

# Installation Instructions and Use & Care Guide



## Commercial Electric Water Heater

- DELC-30/40/50
- DENC-30/40
- DEJC-50/66



Read this manual and the labels on the water heater before you install, operate, or service it. If you have difficulty following the directions, or aren't sure you can safely and properly do any of this work yourself:

- Call our Technical Assistance Hotline at 1-888-479-8324. We can help you with installation, operations, troubleshooting, or maintenance. Before you call, write down the model and serial number from the water heater's data plate.

Incorrect installation, operation, or service can damage the water heater and property, and present risks including fire, scalding, electric shock, and explosion, causing serious injury or death.



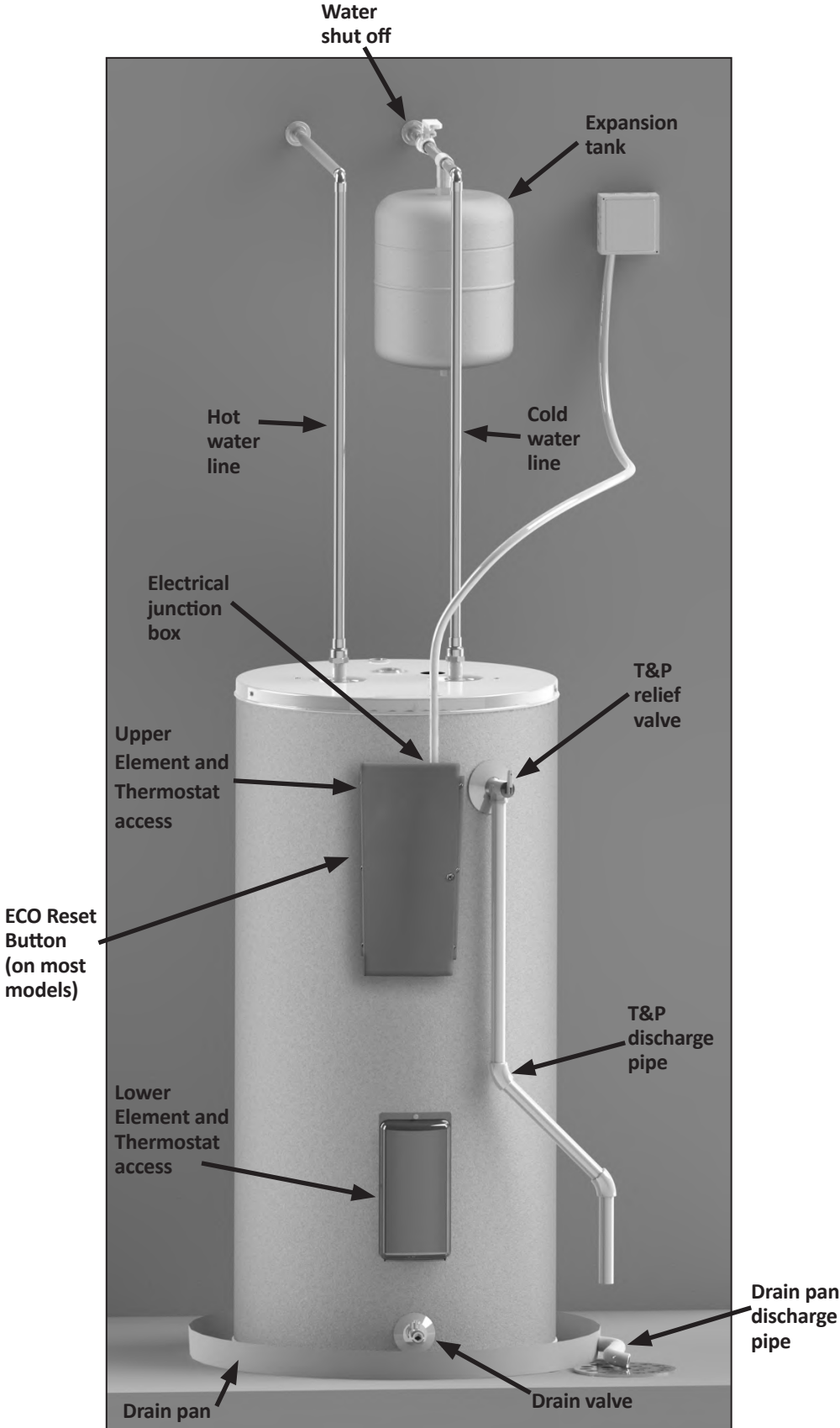
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Keep this manual in the pocket on heater for future reference whenever maintenance, adjustment or service is required.

# COMPLETED INSTALLATION (TYPICAL)





# IMPORTANT SAFETY INFORMATION

To reduce the risk of property damage, serious injury or death, read and follow the precautions below, all labels on the water heater, and the safety messages and instructions throughout this manual.

## RISKS DURING INSTALLATION AND MAINTENANCE



### Electric Shock Risk

Contact with the electrical parts in the junction box and behind the access doors can result in severe injury or death from electrical shock:

- Disconnect power by opening the circuit breaker or removing the fuses before installing or servicing.
- Use a non-contact circuit tester to confirm that power is off before working on or near any electrical parts.
- Replace the junction box cover and access doors after servicing.



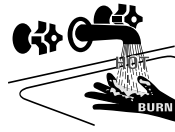
### Lifting Risk

**▲ WARNING!** The water heater is heavy. Follow these

precautions to reduce the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

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

## RISKS DURING OPERATION



### Scalding Risk

This water heater can make water hot enough to cause severe burns instantly, resulting in severe injury or death.

- Feel water before bathing or showering
- To reduce the risk of scalding, install Thermostatic Mixing Valves (temperature limiting valves) at each point-of-use. These valves automatically mix hot and cold water to limit the temperature at the tap. Mixing valves are available from your local plumbing supplier. Follow manufacturer's instructions for installation and adjustment of the valves.
- The thermostat(s) on this water heater have been factory set to approximately 140°F (60°C) to reduce the risk of scalding. Higher temperatures increase the risk of scalding, but even at 140°F (60°C), hot water can scald. If you choose a higher temperature, Thermostatic Mixing Valves are particularly important to help avoid scalding.

Temperature	Time to Produce a Serious Burn
120°F (49°C)	More than 5 minutes
130°F (54°C)	About 30 seconds
140°F (60°C)	Less than 5 seconds
150°F (66°C)	About 1½ seconds
160°F (71°C)	About ½ second
181°F (83°C)	Nearly instantaneous

For information about changing the factory thermostat setting(s), refer to the "Adjusting Temperature" section in this manual (see page 19, step 10).

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

- Water temperature will be hotter if someone adjusted the thermostat(s) to a higher setting.
- Problems with the thermostat(s), or other malfunctions may result in higher than expected water temperatures.
- If the water heater is in a hot environment, the water in the tank can become as hot as the surrounding air, regardless of the thermostat setting.
- If the water supplied to the water heater is pre-heated (for example, by a solar system) the temperature in the tank may be higher than the water heater's thermostat setting.

**To reduce the risk of unusually hot water reaching the fixtures, install Thermostatic Mixing Valves.**

If there is a particular risk of scalding (for example, the elderly, children, or people with disabilities) or if there is a local/provincial law requiring a certain water temperature at the hot water tap, then these precautions are particularly important.

According to a national standard American Society of Sanitary Engineering (ASSE 1070) and most local plumbing codes, the water heater's thermostat should not be used as the sole means to regulate water temperature and avoid scalds.

Properly adjusted Thermostatic Mixing Valves installed, allow you to set the tank temperature to a higher setting without increasing risk of scalds. A higher temperature setting allows the tank to provide much more hot water and can help provide proper water temperatures for appliances such as dishwashers and washing machines. Higher tank temperatures (140°F, 60°C) also kill bacteria that cause a condition known as "smelly water" and can reduce the levels of bacteria that cause water-borne diseases.

#### Water Contamination Risk

Do not use chemicals that could contaminate the potable water supply. Do not use piping that has been treated with chromates, boiler seal, or other chemicals.



