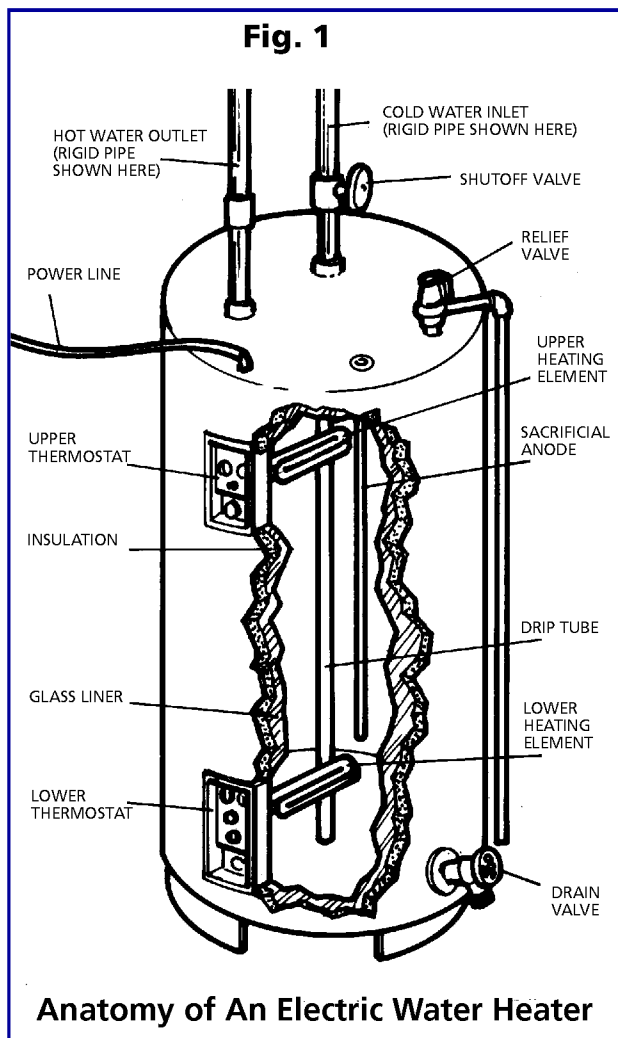
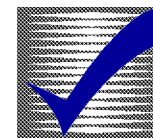




HOW-TO BOOKLET #3018 ELECTRIC HOT WATER



TOOL & MATERIAL CHECKLIST

- Pipe/Adjustable Wrench
- Voltage Tester
- Water Pan
- Torch/Solder/Flux
- Pressure Relief Valve
- Joint Compound/Teflon Tape
- Pliers
- Dielectric Union/Water Flex Lines
- Pipe
- Water Shut-Off Valve
- Blanket/Pipe Insulation
- Earthquake Straps (CA)

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above.

Electric hot water heaters are about as trouble free as any appliance can get. Hardly anything goes wrong with them, and when a problem does occur the problem usually is very easy to solve—even to the point of replacing an old water heater with a new one. In this How-To Booklet you will find two levels of involvement:

- 🏠 **Electric hot water heater maintenance and making minor repairs.**
- 🏠 **How to replace an electric hot water heater.**

DRAINING THE HEATER

Most electric water heater manufacturers advise draining a few gallons of water from the tank of the heater every 6 weeks to remove sediment when the heater is new and every 6 months after the heater has been in operation for a year. To do this:

1. Turn off the water to the heater.
2. Turn off the power to the heater at the main service entrance (circuit breaker or fuse box).
3. Place a water bucket or attach a garden hose to the drain valve of the heater which is positioned at the bottom of the heater. Run the other end of the hose into a floor drain.

4. Open the drain valve and drain a few gallons of water from the heater tank. If you use a bucket to catch the water, turn off the water at the drain valve in order to empty the bucket and replace it.
5. Close the drain valve and turn on the water and the power supply.

WATER TOO HOT

This most likely is a thermostat problem. Check the thermostat on the heater and turn back the setting if it is too high. A normal setting is between 110 and 140 degrees.

If a thermostat adjustment doesn't work, it could be that the thermostat is malfunctioning. This is a job for a professional electrician.

WATER WON'T HEAT

The problem may be lack of power or no power.

