

RV Water Heater Basics

Modern RV water heaters (WH) generally have two ways to heat water, operating in either Electric or LP Gas mode. However, in entry level RVs the WH may be limited to LP gas only. In some motorhomes there will be a third heating method called Motoraid, which uses waste heat from the motorhome engine to heat the water as you drive. Finally, some high end RVs may have an entirely different system in which the water heater is part of a diesel & electric central heating system, typically either the Aquahot or Hydrohot brand names. These systems are an entirely different animal and will not be discussed here.

The standard water heater sizes in RVs are 6 gallon or 10 gallon, much smaller than a residential heater, so you may not be able to enjoy the same long, hot shower as at home. A few models are advertised as being 16 gallon heaters, but these are actually 10 gallon heaters that superheat the water and then mix cold water at the outlet, giving them the equivalent of a 16 gallon capacity at the usual 140 degrees.

There are separate On/Off switches for the Electric and LP Gas Modes and these are sometimes in different locations. It's pretty much up to the RV designer to determine where the switches go and the reasoning isn't always obvious. The heater can be operated in either mode or both can be used to speed up the heating process. Both are controlled by a thermostat, so the heater only runs as needed. In LP gas mode, a heater control circuit board insures safe operation, so 12v power is needed for it to operate.

Many WH have separate thermostats for Electric and LP Gas modes and the two modes are pretty much independent of each other. If one does not work for some reason, usually the other will still be functional. Newer model heaters have begun to use a single common thermostat for both gas and electric, but the two modes are still autonomous. The heater's controller reads the thermostat and turns on electric or gas for heat as needed. The standard thermostats are fixed temperature, typically 140 degrees in recent models, and you cannot adjust them. Older thermostats were 120 degrees. There may be adjustable replacement thermostats available for some brands & models.

Electric Mode

The WH Electric Mode can be used whenever you have 120v shore or generator power available. It requires a fairly substantial amount of electricity, about 12 amps (1400 watts), so you may not want to utilize it if power is limited, or if you want to run other high power appliances (like an air conditioner or microwave oven) at the same time. This is primarily a concern in RVs that have only 30A shore power wiring, or anytime the RV is plugged into an outlet that has 30A or less available. You can switch it off temporarily (the water will stay hot for some time) or change over to LP Gas mode.

When you switch on the Electric mode, the thermostat controls whether 120v power flows to the electric heater element or not. The heater element cycles on & off as needed, heating the water, just like your home water heater. There is no need to turn the heater off when not in use.

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LP Gas Mode

The most basic model gas WH has a pilot light which must be lit manually with a match or sparking device. There is a manual valve that must be set to the Pilot position to light the pilot and then you move the valve to a Run position for continued operation. Once the pilot light is lit and the heater control circuit board detects a flame at the flame sensor, the gas mode thermostat starts and stops the flow of LP gas to the burner, where it is ignited by the pilot flame. There is no need to relight the pilot each time more hot water is needed. If the pilot goes out, no flame is detected and no gas is allowed to flow, preventing any danger from leaking LP gas. When you no longer need to have hot water available, turn the Pilot Control switch to Off and the heater shuts down.

Most modern WH are the DSI (Direct Spark Ignition) type, which has no pilot light. When you switch on the water heater in LP Gas mode, the gas mode thermostat will call for it to be heated as needed. When heating is called for, the heater control circuit board opens the gas valve and activates the igniter, making a spark at the front of the heater's gas burner tube, and [hopefully] igniting the flame. At the same time, the control board starts sensing for a flame [the igniter doubles as a flame sensor]. When the burner flame is sensed, the ignition sequence is complete. If no flame is detected after a preset time (about 15 seconds), the gas valve is closed, the igniter is turned off, and the system "locks out," meaning it won't allow another attempt at restarting until the system is reset by turning it off and on again. Usually a red indicator light will show at the LP Gas Mode switch if the heater fails to light when needed.

While you can run a DSI WH in LP Gas Mode while driving, this is generally not necessary since it heats up within 20-30 minutes after it is turned on anyway. A Manual Pilot type of WH usually does not work while driving - the wind blows the pilot light out. Few RV'ers leave their water heater on while traveling - it's just a waste of fuel.

The WH always needs a steady source of 12v power to operate its circuit board, whether using LP gas or electric as the heating source..

MotorAid

The MotorAid system is conceptually quite simple. Water from the motorhome engine cooling system is circulated through tubes embedded in the water heater. Whenever the engine is at its normal operating temperature, the water in the tank is being heated by the waste heat from the engine. This provides heated water as well as assisting in cooling the engine.

Maintenance

Your water heater requires very little care in normal use. The Electric Mode is essentially maintenance free, and the LP Gas mode needs only an annual cleaning of the burner tube to remove rust flakes, spider webs, etc. A vacuum cleaner nozzle on the tube is usually

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sufficient. However, when you store the RV for long periods you should drain the tank (see your WH owner manual) and, if sub-freezing weather is expected, winterize the associated water lines. The RV's heater plumbing usually has a bypass valve to assist in winterizing. The heater bypass and winterizing procedures are part of the general RV maintenance information and not covered in the WH manual.

Suburban brand water heaters have a sacrificial anode that deteriorates over time and must be replaced periodically. The time period depends on the quality of the water that passes through the tank as well as the amount of use, so individual experience varies widely. The anode is attached to the drain plug.