

Use & Care Manual

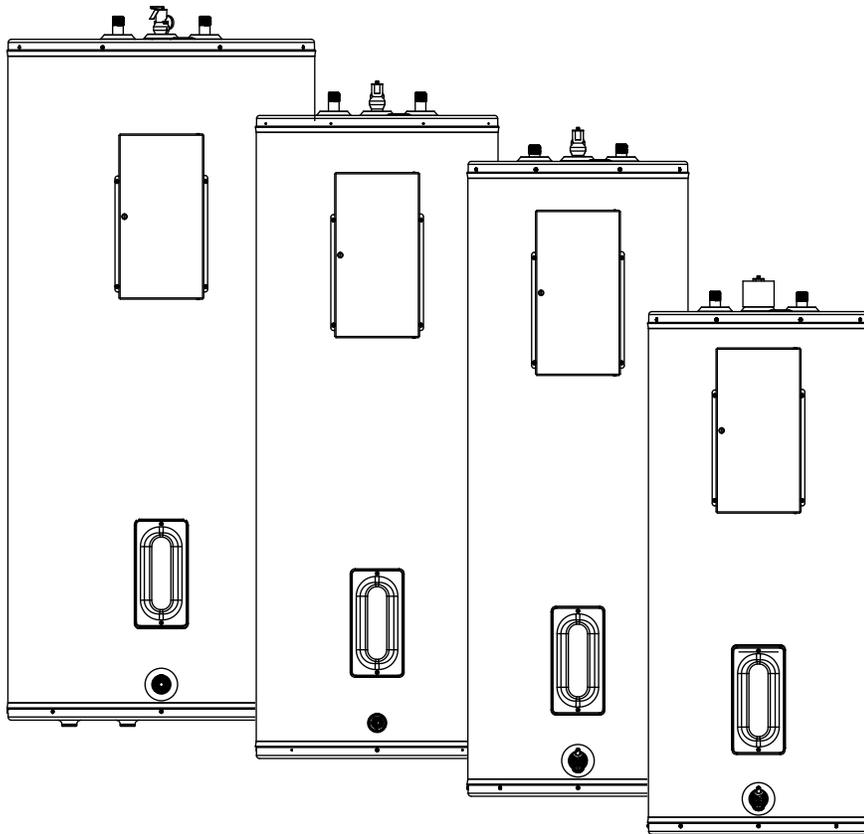
With Installation Instructions for the Installer

Commercial Electric



Water Heaters

Electric Water Heaters



The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, for the owner-operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is imperative that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you do not understand these instructions or any terms within it, seek professional advice.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on "If you need service."

Do not destroy this manual. Please read carefully and keep in a safe place for future reference.

 **Recognize this symbol as an indication of Important Safety Information!**

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

NOTICE: This water heater is designed for use in a commercial application and the installation and maintenance of it should be performed by qualified, licensed service personnel.

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FOR YOUR RECORDS

Write the model and serial numbers here:

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.



READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your water heater.

You'll find many answers to common problems in the Before You Call For Service section. If you review our chart of Troubleshooting Tips first, you may not need to call for service at all.



READ THE SAFETY INFORMATION

Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information! 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", "WARNING", "CAUTION" or "NOTICE".

These words mean:

▲ DANGER

An imminently hazardous situation that will result in death or serious injury.

▲ WARNING

A potentially hazardous situation that could result in death or serious injury and/or damage to property.

▲ CAUTION

A potentially hazardous situation that may result in minor or moderate injury.

NOTICE:

Attention is called to observe a specified procedure or maintain a specific condition.

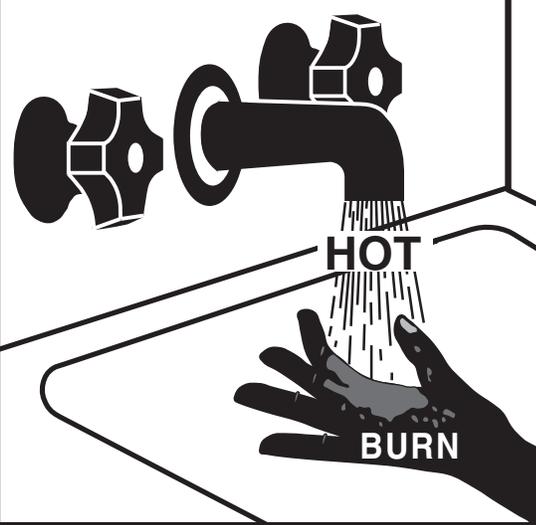
IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

⚠ DANGER!

WATER TEMPERATURE SETTING

Safety and energy conservation are factors to be considered when selecting the water temperature setting of water heater's thermostat. Water temperatures above 125°F can cause severe burns or death from scalding. To meet commercial water use needs, this water heater is capable of supplying outlet water temperatures at 170°F (77°C) or higher. 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 thermostat access panel.

⚠ **DANGER**



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.

See instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available, see manual.

NOTICE: Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See page 13 for more details and contact a licensed plumber or the local plumbing authority for further information.

Maximum water temperatures occur just after the thermostat has shut off the elements. To find the hot water temperature being delivered, turn on a hot water faucet and place a thermometer in the hot water stream and read the thermometer.

The following chart details the relationship of water temperature and time with regard to scald injury and may be used as a guide in determining the safest water temperature for your applications.

Time/Temperature Relationship in Scalds

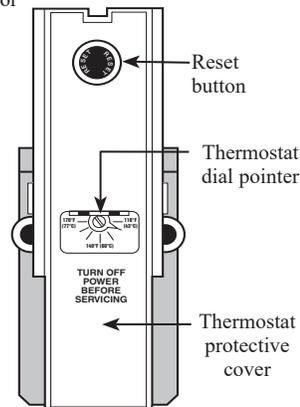
Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

⚠ DANGER: Applications involving small children, disabled, or elderly persons may require a 120°F or lower thermostat setting to prevent contact with “HOT” water.

⚠ DANGER: Hotter water increases the potential for Hot Water SCALDS.

Thermostat for all Models



The illustration above shows the temperature adjustment dial used for setting the water temperature. Refer to Operation section of this manual for detailed instructions in how to adjust the thermostat(s).

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 loss of life.

Be sure to read and understand the entire Use and Care Manual before attempting to install or operate this water heater. It may save you time and cost. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local electric utility.



FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires certain water heater models must be braced, anchored or strapped to resist falling or horizontal displacement due to earthquake motions. For the affected water heaters up to 52 gallon capacity, a brochure with generic earthquake bracing instructions can be obtained from: Office of the State Architect, 1102 Q Street, Sacramento, CA 95811 or you may call 916-445-8100 or ask a water heater dealer.

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



SAFETY PRECAUTIONS

Have the installer show you the location of the circuit breaker and how to shut it off if necessary. Turn off the circuit breaker if the water heater has been subjected to overheating, fire, flood, physical damage or if the ECO fails to shut off.

⚠ DANGER: To reduce the risk of electric shock disconnect all branch circuits before servicing. This water heater is designed to allow connection to more than one branch circuit

- Read this manual entirely before installing or operating the water heater.
- Use this appliance only for its intended purpose as described in this Use and Care Manual.
- Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.
- **DO NOT** attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to a qualified technician.
- **DO NOT** turn on the electrical supply or operate this water heater unless it is completely full of water.



READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY.

SAVE THESE INSTRUCTIONS

Installing the water heater.

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, utility company requirements or, in the absence of local codes, the latest edition of the National

Electrical Code. It is available from some local libraries or can be purchased from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269 as booklet ANSI/NFPA 70.

Location

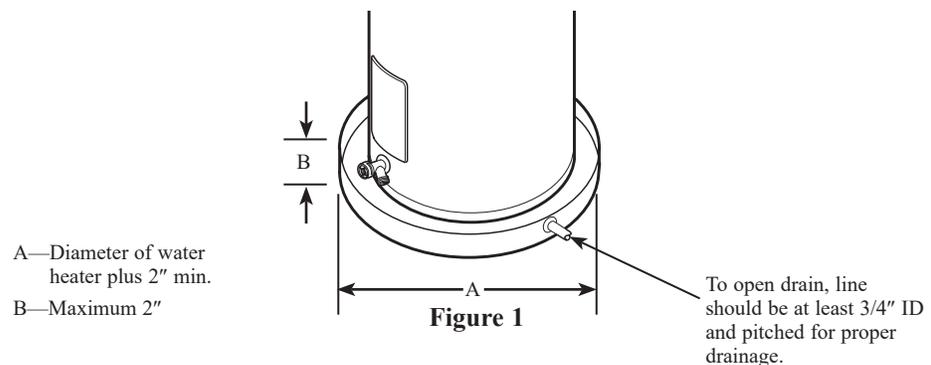
Locate the water heater in a clean dry area as near as practical to the area of greatest heated water demand. Long un-insulated hot water lines can waste energy and water.

Place the water heater in such a manner that the thermostat and element access panels can be removed to permit inspection and servicing such as removal of elements or checking controls.

The water heater and water lines should be protected from freezing temperatures. **DO NOT** install the water heater in outdoor, unprotected areas.

Make certain the floor underneath the water heater is strong enough to sufficiently support the weight of the water heater once it is filled with water.

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



NOTICE: Auxiliary drain pan **MUST** conform to local codes.

Drain Pan Kits are available from the store where the water heater was purchased, or any water heater distributor.

Inspect Shipment

Inspect the water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the

power supply corresponds to the water heater requirements.

Installing the water heater.

Thermal Expansion

Determine if a check valve exists in the inlet water line. Check with your local water utility. It may have been installed in the cold water line as a separate back flow preventer, 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 back flow 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. 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 in the cold water line between the water heater and the check valve (refer to the illustration below). The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over 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.

NOTICE: DO NOT apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the dip tube and/or heat traps.

Water Supply Connections

Refer to the illustration below for 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. Install a shut-off valve in the cold water line near the water heater.

Typical Installation

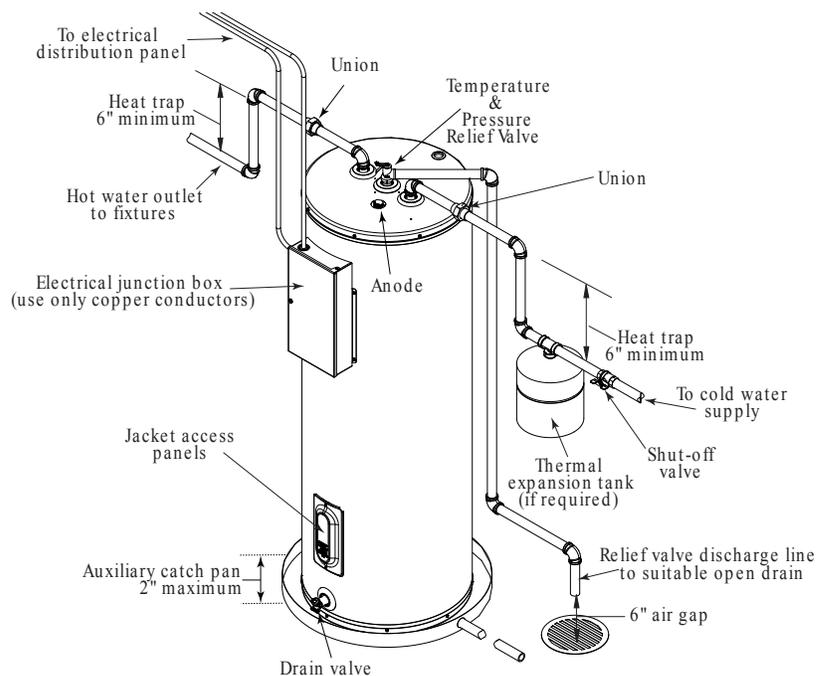


Figure 2

Installing the water heater.

▲CAUTION: 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 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 floor, and does not contact any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances."

Relief Valve

▲WARNING: 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 pressure rating of the relief valve must not exceed 150 psi (1,034 kPa), the maximum working pressure of the water heater as marked on the rating plate. The BTUH 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 (1 watt = 3.412 BTUH).

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.

▲WARNING: DO NOT turn on the electrical supply or operate this water heater unless it is completely full of water. 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.

To Fill the Water Heater

Make certain the drain valve on the water heater is completely closed.

Open the shut-off valve in 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.

Condensation

Condensation can form on the tank when it is first filled with water. Condensation might also occur with a heavy water draw and very cold inlet water temperature.