#### Fire Risk

To reduce the risk of a fire that could destroy property and seriously

injure or kill people:

- Do not store things that can burn easily such as paper or clothes next to the water heater.
- Be sure the junction box cover and the access door covers are in place. These covers keep debris from entering and potentially being ignited, and help keep any internal fires from spreading.
- Keep the water heater from becoming wet. Immediately shut the water heater off and have it inspected by a qualified person if you find that the wiring, thermostat(s) or surrounding insulation have been exposed to water in any way (leaks from plumbing or leaks from the water heater itself can damage property and could cause a fire risk). If the water heater is subjected to flood conditions or the thermostat(s) have been submerged in water, the entire water heater must be replaced.
- Make electrical connections properly, according to the instructions on page 18. Use 10 gauge solid copper wire. Use a UL listed or CSA approved strain relief. Connect ground wire to green ground screw.



#### Explosion Risk

High temperatures and pressures in the water heater tank can cause an

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

A nationally recognized testing laboratory maintains periodic inspection of the valve production process and certifies that it meets the requirements for Relief Valves for Hot

Water Supply Systems, ANSI Z21.22/ CSA 4.4. The T&P Relief Valve's relief pressure must not exceed the working pressure rating of the water heater as stated on the rating plate.

Maintain the T&P Relief Valve properly. Follow the maintenance instructions provided by the manufacturer of the T&P Relief Valve (label attached to T&P Relief Valve) and the procedure that starts on page 27.

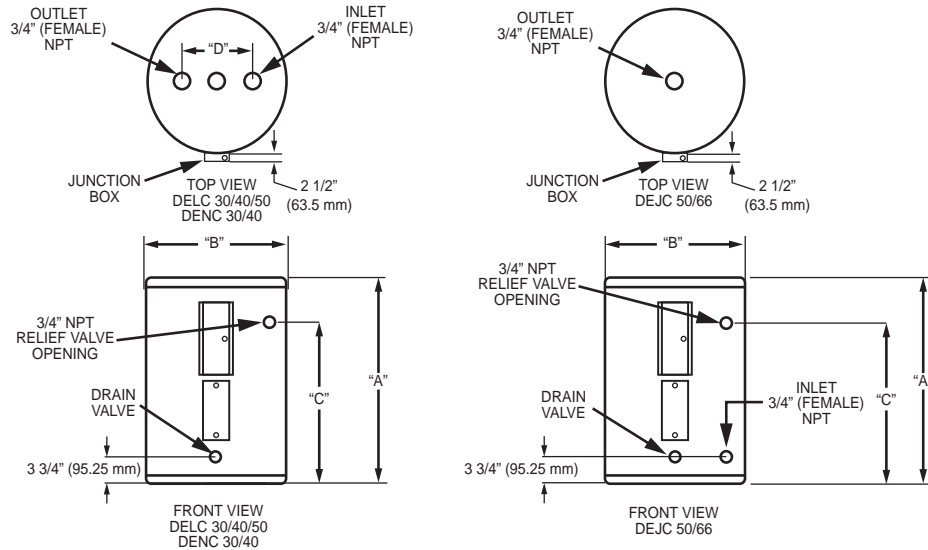
An explosion could occur if the T&P Relief Valve or discharge pipe is blocked. Do not cap or plug the T&P Relief Valve or discharge pipe.

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

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

# GETTING STARTED

GETTING STARTED



**TABLE 1 - ROUGH-IN DIMENSIONS**

Models Dimensions	No. of Elements	Tank Capacity		A		B		C		D		Approx. Shipping Weight	
		US Gals.	Litres	inches	mm	inches	mm	inches	mm	inches	mm	Lbs.	Kg.
DELC-30	2	28	106	31-5/8	803	24	610	21-15/16	557	8	203	120	54
DELC-40	2	38	144	33-7/8	860	26	660	23-7/8	606	8	203	115	52
DELC-50	2	51	193	36	914	26-1/2	673	26-1/8	664	8	203	175	79
DENC-30	2	30	114	39-7/8	1013	22	559	30-7/16	773	8	203	100	45
DENC-40	2	40	151	49-7/8	1267	20-1/2	521	40-3/4	1035	8	203	103	47
DEJC-50	2	48	182	48-1/4	1226	22	559	40-5/16	1024	Side Inlets	-	127	58
DEJC-66	2	66	250	60-1/2	1537	22	559	52-3/4	1340	Side Inlets	-	151	68

**TABLE 2 - RECOVERY CAPACITIES**

Element Wattage (Upper/Lower)	INPUT KW	U.S. Gallons/Hr and Litres/Hr at TEMPERATURE RISE INDICATED											
		F°	36F°	40F°	54F°	60F°	72F°	80F°	90F°	100F°	108F°	120F°	126F°
		C°	20C°	22.2C°	30C°	33.3C°	40C°	44.4C°	50C°	55.5C°	60C°	66.6C°	70C°
<b>NON-SIMULTANEOUS</b>													
/1500		GPH	17	15	11	10	8	8	7	6	6	5	5
	1.5	LPH	64	58	43	38	32	29	26	23	21	19	18
/2000		GPH	23	20	15	14	11	10	9	8	8	7	6
	2.0	LPH	85	77	57	51	43	38	34	31	28	26	24
/2500		GPH	28	25	19	17	14	13	11	10	9	8	8
	2.5	LPH	107	96	71	64	53	48	43	38	36	32	30
3000/3000		GPH	34	30	23	20	17	15	14	12	11	10	10
	3.0	LPH	128	115	85	77	64	58	51	46	43	38	37
3500/3500		GPH	40	36	26	24	20	18	16	14	13	12	11
	3.5	LPH	151	136	98	90	75	68	60	52	49	45	41
4000/4000		GPH	45	41	30	27	23	20	18	16	15	14	13
	4.0	LPH	170	153	114	102	85	77	68	61	57	51	49
4500/4500		GPH	51	46	34	30	25	23	20	18	17	15	14
	4.5	LPH	192	173	128	115	96	86	77	69	64	58	55
5000/5000		GPH	56	51	38	34	28	25	23	20	19	17	16
	5.0	LPH	213	192	142	128	107	96	85	77	71	64	61
5500/5500		GPH	63	56	42	37	31	28	25	22	21	18	18
	5.5	LPH	238	211	158	140	117	105	94	83	79	68	68
6000/6000		GPH	68	61	45	41	34	30	27	24	23	20	19
	6.0	LPH	256	230	170	153	128	115	102	92	85	77	73
<b>SIMULTANEOUS OPERATION</b>													
3000/3000		GPH	68	61	45	41	34	30	27	24	23	20	19
	6	LPH	256	230	170	153	128	115	102	92	85	77	73
3500/3500		GPH	80	72	53	48	40	36	32	28	26	24	22
	7	LPH	302	272	200	181	151	136	121	105	98	90	83
4000/4000		GPH	90	81	60	54	45	41	36	32	30	27	26
	8	LPH	341	307	227	205	170	153	136	123	114	102	97
4500/4500		GPH	101	91	68	61	51	46	41	36	34	30	29
	9	LPH	384	345	256	230	192	173	153	138	128	115	110
5000/5000		GPH	113	101	75	68	56	51	45	41	38	34	32
	10	LPH	426	384	284	256	213	192	170	153	142	128	122
5500/5500		GPH	126	113	84	75	63	56	50	45	42	37	36
	11	LPH	476	427	317	283	238	211	189	170	158	140	136
6000/6000		GPH	135	122	90	81	68	61	54	49	45	41	39
	12	LPH	511	460	341	307	256	230	205	184	170	153	146

Recovery capacities at 100° F rise equal: for non-simultaneous element operation = 4.1 gal. x KW of one element; for simultaneous element operation = 4.1 gal. x 2/3 KW of both elements. For other rises multiply element KW as previously explained by 410 and divide by temperature rise. Full load current for single phase = total watts : voltage.

