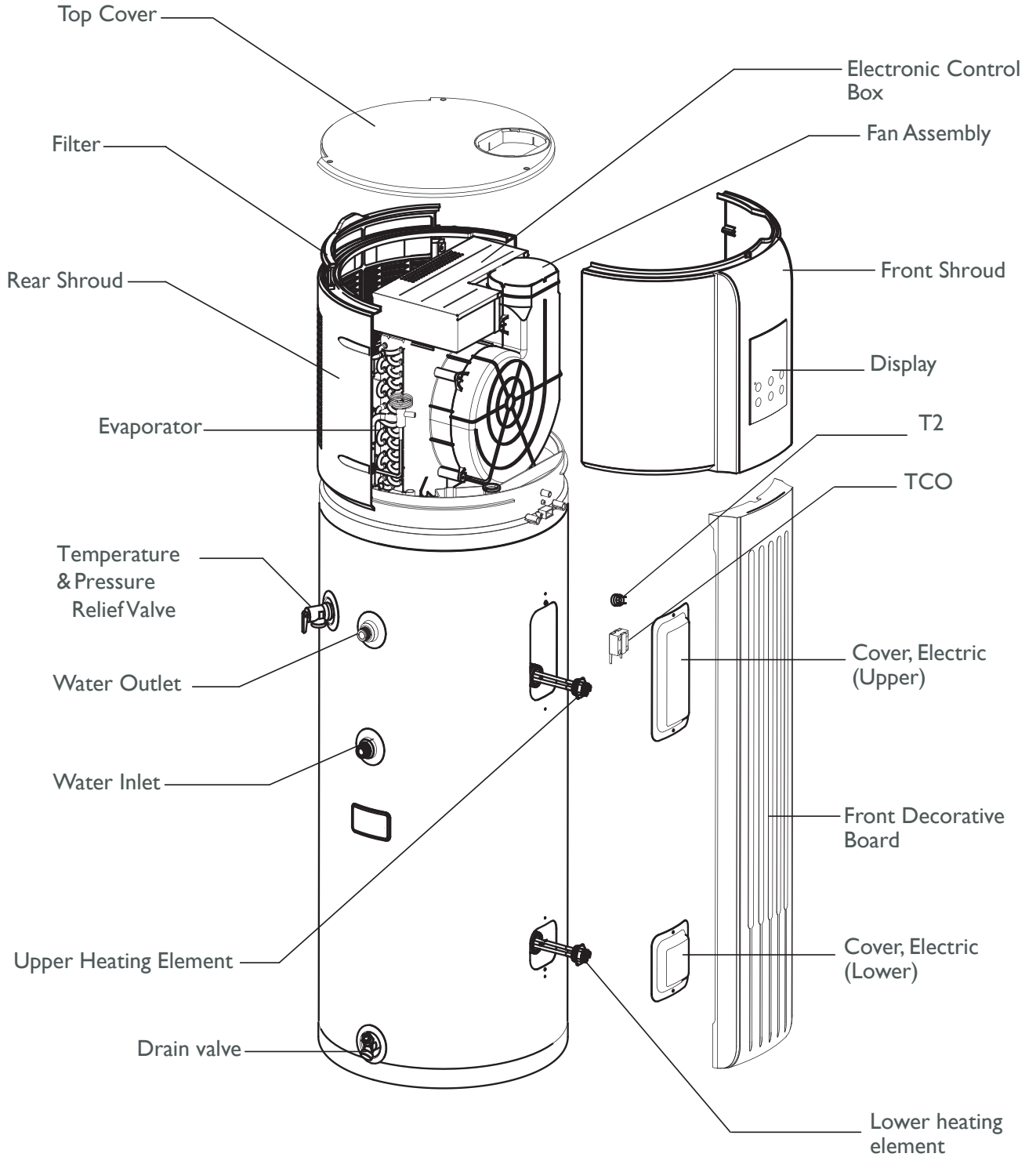
WARNING

THIS UNIT REQUIRES EARTH CONNECTION. MAKE SURE THERE IS A RELIABLE CONNECTION BEFORE USAGE; OTHERWISE IT MAY CAUSE DEATH OR INJURY.



Please ask a certified electrician to install a reliable earth connection. Refer to page 18.
Your safety is important to us!

PARTS NAMES



NOTE: All the pictures in this manual are for explanation purposes only. They may be slightly different from the heat pump water heater you purchased (depending on the model). The actual shape shall remain consistent.

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IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.



WARNING

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury, or death. Be sure to read and understand the entire Owner's Manual before attempting to install or operate this water heater. It may save you time and money. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious personal injury or death. If you have problems understanding the instructions in this manual, or have any questions, STOP and get help from a qualified technician or the local electric utility.

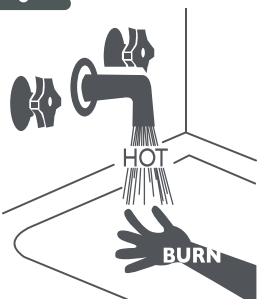
WATER TEMPERATURE ADJUSTMENT

Safety and energy conservation are factors to be considered when selecting the water temperature setting via the water heater's user interface. Water temperatures above 120°F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below. This label is also located on the water heater near the top of the tank.

NOTE: Households with small children, disabled or elderly persons may require a 120°F or lower thermostat setting to prevent contact with HOT water.



DANGER



Water temperature over 120°F can cause severe burns instantly or death from scalds. The electronic temperature control setting usually approximates tap water temperature to reach 160°F regardless of the control setting. Always feel water before bathing and showering.

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

See instruction manual before setting temperature.

Feel water before bathing or showering.

Temperature limiting valves are available. See manual.

Mixing valves for reducing point-of-use water temperature by mixing hot and cold water in branch water lines are available. Contact a licensed plumber or the local plumbing authority for further information.

Temperature	Time to produce a serious burn
120°F	More than 5 minutes
125°F	1-1/2 to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1-1/2 seconds
155°F	About 1 second

Table courtesy of Shriners Burn Institute

The chart shown above may be used as a guide in determining the proper water temperature for your home.

NOTE: Households with small children, disabled or elderly persons may require a 120°F or lower thermostat setting to prevent contact with HOT water.



DANGER

There is a Hot Water SCALD Potential if the control water temperature is set too high.



WARNING

Gasoline, as well as other flammable materials and liquids (adhesives, solvents, etc.), and the vapors they produce are extremely dangerous. DO NOT handle, use or store gasoline or other flammable or combustible materials anywhere near or in the vicinity of a water heater. The arc drawn in the water heater controls can ignite these vapors. Failure to do so can result in property damage, bodily injury or death.

FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that residential water heaters must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For residential water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 400 P Street, Sacramento, CA 95814 or you may call 916.324.5315 or ask a water heater dealer.

However, applicable local codes shall govern installation. For residential water heaters of a capacity greater than 52 gallons, consult the local building jurisdiction for acceptable bracing procedures.