- 1 Check the circuit breaker at the main electrical service entrance. If you find a tripped toggle on the heater circuit, press the toggle to the complete "off" position, and then snap it to the full "on" position. Some toggles are pushed straight down to reactivate instead of being flipped like a light switch.

If the circuit is protected by a fuse system, check the fuse to see that it is still working. If not, replace the fuse with the same amp rating as the old one. The amp rating will be stamped on the bottom tip of the fuse. The fuse probably will be 30 amps, but check.
- 2 If a fuse or tripped circuit breaker is not the problem, and the fuse/circuit continues to blow/snap, call in a professional electrician for repairs.
- 3 If the circuit seems okay, the trouble could be a malfunctioning element. You can replace this yourself. See the details below.

HEATER WATER PIPES LEAK

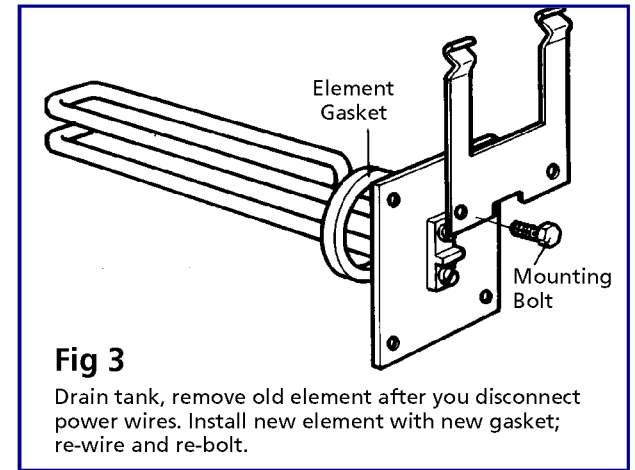
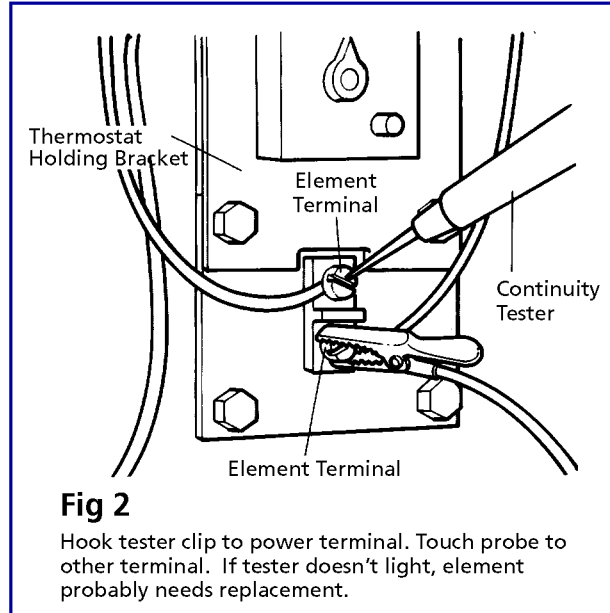
With an adjustable wrench on hex fittings or a pipe wrench, try tightening the pipe fitting at the leak point. Don't use too much pressure; just snug the fitting.

If tightening doesn't work, turn off the electrical power to the heater and turn off the water. Then, replace the pipe fitting.

If the heater is leaking around an element, the problem probably is a faulty element gasket. Turn off the water and the power and try tightening the thermostat bracket over the element. If tightening doesn't work, you will have to replace the gasket. But turn off the water and power before you loosen the bracket/element to reach the gasket.

TANK IS LEAKING

This problem almost always requires replacing the water heater. But before you make the replacement, turn off the water and electric power to the heater and drain the heater.



REPLACING AN ELEMENT

A faulty element can be the cause of no hot water. But before you replace the element, test it with a continuity tester. Below are the steps to take.

- 1 Turn off the electric power at the main electrical service entrance. Turn off water supply to the tank.
- 2 Attach the alligator clip of the tester to one electric terminal of the element. Then touch the probe of the tester to the other electrical terminal of the element. The tester should light. If not, suspect a broken wire or faulty heating element (**Fig. 2**)
- 3 Open a nearby hot water faucet to start draining the tank. Then open the tank's drain valve to drain the remaining water. With the power and water turned off, remove the bolts holding the thermostat bracket and the element in the heater (**Fig. 3**). Let the thermostat hang by the connecting wires. Then replace the old element with a new one of the same size, setting a brand new gasket in position, replacing the bracket and bolts. Be sure to repack the insulation around the thermostat and replace the access door.

