



**Set gas valve knob to the Pilot position. Set thermostat rocker switch to OFF. Set meter to VDC above one.**

**STEP 1 – Try to light pilot**

Does pilot light?  YES  NO

**NO:**

1. Verify gas is on.
2. Check for air in gas line.
3. Check for clogged pilot tube or orifice.

**STEP 2 – Check pilot operation**

Does pilot stay on when gas valve knob is released?  YES  NO

**NO:**

1. Check P/G output.
2. Check for shorted wires.
3. Check pilot coil (yellow wires).

**STEP 3 – Check pilot output**

Is there 500+ mV between PP and PP-TH terminals?  YES  NO

**NO:**

1. Check for low Pilot Generator output.
2. Check for partial shorts or loose wires.
3. Replace Pilot Generator.

**For the following tests leave the Red probe on the PP terminal. Move the Black probe to each test position.**

**STEP 4 – Check Fusible Link**

Is there 500+ mV through Fusible Link?  YES  NO

**NO:** Replace Fusible Link. Check for Roll out, Soot, Down drafting, Low Gas Pressure, etc.

**STEP 5 – Check Fireman's Switch**

Is there 500+ mV through Fireman's Switch?  YES  NO

**NO:** Check that a control system (if installed) is calling for heat or Fireman's Switch loop is closed.

**STEP 6 – Check High Limits**

Is there 500+ mV through Pressure Switch?  YES  NO

**NO:** Check wire harness to High Limits for damage, if OK replace both High Limit. Check for damage to by pass disc, headers, or exchanger. Do a Temperature Rise Test.

**STEP 7 – Check Pressure Switch**

Is there 500+ mV @ Black Wire of Pressure Switch?  YES  NO

**NO:** Make certain filter pump is ON. Perform Back Pressure Test. If 2.5 PSI or more, replace switch. If less, check pump, filter, etc. for pressure problem.

**Set rocker switch to ON. Set thermostat to maximum.**

**STEP 8 – Check Thermostat**

Is there 200+ mV @ Black wire of Temp. Board on terminal TH/PP?  YES  NO

**NO:** Zero volts - Replace rocker switch. 500+ mV do the tests below.

**STEP 9 – Check Gas Valve**

Is there 200+ mV @ TH terminal of the Gas Valve?  YES  NO

**NO:** Move rocker switch to OFF. Rotate Gas Valve Knob to ON. Move rocker switch to ON. Does heater fire?  YES  NO

**NO:** Check #1 burner and orifice. Check gas pressure. If all OK replace Gas Valve.

Perform Thermistor Test (see back pg.)

Disconnect pot wires (orange) and jump pot terminals. If voltage drops to 200+ mV, replace Temp. Control.

Replace Temp. Board

After correcting problem return to Step 9 and proceed.

# LRZM TROUBLESHOOTING 6/09

## Total Millivolt (mV) Loss Test

After the heater is completely operational and firing, do a Total Millivolt Loss Test by place one meter probe on PP-TH and the other probe on TH of the Gas Valve. The meter will now read the total millivolts lost in the entire circuit. Maximum allowable loss for the LRZM is 80 mV. If the loss is greater than 80 mV, test each wire and component by placing one probe at one end and the other probe at the other end of each item. Ideally all wires should have a zero reading and each component, except the Rocker Switch and Temperature Board should have no more than a 5 mV loss. The Rocker Switch can have up to 10 mV and the Temperature Board up to 50 mV. Any item which shows higher than allowable loss should be cleaned, repaired or replaced.

**Gas Pressure Chart**

Supply Pressure	Minimum	Maximum
Natural Gas	5.5 Inches WC (1.4 kPa)	10.0 Inches WC (2.5 kPa)
LP Gas	10.0 Inches WC (2.5 kPa)	14.0 Inches WC (3.5 kPa)
<b>Manifold Pressure</b>	<b>Nominal</b>	
Natural Gas	4.0 Inches WC (1.0 kPa)	
LP Gas	9.0 Inches WC (2.2 kPa)	