California Proposition 65 Warning: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

SAVE THESE INSTRUCTIONS

OPERATING THE WATER HEATER



WARNING

Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE!!** To dissipate such gas and to reduce risk of injury, 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 be an unusual sound such as air escaping through the pipe as the water begins to flow. Do not smoke or use an open flame near the faucet at the time it is open.

SAFETY PRECAUTIONS

- A. Turn off power to water heater if it has been subjected to overheating, fire, flood or physical damage.
- B. Do not turn on the water heater unless it is filled with water.
- C. Do not turn on the water heater if cold water supply shut-off valve is closed.
- D. Do not store or use gasoline or other flammable vapors and liquids, such as adhesives or paint thinner, in the vicinity of this or any other appliance. If such flammables must be used, open doors and windows for ventilation.

NOTE: Air currents may draw flammable vapors from surrounding areas to the water heater.

- E. If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.



If the water heater has been subjected to flood, fire, or physical damage, turn off power and water supplies to the water heater.
Do not operate the water heater again until it has been thoroughly inspected by a qualified service technician.

SAFETY CONTROLS

The water heater is equipped with two temperature-limiting controls (TCO and TOD) that are located above the heating element in contact with the tank surface. If for any reason the temperature becomes excessively high, the temperature-limiting control (TCO or TOD) breaks the power circuit to the heating element. Once the control opens, it must be reset manually. A qualified service technician should reset the temperature limiting controls.

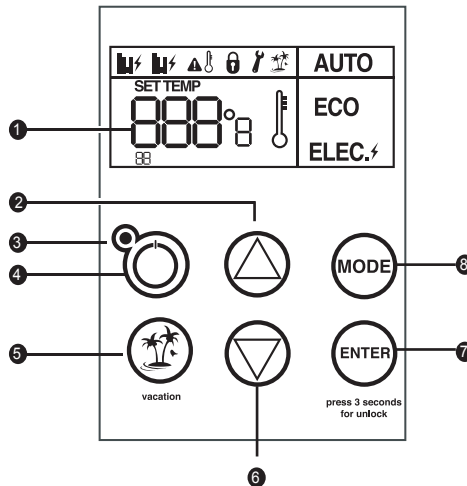
A qualified service technician must investigate the cause of the high temperature condition and corrective action must be taken before placing water heater in service again.



To reset the temperature-limiting control:

1. Turn off the power to the water heater.
2. Remove the jacket access panel(s) and insulation.
The thermostat protective cover should not be removed.
3. Press the red RESET button.
4. Replace the insulation and jacket access panel(s) before turning on the power to the water heater.

READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY. SAVE THESE INSTRUCTIONS.



CONTROLS

1 Display

2 Up

Use up arrow to increase value or turn page up

3 Power Indicator Light

An illuminated display light indicates that the unit is operating, no light displayed means that the unit has stopped operating, and a flashing display light means that the unit is in error or under protection.

4 Power

For starting or shutting down the unit, please note; when the unit is stand-by, the power function can still be utilized.

5 Vacation

Use this button during times of no water usage, such as vacation for an extended period of time.

6 Down

Use Down arrow to decrease the value or turn page down.

7 Enter

To confirm or unlock the key. After changing the set point temperature through keys, consumer needs to press this key within 10 seconds to confirm, or else the set point temperature can not change. When the panel is locked, consumer can press this key for 3 seconds to deactivate the lock.

8 Mode

Used to select operating mode, auto mode, economic mode & electric mode.

Detailed description on the control function:

1. Auto Confirm Function

After 10 seconds of pressing the pad and no other operation, this key will be confirmed and the operation will be effective.

2. Autolock Function

When there is no pressing of any keys for 1 minute, the control pad will automatically lock. To deactivate the lock, press and hold the ENTER pad for three seconds.

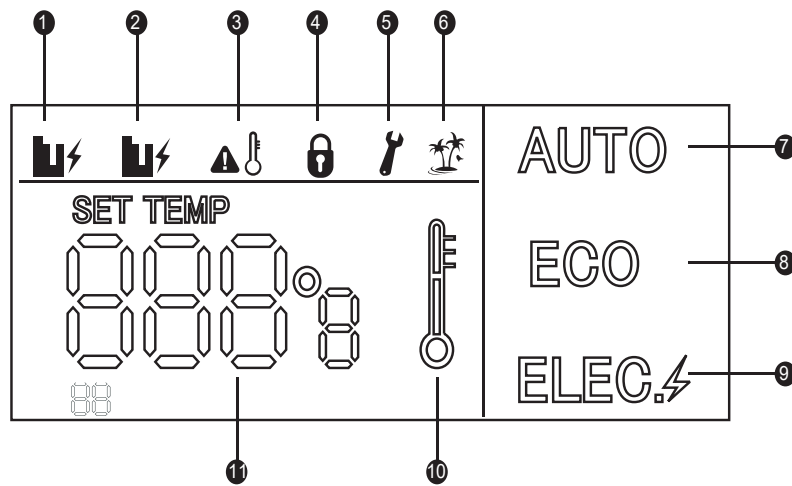
3. Query Function

This function is used to check the parameter of the unit when conducting repairs after the sale and for users.

4. Screen Saver

To extend the life of the screen, the screen will automatically become dimmed when the unit is dormant for an extended period of time. Press any key to activate the screen.

TURNING ON THE WATER HEATER



1 Peak Load-Shifting Mode 1

Use this operating mode during times of no water usage, such as vacation for an extended period of time.

2 Peak Load Shifting Mode 2

When using this mode, the 2 icon will be illuminated, indicating that the current heat pump mode is operational and users cannot set water temperature. The default water temperature is set to be 110°F.

3 High Temperature Setting

If the temperature (set by user or other) is above 120°F, this icon will be illuminated. This indicator will turn off when the temp is 120°F or the unit is turned off or under screen save mode.

4 Lock Icon

This icon will be illuminated when the key is locked, and will be darkened when the key is unlocked.

5 Alarm Icon

This icon will illuminate when there is a unit error or the unit is under protection. Additionally, the unit will sound an audible alarm. This indicator and audible alarm will cease once the error has been corrected and a proper functional mode has been restored.

6 Vacation

Use Down arrow to decrease the value or turn page down.

7 Auto Mode Icon

This icon will be illuminated when the unit is on auto mode and will be darkened when the unit is not operating on auto mode.

NOTE: When the unit is on auto mode this icon will flash slowly.

8 Economic Mode Icon

This icon will be illuminated when the unit is on economic mode and will be darkened when the unit is not on economic mode..

NOTE: When the unit is on economic mode, this icon will flash slowly.

9 Electric Mode Icon

This icon will be illuminated when the unit is on electric heat mode.

NOTE: When the unit is on electric heat mode this icon will flash slowly.

10 Water Temperature Icon

There are 3 phases:

When operating at $140^{\circ}\text{F} \geq \text{TS} \geq 120^{\circ}\text{F}$, all 3 phases will be illuminated. When operating at $120^{\circ}\text{F} \geq \text{TS} \geq 110^{\circ}\text{F}$, the lower 2 phases will be illuminated.