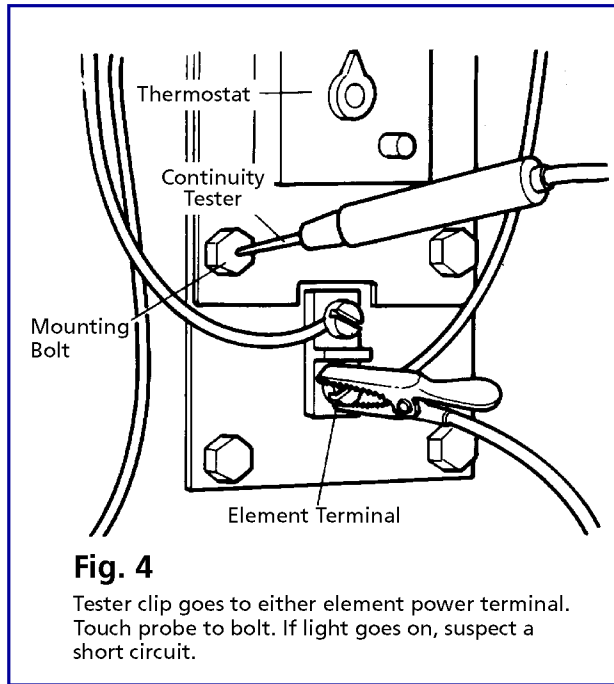


Fig. 4

Tester clip goes to either element power terminal. Touch probe to bolt. If light goes on, suspect a short circuit.

- 4 Turn on the water and fill the water heater tank. When the tank is full of water, turn on the power. Do not turn on the power until the tank has been filled with water.

A SHORT CIRCUIT?

No hot water could indicate a short circuit in the heater instead of a malfunctioning element. Test it this way:

- 1 Turn off the power of the water heater at the main electrical service entrance.
- 2 Remove the access door and the insulation around the thermostats.
- 3 Fasten the alligator clip of a continuity tester to one terminal of the element. Touch the probe of the tester to a bolt holding the bracket/element in position. If the tester light goes on, there is a short circuit and the element usually must be replaced (**Fig. 4**).

A short could be caused by a loose wire in the element coming in contact with metal. If water leakage is the problem a fuse/breaker can blow/snap or the water in the heater will overheat causing the high-temperature cut-off to come on. Most likely you will have to replace the heater.

HOW TO REPLACE THE HEATER

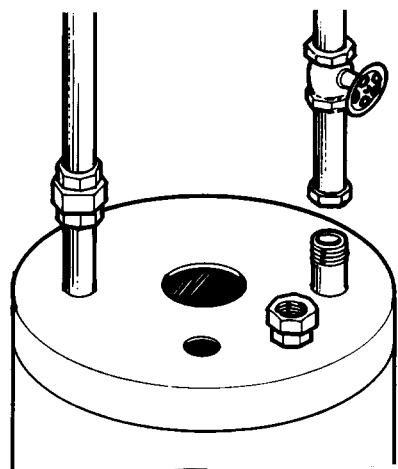
The hot water heater is self-contained, meaning that once you have hooked it up you are done.

Try to purchase the same capacity water heater as before, unless you need greater capacity. The newer heaters are more compact than the older models.

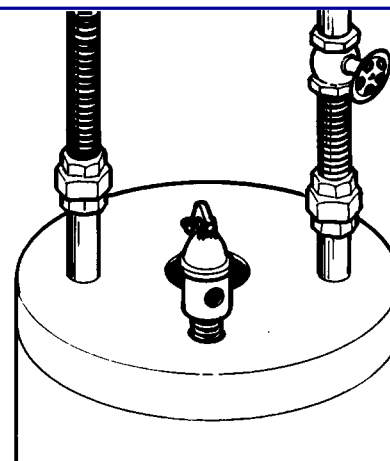
Always follow the manufacturer's instructions and recommendations for installation.

