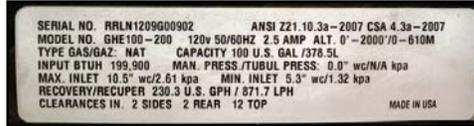




Spiderfire and Initial Installation

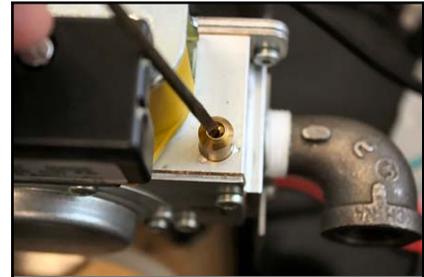
Determining pressure drop is an everyday occurrence when diagnosing Spiderfire water heaters. The rating plate will show a pressure range:

5.3 to 10.5 inches w.c. for natural gas
 11 to 13 inches w.c. for propane (LP)



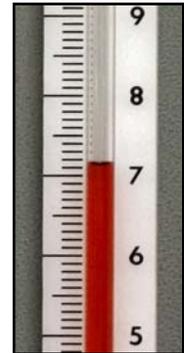
However, it does not tell you if the pressure settings are static (no main burner) or dynamic (main burner on). The use and care manual states the pressure settings are to be set with the main burner ON. Here is how you can do that:

1. Turn OFF gas at the isolation valve. Turn OFF water heater.
2. Locate the inlet pressure tap on the Spiderfire gas valve. Using a small flat blade screwdriver, open up the setscrew (counterclockwise) all the way. Don't worry, it will not come out.
3. Using a manometer (digital is better), place the tube from the meter to the inlet pressure tap on the Spiderfire gas valve. Turn gas back ON.
4. Turn manometer ON and read the pressure. This is the 'static' pressure without the main burner ON; or the gas valve open. This pressure should be identical to that of the gas meter supplying the fuel to the Spiderfire.



TIP: Write the static gas pressure on a piece of tape and place on the front of the water heater. Include the static and dynamic pressures.

5. Turn Spiderfire ON at the display panel and demand heat. Watch the display panel. When the display panel reads IGNITION, look at the manometer. You will notice a small drop at the inlet pressure. This is normal.
6. When the display panel reads HEATING, again observe the manometer. After two minutes of main burner, the reading on the inlet side should ideally be approximately 7 inches w.c for natural and 11" w.c for LP. This is what we call 'dynamic' pressure (main burner is on).
7. If the inlet pressure while the main burner is on is not with ½ inch (.5) of these settings, return to the gas meter and increase (decrease) gas pressure from the meter to within tolerance.



For ideal performance, the Spiderfire is designed with a dynamic (main burner ON) inlet pressure of 7" w.c. natural gas; or 11" w.c. LP.

Installation Tips:

- There may be as much as a 1 ½-inch pressure drop thru the gas valve. If you have any choice, then set the static pressure at the higher end of the pressure range. A pressure drop in excess of 1 ½ inches indicates the fuel pipe supply is too small for the BTU load and pipe distance to the water heater.
- A 10-foot section of ¾-inch black pipe will allow 200,000 BTU of fuel volume to pass. If you install two or more heaters, or a model above 200,000 BTU input, then look to install larger delivery pipes from the gas meter to the water heaters. See gas pipe sizing chart on last page.

The most common start up error code is A01 – Maximum Ignition Attempts. This simply means the controller was able to rectify the main burner flame during an ignition attempt. Here is what to look for:

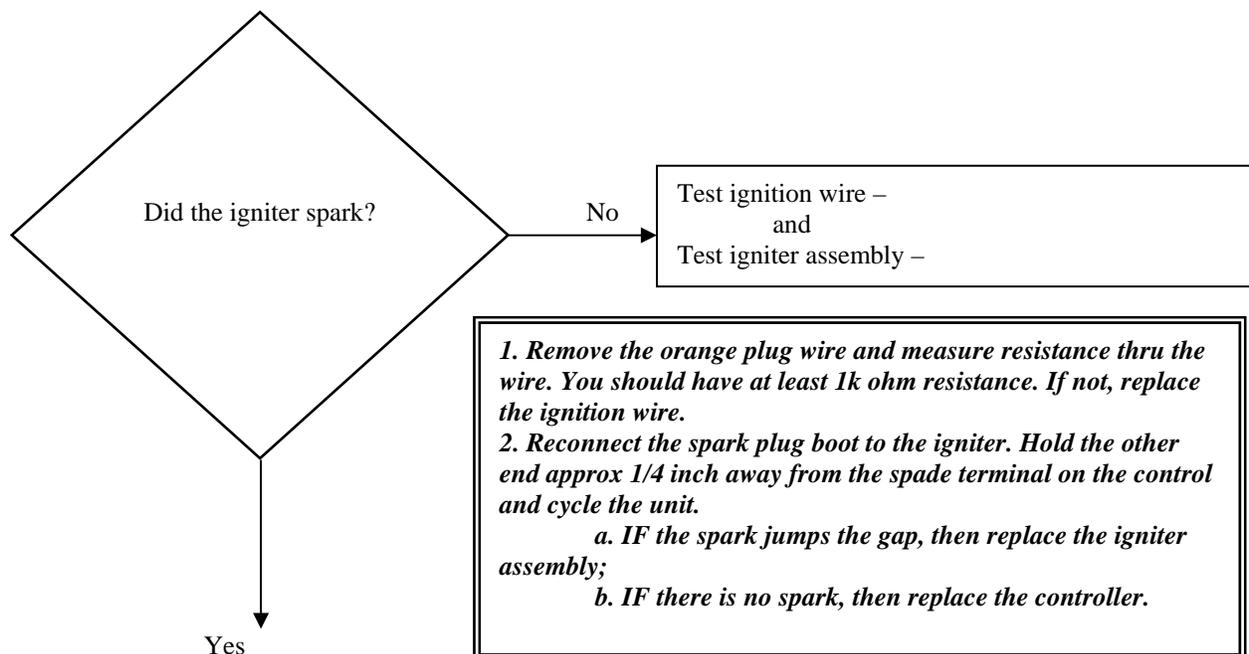
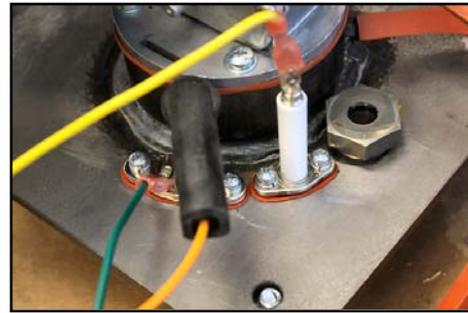


Spiderfire and Initial Installation

Error A01 Ignition Error

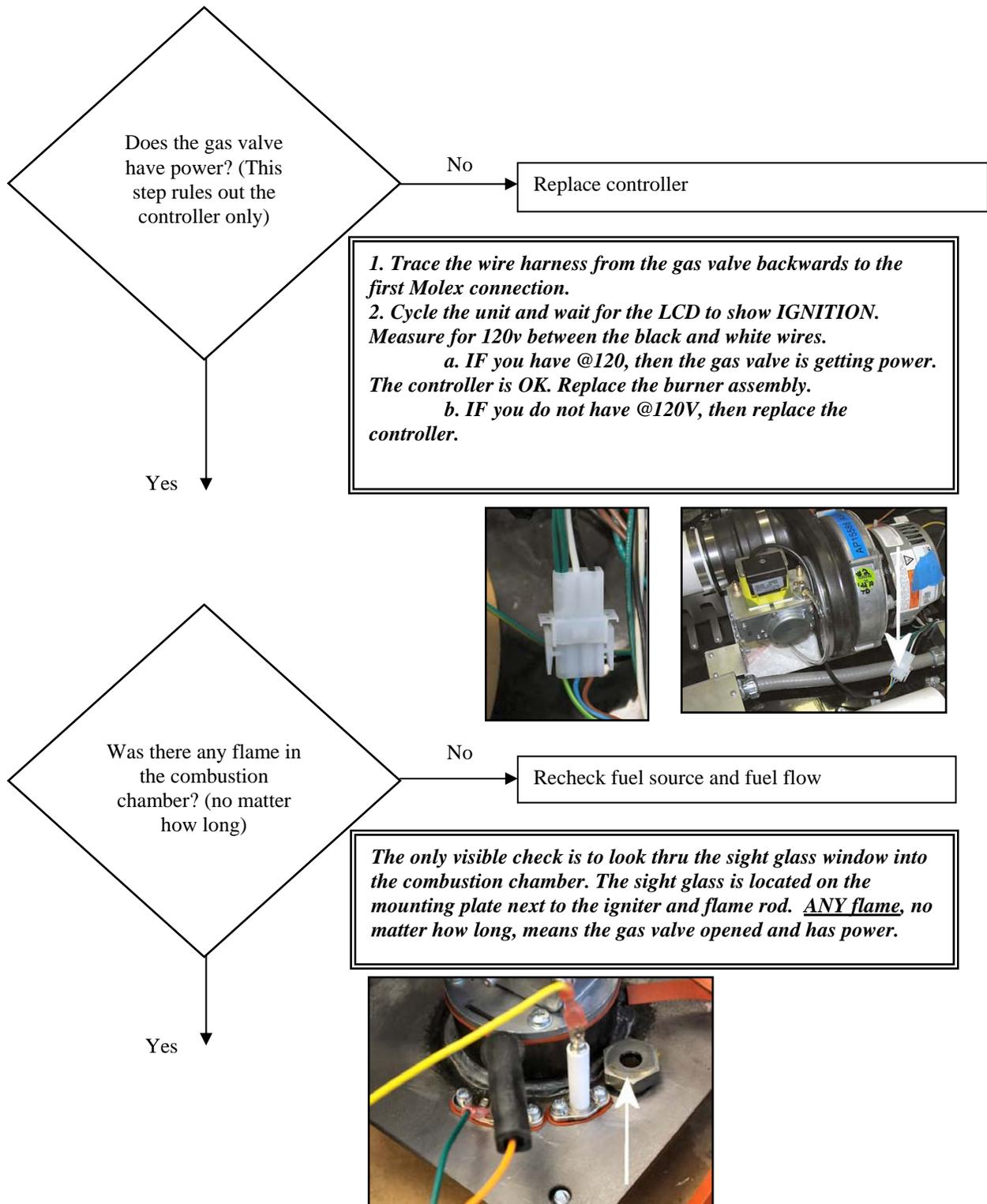
This lockout code means maximum ignition attempts. The unit has cycled for main burner three times (total of nine attempts) without flame rectification. The operative term here is flame rectification. Remember, the control checks many things such as the blower, venting, gas valve, ECO, etc, that would produce their unique error codes. Things to check:

- Does the unit have fuel?
- Is the fuel isolation valve ON?
- Is the orange igniter wire connected at both ends?
- Is the yellow flame probe wire connected at both ends?
- Is the green ground (rectification circuit) wire solidly connected at both ends?
- Is the gas valve Molex connected?





Spiderfire and Initial Installation





Spiderfire and Initial Installation

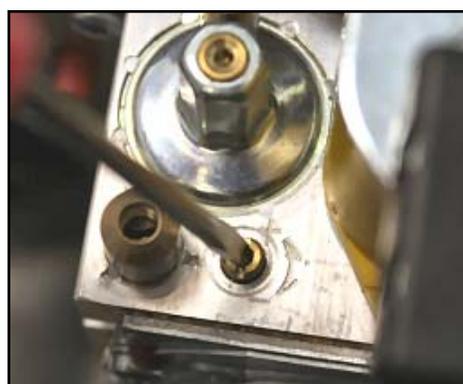
From here, you need to test for flame rectification. The problem can be the flame probe, grounding circuit or the controller.

Set multimeter to DC micro amps. Disconnect the yellow wire from the igniter assembly and connect the multimeter in series. Reading should be at least 8.0 μ A.

Check to ensure green ground connections are secure. Check to ensure yellow wire to flame rod is secure at both ends. Replace the wire(s) or connectors if there is corrosion.

Verify gas valve is set

1. Turn Spiderfire OFF.
2. Locate the slotted adjusting screw on the gas valve.
3. Turn the screw clockwise (-) until the screw bottoms out. Do not force the screw.
4. Turn the screw counterclockwise (+) five (5) turns.
5. Turn the Spiderfire ON and demand heat.
6. If the unit does not go to main burner, turn unit OFF; turn the screw counterclockwise (+) a 1/4 turn and restart the unit.
7. Continue this procedure until you have main burner; and the LCD says HEATING.



Next, you will need a combustion analyzer for CO₂ to fine-tune the gas valve.

8. Turn Spiderfire off and flush all of the hot water in the tank with cold. The next procedure needs the unit to run at full operating speed.
9. Following the instructions on your combustion analyzer, get a reading of the CO₂ levels of the combustion gases 24 inches above the exhaust elbow connection on the bottom water heater. Drill a 1/4 inch tap hole for your analyzer probe.
10. Once you have a consistent CO₂ reading, we need to adjust the reading to between 7 and 8.5% CO₂. If your reading is higher than 8.5%, adjust the screw clockwise (-); if your reading is lower than 7.0%, then adjust the screw counterclockwise (+).
11. When final adjustment is complete, close and seal the tap hole.



TABLE 2
For U.S. Installations
Maximum Capacity of Pipe in Cubic Feet of Gas per Hour for Gas Pressures of
0.5 psig or Less and a Pressure Drop of 0.3 Inch Water Column
Based on a 0.60 Specific Gravity Natural Gas; If 1.5 Specific Gravity L.P. Gas is used, multiply capacity by 0.63

Nominal Iron Pipe Size, Inches	Internal Diameter Inches	Length of Pipe, Feet													
		10	20	30	40	50	60	70	80	90	100	125	150	175	200
1/2	.622	132	92	73	63	56	50	46	43	40	38	34	31	28	26
3/4	.824	278	190	152	130	115	105	96	90	84	79	72	64	59	55
1	1.049	520	350	285	245	215	195	180	170	160	150	130	120	110	100
1 1/4	1.380	1,050	730	590	500	440	400	370	350	320	305	275	250	225	210
1 1/2	1.610	1,600	1,100	890	760	670	610	560	530	490	460	410	380	350	320
2	2.067	3,050	2,100	1,650	1,450	1,270	1,150	1,050	990	930	870	780	710	650	610
2 1/2	2.469	4,800	3,300	2,700	2,300	2,000	1,850	1,700	1,600	1,500	1,400	1,250	1,130	1,050	980
3	3.068	8,500	5,900	4,700	4,100	3,600	3,250	3,000	2,800	2,600	2,500	2,200	2,000	1,850	1,700
4	4.026	17,500	12,000	9,700	8,300	7,400	6,800	6,200	5,800	5,400	5,100	4,500	4,100	3,800	3,500