When operating at $110^{\circ}\text{F} \geq \text{TS} \geq 100^{\circ}\text{F}$, the lowest phase will be illuminated. Note: TS is the preset water temperature.

11 Parameter Icon

This icon will be illuminated when a power supply is connected. Normally it will show water temperature, however when there is error or protection, it will show an error code or protection code. When the error or protection stops, the temperature will display again normally.

ABOUT THE WATER TEMPERATURE SETTING

The temperature of the water in the water heater can be regulated by adjusting the temperature setting up or down using arrow keys on the control panel.

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater. The lower the temperature setting, the greater the savings in energy and operating costs. To comply with safety regulations, the water temperature is factory set at 120°F where local codes require. This is the recommended starting point.

Water temperatures above 120°F can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label on the water heater. This label is located on the water heater near the upper element access panel.

Mixing valves for reducing point-of-use water temperature by mixing hot and cold water in branch water lines are available. Contact a licensed plumber or the local plumbing authority for further information.

The chart below may be used as a guide in determining the proper water temperature for your home.



There is a hot water scald potential if the water temperature is set too high. Households with children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with HOT water.

TIMES & TEMPERATURES THAT MAY CAUSE SCALDING:

120°F	More than 5 minutes
125°F	1-1/2 to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1-1/2 seconds
155°F	About 1 second

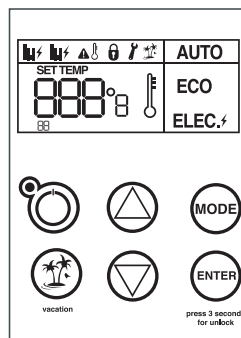
Table courtesy of Shriners Burn Institute

TO ADJUST THE TEMPERATURE

Press the “UP” or “DOWN” key on the control panel. Then the temperature can be increased or decreased. After the desired temperature setting has been achieved, please press the “ENTER” key to accept this set point. (If you do not press the “ENTER” key within 10 seconds, the setting will not change.)



There is hot water scald potential if the water temperature is set too high. 120°F is the recommended water temperature setting, but it can be adjusted to any temperature between 100°F and 140°F.



ADJUSTING THE WATER TEMPERATURE AND FUNCTION MODE

This water heater defaults to the Hybrid operating mode. The Hybrid mode is the recommended setting for this water heater, but can be changed if desired.

Eco Mode

Eco is the most energy-efficient mode for this water heater. It takes heat from the surrounding air to heat the water. The time it takes to heat the water is longer in this mode, so it may NOT be ideal if you have a high-demand situation such as a large household or company.

Electric Mode

This mode uses only the upper and lower heating resistance elements to heat the water. The time it takes to heat the water is reduced in this mode, but it is the LEAST energy-efficient mode.

Auto Mode —RECOMMENDED MODE

Hybrid Mode combines the energy efficiency of eHeat™ with the recovery speed and power of the Standard Electric mode, with normal water usage.

ABOUT THE FEATURE BUTTONS ON THE USER INTERFACE

Vacation

You may use this feature when traveling away from home for an extended period of time and hot water won't be needed. In this mode, the unit will drop the water temperature down to 50°F and will use the most efficient heating mode to conserve energy while the heater is sitting idle. The unit will automatically resume heating one day before your return, so that hot water will be available. For example, if you will be gone 7 days, press the VACATION button, press the UP arrow button until the display reads "7 days" (the default is 7 days) and press ENTER. The unit will drop the water temperature down to 50°F for 6 days. At the end of the 6th day, it will automatically return to the previous operating mode and heat the water to the original temperature setting. The green light will be illuminated when this feature is ON.

USING THE COMBINATION BUTTONS

Combination buttons function can convert the temperature display from °F to °C, inquire component's parameters, or clear the entire malfunction code and alarm.

1. °F or °C conversion

The water temperature display default is °F (Fahrenheit). To display the temperature in °C (Celsius), press the "ENTER" and "MODE" buttons simultaneously for 1 second.

NOTE: To change back to °F, repeat the step above.

2. Inquire component's parameters

To inquire component's parameters, press the "Enter" and "Up" buttons simultaneously for 1 second.

NOTE: To exit the inquire function, repeat the step above.

3. Clear malfunction

To clear malfunction, press "Enter" and "Down" buttons simultaneously for 1 second.

4. Clear alarm

To clear alarm, press "Enter" and "Vacation" buttons simultaneously for 1 second.

**DANGER**

Before manually operating the relief valve, make certain no one will be exposed to the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

NOTE: If the temperature and pressure-relief valve on the hot water heater discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or your plumbing contractor on how to correct this. Do not plug the relief valve outlet. Properly maintained, your water heater will provide years of dependable trouble-free service. It is suggested that a routine preventive maintenance program may be established and followed by the user.

Periodic Inspection:

It is further recommended that a periodic inspection of the operating controls, heating elements and wiring should be made by service personnel qualified in electric appliance repair. Most electrical appliances, even when new, make some sound when in operation. If the hissing or singing sound level increases excessively, the electric heating element may require cleaning. Contact a qualified installer or plumber for inspection.

DRAINING THE WATER HEATER**CAUTION**

Shut off power to the water heater before draining water.

**DANGER**

Before manually operating the relief valve, make certain no one will be exposed to the hot water released by the valve. The water drained from the tank may be hot enough to present a scald hazard and should be directed to a suitable drain to prevent injury or damage.

Vacation and Extended Shutdown

If the water heater is to remain idle for an extended period of time, the power and water to the appliance should be turned off to conserve energy and prevent a buildup of dangerous hydrogen gas. The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shutdown period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation.

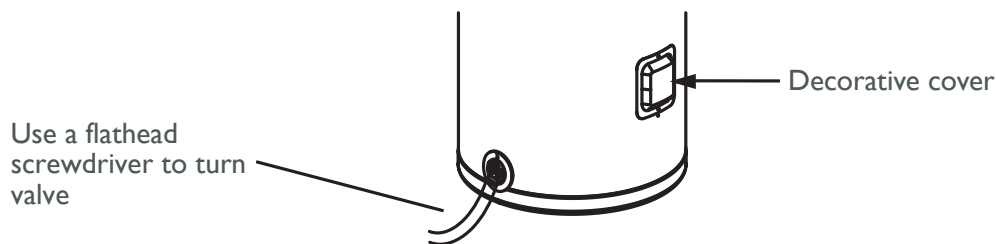
Temperature and Pressure-Relief Valve:

At least once a year, lift and release the lever handle on the temperature and pressure-relief valve, located on the back-left side of the water heater, to make certain the valve operates freely.

Flushing Tank:

A water heater's tank can act as a settling basin for solids suspended in the water. It is therefore not uncommon for hard water deposits to accumulate in the bottom of the tank. To clean the tank of these deposits, open the drain valve located under the large decorative cover near the bottom of the unit and drain a few quarts of water from the water heater every month.