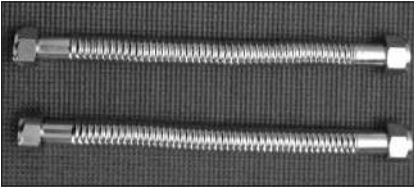


Figure 1 - Flexible connectors use compression fittings and do not require soldering.



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



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

- 1** Review all of the instructions before you begin work. Improper installation can damage the water heater and property, and can present risks of serious injury or death.
- 2** Check with your local/provincial authorities for any local/provincial codes that apply to your area. In the absence of local/provincial codes, follow the “Canadian Electrical Code” CSA C22.1 current edition and the National Plumbing Code (NPC). The instructions in this manual comply with national codes, but the installer is responsible for complying with local/provincial codes.
- 3** Before you start, be sure you have, and know how to use, the following tools and supplies:

  - Plumbing tools and supplies appropriate for the type of water pipes in the plumbing system
  - Threaded connectors (figure 1) for the cold and hot water pipes
  - For plastic pipe, use threaded connectors suitable for the specific type of plastic pipe used: CPVC and PEX (cross-linked polyethylene). Do not use PVC pipe.
  - For copper pipe, you may purchase connector kits with compression fittings that don’t require soldering (figure 1). Compression fittings are easier to install than soldering copper pipes.
  - Thread sealant tape or pipe joint compound approved for potable water

- Tools to make the electrical connections (for example, screwdrivers, wire strippers)
- Non-Contact circuit tester to check for power (figure 2)
- Water Pressure Gauge (see page 11, figure 4)

**Recommended Accessories:**

- Suitable drain pan (see page 12, figure 6)
- Automatic leak detection and shut-off device
- Pressure Reducing Valve (figure 3)
- Thermal Expansion Tank (see page 11, figure 5)
- Thermostatic Mixing Valves (see page 12, figure 7)

# GETTING STARTED

## Electrical



### GENERAL

The installation must conform with these instructions and the local code authority having jurisdiction and the requirements of the power company. In the absence of local codes, the installation must comply with the current editions of the Canadian Electrical Code CSA C22.1.

An electrical ground is required to reduce risk of electrical shock or possible electrocution. The water heater should be connected to a separate grounded branch circuit with over-current protection and disconnect switch. The water heater should be grounded in accordance with national and local codes.

Voltage applied to the heater should not vary more than +5% to -10% of the model and rating plate marking for satisfactory operation.

**DO NOT ENERGIZE THE BRANCH CIRCUIT FOR ANY REASON BEFORE THE HEATER TANK IS FILLED WITH WATER. DOING SO WILL CAUSE THE HEATING ELEMENTS TO BURN OUT AND VOID WARRANTY.**

The factory wiring is attached to a terminal block within the external junction box unit. The branch circuit is connected to the terminal block within this junction box. The water heater should be connected to a separate, grounded, branch circuit with overcurrent protection and disconnect

switch. The water heater should be grounded in accordance with national and local codes.

### BRANCH CIRCUIT

The branch circuit wire size should be established through reference to the current edition of the Canadian Electrical Code CSA C22.1 or other locally approved source in conjunction with the heater amperage rating.

The branch circuit should be sized at 125 percent of the heater rating and further increase wire size as necessary to compensate for voltage drop in long runs.

### CALCULATING AMPERAGE/ OVERCURRENT PROTECTION

The dual element heater is factory wired for connection to a three wire, three-phase delta branch circuit, non-simultaneous operation. In addition, a ground conductor is required.

Element connection is for non-simultaneous operation. This means only one element operates at a time. The wiring diagram, on page 10, shows the heater may be field converted to simultaneous element operation by moving the red wire on "J" terminal to L1. It is then possible for both elements to operate at once as determined by the thermostats. Regardless of element connection the heater operates in an "unbalanced" fashion.

The heater may be field converted to single-phase operation by moving the wire on L3 of the terminal block to L2. L3 is not used, see page 10.

The heater, now in single-phase non-simultaneous operation, may be field-converted to single phase simultaneous operation by moving the red wire on terminal "J" to L1, see page 10.

This is an example of calculating heater amperage for both types of element operation. From this, the branch circuit conductor and overcurrent protection sizing can be established.

Non-simultaneous: (as factory wired)	Simultaneous: (Field conversion)
$3000 \div 240 =$ 12.5 amps*	$3000 \div 240 =$ 12.5 amps* $12.5 \times 1.73 = 21.6$ amps
*NOTE: as a single-phase nonsimultaneous unit.	*NOTE: as a single-phase simultaneous unit the total is: $12.5 \times 2 = 25$ amps

The example is of a three-phase 240 volt unit with two, 6 kw elements. The notations are for units field converted to single-phase. Check the heater model and rating plate for actual specifications and substitute those values in the following.

The rating of the overcurrent protection should be computed on the basis of 125 percent of the total connected load amperage. Where the standard ratings and settings do not correspond with this computation, the next higher standard rating or setting should be selected.



## Approvals

All models are listed by Underwriters Laboratories Inc.



Low Lead Content

## Model and Rating

<b>AUTOMATIC STORAGE WATER HEATER CHAUFFE-EAU À ACCUMULATION AUTOMATIQUE</b>		MODEL NUMBER N° DE MODÈLE		
		SERIAL NUMBER N° DE SÉRIE		
		ITEM ID / PART NUMBER N° ITEM / N° PIÈCE		
FACTORY INSTALLED / INSTALLÉ À L'USINE				
VOLTS AC VOLT CA	PHASE	UPPER ELEMENT ÉLÉMENT SUPÉRIEUR WATTS	LOWER ELEMENT ÉLÉMENT INFÉRIEUR WATTS	NON-SIMULTANEOUS NON SIMULTANÉ TOTAL WATTS
CIRCUIT		MAXIMUM ALLOWABLE RATING / PUISSANCES MAXIMALES ADMISSIBLES		SIMULTANEOUS PUISSANCE SIMULTANÉE TOTAL WATTS
		MAX WATTS/ELEMENT WATTS MAX/ÉLÉMENT	MAX LOAD PUISSANCE MAX WATTS	
For installed rating see element marking. / Pour la puissance installée: consulter le marquage de l'élément				
CAPACITY/ CAPACITÉ		TEST PRESSURE/ PRESSION D'ESSAI		  LLC  Energy Verified Only Énergie Vérifiée Seulement
GAL	LITRE	PSI	kPa	
		PSI	kPa	