- 1 Turn off the water at the main shut-off valve first, then the shut-off valve to the water heater, if you have one.
- 2 Turn off the power at the service panel by throwing the switch to the "off" position, or by removing the fuse. **NOTE:** Check that the power is off by using a voltage tester on the two power element terminals (see the section on "Replacing An Element").
- 3 Drain the water from the tank by hooking a garden hose to the drain valve and draining it outside or into a floor drain. Open some water faucets to allow water in the lines to drain, too.
- 4 Disconnect the water lines with an adjustable wrench, pipe wrench or slip joint pliers. If the pipes are galvanized steel without a union, cut the pipe and remove it from the heater and the next threaded fitting. **NOTE:** Use two wrenches when disconnecting from copper pipe to prevent twisting soldered fittings off the pipe (**Fig. 5**).
- 5 With the power off at the source, remove the cover plate to the heater where the power lines enter. Disconnect the power lines and remove any connectors anchoring the wires to the cover.

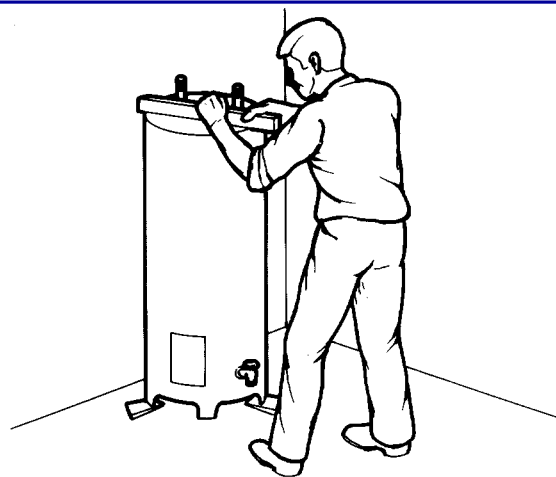
- 6 Clean the area and place a drain pan/insulation pad where the new heater will go.
- 7 Remove the old heater and replace it with the new one. Get someone to help; they are heavy! (**Fig. 6**)
- 8 Install the relief valve, drain pipe (if desired), and other fittings on the heater as per manufacturer's instructions. Use teflon tape on plastic or copper and joint compound on galvanized pipe to make a good seal. **NOTE:** It is best to add some items to the heater before installing, such as the relief valve (**Fig. 7**).
- 9 Connect the water pipes with flexible supply lines. Use a threaded nipple extending from the heater and another at the water line. If the distance is too great, add a length of pipe to reach. Add a shut-off valve to the cold water line if needed. **NOTE:** Always use dielectric unions or couplers built into the supply lines to prevent electrolysis. Failure to do so can cause you to lose your warranty and will make the tank rust out from the inside in months, rather than years.
- 10 Connect the wires to the heater as per the manufacturer's instructions. Most wires connect through a top plate in a built-in electrical box. There are two terminals, one red wire and one black wire (or two black wires go to each terminal). **NOTE:** A hot water heater uses 220 volts, meaning the two 110 volt lines are connected to the terminals.
- 11 Turn on the main valve and check for leaks. When the tank is full, turn on the power and set the temperature between 110 and 140 degrees (**Fig. 8**).
- 12 Secure the heater with earthquake straps (California) or other required tie downs. Drain several gallons from the tank initially and drain several gallons periodically to remove any sediment. Insulate both the heater and pipes to stop condensation and keep your heating costs low.

**Fig. 5**

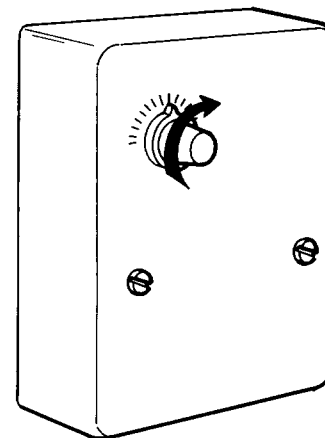
Turn off the power and drain the water tank. Then disconnect the water lines; the pipes can be rigid, as shown, or flexible. Cut the pipes if needed; install unions.

**Fig. 7**

Install relief valve. When unit is fully connected and water is hot, test the valve by squeezing it. Water will run out if valve is okay. In this example, flexible pipes are used.

**Fig. 6**

Install parts before setting heater. Then set heater and level it with shingle shims. Heaters are heavy; have a friend help you.

**Fig. 8**

Turn on water and fill tank completely. Then turn on electric power and heat water. Set the thermostat to 110-140F.