Attach a garden hose to the drain valve located at the bottom of the unit and direct that hose to a drain. Allow several gallons to flush through the discharge line into an open drain. The decorative front cover must be removed to access the valve. In order to drain the water heater completely, turn off the cold water supply and open a hot water faucet or lift the handle on the relief valve to admit air into the tank.



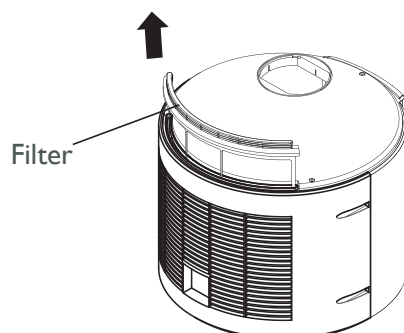
Operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation.

CLEANING THE FILTER

In the Auto and Eco modes, the heater moves air through the system and out the top of the unit. The filter is in place to protect the evaporator from dirt and dust. A clean air filter is important to get the highest efficiency. Occasionally this filter will need to be cleaned (at least once a year). When the filter requires cleaning, the red light above the filter button will be illuminated and an audible beep will sound. The screen will display instructions that the filter needs to be cleaned. When this screen displays this message, you can press the arrow button for instructions on how to clean the filter.

Leave the power on and remove the filter from the top of the unit. It is located in the top of the unit behind the hot and cold inlet pipes. Grasp the plastic handle and slide the filter straight up until it clears the cover. Once it has been removed, the filter can be wiped clean with a damp rag or rinsed with warm water. Once the filter has been cleaned, it can be replaced by aligning it into the slot in the top of the unit and sliding it down into place, when the handle is flush with the top of the cover, it is seated. When the clean filter has been reinstalled, press the FILTER button and then press ENTER.

IMPORTANT: The filter must be cleaned when the alarm is displayed. A dirty filter will make the system work harder and result in a reduction of efficiency and possible damage to the system. In order to get the best energy efficiency available, make sure your filter is clean.

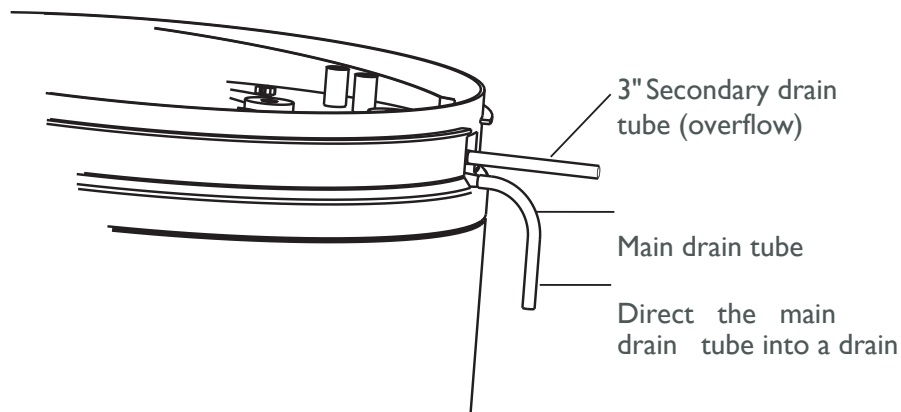


CLEARING THE CONDENSATION DRAIN TUBES

There are two drain hoses that are attached to the back of the heater. If both of these get clogged, water will spill down the outside of the unit. The primary drain is intended to carry all condensate away. If it is clogged or if the hose is kinked, the condensate will exit from the secondary drain tube onto the floor. This is intended as a notification to the user that the primary drain is clogged. Remove the drain hose and clear any debris. Reattach.

Periodically inspect the drain lines and clear any debris that may have been collected in the lines.

See Installation Instructions for more information.



INSTALLATION INSTRUCTIONS

HPWH50G-AS

The location chosen for the water heater must take into consideration the following:

LOCAL INSTALLATION REGULATIONS

This water heater must be installed in accordance with these instructions, local codes, utility codes, and utility company requirements or, in the absence of local codes, the latest edition of the National Electrical Code. It is available from consumers local libraries or can be purchased from the National Fire Prevention Association, Batterymarch Park, Quincy, MA 02169 as booklet ANSI/NFPA 70.

POWER REQUIREMENTS

Check the markings on the rating plate of the water heater to be certain the power supply corresponds to the water heater requirements.

LOCATION

Locate the water heater in a clean dry area as near as possible to the area of greatest heated water demand. Long uninsulated hot water lines can waste energy and water.

NOTE: Because this unit draws in air from the room to heat the water, the room must be at least 10' x 10' x 7' (700 cubic feet) or larger. If the room is smaller, there must be a louvered door.

Place the water heater in such a manner that the air filter, cover and front panels can be removed to permit inspection and servicing, such as removal of elements or cleaning the filter.

The water heater and water lines should be protected from freezing temperatures & highly corrosive atmospheres.

Do not install the water heater in outdoor, unprotected areas.



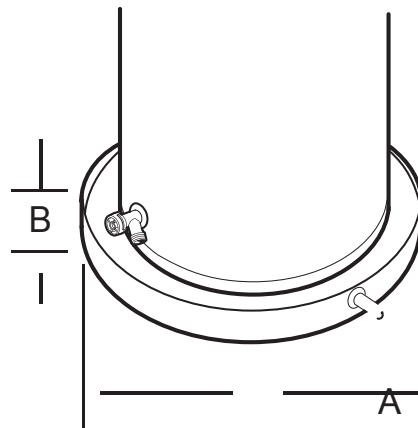
CAUTION

The water heater should not be located in an area where leakage of the tank or connections will result in damage to the adjacent area or to lower floors of the structure. Where such areas cannot be avoided, it is recommended that a suitable catch pan, adequately drained, be installed under the water heater.



DANGER

This water heater **SHOULD NOT** be installed where vapors are to be used or stored. Such liquids include gasoline, LP gas (butane & propane), paint or adhesives, thinners, solvents or removers, because natural air vapors can be carried from where liquids are being used or stored. The spark from within the water heater can result in severe burns or death to those in range, as well as property.

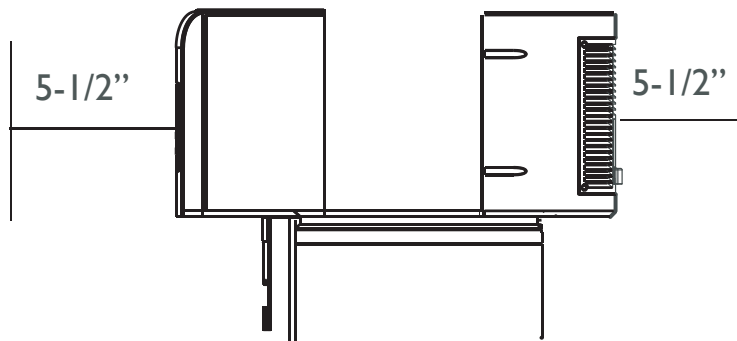


Route to open drain line should be at least 3/4" ID and pitched for proper drainage.
 A—Diameter of water heater plus 2" min.
 B—Maximum 2".