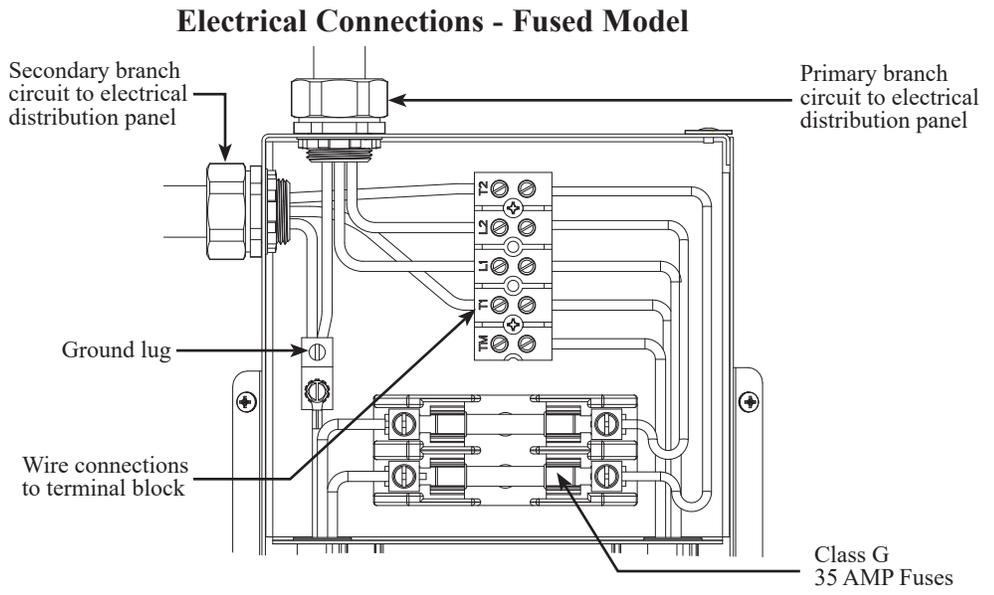
This condition is not unusual, and will disappear after the water becomes heated. If, however, the condensation continues, examine the piping and fittings for possible leaks.

Installing the water heater.

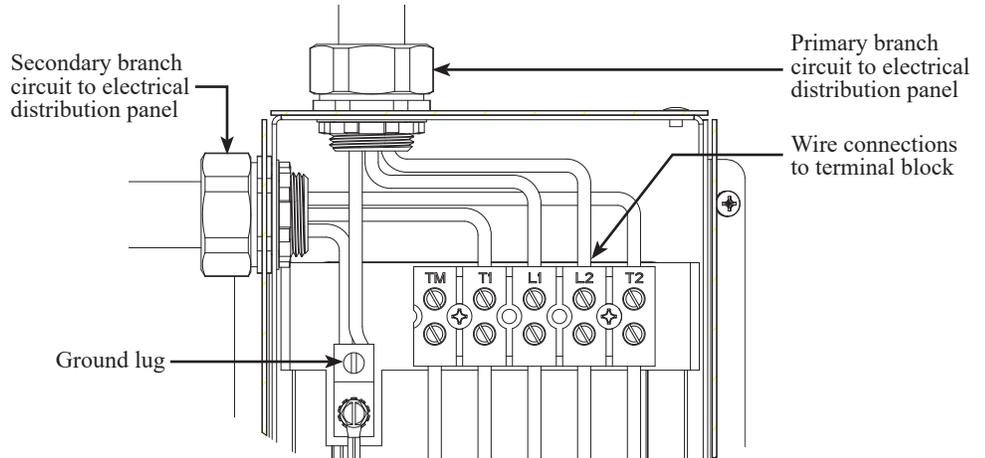
Electrical Connections - Terminal Block Configuration

⚠CAUTION: The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Non-metallic piping, dielectric unions, flexible connectors etc. can cause the water heater to be electrically isolated.

DO NOT turn on the electrical supply or operate this water heater unless it is completely full of water.



Electrical Connections - Unfused Model



Some ELD model water heaters are equipped with a terminal block to allow field conversion from single-phase to three-phase and/or simultaneous to non-simultaneous operation of the elements. Please refer to the "Potential Field Conversions" table in the next section to determine the possible field conversion configuration. Please refer to the wiring diagram in the following sections for the factory and field wiring of the terminal block units. The installation must conform to local codes or the latest edition of National Electric Code.

GROUNDING -The branch circuit wiring should include a separate conductor for grounding. It should be attached to the ground terminal of the water heater to

reduce the risk of electric shock. The water heater must be grounded in accordance with local codes or the latest edition of the National Electric Code.

The terminal block configuration is shipped from the factory as a single phase simultaneous operation, and it is designed to be wired to two independent branch circuits. The first branch circuit is connected to terminals L1 and L2, and it must be sized according to the upper element rating. The second branch circuit is connected to terminals T1 and T2, and it must be sized according to the lower element rating. In this configuration, both elements may turn on at the same time during a heating cycle.

Installing the water heater.

⚠CAUTION: 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.

Electrical Connections - Field Conversions

Potential Field Conversions

Base Model	Single Phase Simultaneous	Single Phase Non-Simultaneous	Single Phase Non-Simultaneous with Off- Peak Meter or Timer	Single Phase Non-Simultaneous with Off- Peak Meter or Timer (3-wire)	Three Phase Simultaneous	Three Phase Non-Simultaneous
ELDS30	YES	YES	YES	YES	YES	YES
ELDS40	YES	YES	YES	YES	YES	YES
ELDS52	YES	YES	YES	YES	YES	YES
ELD30	YES	YES	YES	YES	YES	YES
ELD40	YES	YES	YES	YES	YES	YES
ELD52	YES	YES	YES	YES	YES	YES
ELD66	YES	-	YES	-	YES	-
ELD80	YES	-	YES	-	YES	-
ELD120	YES	-	YES	-	YES	-

For installation to a single branch circuit in either single phase or three phase simultaneous or non-simultaneous operation, the water heater must be converted in the field according to below instructions.

Single Phase Simultaneous

To install the water heater as a single phase simultaneous operation to a single branch circuit, remove the black/white wire from terminal T1 and the red/black wire from terminal T2. The black/white wire is field connected with the yellow/black wire to terminal L1. The red/black wire is field connected with blue/white wire to terminal L2. The branch circuit is connected to terminals L1 and L2, and it must be sized according to the total rating of the water heater (upper element rating+ lower element rating).