DELC-30/40/50, DENC-30/40 & DEJC-50/66

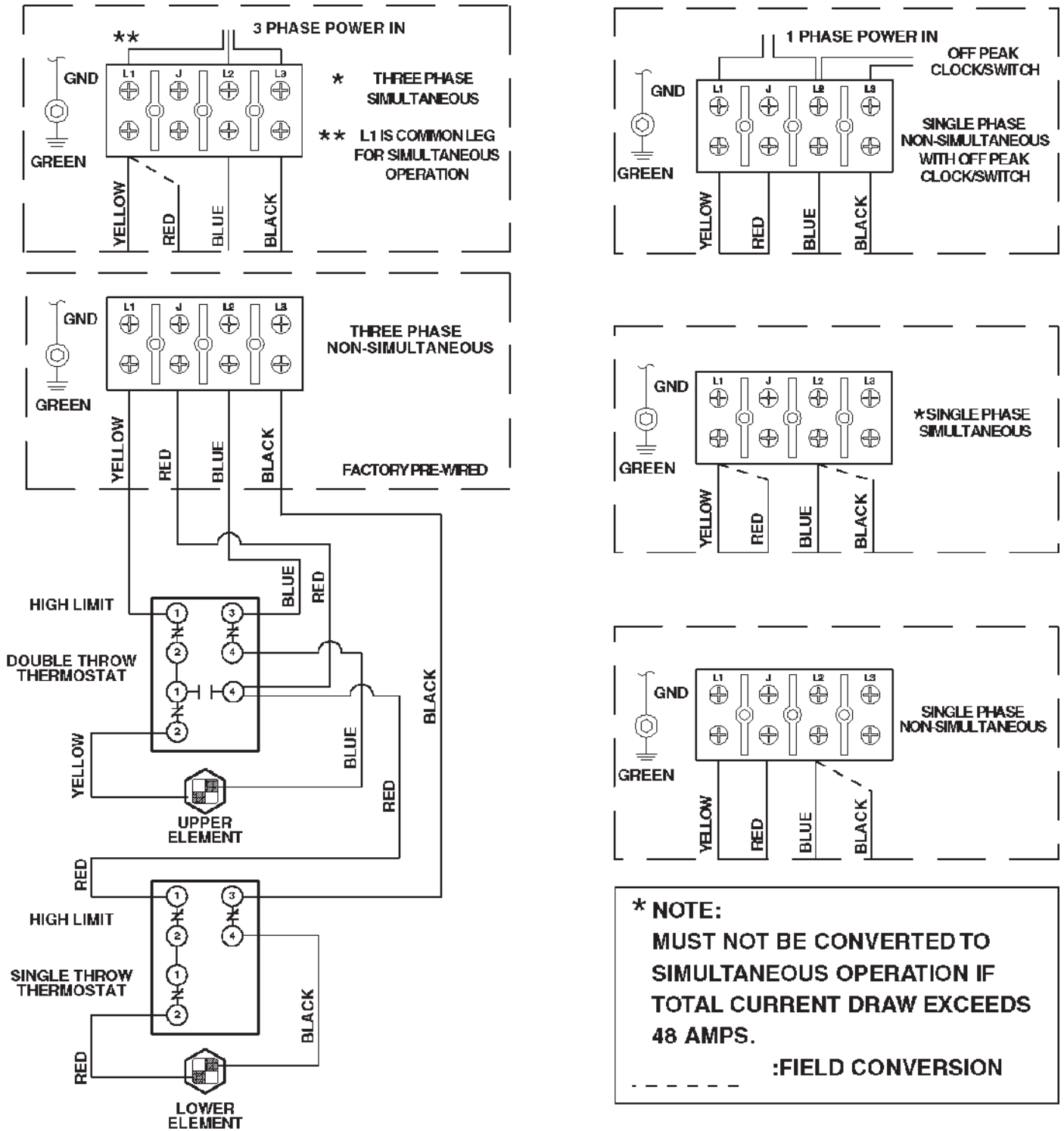
GETTING STARTED

# GETTING STARTED

## Thermostat Wiring Diagram

### A-8 CIRCUIT FOR DUAL ELEMENT HEATER

GETTING STARTED



# INSTALLATION

Follow these steps for proper installation:

## Step 1:

### ✓ Verify the plumbing system is equipped and up-to-date for proper operation

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

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

### ✓ Water pressure

We recommend checking the water pressure with a pressure gauge (figure 4). Most codes allow a maximum incoming water pressure of 80 psi. We recommend a working pressure no higher than 50-60 psi (345-414 kPa).

**HOW:** Purchase an inexpensive water pressure gauge available at local plumbing supplier. Connect the Water Pressure Gauge to an outside faucet and measure the maximum water pressure experienced throughout the day (highest water pressures often occur at night).

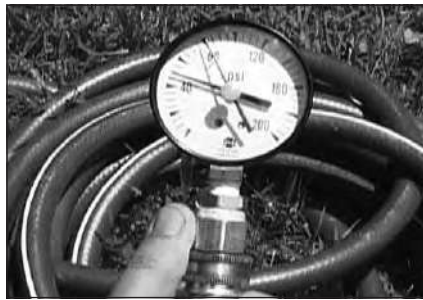


Figure 4 - Use a Water Pressure Gauge to make sure the water pressure is not too high.

To limit the water pressure:  
Locate the Pressure Reducing Valve (PRV) on the main incoming (cold) water supply line and adjust the water pressure control to between 50-60 psi (345-414 kPa). If the property does not have a Pressure Reducing Valve, install a PRV on the main water supply line and set it to between 50-60 psi (345-414 kPa). Pressure Reducing Valves are available at local plumbing supplier.

**BACKGROUND:** Over the years, many utilities have increased water supply pressures so they can serve more properties. In some areas, pressures exceed 100 psi (689 kPa). High water pressures can damage water heaters, causing premature leaks. If you have replaced toilet valves, had a water heater leak, or had to repair appliances connected to the plumbing system, pay particular attention to the water pressure. When purchasing a PRV, make sure the PRV has a built-in bypass.

### ✓ Water pressure increase caused by thermal expansion

Verify that you have a properly sized Thermal Expansion Tank (figure 5). We recommend installing an expansion tank if the property does not have one. Applicable local/provincial codes may require a properly pressurized, properly sized Thermal Expansion Tank (see image on inside front cover).



Figure 5 - A Thermal Expansion Tank helps protect the plumbing system from pressure spikes.

**HOW:** Connect the Thermal Expansion Tank (available at local plumbing supplier) to the cold water supply line near the water heater. The expansion tank contains a bladder and an air charge. To work properly, the Thermal Expansion Tank must be sized according to the water heater's tank capacity and pressurized to match the supply water pressure. Refer to the installation instructions provided with the Thermal Expansion Tank for installation details.

# INSTALLATION

**BACKGROUND:** Water expands when heated, and the increased volume of water must have a place to go, or thermal expansion will cause large increases in water pressure (despite the use of a Pressure Reducing Valve on the main water supply line).

**NOTICE:** The main water supply line will require the use of backflow preventers and check valves to restrict water from reentering the public water system. Backflow preventers are often installed in water meters and may not be readily visible. As a result, most all plumbing systems today are now “closed,” and almost all properties now need a Thermal Expansion Tank.

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

## Water pipe and tank leaks

Leaks from plumbing pipes or from the water heater itself can damage property and could cause a fire risk.

- Install an automatic leak detection and shutoff device (available at local plumbing supplier). These devices can detect water leaks and can shut off the water heater’s water supply if a leak occurs.



Figure 6 - A suitable drain pan piped to an adequate drain can help protect flooring from leaks and drips.

- Install a suitable drain pan (available at local plumbing supplier) under the water heater (figure 6) to catch condensation or leaks in the piping connections or tank. Most codes require, and we recommend, installing the water heater in a drain pan that is piped to an adequate drain. The drain pan must be at least two inches wider than the diameter of the water heater. Install the drain pan so the water level would be limited to a maximum depth of 1-3/4” (44 mm).



## Water temperature regulation



Figure 7 - Thermostatic Mixing Valves can help prevent scalding.

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

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

**BACKGROUND:** A Thermostatic Mixing Valve mixes hot water from the water heater with cold water to more precisely regulate the temperature of hot water supplied to fixtures. If you aren’t sure if your plumbing system is equipped with properly installed and adjusted Thermostatic Mixing Valves contact a qualified person for more information.

## Step 2:

### Verify that the location is appropriate

Before installing your water heater, ensure that:

- 1 The water heater will be:
  - Installed indoors close to the center of the plumbing system.
  - In a suitable drain pan piped to an adequate floor drain or external to the building (See page 12, figure 6).
  - In an area that will not freeze.
  - In an area that is suitable for installing the water heater vertically.

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

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

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

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

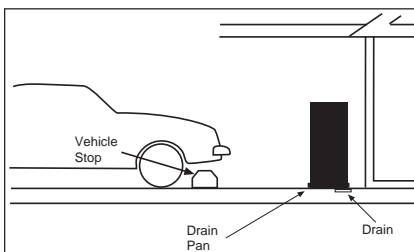


Figure 8 - In a garage, install a vehicle stop to avoid water heater damage.

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

## Step 3:

### Removing the old water heater

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

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

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

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

- 4 Disconnect the electrical wires.

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



Figure 9 - Let the hot water run until it is cool.

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

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

- 7 Turn the cold water supply valve OFF.

- 8 Open the drain valve on the water heater.