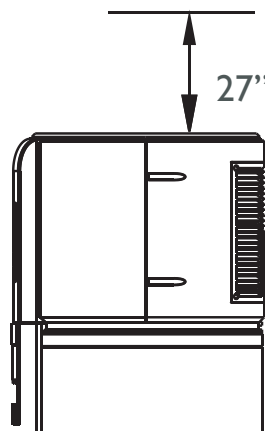
NOTE: Auxiliary catch pan **MUST** conform to local codes. Catch Pan Kits are available from the store where the water heater was purchased, your local home improvement store or any water heater distributor.

REQUIRED CLEARANCES:

There must be a 5-1/2" minimum clearance (air space) between the front or rear cover and any objects. The recommended clearance to use is 7".



A 16" minimum clearance is required to remove the filter for cleaning. The hot and cold-water plumbing and electrical connections must not interfere with the removal of the filter.



The unit has a condensate drain; therefore a drain must be available in close proximity to the unit. The drain must not be higher than 36" above the floor (laundry drain is acceptable). If no drain is available, then a common condensate pump with a capacity no less than 1 gallon/day must be purchased from a local builder or home improvement store and installed.

INSTALLATION INSTRUCTIONS THERMAL EXPANSION

The water heater should not be installed in a space where liquids which give off flammable vapors are used or stored. Determine if a check valve exists on the inlet water line. It may have been installed on the cold water line as a separate backflow prevention device, or it may be part of a pressure-reducing valve, water meter or water softener.

A check valve located in the cold water inlet line can cause what is referred to as a “closed water system.” A cold water inlet line with no check valve or backflow prevention device is referred to as an “open” water system. As water is heated, it expands in volume and creates an increase in the pressure within the water system. This action is referred to as “thermal expansion.” In an “open” water system, expanding water which exceeds the capacity of the water heater flows back into the city main where the pressure is easily dissipated.

A “closed water system,” however, prevents the expanding water from flowing back into the main supply line, and the result of “thermal expansion” can create a rapid and dangerous pressure increase in the water heater and system piping. This rapid pressure increase can quickly reach the safety setting of the relief valve, causing it to operate during each heating cycle.



WARNING

Thermal expansion, and the resulting rapid and repeated expansion and contraction of components in the water heater and piping system, can cause premature failure of the relief valve, and possibly the heater itself. Replacing the relief valve will not correct the problem!

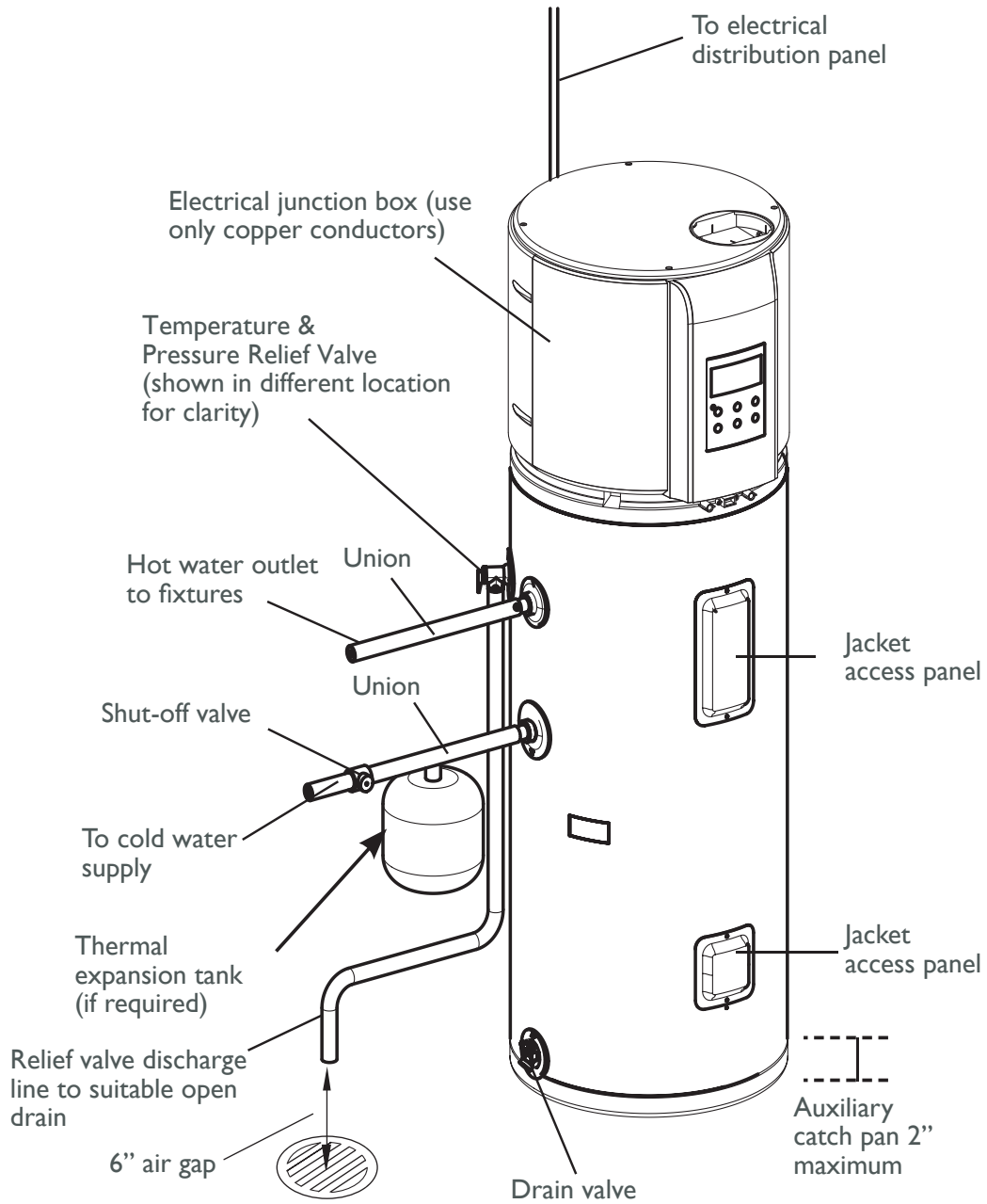
The suggested method of controlling thermal expansion is to install an expansion tank on the cold water line between the water heater and the check valve (refer to the illustration on page 16). The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the excess pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier or plumbing inspector for additional information regarding this subject.

WATER SUPPLY CONNECTIONS

Refer to the illustration below (Page 16) for an example of a suggested typical installation. The installation of unions or flexible copper connectors is recommended on the hot and cold water connections so that the water heater may be easily disconnected for servicing if necessary. The HOT and COLD water connections are clearly marked and are 3/4” NPT on all models.