Single Phase Non-Simultaneous

To install the water heater as a single phase non-simultaneous operation to a single branch circuit, remove the black/white wire from terminal T1 and the red/black wire from terminal T2. The black/white wire is field connected with brown/white wire to terminal TM. The red/black wire is field connected with blue/white wire to terminal L2. The branch circuit is connected to terminals L1 and L2, and it must be sized according to either the upper element rating or the lower element rating, whichever is greater. If they are equal, size the branch circuit according to the lower element rating.

Single Phase Non-Simultaneous with Off-Peak Meter or Timer

To install the water heater as a single phase non-simultaneous operation with off-peak meter or timer, remove the red/black wire from terminal T2. The red/black wire is field connected with blue/white wire to terminal L2. The off-peak meter or timer is connected to terminals TM and T1. The branch circuit is connected to terminal L1 and L2, and it must be sized according to either the upper element or the lower element rating, whichever is greater. If they are equal, size the branch circuit according to the lower element rating.

Single Phase Non-Simultaneous with Off-Peak Meter or Timer (3-wire)

To install the water heater as a single phase non-simultaneous operation with off-peak meter or timer (3-wire), remove the black/white wire from terminal T1. The black/white wire is field connected with brown/white wire to terminal TM. The off-peak meter or timer is connected to terminal T2. The branch circuit is connected to terminals L1 and L2, and it must be sized according to either the upper element or the lower element rating, whichever is greater. If they are equal, size the branch circuit according to the lower element rating.

Three Phase Simultaneous

To install the water heater as a three phase simultaneous operation, remove

Installing the water heater.

▲CAUTION: To reduce the risk of electric shock, disconnect both branch circuits before servicing the water heater installed in this configuration.

▲CAUTION: For the terminal block configuration, the water heater is dual rated for three-phase or single-phase and non-simultaneous or simultaneous operation. Refer to the wiring diagram and inspect the field wiring to determine the installed water heater configuration.

the black/white wire from terminal T1. The black/white wire is field connected with yellow/black wire to terminal L1. The branch circuit is connected to terminals L1, L2, and T2. The branch circuit must be sized according to the total rating of the water heater in three phase operation.

Three Phase Non-Simultaneous

To install the water heater as a three phase non-simultaneous operation, remove the black/white wire from terminal T1. The black/white wire is field connected with brown/white wire to terminal TM. The branch circuit is connected to terminals L1, L2, and T2. The branch circuit must be sized according to either the upper element or the lower element rating, whichever is greater. If they are equal, size the

branch circuit according to the lower element rating.

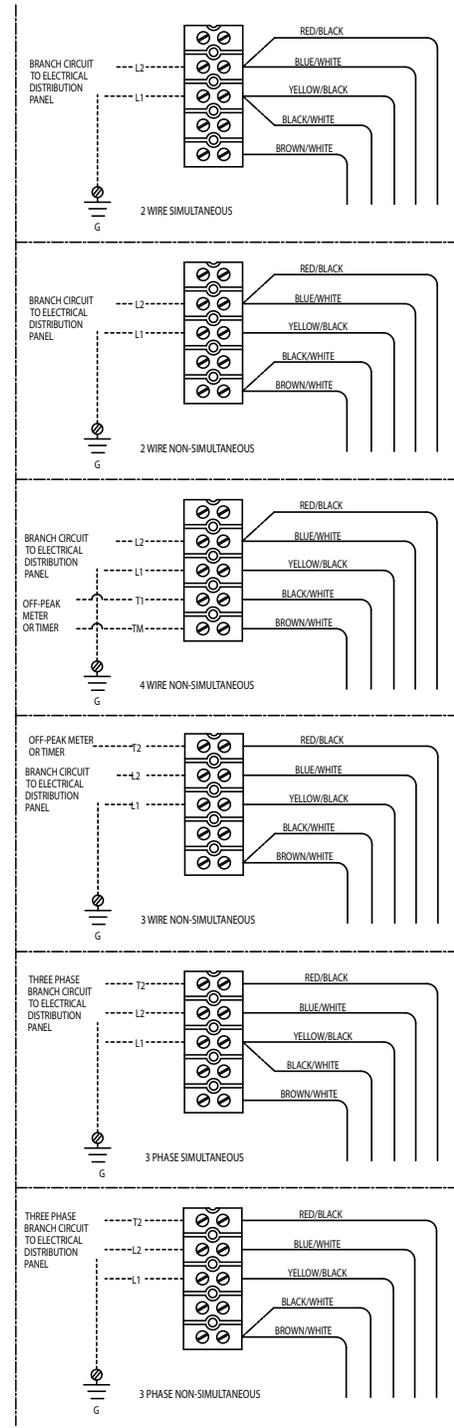
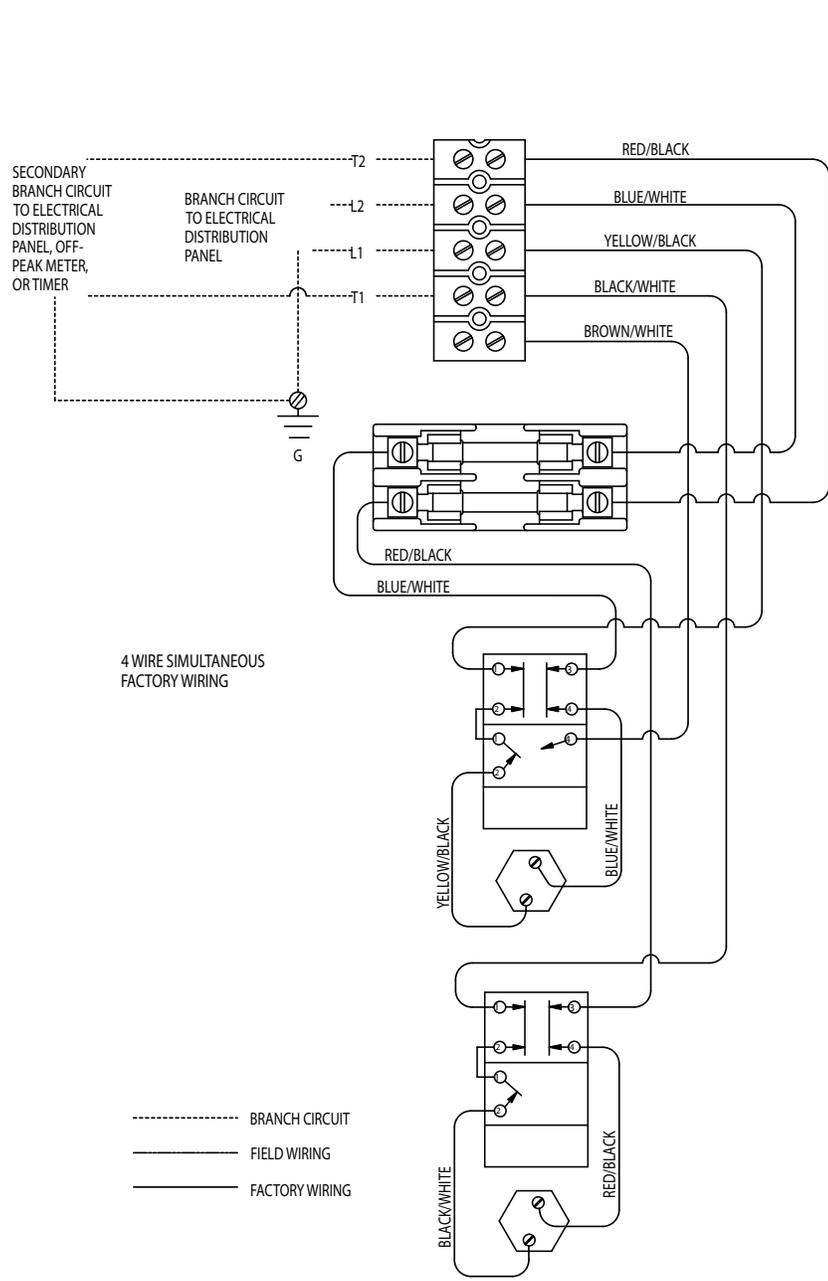
Wire Sizing

