

## No Hot Water

Use the following step-by-step plan as a guide to help determine why you have no hot water.

### 1 Check the Status Light

The Status Light on the gas control valve flashes once every four seconds when there are no problems and there is no call for heat.

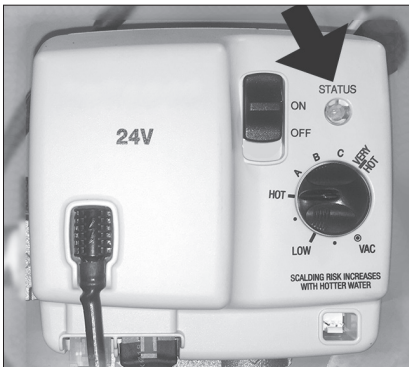


Figure 28 - Status Light

If the Status Light is flashing once every four seconds and you have no hot water, make sure the gas control knob is set to HOT.

If the Status Light flashes a different pattern than is described above, refer to “Gas Control Valve/Thermostat - Status Light Codes” starting on page 23.

If the Status Light is not flashing, go to Step 2.

### 2 Status Light is Not Flashing

If the Status Light on the gas control valve/thermostat does not flash, the system may be locked out. Refer to “Gas Control Valve/Thermostat - Status Light Codes” on page 23. Be sure to read the notes at the top of the flowchart.

## Insufficient Hot Water or Slow Hot Water Recovery

**▲ WARNING! Because of the increased risk from scalding, if you set the water heater’s gas control knob higher than 120°F (49°C), install Thermostatic Mixing Valves. Due to the increased risk of scalding, do not set the temperature of the Thermostatic Mixing Valves above 120°F (49°C).**

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 in the house for hot water).
- 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.
- Sediment or lime buildup in the bottom of the tank.

**Thermostatic Mixing Valves:** If the hot water is simply not warm enough, make sure the faucet you are checking does not 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.

**Undersized Water Heater:** If your water heater runs out of hot water

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 your family’s hot water needs with the existing water heater by installing Thermostatic Mixing Valves and then turning the gas control knob to a higher setting.

You can also reduce your home’s hot water needs by washing clothes in cold water, installing flow restrictors on shower heads, repairing leaky faucets, and taking other conservation steps.

**Reversed Connections or Melted Dip Tube:** Check the hot and cold water connections and make sure your home’s 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 home’s plumbing system can make it appear that the water heater is producing little to no hot water. In this case, the burner will be on all or almost all the time, yet you will have very little hot water. Locate and repair the leak.

**Sediment or Lime in Tank:** With an existing water heater, if you have some hot water but not as much as you are used to, there may be a buildup of sediment or lime on the bottom of the tank. Sediment or lime

buildup can reduce the efficiency of your water heater. Heavy deposits can damage the water heater. See the Maintenance section for steps on draining and flushing the water heater.

## Temperature Too High

Adjust the thermostat on the water heater to a lower setting. Install or adjust Thermostatic Mixing Valves (see the valve manufacturer's instructions).

## 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 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 is 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 home's water pressure is too high and/or you need a Thermal Expansion Tank. See Step 1 (page 10) 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. If the T&P Relief Valve is discharging large amounts of very hot water, turn OFF the gas supply valve/thermostat and call a qualified person.

**⚠ 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.

**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 home's water pressure may be too high or the Thermal Expansion Tank 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 sealing 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. Refer to the T&P Relief Valve Maintenance section of this manual.

**⚠ WARNING! When manually operating the Temperature Pressure Relief Valve, make sure that no one is in front of or around the discharge outlet. The water may be extremely hot and could cause severe burns.**

**Also ensure that the water discharge will not cause property damage.**

If the water pressure is below 80 psi (551 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" 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.

**NOTICE:** 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 very strong, you could increase the tank temperature to 140°F (60°C) in order to reduce bacterial 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.**

## Gas Control Valve/Thermostat - Status Light Codes

### NOTICE:

- These codes apply to the gas control valve/thermostat. The location of the gas control valve/thermostat is shown on page 2.
- Refer to the following pages for detailed troubleshooting procedures.