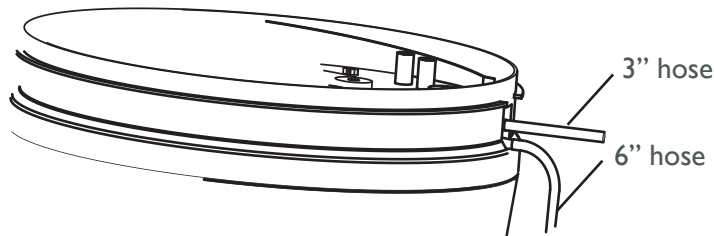
NOTE: Installing a shut-off valve on the cold water line near the water heater will allow for easier service or maintenance of the unit later.

IMPORTANT: Do not apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting the adapter to the cold water connections on heater. Any heat applied to the hot or cold water connection will permanently damage the dip tube.



CONDENSATION DRAIN TUBES

This unit has a condensation tray. The water collected in the tray drains out of the tube coming off the back of the unit. Two flexible hoses are attached to the two drain ports on the back of the unit. Attach one end of the longer 6' hose to the lower drain port on the back of the unit, underneath the rear cover. Direct the other end to a drain in the floor, no higher than 3' above the floor. If such a drain is unavailable, a condensate drain pump (not provided) must be purchased and installed. Attach the shorter 3" hose to the top drain port.



INSTALLATION INSTRUCTIONS

A new combination temperature and pressure-relief valve, complying with the Standard for Relief Valves and Automatic Gas Shut-Off Devices for Hot Water Supply Systems, ANSI Z21.22, is supplied and must remain installed to the opening provided and marked for that purpose on the water heater. No valve of any type should be installed between the relief valve and the tank. Local codes shall govern the installation of relief valves.

RELIEF VALVE



The pressure rating of the relief valve must not exceed 150 PSI, the maximum working pressure of the water heater as marked on the rating plate. The BTU/h rating of the relief valve must not be less than the input rating of the water heater as indicated on the rating label located on the front of the heater (1watt=3.412 BTU/h). Connect the outlet of the relief valve to a suitable open drain so that the discharge water cannot contact live electrical parts or persons and to eliminate potential water damage. Piping used should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.



To reduce the risk of excessive pressures and temperatures in this water heater, install temperature and pressure protective equipment required by local codes and no 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 Shut-Off Devices for Hot Water Supply systems, ANSI Z21.22. This valve must be marked with a maximum set pressure not to exceed the marked maximum working pressure of the water heater. Install the valve into an opening provided and marked for this purpose in the 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 floors and does not contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances.



Electrical connections must be wired properly. 240V AC must be applied to L1 and L2 wires as shown in the illustration on page 18. Failure to do so will VOID the warranty, and can result in the improper application of 120V AC connected to the water heater, which may damage the compressor or other electrical components.

TO FILL THE WATER HEATER

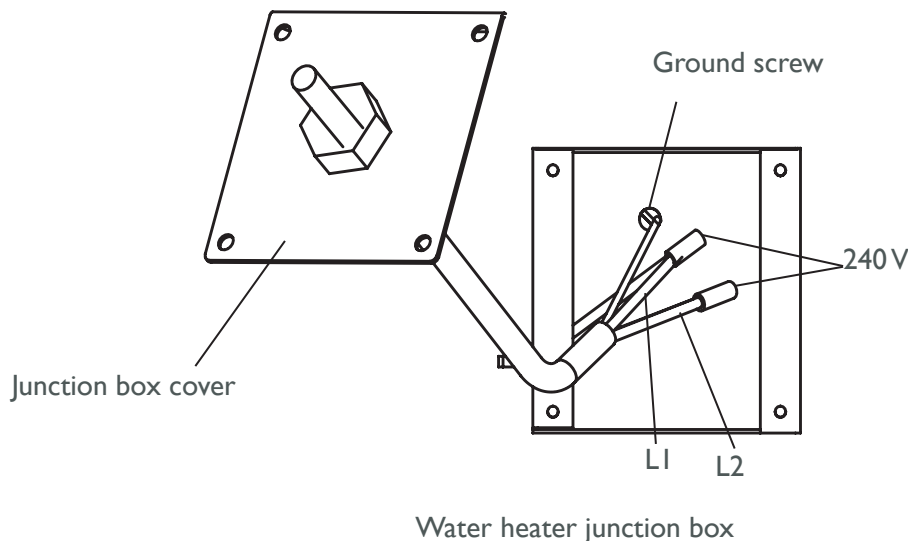


WARNING

The tank must be full of water before heater is turned on. The water heater warranty does not cover damage or failure resulting from operation with an empty or partially empty tank. Make certain the drain valve is completely closed. Open the shut-off valve on the cold water supply line. Open each hot water faucet slowly to allow the air to vent from the water heater and piping. A steady flow of water from the hot water faucet(s) indicates a full water heater.

ELECTRICAL CONNECTIONS

A qualified electrician must provide a separate branch circuit with copper conductors, over current protective device and suitable disconnecting means. All wiring must conform to local codes or latest edition of National Electrical Code ANSI/NFPA 70. The water heater is completely wired to the junction box at the top of the water heater. An opening for 1/2" or 3/4" electrical fitting is provided for field wiring connection. The voltage requirements and wattage load for the water heater are specified on the rating label on the front of the water heater. The branch circuit wiring should include either; Metallic conduit or metallic sheathed cable approved for use as a grounding conductor and installed with fittings approved for the purpose. Nonmetallic-sheathed cable, metallic conduit or metallic sheathed cable not approved to be used as a ground conductor shall include a separate conductor for grounding. It should be attached to the ground terminals of the water heater and the electrical distribution box.



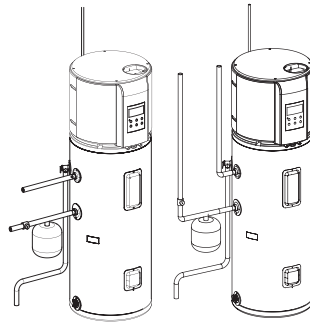
WARNING

A proper ground connection is essential. The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Nonmetallic piping, dielectric unions, flexible connectors, etc., can cause the water heater to be electrically isolated.

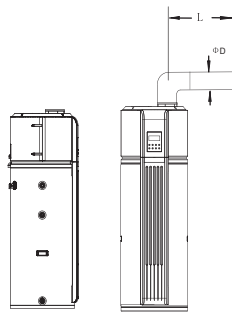
INSTALLATION INSTRUCTIONS

The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices. If local codes require external application of insulation blanket kits, the manufacturer's instructions included with the kit must be carefully followed. Application of any external insulation, blankets or water pipe insulation to this water heater will require careful attention to the following:

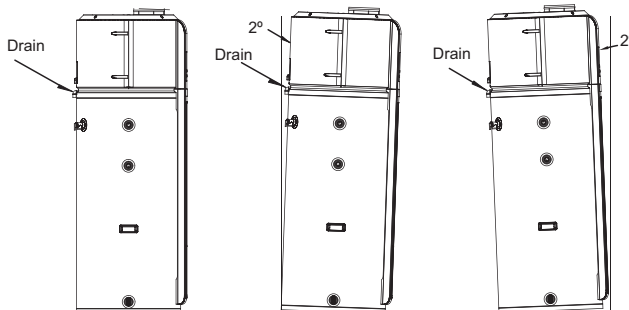
- Do not cover access panels to the heating elements.
- Do not cover the electrical junction box of the water heater.
- Do not cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of the insulation blanket.
- Do not block the air inlet outlets below and on the top covers.