Check the rating plate on the water heater for correct voltage. Refer to the column under the corresponding phase (1-phase or 3-phase) and element operation (non-simultaneous or simultaneous) for the rated amperage of the water heater. The branch circuit and its overcurrent protection must be sized in accordance with the local codes or the National Electric Code NFPA 70 using the correct amperage rating on the water heater.

Once installation is complete, compare the installation with the wiring diagram to ensure that the conversion to the desired configuration is complete.

Installing the water heater.

Manual Wiring Diagram Fused



Installing the water heater.

Branch Circuit Sizing and Wire Size Guide, For ELD(S) 30, 40, and 52 Models

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

Single Phase Non-Simultaneous or Three phase Non-Simultaneous

Element Wattage	Recommended Over Current Protection (Fuse or Circuit Breaker Amperage Rating)				Copper Wire Size AWG Based on NEC Table 310.15 (B)(16) (formerly Table 310.16)			
	208V	240V	277V*	480V	208V	240V	277V*	480V
3,000	20	20	15	15	12	12	14	14
4,000	25	25	20	15	10	10	12	14
4,500	30	25	20	15	10	10	12	14
5,000	30	30	25	15	10	10	10	14
5,500	35	30	25	15	8	10	10	14
6,000	40	35	30	20	8	8	10	12

*277V is for single phase installation only.

For two independent branch circuits installation, both branch circuits must be sized according to the table.

Single Phase Simultaneous Wiring

Total Element Wattage	Recommended Over Current Protection (Fuse or Circuit Breaker Amperage Rating)				Copper Wire Size AWG Based on NEC Table 310.15 (B)(16) (formerly Table 310.16)			
	208V	240V	277V	480V	208V	240V	277V	480V
6,000	40	35	30	20	8	8	10	12
8,000	50	45	40	25	8	8	8	10
9,000	60	50	45	25	6	8	8	10
10,000	60	60	45	30	6	6	8	10
11,000	70	60	50	30	4	6	8	10
12,000	80	70	60	35	4	6	6	8

3 Phase Simultaneous Wiring

Total Element Wattage	Recommended Over Current Protection (Fuse or Circuit Breaker Amperage Rating)				Copper Wire Size AWG Based on NEC Table 310.15 (B)(16) (formerly Table 310.16)			
	208V	240V	277V	480V	208V	240V	277V	480V
6,000	35	30	NA	15	8	10	NA	14
8,000	45	40	NA	20	8	8	NA	12
9,000	50	45	NA	20	8	8	NA	12
10,000	60	45	NA	25	6	8	NA	10
11,000	60	50	NA	25	6	8	NA	10
12,000	70	60	NA	30	6	6	NA	10

Installing the water heater.

Branch Circuit Sizing and Wire Size Guide, For ELD 66, 80, and 120 Models

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

208 Volt Rated Water Heaters

Factory Shipped Rating		
Volts	208	
Operation	SIM	
Phase	1-PH	3-PH
Rating	12100	12100
AMP	58	50
OCPD	80	70
Wire	4	6

277 Volt Rated Water Heaters

Factory Shipped Rating		
Volts	277	
Operation	SIM	
Phase	1-PH	3-PH
Rating	12100	NA
AMP	44	NA
OCPD	60	NA
Wire	6	NA

240 Volt Rated Water Heaters

Factory Shipped Rating		
Volts	240	
Operation	SIM	
Phase	1-PH	3-PH
Rating	12100	12100
AMP	50	44
OCPD	70	60
Wire	6	6

480 Volt Rated Water Heaters

Factory Shipped Rating		
Volts	480	
Operation	SIM	
Phase	1-PH	3-PH
Rating	12100	12100
AMP	25.2	22
OCPD	35	30
Wire	8	10

Installing the water heater.

▲WARNING: If local codes require external application of insulation blanket kits the manufacturer's instructions included with the kit must be carefully followed.

Insulation Blankets

Insulation blankets, available to the general public, for external use on electric water heaters are not necessary. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. This water heater meets or exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements making an insulation blanket unnecessary.

