

Guides are only intended for use on Atwood[®] products by service technicians who have successfully completed Atwood[®] training. This guide should be used in conjunction with the appropriate Instruction Manual provided with the product and any applicable Industry standards. This is not intended to be a complete list. Please direct questions concerning service of Atwood[®] products to 866-869-3118 before proceeding.

CAUSE

SOLUTION

WATER HEATER LOCK OUT - SPARK PRESENT BUT NO GAS

Gas pressure incorrect	Set inlet pressure at a minimum 11" W.C. with two or more gas appliances running
Low voltage	Correct power supply - 10.5 VDC minimum
Blocked main burner tube	Clean burner tube
Blocked main burner orifice	Clean or replace orifice
Loose wires on E.C.O.	Secure wire connections
Loose wire connections on solenoid valve	Secure wire connections
Loose valve wire on wiring harness	Repair wire on edge connector or replace wiring circuit board harness
Defective E.C.O.	Replace E.C.O.
Defective circuit board	Replace circuit board
Defective solenoid valve	Replace coils or solenoid valve
No gas to solenoid valve	Correct gas supply
Dirty connector on circuit board	Clean edge connector

WATER HEATER LOCK OUT - GAS PRESENT BUT NO SPARK

High tension lead wire loose	Secure wire connection on circuit board
Electrodes loosely attached to main burner	Secure electrodes to main burner
Improper electrode gapping	Re-position spark gap to 1/8" and into path of flame
Dirty electrodes	Clean electrodes
Wires loose in electrode porcelain	Replace electrodes
Cracked porcelain on electrode	Replace electrodes
Defective circuit board	Replace circuit board

WATER HEATER LOCK OUT - GAS AND SPARK PRESENT

Gas pressure incorrect	Set inlet pressure at a minimum 11" W.C. with two or more gas appliances running
Low voltage	Correct power supply - 10.5 VDC minimum
Poor electrical ground	Secure electrical ground
Electrodes out of flame pattern	Re-adjust electrodes
Electrodes sparking to screw fastening burner to flue tube	Adjust electrodes away from screw
Dirty electrodes	Clean electrodes
Partial obstruction in main burner	Clean main burner
Partially obstructed main burner orifice	Clean main burner orifice or replace
Improper air adjustment	Adjust main burner air shutter approximately 1/4 open
Flame spreader on main burner out of adjustment	Adjust flame spreader so that it is square to the end burner tube out of alignment of the main burner
Manifold not aligned with main burner	Re-align solenoid valve with main burner
Partially opening solenoid valve	Replace solenoid valve
Defective circuit board	Replace circuit board

continued

CAUSE	SOLUTION
EXCESSIVE OR INSUFFICIENT WATER TEMPERATURES	
By-pass kit valves not set properly -----	Place valves in proper position
Thermostat not seated against tank -----	Reseat thermostat
Defective thermostat -----	Replace thermostat
ERRATIC BURNER FLAME OR SOOTING	
Low gas pressure -----	Set inlet pressure at a minimum 11" W.C. with two or more gas appliances running
Poor gas supply -----	Replace gas supply
Improper air adjustment -----	Adjust main burner air shutter approximately 1/4 way open. Flame should be mainly blue and quiet.
Poor main burner alignment -----	Adjust valve and main burner alignment
Misaligned burner flame spreader -----	Align flame spreader so it is square with end of burner tube.
Blocked burner orifice -----	Clean orifice. DO NOT enlarge orifice
Obstructed main burner -----	Clean main burner
Obstructed "U" tube -----	Clean "U" tube
Obstructed exhaust grille -----	Remove obstruction
NO SPARK AND NO GAS	
No voltage -----	Correct power supply - minimum 10.5 VDC
Dirty edge connector on circuit board -----	Clean edge connector
Defective thermal cut-off -----	Replace thermal cut-off
Defective ON/OFF switch -----	Replace switch
Defective circuit board -----	Replace circuit board
Defective thermostat -----	Replace thermostat



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INTERMITTENT IGNITION

Electronic Ignition Water Heater

INFORMATION GUIDE

Effective: 8/21/00

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1. CHECK ALL OF THE WIRE CONNECTIONS.

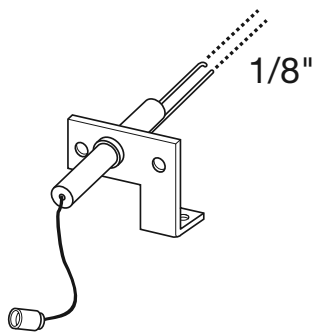
Poor or corroded wire connections cause most of the intermittent problems in water heaters. You should go through and pull all of the wires off any spade connections. Then reconnect them and ensure the connections are tight and corrosion free.