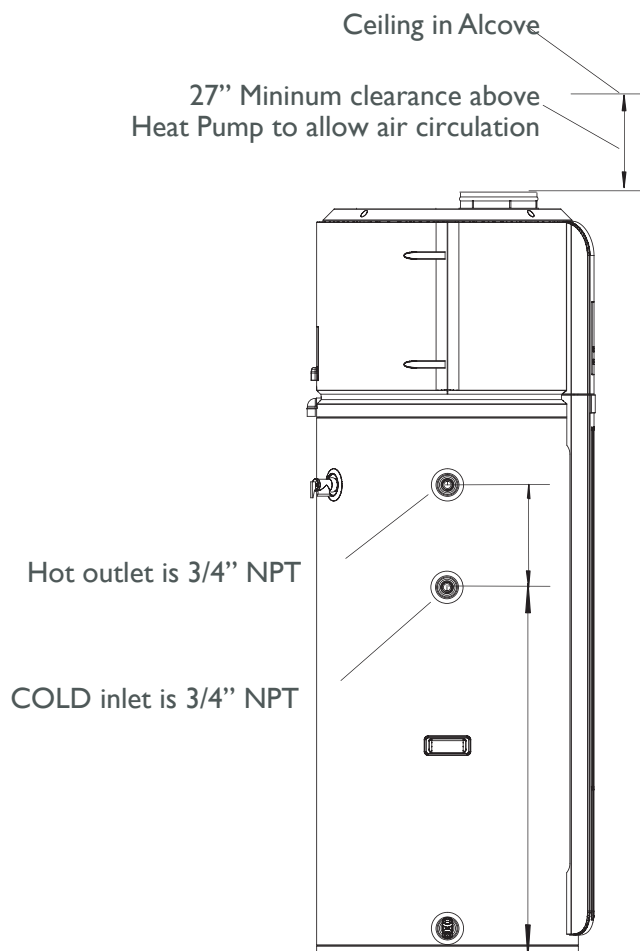
Wind ring is a selectable accessory. If there is a wind ring, it can be selected to connect the air pipe. (Refer to the following figure.)



To ensure fluent draining of condensate water from evaporator, please install the main unit on a level floor. Otherwise, please ensure that the drain vent is at the lowest possible location. Recommended angle of unit to the ground should no more than 2°.



INSTALLATION INSTRUCTIONS



ACCESSORIES

Accessory name	Quantity	Image	Purpose
Installation & Owner's Manual	1		Owner's comprehensive installation, safety & warning instructions.
Wind Ring (Selective)	1		To connect the Air Duct
Drain pipe for water condensation	1		Primary Condensate Drain Hose.
Drain pipe (short) for water condensation	1		Secondary Condensate Drain Hose.

NOTE: This guide recommends minimum branch circuit sizing based on the National Electric Code. Refer to wiring diagrams in this manual for field wiring connections.

BRANCH CIRCUIT SIZING GUIDE

Water Heater Wattage	Recommended Over-Current Protection – Fuse or Circuit Breaker Amperage Rating –			
	208 V	240 V	277 V	480 V
3,000	20	20	15	15
4,000	25	25	20	15
4,500	30	25	25	15
5,000	30	30	25	15
5,500	35	30	25	15
6,000	40	35	30	20
8,000	50	45	40	25
9,000	-	50	45	25
10,000	-	-	50	30
11,000	-	-	50	30
12,000	-	-	-	35

Water Heater Wattage	Copper Wire Size AWG Based Heater Wattage on N.E.C. Table 310-16 (75°C)			
	208 V	240 V	277 V	480 V
3,000	12	12	14	14
4,000	10	10	12	14
4,500	10	10	10	14
5,000	10	10	10	14
5,500	8	10	10	14
6,000	8	8	10	12
8,000	8	8	8	10
9,000	-	8	8	10
10,000	-	-	8	10
11,000	-	-	8	10
12,000	-	-	-	8

INSTALLATION CHECKLIST

1. Tank location:

- 1) Check if room size less than 10' x 10' x 7' (700 cu. ft.). If yes, louvered doors or similar ventilation is required.
- 2) Ensure that back of unit is at least 7 inches away from wall or other obstacles.

2. Plumbing connections:

- 1) Ensure that connections DO NOT prevent air filter removal.
- 2) Ensure there are no leaks after filling the tank with water, either when water is flowing or not.

3. Condensate lines are in place:

- 1) Short tube connected to upper drain nozzle.
- 2) Longer tube on lower drain nozzle connected and directed into a floor drain or a condensate pump.
- 3) Temperature & Pressure-Relief Valve are functioning and drain line completed per local code.
- 4) Electrical connections DO NOT prevent air filter removal.
- 5) Verify that control panel displays 120°F Auto mode.
- 6) Front cover is in place.

WHAT TO EXPECT FOR “NORMAL START-UP”

Only after the unit has been installed and the electrical & water connections are secure and checked, should the unit be filled with water (The tank is vented by opening any hot water faucet in the location to permit the tank to fill completely with water). Once tank is filled with water and electricity is connected, the user must press the POWER button on the user display interface. The unit will then remind the user to check that the tank has been filled with water; which is acknowledged by pressing POWER again.

Elapsed Time	HPWH50G-AS Actions	Comments
0 to 1.5 minutes	Unit is silent	This 3 minute off-time prevents compressor damage.
1.5 to 3 minutes	Fans turn on	
8 to 30 minutes	Compressor turns off and upper Element turns on for about 20 minutes	To quickly provide initial amount of hot water for user (about 25 gallons).
30 minutes and beyond	Upper element turns off and compressor turns back on	User efficient heat pump for majority of heating.

NOTE: The heat pump operating ranges are from 45°F to 120°F. If the ambient temperature is outside of this range, the heat pump will not be able to run and the backup electric elements will be used until the ambient temperature returns to the normal operating range.

BEFORE YOU CALL SERVICE

Troubleshooting Tips: Save time & money! Review the chart below first & you may not need to call for service.