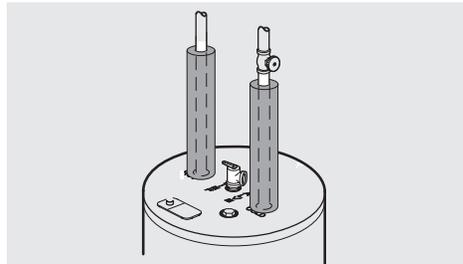
The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving 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.

▲CAUTION: If local codes require the application of an external insulation blanket to this water heater, pay careful attention to the following so as not to restrict the proper function and operation of the water heater:

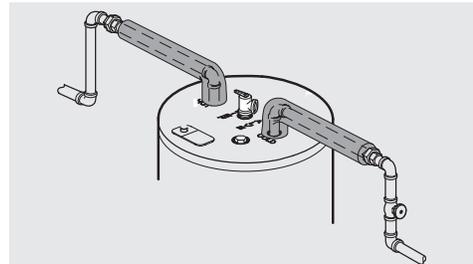
- **DO NOT** cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.
- **DO NOT** apply insulation to the top of the water heater. This could interfere with the safe operation of the electrical junction box.
- **DO NOT** cover the jacket access panel(s) to the thermostat(s) and heating element(s), or pressure and temperature relief valve.
- Inspect the insulation blanket frequently.

Hot and Cold Pipe Insulation Installation



Typical vertical piping arrangement

For increased energy efficiency, some water heaters have been supplied with two 24" sections of pipe insulation.



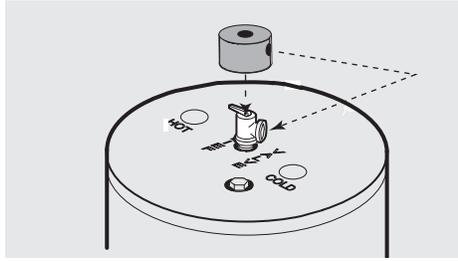
Typical horizontal piping arrangement

Please install the insulation, according to the illustrations above, that best meets your requirements.

Installing the water heater.

Relief Valve Insulation Installation

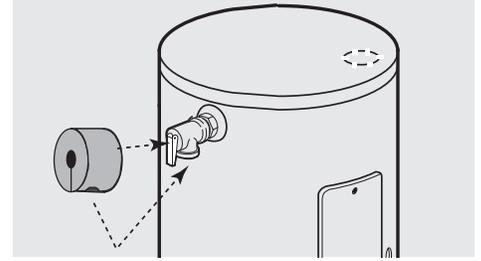
▲ CAUTION: Ensure the T&P Valve opening is not obstructed by the insulation.



Typical top connection arrangement

For increased energy efficiency, some water heaters have been supplied with a 2-3/8" section of pipe insulation.

Please install the insulation, according to the illustrations above, that best meets your requirements.



Typical side connection arrangement

Slip the insulation cover over the T&P Valve through the center hole and align the hole in the side with the opening of the T&P Valve.

Heat Trap

For increased energy efficiency, some water heaters have been supplied with factory installed internal or external heat traps in the hot outlet and cold water inlet openings.

NOTICE: DO NOT apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the dip tube and/or heat traps.

Installation Checklist

A. Water Heater Location

- Close to area of heated water demand.
 - Indoors and protected from freezing temperatures.
 - Area free of flammable vapours.
 - Provisions made to protect area from water damage.
 - Sufficient room to service heater.
 - Drain pan installed.
-

B. Water Supply

- Water heater completely filled with water.
 - Air purged from water heater and piping.
 - Water connections tight and free of leaks.
-

C. Relief Valve

- Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
 - Discharge line protected from freezing.
-

D. Wiring

- Power Supply voltage agrees with water heater rating plate.
- Branch circuit wire and fusing or circuit breaker of proper size.
- Electrical connections tight and unit properly grounded.

Operating the water heater.

▲CAUTION: 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 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** **DO** turn off power to water heater if it has been subjected to over heating, fire, flood, physical damage.
- B** **DO NOT** turn on water heater unless it is completely filled with water.
- C** **DO NOT** turn on water heater if cold water supply shut-off valve is closed.
- D** If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified service technician perform the work.

▲WARNING: If the water heater has been subjected to fire, flood or physical damage, turn off power to water heater, and **DO NOT** operate the water heater again until it has been checked by a qualified service technician.

NOTICE: **DO NOT** use this appliance if any part has been under water.

Immediately call a qualified installer or service agency to replace a flooded water heater. DO NOT attempt to repair the unit! It must be replaced.

Safety Controls

The water heater is equipped with a combination thermostat and temperature limiting control (ECO) that is located above the heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the temperature limiting control (ECO) breaks the power circuit to the heating element. Once the control opens, it must be reset manually.

▲CAUTION: The cause of the high temperature condition must be investigated by qualified service technician and corrective action must be taken before placing the water heater in service again.

To reset the temperature limiting control:

- 1** Turn off the power to the water heater.

▲DANGER: To reduce the risk of electric shock, disconnect all branch circuits before opening the access panel(s). The water heater may be connected to more than one branch circuit.

- 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.

Operating the water heater.

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

Water Temperature Setting

The temperature of the water in the water heater can be regulated by setting the temperature dial of the adjustable surface mounted thermostat(s) located behind the jacket access panel(s).

Dual element heaters have two thermostats.

Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater's thermostat(s). The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations the thermostat(s) are factory set at 120°F or less where local codes require. This is the recommended starting point.

Water temperatures above 125°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 thermostat access panel.

Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See page 4 for more details and 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 installation.

If the water heater has been subjected to fire, flood or physical damage, turn off power to water heater, and **DO NOT** operate the water heater again until it has been checked by a qualified service technician.

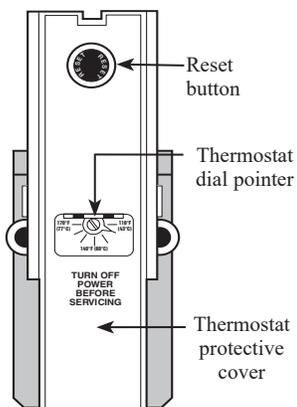
NOTICE: DO NOT use this appliance if any part has been under water. Immediately call a qualified installer or service agency to replace a flooded water heater. DO NOT attempt to repair the unit! It must be replaced.

Time/Temperature Relationship in Scalds

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

Table courtesy of Shriners Burn Institute

⚠ DANGER: Hotter water increases the potential for Hot Water SCALDS.