We want to point out two connections often overlooked.

First, check the (green) ground wire of the circuit board. This wire screws down under the circuit board mounting screw. If that screw for the board is loose, you may not have a secure ground.

Second, check the four wire edge connector going into the circuit board. Remove the circuit board. Take a pencil eraser and clean the marks off the connection of the circuit board. Reconnect the four wire edge connector onto the circuit board and then immediately remove it. Look at the edge connection of the board. You need to see four good scratches in the connection. If you do not see four scratches, then you will need to repair the edge connector or replace the wire harness.

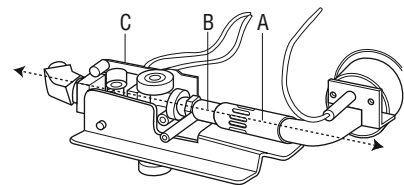
2. CHECK THE INTEGRITY AND POSITION OF THE SPARK PROBE ASSEMBLY.



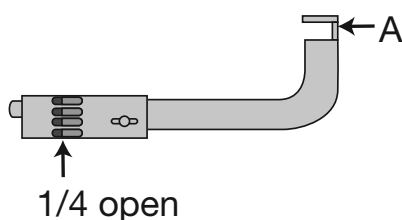
The gap between the sparking probe and the ground probe should be 1/8 inch. The probes should be clean and free of cracks, flaking and corrosion. Position the probes so that they are in the path of the gas flow. Cracks in the ceramic insulator can also be the source of an intermittent problem. To check for cracks insert a fiber washer or any other type of insulation material in the 1/8" gap between the rods. Remove the gas valve from the circuit and turn the unit on. If you see a spark jumping from the ceramic to the ground rod or bracket, replace the spark probe.

3. CHECK THE ALIGNMENT OF THE MAIN BURNER TO THE ORIFICE.

Position the main burner tube (A) so that the gas coming out of the orifice (B) is going straight down the middle of the burner tube. If the alignment is off, the gas will bounce down the tube which will alter the gas flow once it reaches the spark. Manually shift the valve (C) with your hands to achieve this alignment.



4. CHECK THE ALIGNMENT OF THE FLAME SPREADER ON THE BURNER TUBE.



At the end of the burner tube there is a dime-shaped deflector disk. This disk spreads the flame out for proper heat distribution. Align the flame spreader (A) so that it is parallel to the end of the tube and positioned in the center of the end of the tube. If the flame spreader is out of position, it could divert the gas away from the spark and cause intermittent ignition.

continued

5. CHECK THE AIR ADJUSTMENT.

The burner tube has an adjustable air shutter on it at the end where it goes over the orifice. Position the air shutter so that it is 1/4 of the way open. We are looking for a blue flame with small traces of yellow in the flame. If the flame is fairly quiet then it is adjusted correctly.

6. CHECK THE CLEANLINESS OF THE ORIFICE.

The orifice is the hex head brass fitting that is screwed onto the brass manifold of the valve. You will have access to this part once the burner has been removed. Remove the brass orifice and clean with isopropyl alcohol. **NEVER** enlarge the size of the orifice.

7. CHECK FOR OBSTRUCTIONS IN THE MAIN BURNER TUBE.

The cleanliness of this tube is very important. Spider webs, soot and other debris can accumulate, causing problems with gas flow down the tube. We recommend cleaning the burner tube with a brush and not compressed air. Compressed air may not fully remove the obstruction.

8. CHECK THE CLEANLINESS OF THE FLUE TUBE.

The flue tube is the 2-1/2 inch diameter tube that starts at the bottom right corner of the water heater (where the main burner flame enters) and comes out the top left. This tube can become blocked by debris like insect nests or soot. To clean remove the metal flue box in the top left corner of the water heater. To facilitate cleaning unfold a wire hanger, wrap a rag around the end and use this to swab out the tube.

9. CHECK THE VOLTAGE TO THE VALVE.

Make sure that the voltage to the gas solenoid valve is between 10.5 and 13.5 volts DC. Voltage drops can occur at almost any component. Turn on another twelve volt appliances when you check the voltage so that you can see how the converter is working with a load. The voltage itself can be intermittent. With linear converters the 12 VDC varies depending on the 115 VAC. If the 115 VAC is high then the 12 VDC will be high, and if the 115 VAC is low then the 12 VDC will be low. If the power to the water heater is connected to the unfiltered side of the converter, move it to the filtered side.