**Temperature Rise Chart**

Model	Minimum Temp Rise, °F (°C)	Maximum Temp Rise, °F (°C)	Minimum System Flow GPM (lps)
125	3 (2)	7 (4)	30 (1.9)
175	5 (3)	10 (6)	30 (1.9)
250	7 (4)	15 (8)	30 (1.9)
325	9 (5)	17 (9)	30 (1.9)
400	11 (6)	20 (11)	30 (1.9)

**Thermistor (Water Temperature Sensor) Chart**

WATER TEMP IN HEADER °F (°C)	APPROX. RESISTANCE IN 1,000'S OF OHMS (kOhms)
50 (10)	19.9
60 (15)	15.3
70 (21)	11.9
80 (26)	9.3
90 (32)	7.3
100 (38)	5.8

Symptom	Cause	Remedy
Pump not operating.	A. No power B. Pump defective C. Incorrect wiring	A. Check circuit breaker and power. B. Replace. C. Recheck wiring.
Pilot outage.	A. Inlet gas pressure low  B. Inlet gas pressure too high causing an unstable blowing pilot. C. Weak or defective thermocouple. D. Damaged pilot or thermocouple E. Dirty pilot F. Plugged or undersized pilot orifice.	A. Consult gas utility company. Inlet gas pressure to heater should be 5.5" to 10.0" WC for Natural Gas or 10.0" to 14" for Propane Gas. B. Pressure should be regulated within limits shown above. C. Replace thermocouple. D. Replace. E. Blow dust or lint out of pilot. F. Clean or replace pilot orifice.
Flame roll-out at startup.	A. Check burner orifices for blockage (spider webs) B. Blocked flue C. Pilot out of position (delayed ignition) D. Blocked heat exchanger. E. Fiber board out of place. F. Altered vent cap. G. Low gas pressure	A. Remove and clean each orifice.  B. Remove blockage. C. Correct pilot position. D. Clean or correct as necessary. E. Clean or correct fiber board as necessary. F. Install factory provided vent cap. G. Check and correct gas pressure.
Spillage at draft hood.	A. Cold chimney B. Vent pipe pitches down to chimney C. Blocked chimney. D. Altered draft hood. E. Prefabricated chimney with incorrect cap.	A. Allow heater to operate five (5) minutes to create draft action. B. Reinstall vent cap to pitch up from heater to chimney. C. Remove blockage. D. Install factory provided draft hood. E. Install UL listed vent cap.
Lazy flame with yellow tip.	A. Low primary air.	A. Check for blocked louvers or openings to heater.
Not enough heat	A. Inadequate gas supply B. Low manifold gas pressure.  C. Heater size inadequate. D. Low Temperature Rise.	A. Gas meter too small. Gas line from meter to heater too small. B. Gas pressure on heater manifold should be adjusted to 4.0" WC Natural Gas, 9.0" WC Propane. C. Replace with heater of higher input rating. D. Check and correct water flow.
Heater pounding or knocking.	A. Inadequate water flow through heater.	A. Check Temperature Rise (see chart above). If temperature rise is above the maximum check for damaged or incorrectly set bypass.
Heater condensing	A. Low water temperature.	A. Flue product moisture will condense at the start-up until the water temperature reaches normal operating conditions.
Pressure relief valve opens.	A. Restriction in water flow system at or downstream of heater	A. Check for proper operation of all valves, bypass valve and any equipment between pool and heater outlet.
Pilot is lit but main burners will not come on.	A. Gas valve not at "ON" position. B. Hi-Limit switches failed. C. Pressure switch failed or out of adjustment. D. Fusible Link failed. E. Gas valve failed. F. Broken wire in thermostat circuit or defective thermostat. G. Heater wired incorrectly.	A. Turn knob to "ON" position. B. Investigate reason for overheating and replace Hi-limit switches. C. Adjust pressure switch or replace as necessary. D. Investigate reason for flame rollout and replace Fusible link as necessary. E. Check and replace Gas Valve as necessary. F. Check continuity through thermostat circuit with wires disconnected. G. Check heater wiring against wiring diagram.
Heater short cycles	A. Low water flow through heater. B. Failed High-limit switch.	A. Increase size of pump or increase piping size as necessary. B. Check Hi-limit switches and replace as necessary.