# INSTALLATION



Figure 10 - Draining the old water heater.

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

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



Figure 11 - Removing the T&P Relief Valve discharge pipe.

**11** Disconnect the water pipes. Many water pipes are connected by a threaded union which can be disconnected with wrenches. If you must cut the water pipes, cut the pipes close to the water heater's inlet and outlet connections, leaving the water pipes as long as

possible. If necessary, you can make them shorter later when you install the new water heater.

**12** Remove the old water heater.

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

## Step 4:

### Installing the new water heater

**1** Completely read all instructions before beginning. If you are not sure if you can complete the installation, seek assistance from any of the following sources:

- Schedule an appointment with a qualified person to install your water heater.
- Call our Technical Assistance Hotline at 1-888-479-8324.

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

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

**NOTICE:** Most codes require setting the water heater in a suitable drain pan piped to an adequate drain. The drain pan helps avoid property damage which may occur from condensation or leaks in the piping connections or tank. The drain pan must be at least two inches (51 mm) wider than the diameter of the water heater. Install the drain pan so the water level is limited to a maximum depth of 1-3/4" (44 mm).

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

- The T&P Relief Valve will not be in contact with any electrical parts.
- There is adequate space to install the T&P Relief Valve discharge pipe and that it can be piped to a separate drain (and not into the drain pan, unless otherwise allowed by provincial or local codes).
- There is adequate access and space around the water heater for future maintenance.

**DO NOT CONNECT ELECTRICAL WIRING UNTIL YOU ARE INSTRUCTED TO DO SO.**

**NOTICE:** Connecting electrical power to the tank before it is completely full of water (water must run FULL STREAM from a hot water tap for a full three minutes) will cause the upper heating element to burn out.

**Step 5:**

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

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

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

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

- The discharge pipe should be at least 3/4" (19 mm) inside diameter and sloped for proper drainage. Install it to allow complete drainage of both the T&P Relief Valve and the discharge pipe.

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



Figure 12 - The T&P Relief Valve discharge pipe must be installed properly and piped to an adequate drain.

- Terminate the discharge pipe a maximum of 12 inches (305 mm) above a floor drain or outside the building. Do not drain the discharge pipe into the drain pan; instead pipe it separately to an adequate drain. In cold climates, terminate the discharge pipe inside the building to an adequate drain. Outside drains could freeze and obstruct the drain line. Protect the drain from freezing.

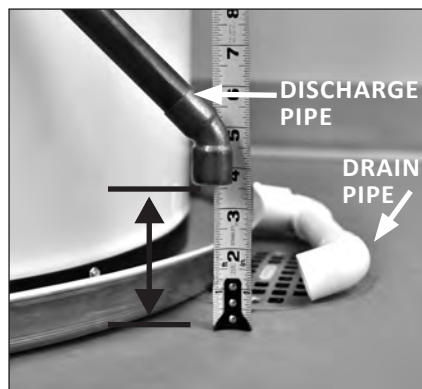


Figure 13 - The end of the T&P Relief Valve discharge pipe must be no more than 12 inches (305 mm) above a floor drain or terminate outside the building.

# INSTALLATION

## Step 6:

### Install shutoff and tempering valves

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

**2** Install a Thermostatic Mixing Valve. Consult the valve manufacturer's instructions or a qualified person.



Figure 14 - Install Thermostatic Mixing Valves where hot water will be used.

**▲ WARNING! Even if the water heater's thermostat(s) are set to a relatively low temperature, hot water can scald. Install Thermostatic Mixing Valves to reduce the risk of scalding. (see page 4.)**

**3** For water heaters that are fed by a solar water heating system (or any other pre-heating system), always install a

Thermostatic Mixing Valve or other temperature limiting device in the inlet water supply line to limit water supply inlet temperature to 120°F (49°C). Solar water heating systems can supply water with temperatures exceeding 170°F (77°C) and may result in water heater malfunction.

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

## Step 7:

### 1 Connect the water supply

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

**2** Connect the cold water supply using 3/4 inch (19mm) National Pipe Thread "NPT" to the cold water inlet nipple.

For ease of removing the water heater for service or replacement, connect the water pipes with a coupling called a union. We recommend using a dielectric-type union (available at local plumbing supplier). Dielectric unions can help prevent corrosion caused by tiny electric currents common in copper water pipes and can help extend the life of the water heater.

### IF YOU HAVE COPPER PIPES:

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



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

- Solder a short length of pipe (about a foot or so) to a threaded adapter using only 95/5 tin-antimony or equivalent solder. Attach the threaded adapters to the water heater's connections (using thread sealant tape or pipe joint compound). Connect the water pipes by soldering, keeping the connections at the water heater cool with wet rags.



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

**3** Connect the hot water supply using 3/4 inch (19mm) NPT to the hot water outlet. Follow the same connection guidelines as for the cold water supply.

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

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

**6** If needed, install (or adjust) a Pressure Reducing Valve to 50-60 psi (345-414 kPa) and install a Thermal Expansion Tank.



Figure 15 - A Pressure Reducing Valve is required if the plumbing system's water pressure is above 80 psi (552 kPa).



Figure 16 - The Thermal Expansion Tank should be pressurized with air to match the incoming water pressure.

### Step 8:

## Verify connections and completely fill tank

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

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

**2** Turn the cold water supply back on.



Figure 17 - Fully open the cold water supply valve.

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

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

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

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

# INSTALLATION



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

If Dry Firing occurs, replace the upper heating element according to the instructions on page 25.

## Step 9:

### Make electrical connections

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

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

- 1 Be sure the electrical power to the water heater is turned OFF at the circuit breaker panel (or remove the circuit’s fuses).
- 2 Using a non-contact circuit tester, check the wiring to make certain the power is OFF.
- 3 Check the water heater’s data plate and ensure that the voltage, wiring size (ampacity) and circuit breaker rating and type are correct for this water heater. Refer to the wiring diagram located on the water heater for the correct electrical connections. Ensure that wire sizes, type, and connections comply with all applicable local codes. In the absence of local/provincial codes, follow the “Canadian Electrical Codes” CSA C22.1 current.
- 4 Open the upper access panel and fold away the insulation to access the electrical junction box.



Figure 18 - The water heater’s electrical requirements can be determined from the data plate.

- 5 Install wiring in an approved conduit (if required by local codes). Use a UL listed or CSA approved strain relief to secure the electrical wiring to the water heater.
- 6 Connect the ground wire to the green ground screw. Connect the power wires to the terminal block for single-phase or 3-phase operation as desired (see page 10).

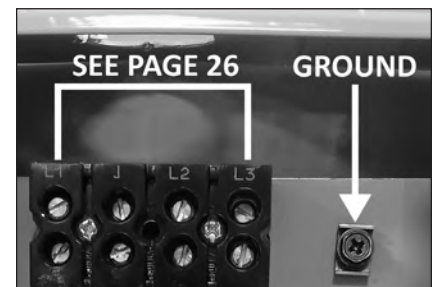


Figure 19 - Connecting the electrical wires.

- 7 Fold the insulation back in place, close the upper access panel and secure with the screw provided.
- ▲ WARNING!** Be sure cover is secured to reduce the risk of fire and electric shock.

## Step 10:

### Adjusting the Temperature

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

**1** Set the thermostat(s) to desired temperature. The thermostat(s) on this water heater have been factory set to approximately 140°F (60°C) to reduce the risk of scalding. You may wish to set a higher temperature to provide hot water for automatic dishwashers or laundry machines, to provide more hot water capacity, and to reduce bacterial growth. Higher tank temperatures (140°F, 60°C) kill bacteria that cause a condition known as "smelly water" and can reduce the levels of bacteria that cause water-borne diseases.

**▲ WARNING! Higher temperatures increase the risk of scalding, but even at 140°F (60°C), hot water can scald (see page 4).**

If you increase the water heater's temperature setting, install Thermostatic Mixing Valve(s) to reduce the risk of scalding.



Figure 20 - Adjust Thermostatic Mixing Valves to 120°F (49°C) or lower.