10. CHECK THE GAS PRESSURE OF THE RV.

Make sure the gas pressure of the RV is checked with preferably the furnace and the range on to simulate a load. The pressure should be 11 inch water column under load. Besides gas pressure being at the proper level there are other strange things that can happen inside gas lines that cause intermittent problems. We have seen oil build up in a gas line that meant there was good pressure to one appliance but not the correct pressure to another appliance. Moisture could also build up in the gas line that would freeze and partially block the line. Intermittent pressure from the regulator of the bottles is still another area that should be investigated.

11. INTERMITTENT CIRCUIT BOARD.

If you have gone through all of the above checks and the intermittent problem is still occurring, only then check the circuit board. Ensure the circuit board is clean and reasonably moisture free before you change it.

There are two major points that should have stood out to you from this list.

First, the majority of intermittent ignition problems on Atwood electronic ignition water heaters can be corrected by cleaning certain components or making simple adjustments.

Second, ignition problems can be found in other components than the circuit board. The circuit board is not the end all solution to ignition problems. This mindset developed a number of years ago with the introduction of the first circuit boards that were not very reliable. We've learned a lot since then. Technology has progressed making today's circuit boards very reliable. The circuit board can only do what the other components of the water heater allow it to do.

****POTTED CHANNEL CIRCUIT BOARDS**

Atwood **potted circuit boards can be tested using a multi-meter. This test must be performed with the circuit board removed, and the meter set to the ohms scale. This will check the continuity of all tracks on the harness connection of the board.

The following steps should be used to test each track.

A. Cross leads of meter to ensure it is registering continuity.

B. TO TEST POWER TRACK:

Place negative lead of the multi-meter to ground (green wire) track of edge connection and positive lead of the multi-meter to top power (brown wire) track of edge connection. If no continuity, board is defective. *Atwood does not warranty this installation related failure.

C. TO TEST LAMP TRACK:

Place negative lead of the multi-meter to ground (green wire) track of edge connection and positive lead of the multi-meter to lamp (blue wire) track of edge connection. If no continuity, this indicates blown lamp track. Circuit board will still fire unit but lamp light will not come on. This is caused by a short in the blue wire between the unit and the switch. Wiring must be corrected before the board is replaced. *Atwood does not warranty this installation related failure.

D. TO TEST VALVE TRACK:

Place negative lead of the multi-meter to ground (green wire) track of edge connection and positive lead of the multi-meter to valve (red wire) track of edge connection. If no continuity, this indicates a blown valve track.

- If the valve wire is shorting under the flue box – Atwood will warranty the board.
- If the E.C.O. terminals are contacting the drawn pan – Atwood will warranty the board only if the inner tank of the water heater was installed flush on the floor of the coach.
- If the inner tank of the water heater does not rest flush against the floor of the coach – *Atwood does not warranty this installation related failure.

* Installation related failures on circuit boards are the responsibility of the coach manufacturer.

** Non potted circuit boards can be checked by turning the board over and visually inspecting each track for a burn mark or break in the track itself. A burn mark or broken track indicates the board is blown. Depending on which track is blown determines whether it is covered under Atwood's warranty as stated in section B, C and D.

THERMAL CUT-OFF DEVICE

Current Atwood direct ignition water heaters are equipped with a thermal cut-off device. This device is located on the incoming power wire and is connected to the thermostat. The thermal cut-off is designed to permanently break circuit and shut down the water heater before excessive heat can cause damage due to obstructions in the main burner tube or flue tube caused by spiders or mud wasps. These obstructions can cause the main burner flame to burn outside the main burner tube. When the flame or the heat from the flame contacts the thermal cut-off, the circuit will open.

If there is **no heat damage** to the thermal cut-off, and if it is determined defective, Atwood will cover the replacement of this device under warranty. We will allow .25 hour at your Atwood approved warranty rate. If there **is heat damage** the device performed its safety feature and no warranty labor will be allowed. Any obstructions should be removed, alignment checked and gas pressure taken before a new thermal cut-off is installed.

Note: When replacing a thermal cut-off, also examine the grill in the access door while the door is in the closed position. The wide aluminum band of the grill should be at the bottom. If it is at the top, this condition may trap exhaust heat and possibly also cause thermal cut-off to trip. To correct, remove the grill from the door and snap back in place with the wide aluminum band at the bottom.