**EXAMPLE: An “Eight-Four Flash” will show eight flashes, then four flashes, followed by a three second pause. The pattern will then repeat.**

LED FLASH SEQUENCE	GAS CONTROL VALVE/ THERMOSTAT STATUS	CORRECTIVE ACTION
Short Flash once every four seconds	IDLE (no call for heat, no fault conditions)	
“Heartbeat”, alternates bright/dim	Call for Heat (no fault conditions)	
One Flash, three second pause	Low Flame Signal (control continues to operate)	<p>Turn the power switch on the gas control valve/thermostat to the “OFF” position and unplug the power cord from the power outlet.</p> <ol style="list-style-type: none"> <li>1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate, proceed to Step 2.</li> <li>2. Check all wiring connections and ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, proceed to Step 3. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list for the appropriate replacement. After any connection problems are fixed, restart the water heater by following the lighting instructions on page 18. If the problem persists, proceed to Step 3.</li> <li>3. Check the condition of the base ring filter and flame arrestor. If they are clogged, follow the instructions for cleaning on page 30. If parts are not clogged, proceed to Step 4. After cleaning, follow the instructions for lighting on page 18. If problem persists, proceed to Step 4.</li> <li>4. Follow the instructions on page 29 to remove the burner assembly. Once the burner assembly has been removed, inspect the manifold tube and burner for any obstructions. If any clogs or obstructions are present, clear them. Inspect the pilot assembly’s electrode/flame sense rod for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/flame sense rod, replace the igniter/pilot assembly. Follow the directions on page 29 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 18. If the problem persists, contact a qualified service representative.</li> </ol>
Two Flash, three second pause	End Switch Failed Closed	<p>Look at the top of the water heater to see if the damper is open (Figure 21 on page 16). If the damper is open, ensure there is no obstruction that would prevent the damper from closing. If there are any obstructions, turn the power switch on the gas control valve/thermostat to the “OFF” position, then remove the obstruction. If the damper closes, turn the power switch on the gas control valve/thermostat to the “ON” position. If there are no obstructions present, turn the power switch on the gas control valve/thermostat to the “OFF” position. Observe the damper to see if the damper closes. If the damper does not close, unplug the power cord from the power outlet and proceed to Step 1. If the damper closes, turn the power switch on the gas control valve/thermostat to the “ON” position.</p> <ol style="list-style-type: none"> <li>1. Check all wiring connections to ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list on pages 32-33 for the appropriate replacement. After any connection problems are fixed, restart the water heater by following the lighting instructions on pages 18. If the problem persists, replace the damper.</li> </ol>
Three Flash, three second pause	End Switch Failed Open or TCO (Thermal Cutoff) Limit Lockout	<p>Turn the power switch on the gas control valve/thermostat to the “OFF” position and unplug the power cord from the power outlet.</p> <ol style="list-style-type: none"> <li>1. Attempt to depress the TCO door switch button (see “Completed Installation” illustration on page 2). If the TCO door switch button depresses, follow the instructions for cleaning the filter and flame arrestor on page 30. After cleaning is completed, follow the lighting instructions on pages 18. If the TCO door switch button does not depress, proceed to Step 2.</li> <li>2. Follow the lighting instructions on pages 18. Observe the damper during initial startup. If there is a call for heat and the damper opens, allow the unit to continue to perform and monitor any change in status. If there is a call for heat and the damper does not open, proceed to Step 3.</li> <li>3. Check all wiring connections and ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list on pages 32-33. After any connection problems are fixed, restart the water heater by following the lighting instructions on pages 18. If the problem persists, replace the damper.</li> </ol>
Four Flash, three second pause	ECO Limit Lockout	<p>Turn the power switch on the gas control valve/thermostat to the “OFF” position, wait 10-20 seconds, then turn the power switch on the gas control valve/thermostat to the “ON” position. If the problem persists, replace the gas control valve/thermostat (see page 28).</p>
Five Flash, three second pause	Flame Out Sequence	<p>Turn the power switch on the gas control valve/thermostat to the “OFF” position. Wait 10 minutes, then follow the lighting instructions on pages 18. If the problem persists, replace the gas control valve/thermostat (see page 28).</p>