#### To adjust the water heater's thermostat:

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

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

- Open the electrical junction box and remove the lower thermostat access panel. Do not remove the plastic personnel protectors covering the thermostats.
- Using a flat tip screwdriver, rotate the adjusting knob to the desired temperature setting (NOTE: It is not necessary to adjust the upper thermostat for a dual element unit. However, if it is adjusted above the factory set point 140°F (60°C) it is recommended that it not be set higher than the lower thermostat setting).
- Fold the insulation back in place and replace the access panels.

**▲ WARNING! Be sure panels are secured to reduce the risk of fire and electric shock.**

- 2** Turn the electric power back on.
- 3** Wait for the water to heat up. It may take several hours for a tank of cold water to heat up. If you have no hot water after two hours, refer to the Troubleshooting Section (see page 21).

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

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



# TROUBLESHOOTING

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

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

## No Hot Water

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

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

**Follow these steps to diagnose and correct common electrical problems:**

**1** **Check the electric power to the water heater.** No hot water is often caused by a problem with the electrical wiring or circuit breakers. You'll need a non-contact circuit tester. Follow these guidelines:

- Locate the water heater's circuit breaker and turn it off (or remove the

circuit's fuses).

- Open the electrical junction box.
- Identify the two power wires. The power wires are usually black/black or black/red—the green or copper wire is the ground wire.



Figure 21 - Use a non-contact circuit tester to check for electrical power.

- Turn the circuit breaker back on (or install the fuses) and check the power on both incoming power wires using a non-contact circuit tester.
- Turn the power off and close the electrical junction box.

If the water heater is not getting power, contact a qualified person to have the wiring or circuit breakers checked.

**2** **Check the upper heating element.** If the water heater is getting electrical power, check to see if the upper heating element has burned out. If the upper element is burned out, you'll have no hot water. To check the upper element, you'll need a multimeter capable of reading resistance.

- Turn the power OFF at the circuit breaker or remove fuses.
- Open the electrical junction box.
- Remove the insulation to access the upper thermostat and heating element.

**3** **Check the top two screws of the upper thermostat using a non-contact circuit tester and confirm that power is off (screw terminals 1 and 3 in photo on next page).**

- With the electrical power off, remove the two power wires from the upper heating element.

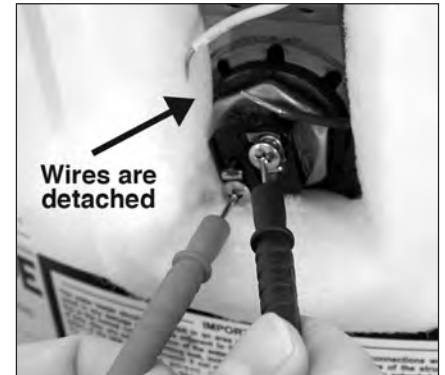


Figure 22 - Use a multimeter to check the resistance of the upper heating element.

**4** **Check the resistance of the upper heating element using a multimeter.** Measure the resistance between the two screw terminals on the upper heating element. A good element will have a resistance between 5 and 25 Ohms. If the resistance is:

**Outside this range.** Replace the element (see the Routine Maintenance section on page 25). On a new water heater, a burned out upper heating element is almost always caused by turning the power on before the tank was completely full of water (Dry Fire). (See Step 8 in the Installation section.)

**Within this range.** Reattach the power wires, making sure the wires are in good condition and the connections are clean and tight. Next, check the following:

# TROUBLESHOOTING

## 5 Check/Reset Energy Cut Off (ECO) Button.

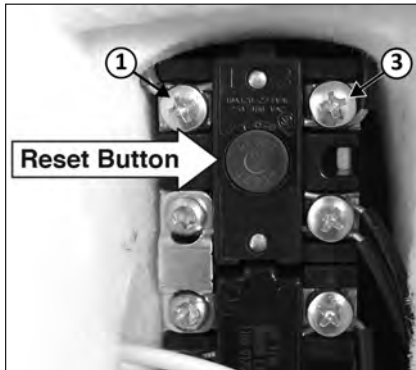


Figure 23 - Energy Cut Off (ECO) button

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

### To check the Energy Cut Off (ECO)

- Turn off the power to the water heater.

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

- Press the red ECO reset button (see photo above).
- The ECO was tripped if you hear a click when it is reset. In most cases, a tripped ECO indicates that the tank overheated due to a problem with one of the elements or thermostats—have a qualified person check the upper and lower elements and thermostats and

replace if necessary.

- The ECO was not tripped if you didn't hear a click. In that case, the upper thermostat should be checked by a qualified person.
- Replace the insulation and close the electrical junction box.

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

## Insufficient Hot Water or Slow Hot Water Recovery

**▲ WARNING! Because of the increased risk from scalding, if you set the water heater's thermostat(s) higher than 120°F (49°C), Thermostatic Mixing Valves are particularly important (see page 4).**

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

- Faulty Thermostatic Mixing Valve in a faucet or shower control (check other faucets for hot water)
- One (or both) of the thermostats set too low
- Water heater's capacity too small (or usage too high)
- Reversed plumbing connections or melted dip tube (usually found soon after new installation)
- Plumbing leak
- Bad lower heating element (or lower thermostat)
- Low supply voltage

**Thermostatic Mixing Valves.** If the hot water is simply not warm enough, make sure the faucet you are checking doesn't have a defective Thermostatic Mixing Valve. Many shower controls now have built-in mixing valves. If these devices fail, they can reduce the

amount of hot water the shower or faucet delivers even though there is plenty of hot water in the tank. Always check the water temperature at several faucets to make sure the problem is not in a faucet or shower control.

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

**Undersized water heater.** If your water heater runs out of hot water too quickly, it may be too small for your needs. If the water heater is old, consider replacing it with a larger model. If the water heater is in good condition, you may be able to meet the plumbing system's hot water needs with the existing water heater by installing Thermostatic Mixing Valves and then turning the thermostat(s) to a higher setting. See page 19, step 10.

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

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

**Lower heating element not working.**

If the lower heating element (or, more rarely, the lower thermostat) is not working, you will have some hot water but not as much as before. Because the lower element does most of the work, the lower element usually wears out before the upper element. Replace the lower element and/or thermostat if necessary (see page 25-27).

**Temperature Too High**

If the water temperature is too hot:

- Install or adjust the Thermostatic Mixing Valves (see manufacturer's instructions), or
- Adjust the thermostat(s) on the water heater (see Step 10 in the Installation section of this manual).

A nonfunctioning thermostat or a shorted heating element can cause extremely hot water. If the Temperature and Pressure Relief Valve (T&P Valve) releases large amounts of very hot water, it is likely due to a shorted heating element, or more rarely a nonfunctioning thermostat, or the thermostat does not fit snugly against the tank. Very high water temperatures can also cause the Energy Cut Off (ECO) to trip (see page 22). Turn power off until this problem is fixed.

**Low Water Pressure**

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

- Melted heat traps or dip tube. Soldering copper pipes while they are connected to the water heater can melt the heat traps inside the hot and

cold water connections or the dip tube (cold water side). Melted heat traps or a melted dip tube can restrict the flow of hot water. If that's the case, replace the heat traps or dip tube.

- Partially closed supply valve. Open the water heater's supply valve fully.

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

A small amount of water dripping from the Temperature and Pressure (T&P) Relief Valve usually means the water pressure is too high or you need a properly sized and pressurized Thermal Expansion Tank. Refer to Step 1 in the Installation section of this manual for more information. A large amount of hot water coming from the T&P discharge pipe may be due to the tank overheating.

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

**Water pressure too high.** High water pressure can cause the T&P Relief Valve to drip. Install a Pressure Reducing Valve (PRV) on the main cold water supply line. Adjust the PRV to between 50-60 psi (345-414 kPa).