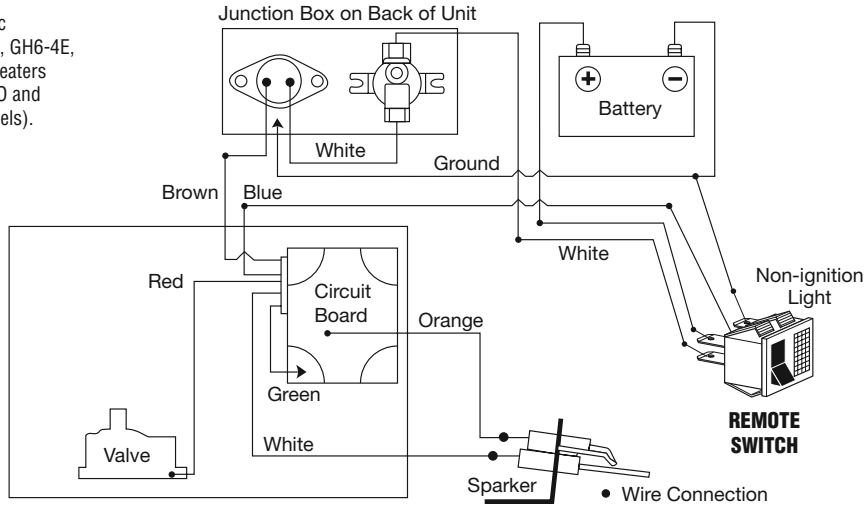
THERMOSTAT

The thermostat on this water heater is pre-set at 140° F. The water heater will cycle off when the water temperature reaches 140° F. and will generally take 20-25 minutes to reach this temperature. It will cycle back on when the water temperature cools down to approximately 115° F. In the latter part of the heating cycle though, it is very common for the pressure-temperature relief valve to weep. Refer to the page covering weeping relief valves to remedy this situation.

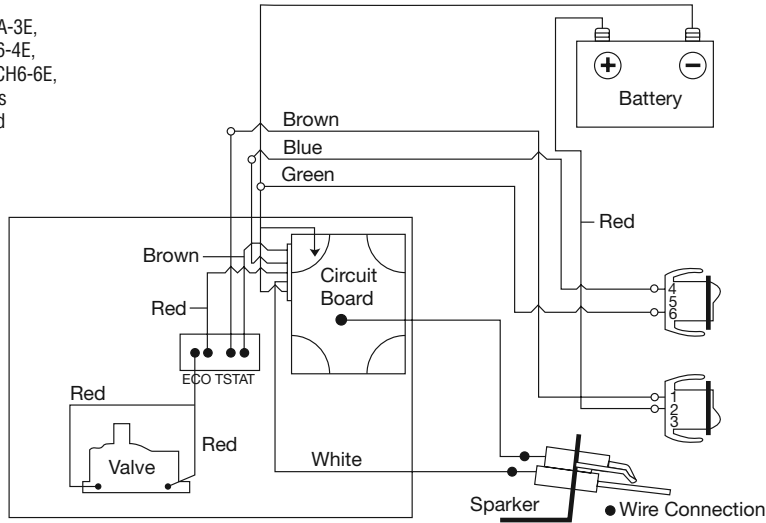
If a customer is dissatisfied with the temperature of the water, first check the water temperature with a cooking thermometer and verifying that the initial cycle is within the time noted above. If not, an adjustable thermostat may be purchased allowing the water temperatures to be adjusted from 110 - 150° F. It fits in place of the original thermostat.

Water Heater Wiring Schematics

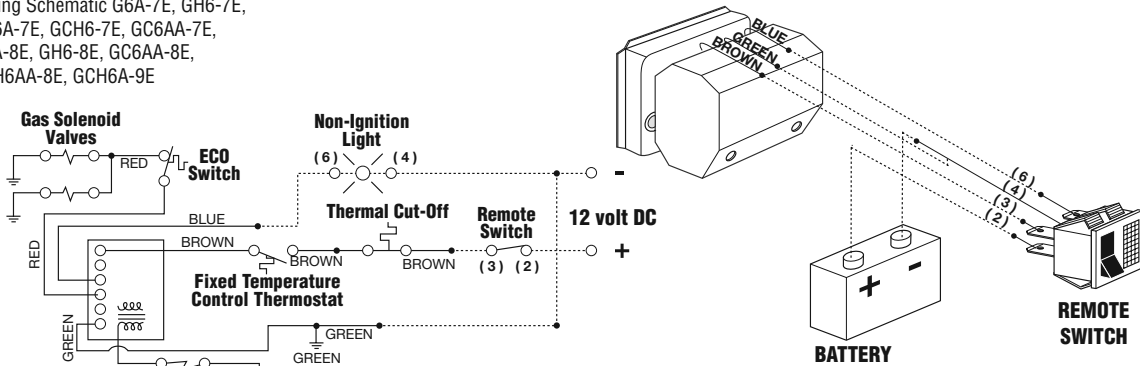
Wiring Schematic
G6A-2E, G6A-3E, GH6-4E,
GH6-3E Water Heaters
(Rear Mount ECO and
Thermostat Models).