If adjustment is necessary

1 Turn off the power to the water heater.

⚠ DANGER: To reduce the risk of electric shock, disconnect all branch circuits before opening the access panel(s). The water heater may be connected to more than one branch circuit.

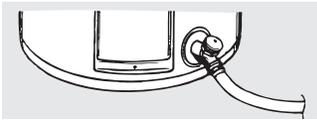
2 Remove the jacket access panel(s) and insulation exposing the thermostat(s).

The thermostat protective cover(s) should not be removed.

3 Using a small screwdriver, set the thermostat(s) dial pointer(s) to the desired temperature.

4 Replace the insulation and jacket access panel(s). Turn on the power to the water heater.

Care and cleaning of the water heater.



Draining the Water Heater

⚠CAUTION: Shut off power to the water heater before draining water.

⚠DANGER: To reduce the risk of electric shock, disconnect all branch circuits before opening the access panel(s). The water heater may be connected to more than one branch circuit.

⚠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.

In order to drain the water heater, turn off the cold water supply. Open a hot water faucet or lift the handle on the relief valve to admit air to the tank.

Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain. Open the valve.

⚠DANGER: Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with 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.

NOTICE: 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.

Routine Preventative Maintenance

Properly maintained, your water heater will provide years of dependable trouble-free service.

It is suggested that a routine preventive maintenance program be established and followed by the user.

It is further recommended that a periodic inspection of the operating controls, heating element 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 plumbing contract to inspect.

At least once a year, lift and release the lever handle on the temperature pressure relief valve, located near the top of the water heater, to make certain the valve operates freely. Allow several gallons to flush through the discharge line to an open drain.

A water heater's tank can act as a setting basin for solids suspended in the water. It is therefore not uncommon for hard water deposits to accumulate in the bottom of the tank. It is suggested that a few quarts of water be drained from the water heater's tank every month to clean the tank of these deposits.

Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a banging noise heard in a water pipe. Strategically located risers in the water pipe system or water hammer arresting devices can be used to minimize the problem.

The anode rod should be removed from the water heater's tank annually for inspection and replaced when more than 6" of core wire is exposed at either end of the rod.

Make sure the cold water supply is turned off before removing anode rod.

Care and cleaning of the water heater.

NOTICE: Refer to the Hydrogen Gas Caution in the Operating Instructions.

Vacation and Extended Shut-Down

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 build-up of dangerous hydrogen gas.

The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shut-down 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.

NOTICE: DO NOT remove the anode rod from the water heater's tank, except for inspection and/or replacement, as operation with the anode rod removed will greatly shorten the life of the glass lined tank and will exclude warranty coverage.

Anode Rod

This water heater is equipped with an anode rod designed to prolong the life of the glass lined tank. The anode rod is slowly consumed, thereby eliminating or minimizing corrosion of the glass lined tank.

Water sometimes contains a high sulfate and/or mineral content and together with cathodic protection process can produce a hydrogen sulfide, or rotten egg odor in the heated water. Chlorination of the water supply should minimize the problem.

Replacement Parts.

Instructions For Placing a Parts Order

Address parts orders to the distributor or store where the heater was purchased.

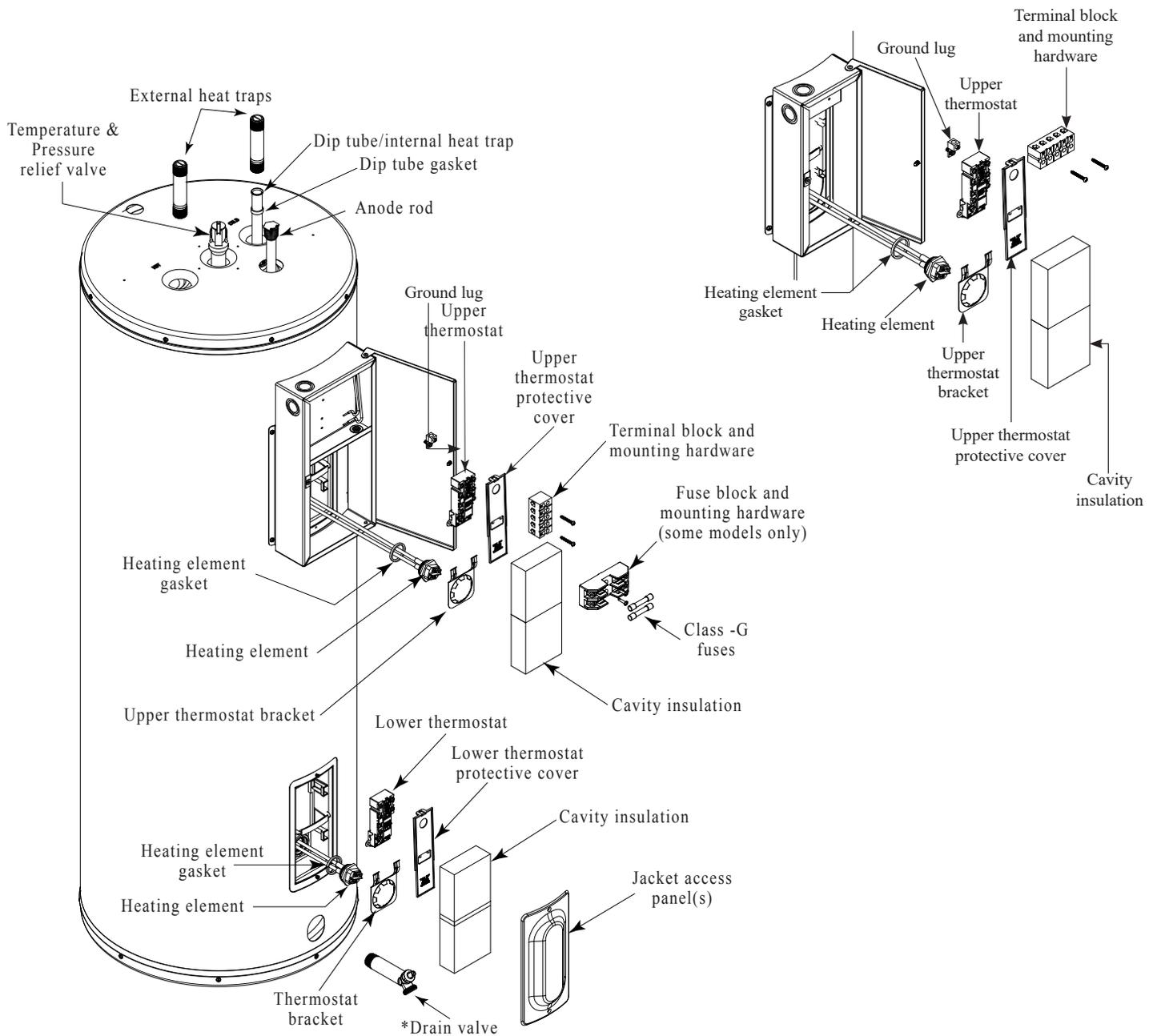
All parts orders should include:

- 1 The model and serial number of the water heater from the rating plate.
- 2 Specify voltage and wattage as marked on the rating plate.