Elapsed Time	Possible Causes	What to Do
Water heater is noisy	Fans are used to move air through the system. The fan noise volume will vary as the water is heated.	<ul style="list-style-type: none"> • Some amount of fan noise is normal (similar to the blower on a central heating and cooling system). If you hear an abnormal noise like a knocking of the noise level seems unusually loud, then contact service. • If noise level has been increasing over several weeks or months, the filter may be getting dirty, thus making the fans work harder. Check to see if filter needs to be cleaned. (See page 13 for instructions).
Water heater is making the room too cold	Room is not vented properly or is too small.	<ul style="list-style-type: none"> • If the room is smaller than 10' x 10' x 7', then it must have a louvered door or other means to allow air exchange with surrounding rooms.
Water dripping down the outside of the heater	<p>Condensate drain hoses are not connected.</p> <p>Condensate drain hoses are Kinked or clogged.</p>	<ul style="list-style-type: none"> • Two drain hoses are included with your water heater. Connect the longer 6" hose to the lower condensate drain port. Connect the short 3" hose to the upper condensate drain port. • Remove each drain hose and clear any debris from the line. You can use a small wire like a hanger or a small screwdriver to clear out any debris in the drain port on the unit.
Not enough or no hot water	<p>Water usage may have exceeded the capacity of the water heater.</p> <p>A fuse is blown or a circuit breaker tripped.</p> <p>Electric supply may be off.</p> <p>Water temperature may be set too low.</p> <p>Leaking or open hot water faucets.</p> <p>Electric service to your home may be interrupted.</p> <p>Improper wiring.</p> <p>Manual reset limit (TCO). Cold water inlet temperature may be colder during the winter months.</p>	<ul style="list-style-type: none"> • Wait for the water heater to recover after an abnormal demand. • Replace fuse or reset circuit breaker. • Make sure electric supply to water heater and disconnect switch, if used, are in the ON position. • See the water temperature setting section. • Make sure all faucets are closed. • Contact the local electric utility. • See the installation instructions sections. • See the water temperature setting section. • This is normal. The colder inlet water takes longer to heat.
CAUTION: For your safety, DO NOT attempt to repair electrical wiring, controls, heating elements or other safety devices. Refer repairs to a qualified service professional.		
Water is too hot	<p>Water temperature is set too high.</p> <p>Electronic control has failed.</p>	<ul style="list-style-type: none"> • See the water temperature setting section. • Call for service.
Rumbling noise	Water conditions in your home caused a buildup of scale or mineral deposits on the heating elements.	<ul style="list-style-type: none"> • Remove and clean the heating elements.

BEFORE YOU CALL FOR SERVICE

Problem	Possible Causes	What to Do
Relief valve producing popping noise or draining.	Pressure buildup by thermal expansion to a closed system.	<ul style="list-style-type: none"> This is an unacceptable condition and must be corrected. Contact your water supplier or a plumbing contractor for directions to correct this issue. Do not plug the relief valve outlet.
Unit is not making noise.	If unit is using resistance elements, it will not make noise.	<ul style="list-style-type: none"> Check mode of unit.

ERROR CODE	MEANING	ACTIONS / SOLUTIONS
E0	T2 SENSOR MALFUNCTION	CHECK WIRES FOR DAMAGE CHECK WIRES CONNECTIONS FROM SENSOR TO CONTROL BOARD CHECK T2 FOR INTERFERENCE WITH STRONG MAGNETIC FIELD CHECK ACTUAL TEMP. SHOULD BE BETWEEN IN 32°F - 140°F
E1	T3 SENSOR MALFUNCTION	CHECK WIRES FOR DAMAGE. MEASURE RESISTANCE FROM CONTROL BOARD CONNECTION. CHECK WIRE CONNECTIONS FROM SENSOR TO CONTROL BOARD CHECK T3 VERIFY IF SENSOR IS DAMAGED USING OHMMETER CHECK T3 FOR INTERFERENCE WITH STRONG MAGNETIC FIELD CHECK ACTUAL TEMP. SHOULD BE BETWEEN 23°F-86°F (TOLERANCE +9°F)
E4	Th SENSOR MALFUNCTION	CHECK ELECTRONIC EXPANSION VALVE FOR DAMAGE CHECK WIRES FOR DAMAGE. MEASURE RESISTANCE FROM CONTROL BOARD CONNECTION CHECK WIRE CONNECTIONS FROM SENSOR TO CONTROL BOARD CHECK Th SENSOR FOR DAMAGE CHECK Th FOR INTERFERENCE WITH STRONG MAGNETIC FIELD CHECK ACTUAL TEMP. SHOULD BE BETWEEN 41°F-95°F
E5	T4 SENSOR MALFUNCTION	CHECK WIRES FOR DAMAGE. MEASURE RESISTANCE FROM CONTROL BOARD CONNECTION CHECK WIRE CONNECTIONS FROM SENSOR TO CONTROL BOARD CHECK T4 SENSOR FOR DAMAGE CHECK T4 FOR INTERFERENCE WITH STRONG MAGNETIC FIELD CHECK ACTUAL TEMP. SHOULD BE BETWEEN IN 68°F-221°F (TOLERANCE +9°F)
E6	T5 SENSOR MALFUNCTION	CHECK REFRIGERANT TUBING FOR DAMAGE CHECK FOR REFRIGERANT LEAKAGE CHECK WIRES FOR DAMAGE. MEASURE RESISTANCE FROM CONTROL BOARD CONNECTION CHECK WIRE CONNECTIONS FROM SENSOR TO CONTROL BOARD CHECK T5 SENSOR FOR DAMAGE CHECK T5 FOR INTERFERENCE WITH STRONG MAGNETIC FIELD
E8	Water temperature is too high (T2 >= 165°F)	CHECK IF T2 SENSOR WIRING IS BROKEN CHECK IF T2 SENSOR TERMINAL CONNECTION IS STABLE CHECK IF THE T2 SENSOR CAN ACCURATELY DETECT THE TEMPERATURE CHECK IF UPPER/LOWER ELECTRIC HEATERS & COMPRESSOR RELAY CONTROL IS WORKING NORMALLY
P0	EVAPORATER TEMP. BELOW 32°F	DISAPPEAR WHEN EVAPORATER TEMP. HIGHER THAN 32°F CHECK FOR ANY REFRIGERANT LEAKAGE
P2	AIR DISCHARGE HIGH TEMP PROTECTION	CHECK PRESSURE IN THE REFRIGERANT SYSTEM
P4	COMPRESSOR CURRENT IS TOO HIGH	CHECK THE SUPPLY VOLTAGE < 198 VAC CHECK COMPRESSOR FOR DAMAGE
P8	UPPER ELEMENT CURRENT IS TOO LOW	CHECK UPPER ELEMENT RESISTANCE CHECK CONNECTIONS FROM UPPER ELEMENT TO CONTROL BOARD CHECK UPPER ELEMENT RELAY
PA	LOWER ELEMENT CURRENT IS TOO LOW	CHECK LOWER ELEMENT RESISTANCE CHECK CONNECTIONS FROM LOWER ELEMENT TO CONTROL BOARD CHECK UPPER ELEMENT RELAY
P5	AIR FILTER IS TOO DIRTY	CLEAN THE AIR FILTER
C0	ABNORMAL POWER SUPPLY	CHECK POWER, VOLTAGE AND FREQUENCY CHECK POWER WIRE, COULD BE LOOSE OR BROKEN

Notes

American Standard[®]
WATER HEATERS