Wiring Schematic G6A-3E,
G6A-4E, GH6-3E, GH6-4E,
GCH6-4E, G6A-6E, GCH6-6E,
GH6-6E Water Heaters
(Front Mount ECO and
Thermostat Models).



Wiring Schematic G6A-7E, GH6-7E,
GC6A-7E, GCH6-7E, GC6AA-7E,
G6A-8E, GH6-8E, GC6AA-8E,
GCH6AA-8E, GCH6A-9E



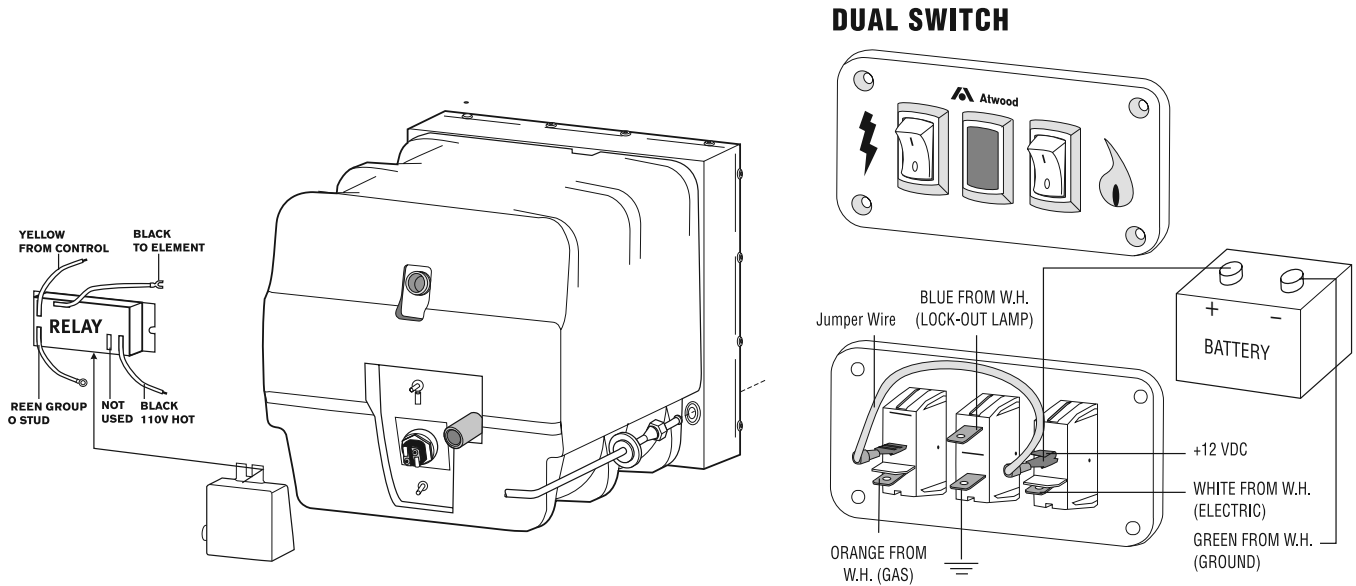
Dotted lines are wired by customer

CAUTION
When servicing controls, label all wires prior to disconnection.
Wiring errors can cause personal injury or property damage.
Verify proper operation after servicing.

GC 10A-4E & GC 6A-10E Wiring

In 2003, Atwood created a new gas-electric water heater. These units improve serviceability by moving most of the components for the electric portion of the water heater to the outside except the element and relay, which remain in a junction box in the rear. One module board controls both gas and electric.

When replacing a 3E or 9E to a 4E or 10E some wiring changes are necessary. See the INFORMATION NOTICE that follows.



WIRING DIAGRAM COMBINATION GAS/ELECTRIC