# TROUBLESHOOTING GUIDE

## Residential Gas-fired Water Heaters Atmospheric Vent - Powered Damper

LED FLASH SEQUENCE	GAS CONTROL VALVE/ THERMOSTAT STATUS	CORRECTIVE ACTION
Six-One Flash, three second pause	Soft Lockout* - Retry Limit - Failed TFI (Trial for Ignition)	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position. Unplug the water heater from the wall outlet. Plug the power cord back in, then follow the lighting instructions on page 18. If that does not work, turn the power switch on the gas control valve/thermostat to the "OFF" position, unplug the power cord from the power outlet, then follow the steps below.</p> <ol style="list-style-type: none"> <li>1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate, proceed to Step 2.</li> <li>2. Check all wiring connections and ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, proceed to Step 3. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list for the appropriate replacement. After any connection problems are fixed, restart the water heater by following the lighting instructions on page 18. If the problem persists, proceed to Step 3.</li> <li>3. Check the condition of the base ring filter and flame arrestor. If they are clogged, follow the instructions for cleaning on page 30. If parts are not clogged, proceed to Step 4. After cleaning, follow the instructions for lighting on page 18. If problem persists, proceed to Step 4.</li> <li>4. Follow the instructions on page 29 to remove the burner assembly. Once the burner assembly has been removed, inspect the manifold tube and burner for any obstructions. If any clogs or obstructions are present, clear them. Inspect the pilot assembly's electrode/flame sense rod for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/flame sense rod, replace the igniter/pilot assembly. Follow the directions on page 29 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 18. If the problem persists, contact a qualified service representative.</li> </ol>
Six-Two Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost - END Switch Fails	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position and unplug the power cord from the power outlet.</p> <ol style="list-style-type: none"> <li>1. Check all wiring connections to ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, replace the damper. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list on pages 32-33 for the appropriate replacement. After any connection problems are fixed, restart the water heater by following the lighting instructions on page 18. If the problem persists, replace the damper.</li> </ol>
Six-Three Flash, three second pause	Soft Lockout* - Recycle Limit - Flame Lost	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position and unplug the power cord from the power outlet.</p> <ol style="list-style-type: none"> <li>1. Check the incoming gas line pressure to ensure adequate supply to the water heater. If incoming gas supply pressure is adequate, proceed to Step 2.</li> <li>2. Check all wiring connections and ensure all harness and wire connections are seated firmly and provide proper electrical contact. If no connection problems are found, proceed to Step 3. Firmly seat any loose connections found. If any connections are found to be damaged, consult the replacement parts list for the appropriate replacement. After any connection problems are fixed, restart the water heater by following the lighting instructions on page 18. If the problem persists, proceed to Step 3.</li> <li>3. Check the condition of the base ring filter and flame arrestor. If they are clogged, follow the instructions for cleaning on page 30. If parts are not clogged, proceed to Step 4. After cleaning, follow the instructions for lighting on page 18. If problem persists, proceed to Step 4.</li> <li>4. Follow the instructions on page 29 to remove the burner assembly. Once the burner assembly has been removed, inspect the manifold tube and burner for any obstructions. If any clogs or obstructions are present, clear them. Inspect the pilot assembly's electrode/flame sense rod for corrosion buildup, degradation, or damage. If there is evidence of any damage to the electrode/flame sense rod, replace the igniter/pilot assembly. Follow the directions on page 29 to re-install the burner assembly into the combustion chamber. Follow the instructions for lighting on page 18. If the problem persists, contact a qualified service representative.</li> </ol>
Six-Four Flash, three second pause	Soft Lockout* - Flame Out of Sequence Sensed	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position and unplug the power cord from the power outlet. Wait 10 minutes, then follow the lighting instructions on page 18. If the problem persists, replace the gas control valve/thermostat (see page 28).</p>
Seven Flash, three second pause	Flammable Vapor Sensor (FVS) Lockout	<ol style="list-style-type: none"> <li>1. Do not touch any electrical switch, do not use any phone in the building, and do not try to light any appliance.</li> <li>2. Smell around the water heater to ensure there are no gas leaks at the gas control valve/thermostat or in the supply gas line or for any other type of flammable vapors in the area.</li> <li>3. Carefully inspect the area surrounding the water heater for any substances such as gasoline, paint, paint thinners, varnish, or cleaners that could emit flammable vapors. Remove anything that can potentially emit flammable vapors from the area and store it properly in a different location.</li> <li>4. Contact a qualified service representative for inspection and/or replacement of the FV sensor.</li> </ol>
Eight-One Flash, three second pause	Flammable Vapor Sensor (FVS) Fault Detected	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position, wait 10-20 seconds, then turn the power switch on the gas control valve/thermostat to the "ON" position. If the problem persists, replace the gas control valve/thermostat.</p>
Eight-Two Flash, three second pause	Temperature Sensor Fault Detected	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position, wait 10-20 seconds, then turn the power switch on the gas control valve/thermostat to the "ON" position. If the problem persists, replace the gas control valve/thermostat.</p>
Eight-Three Flash, three second pause	Electronic Fault Detected	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position, wait 10-20 seconds, then turn the power switch on the gas control valve/thermostat to the "ON" position. If the problem persists, replace the gas control valve/thermostat.</p>
Eight-Four Flash, three second pause	Gas Control Valve/Thermostat Fault Detected	<p>Turn the power switch on the gas control valve/thermostat to the "OFF" position, wait 10-20 seconds, then turn the power switch on the gas control valve/thermostat to the "ON" position. If the problem persists, replace the gas control valve/thermostat.</p>

\*Soft Lockout - 20 minute wait before returning to normal operating mode.

### Sequence of Operations Chart