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

**Debris.** In rare cases, debris can stick inside the T&P Relief Valve preventing the valve from seating fully. In that case,

the T&P Relief Valve discharge pipe will drip. You may be able to clear debris from the T&P Relief Valve by manually operating the valve, allowing small quantities of water to flush out the debris. See the label on the T&P Relief Valve for instructions.

If the water pressure is between 50-60 psi (345-414 kPa), a Thermal Expansion Tank is installed and properly pressurized, and the valve has been cleared of any debris, and it still drips, the valve may be broken—have a qualified person replace the T&P relief valve.

**Water Odor**

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

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

In cases where the "rotten egg" smell is pronounced, you can raise the tank temperature to 140°F (60°C) in order to reduce bacteria growth in the tank.

**▲ WARNING! Because higher temperatures increase the risk of scalding, if you set the thermostat(s) higher than 120°F (49°C), Thermostatic Mixing Valves are particularly important (see page 4).**

# MAINTENANCE

## Routine Maintenance

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

## Water Heater Maintenance

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

## Draining and Flushing the Water Heater

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

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

than trying to remove heavy lime deposits.

## To drain and flush the tank:

- 1 Locate the water heater's circuit breaker and turn it OFF (or remove the circuit's fuses).



Figure 24 - Circuit Breaker

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



Figure 25 - Water Faucet

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

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



Figure 26 - Drain Valve

- 6 Open a hot water faucet to help the water in the tank drain faster.

**NOTICE:** DO NOT turn electrical power

back on unless the tank is completely full of water.

- 7 Remove and inspect the anode rod (see Repair Parts Illustration on page 28 for location of the anode rod). Replace the anode rod if it is depleted. Turn power off. Run hot water until it's cool. Turn cold water supply valve off. Open a hot water faucet to depressurize tank. Locate and remove the black plastic cover marked "Anode." Use a "key hole" saw or similar tool to remove the foam insulation covering the anode rod. Once the anode rod is exposed, use a 1 1/16" socket wrench with an extension to remove it. Inspect the anode rod and replace if depleted. Apply thread sealant tape or pipe joint compound and reinstall the anode rod tightly. It is not necessary to replace the foam removed to access the anode. Turn cold water supply valve on. When hot water runs full, close hot water faucet. Check for leaks and repair if necessary. Turn power on.



Figure 27 - Anode Rods from new (top) to partially depleted (middle) to fully depleted stage (bottom)

**Anode Rod.** The anode rod is a sacrificial metal rod that helps reduce corrosion and premature failure (leaks) in the tank. The anode rod is a consumable item. Inspect the anode rod after the first six months of operation when you drain and flush the tank. Replace the anode rod if it is substantially worn out or depleted. Thereafter, inspect the anode rod annually or more frequently if needed. If you use a water softener, your anode rod will deplete faster than normal. Inspect the anode rod more frequently,



replacing the anode rod as needed. Obtain new anode rods from a local plumbing supplier or have a qualified person replace it. (Anode rods are a consumable item and are not covered under warranty).

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

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

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

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

## Replacing the Heating Element

**▲ WARNING!** Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

If you are not comfortable replacing a heating element or thermostat yourself, have this work done by a qualified person. To replace the heating element, you'll need the following tools and supplies:



Figure 28 - Non-Contact Circuit Tester

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



Figure 29 - Heating Element (with gasket)

- Check your water heater's data plate for the correct wattage and voltage. Heating elements are available at most hardware stores.



Figure 30 - Element Wrench

- Some regular sockets (1 1/2 inch SAE) may work, but regular sockets are often beveled and may slip. Inexpensive element wrenches are available at local plumbing supplier .
- Garden hose to drain the tank
- Hand dishwashing soap to lubricate the gasket
- A clean cloth to clean the threaded opening
- A flat blade and a Phillips screwdriver

## Steps for Replacing the Heating Element:

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



Figure 31 - Circuit Breaker

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



Figure 32 - Non-Contact Circuit Tester

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



Figure 33 - Water Faucet

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

**4** Connect a garden hose to the drain valve and place the other end of the hose in a drain or outside (or use buckets). Turn OFF the cold water valve that supplies the water heater. Open the drain valve on the water heater. Opening a hot water faucet will help the tank drain faster.

# MAINTENANCE

- 5 Open the electrical junction box or remove the lower access panel on the water heater, fold back the insulation, and remove the plastic element/thermostat cover.

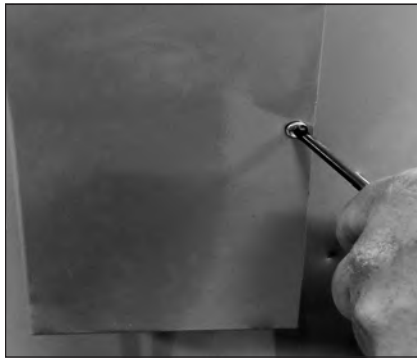


Figure 34 - Electrical Junction Box

- 6 With the tank drained and power off, remove the power wires from the element you intend to replace.
- 7 Remove the bad element using an element wrench.
- 8 Make sure the new element is the correct replacement by referring to the water heater's data plate for voltage and wattage information.
- 9 Clean the threads in the tank opening with a rag. Insert the new element equipped with a rubber gasket. NOTE: Use a drop of hand dishwashing liquid to lubricate the gasket to help avoid damaging the gasket as it is being tightened. Tighten with an element wrench.

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

- 10 Refill the tank by opening the cold water supply valve. Make sure a hot water faucet is

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



Figure 35 - Drain Valve

- 11 Check the newly installed element for leaks. If a leak is present, tighten the element until the leak stops. If you cannot stop the leak, drain the tank and remove the element. Inspect the gasket for damage. If the gasket is damaged, replace the gasket and re-install the element.
- 12 Once the element is successfully installed and there are no leaks, replace the power wires, thermostat cover, insulation, and access panel. Make sure all wire connections are tight. Close the electrical junction box.
- 13 Restore power to the water heater. It may take two hours for the tank to heat up.

## Replacing the Thermostat

**▲ WARNING!** Working on an energized circuit can result in severe injury or death from electrical shock. Turn power off. Check wires with a non-contact circuit tester to make sure power is off. When you are finished, be sure all covers are secured to reduce the risk of fire and electric shock.

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

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

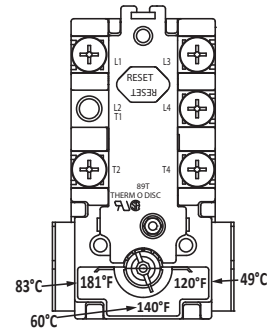


Figure 36 - Upper and Lower Thermostats

- A replacement thermostat (available at local plumbing supplier).
- A business card to check the gap between the thermostat and the tank
- Tape and a permanent marker to mark the wires
- A flat blade and a Phillips screwdriver

## Steps for Replacing the Thermostat:

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

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

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



Figure 37 - Non-Contact Circuit Tester

- 3 Remove the plastic element/thermostat cover. Open the lower access panel on the water heater if replacing the lower thermostat. Fold back the insulation and remove the plastic element/thermostat cover.
- 4 Make sure the replacement thermostat matches the original thermostat.
- 5 Mark the wires with tape so you'll know how to put them back on.
- 6 Disconnect the wires from the bad thermostat and remove the thermostat from the metal mounting clip.
- 7 Install the new thermostat in the metal mounting clip.
- 8 Make sure the new thermostat fits snugly against the tank. You should NOT be able to slip a business card between the thermostat and the tank. If you can, bend the thermostat mounting clip until the thermostat fits tightly against the tank.
- 9 Attach the wires following the wiring diagram on the water heater's label. Make sure all wire connections are tight.
- 10 Replace the plastic element/thermostat cover, insulation, and access panel.
- 11 Close the upper access panel to the electrical junction box.
- 12 Restore power to the water heater. It may take two hours for the tank to heat up.