- 3 Part description (as noted below) and number of parts desired.

⚠ CAUTION: For your safety DO NOT attempt repair of electrical wiring, thermostat(s), heating elements or other operating controls. Refer repairs to qualified service personnel.

Control Panel for Unfused Models



*May differ in actual appearance.

Before You Call For Service...



Troubleshooting Tips

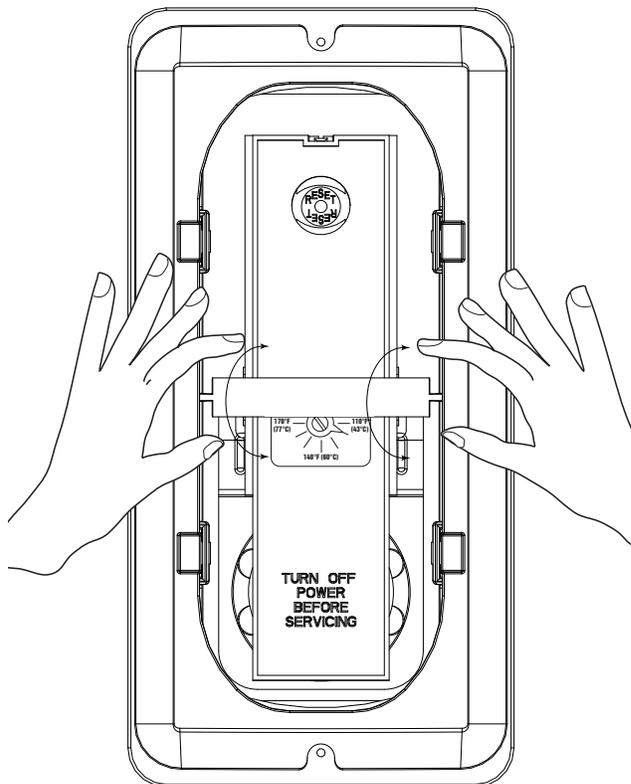
Save time and money! Review the chart on this page first and you may not need to call for service.

Problem	Possible Causes	What To Do
Rumbling noise	Water conditions in your location caused a build up of scale or mineral deposits on the heating elements.	<ul style="list-style-type: none"> Remove and clean the heating elements.
Relief valve producing popping noise or draining	Pressure build up caused by thermal expansion in a closed system.	<ul style="list-style-type: none"> This is an unacceptable condition and must be corrected. Contact the water supplier or plumbing contractor on how to correct this. DO NOT plug the relief valve outlet.
Rattling noise during periods of water usage	Internal heat trap fittings in operation.	<ul style="list-style-type: none"> This is normal for heat trap fittings when in operation and does not indicate a need for service.
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater.	<ul style="list-style-type: none"> Wait for the water heater to recover after an abnormal demand.
	A fuse is blown or a circuit breaker tripped.	<ul style="list-style-type: none"> Replace fuse or reset circuit breaker.
	Electric supply may be off.	<ul style="list-style-type: none"> Make sure electric supply to water heater and disconnect switch, if used, is in the ON position.
	The thermostat may be set too low.	<ul style="list-style-type: none"> See the Operating the water heater section of this manual.
	Leaking or open hot water faucets.	<ul style="list-style-type: none"> Make sure all faucets are closed.
	Electric service to your location may be interrupted.	<ul style="list-style-type: none"> Contact the local electric utility.
	Improper wiring.	<ul style="list-style-type: none"> See the Installing the water heater section of this manual.
	Manual reset limit (ECO).	<ul style="list-style-type: none"> See the Operating the water heater section of this manual.
Water is too hot	Cold water inlet temperature may be colder during the winter months.	<ul style="list-style-type: none"> This is normal. The colder inlet water takes longer to heat.
	The thermostat is set too high.	<ul style="list-style-type: none"> See the Operating the water heater section of this manual.

⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostats, heating elements or other safety devices. Refer repairs to qualified service personnel.

Cavity Insert Instructions

The following instructions are intended for qualified service personnel ONLY, and should only be done when necessary.



In order to replace the thermostat or heating element, remove the cavity insert crossbar by following the instructions below:

- 1 Turn off the power to the water heater.
⚠ DANGER: To reduce the risk of electric shock, disconnect all branch circuits before opening the access panel(s). The water heater may be connected to more than one branch circuit.
- 2 Remove the jacket access panel(s) and insulation.
- 3 Rotate the crossbar up and down until it breaks away from the remainder of the cavity insert. (See illustration to the left)
Discard the crossbar. It cannot and need not be replaced.
- 4 Replace the thermostat and/or element as necessary.
- 5 Replace the insulation and jacket access panel(s) before turning on the power to the water heater.

NOTICE: The cavity insert crossbar is necessary for the manufacturing process only. The removal of the crossbar will not interfere with the operation of the water heater.

Notes:

Notes:

Notes:

IF YOU NEED SERVICE



1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.
2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:
800 Interstate Park Drive
Montgomery, Alabama 36109
Phone: 1-800-432-8373

When contacting the manufacturer, the following information will be requested:

- a. Model and serial number of the water heater as shown on the rating plate attached to the jacket of the heater.
- b. Address where the water heater is located and physical location.
- c. Name and address of installer and any service agency who performed service on the water heater.
- d. Date of original installation and dates any service work was performed.
- e. Details of the problems as you can best describe them.
- f. List of people, with dates, who have been contacted regarding your problem.