### T&P Relief Valve Maintenance

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

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

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



Figure 38 - T&P Relief Valve

- At least every five years, have a qualified person inspect the T&P Relief Valve and discharge pipe. Damage caused by corrosive water conditions, mineral deposits, or other problems can only be determined when a qualified person removes and inspects the valve and its components.
- Note that a dripping T&P Relief Valve is usually caused by the water pressure being too high or the lack of a Thermal Expansion Tank. If your T&P Relief Valve drips, see page 23.

# REPAIR PARTS

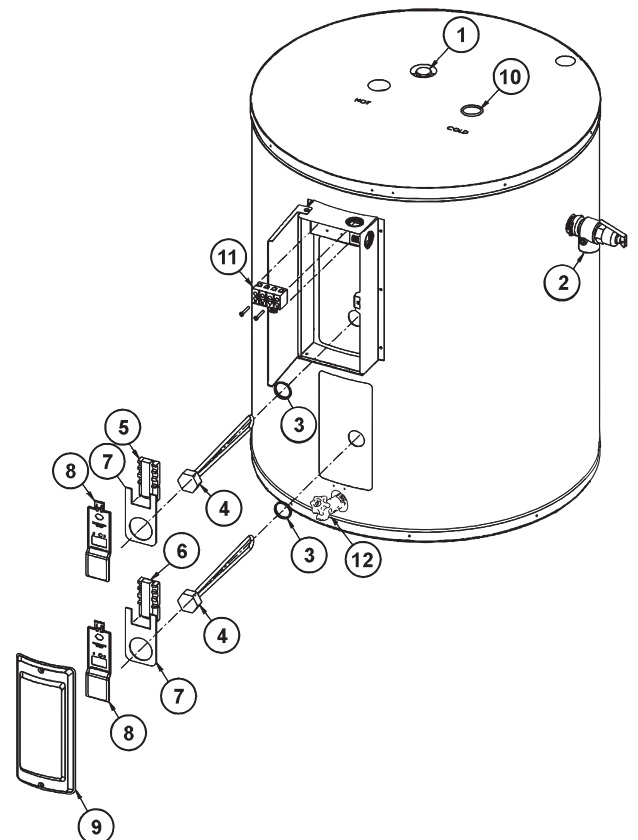
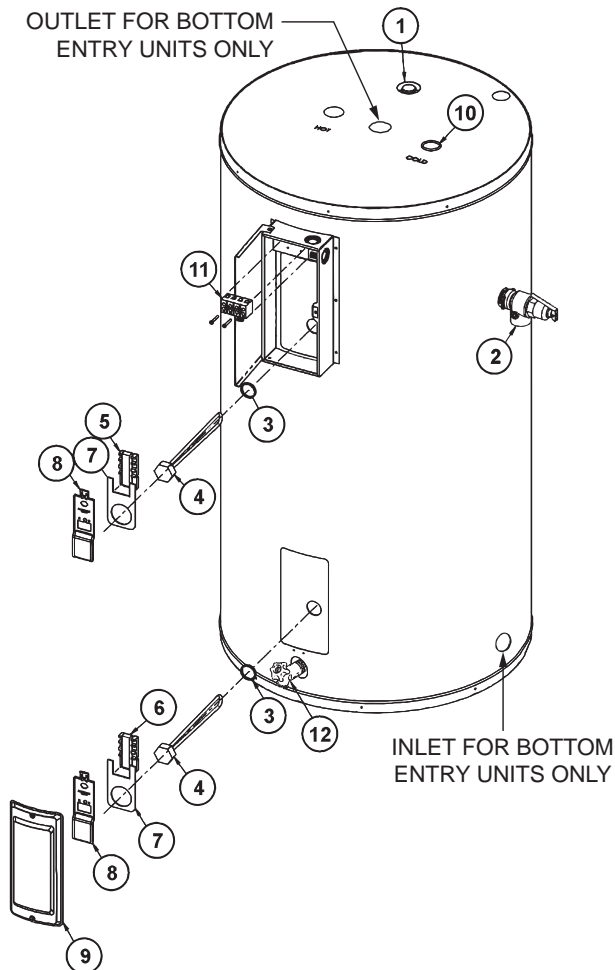
Key No.	Part Description
1A	ANODE, ALUMINUM
1B	ANODE, MAGNESIUM (SMR P72 AND S19)
2	T&P RELIEF VALVE
3	ELEMENT GASKET
4	ELEMENT
5	UPPER THERMOSTAT W/ HI LIMIT
6	LOWER THERMOSTAT W/ HI LIMIT
7	THERMOSTAT BRACKET
8	PERSONAL PROTECTOR
9	LOWER ACCESS PANEL
10	DIP TUBE
11	POWER TERMINAL
12	DRAIN VALVE

Repair parts may be ordered through your plumber, local distributor, local plumbing supplier, or by calling. When ordering repair parts always give the following information:

1. Model and serial number.
2. Item number and part description.

**DENC-30/40 & DEJC-50/66**

**DELG-30/40/50**



# COMMERCIAL WATER HEATER LIMITED WARRANTY



## EFFECTIVE

For 3 Years, in the event of a tank leak, we will repair or, at our discretion, replace the defective water heater.

For 1 Year, in the event of part failure, we will repair or, at our discretion, replace the defective part.

We warrant this product against defects in materials or workmanship as described in this document if installed within the United States or Canada and provided the product remains at its original place of installation.

Warranty coverage begins the date of installation OR the date of manufacture if installation cannot be verified.

## WHAT'S COVERED

Subject to these terms, in the event of defect in materials and/or workmanship resulting in a **tank leak** during the **first three years**, we will:

- Replace the water heater should the tank leak.

Subject to these terms, in the event of a defect in materials and/or workmanship appearing during the **first year**, we will:

- Repair or, at our discretion, replace any part of the water heater covered under this limited warranty excluding parts subject to normal maintenance (Example: non-electronic anode rod, filter, etc)

**Service/labor, shipping, delivery, installation, handling or any other costs are not covered at any time under this warranty.**

Any replacement part or product will be warranted only for the unexpired portion of the original water heater's limited warranty period.

If an identical model is no longer available due to a change in law, regulation, or standard, we will replace the product with one having comparable capacity and input. In these instances, the owner will have the option of paying the difference between what was paid for the original model and the new model with the additional features, or receiving a refund of the portion of the purchase price, on a pro-rata basis allocable to the unexpired portion of the warranty.

## WHAT'S NOT COVERED

- Problems caused by improper: gas supply line sizing, gas type, venting, connections, combustion air, voltage, wiring, or fusing
- Failure to follow applicable codes
- Failure to follow printed instructions
- Abuse, misuse, accident, fire, flood, Acts of God
- Improper installation, sizing, delivery, or maintenance
- Claims related to rust, noise, smell, or taste of water
- Failure to conduct authorized factory start up if required
- Alterations to the water heater
- Non-outdoor heaters installed outdoors
- Damages due to a failure to allow for thermal expansion
- Heat exchanger failure due to lack of adequate / proper supply of water
- Heaters moved from their original location
- Service trips to explain proper installation, use, or maintenance of the product/unit or to describe compliance requirements under applicable codes and regulations
- Charges related to accessing your heater including but not limited to door/wall removal, equipment rental, etc.
- Replacement parts after expiration of this warranty

## LIMITATIONS

NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, THIS IS YOUR SOLE AND EXCLUSIVE WARRANTY. ALL OTHER WARRANTIES INCLUDING A WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES. TOTAL LIABILITY ARISING AT ANY TIME SHALL NOT EXCEED THE PURCHASE PRICE PAID WHETHER BASED ON CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER LEGAL THEORY.

## SERVICE INQUIRIES:

For service inquiries call the telephone number listed below. Be prepared to provide the following information: name, address, and telephone number; the model and serial number of the water heater; proof of installation; and a clear description of the problem.

For your records, fill in the product:

Serial: \_\_\_\_\_

Model: \_\_\_\_\_

Canadian Customers:

**A. O. Smith Enterprises Ltd.**  
599 Hill Street West  
Fergus, Ontario N1M 2X1  
888-479-8324  
[www.hotwatercanada.ca](http://www.hotwatercanada.ca)







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