

# Troubleshooting Guide

Pulsefire LRT/UBF

*Revised Dec 2023*

## Diagrams:

- [Electrode Alignment](#)
- [Exploded View \(Pulsefire LRT\)](#)
- [Circuit Board](#)

## Troubleshooting:

- [The voltage gauge does not display a reading.](#)
- [Fuel is not emitted and there is no arc between the electrodes when the trigger is pressed.](#)
- [Fuel is not emitted when the trigger is pressed.](#)
- [Fuel is not being ignited reliably \(or at all\).](#)
- [The stream of fire is shorter than expected \(less than 4.5 meters / 15 feet\).](#)

### Note: Electrical Diagnosis

With any electrical issues, ensure there are no foreign objects or metal touching the circuit board or its terminals, and nothing appears damaged (dark scorch marks, cracks, corrosion). If there is a visible issue, replace the circuit board and ensure all connections are correct.

The voltage gauge does not display a reading.

Step	Action	Yes	No
1	Ensure the battery is fully charged and plugged in to the XT60 connector of the unit, and the main power switch is on.  Does pressing the trigger activate the pump and arc ignition?	Go to Step 2	Go to Step 5
2	<ul style="list-style-type: none"> <li>Inspect for loose connectors, broken wires, or faulty solder joints between voltage gauge and circuit board.</li> <li>Ensure positive (+) terminal of voltage gauge is connected to the JP13 VG+ terminal and negative is connected to the JP14 VG- terminal.</li> </ul> Was the problem found and resolved?	-	Go to Step 3
3	Remove wires from voltage gauge and connect test wires directly from a low voltage (9-13 volts DC) source.  Did the voltage gauge turn on and display a reading?	Go to Step 2	Go to Step 4
4	Replace the voltage gauge.	-	-
5	<ul style="list-style-type: none"> <li>Inspect fuse for damage.</li> <li>Inspect for loose connectors, broken wires, or faulty solder joints between the XT60 connector and circuit board.</li> <li>Inspect for loose connectors, broken wires, or faulty solder joints between the main power switch and circuit board.</li> </ul> Was the problem found and resolved?	-	Go to Step 6
6	Use a multimeter to test the function of the main power switch.  Does the power switch pass testing?	Go to Step 5	Go to Step 7
7	Replace the power switch.	-	-

Fuel is not emitted *and* there is no arc between the electrodes when the trigger is pressed.

*If only one is non-functional, see its respective related section.*

Step	Action	Yes	No
1	Ensure the battery is fully charged and plugged in to the XT60 connector of the unit, and the main power switch is on.  Does the voltage gauge function?	Go to Step 2	See section <a href="#">The voltage gauge does not display a reading.</a>
2	The low voltage cutoff circuit will prevent the trigger switch from functioning if the voltage is too low. Is the voltage reading 11 volts or higher?	Go to Step 3	Charge the battery.
3	Inspect for loose connectors, broken wires, or faulty solder joints between the main power switch and circuit board.  Was the problem found and resolved?	-	Go to Step 4
4	Use a multimeter to test the function of the main power switch. Ensure connection exists between same thickness wires when switch is in the ON position.  Does the power switch pass testing?	Go to Step 6	Go to Step 5
5	Replace the power switch.  Was the problem resolved?	-	Go to Step 6
6	Use a multimeter to test the function of the trigger switch.  Does the trigger switch pass testing?	Go to Step 7	Go to Step 8
7	The low voltage circuit is not allowing the coil in the relay to activate, or the relay is faulty.  Replace the circuit board assembly.	-	-
8	Replace the trigger switch.  Was the problem resolved?	-	Go to Step 7

Fuel is not emitted when the trigger is pressed.

Step	Action	Yes	No
1	Ensure fuel is in the reservoir. Does the voltage gauge function?	Go to Step 2	See section <a href="#">The voltage gauge does not display a reading.</a>
2	Open the nozzle valve, if equipped. Was the problem resolved?	-	Go to Step 3
3	Does the fuel pump make any noise or vibration when the trigger is pressed?	Go to Step 4	Go to Step 5
4	Inspect for obstructions in air/fuel flow: <ul style="list-style-type: none"> <li>Use a pick or very small screwdriver to gently press the center piston of the check valve installed in the fuel cap and verify that it moves easily.</li> <li>Inspect for obstructions rearward of the fuel pump: within the tank outlet hose fitting, hose, and fitting at rear of pump.</li> <li>Inspect for obstructions forward of the fuel pump: within the check valve and nozzle. If the check valve is installed too tightly, the moving piston inside can bind, causing blocked or partial flow.</li> </ul> Was the problem found and resolved?	-	Go to Step 6
5	Use a multimeter to test for voltage (DC) at the threaded terminals at the front of the fuel pump while pressing the trigger button. Is the multimeter reading within 2 volts of what is shown on the voltage gauge?	Go to Step 6	Go to Step 7
6	Replace the fuel pump. It may be seized internally or otherwise have a broken internal electrical component.	-	-
7	Inspect for loose connectors, broken wires, or faulty solder joints between the fuel pump terminals and circuit board. Was the problem found and resolved?	-	Go to Step 6

Fuel is not being ignited reliably (or at all).

Step	Action	Yes	No
1	<p>Inspect the electrodes at the front of the unit for black carbon buildup. Ensure the insulators are white and clean.</p> <p>Carbon is conductive and will allow the high voltage generated by the ignition to travel from the metal electrode wire to the nozzle shield and beyond. This can cause the user to feel mild shocks.</p> <p>Was the problem resolved?</p>	-	Go to Step 2
2	<p>Ensure the fuel used is flammable at the current ambient temperature.</p> <p>Gasoline is the primary recommendation due to its flash point being below -40 °C (-40 °F). Diesel requires the ambient temperature to be 51°C (125 °F) to sustain combustion. Thus, 100% diesel will not ignite, and gasoline-diesel mixtures with too high diesel content will also be difficult or impossible to ignite.</p> <p>Was the problem resolved?</p>	-	Go to Step 3
3	<p>Ensure the electrodes are positioned optimally.</p> <p>See <i>Electrode Alignment</i> diagram.</p> <p>Was the problem resolved?</p>	-	Go to Step 4

4	<ul style="list-style-type: none"> <li>Inspect for loose connectors, broken wires, or faulty solder joints between electrode core wire (within the ceramic insulators) and high voltage transformer (HVT, the black box component).</li> <li>With the fuel pump wires disconnected (either from the circuit board or fuel pump), the unit can also be activated in a dark room to observe areas of blue or purple light indicating a faulty wire or connection leaking high voltage arcs.</li> <li>Inspect for loose connectors, broken wires, or faulty solder joints between HVT and circuit board.</li> <li>Ensure gray wire of HVT is connected to the JP6 ARC1 terminal and black wire is connected to the JP16 ARC2 terminal.</li> </ul> <p>Was the problem found and resolved?</p>	-	Go to Step 5
5	<p>Remove the HVT and electrodes from the unit. Place the electrodes on a nonconductive surface with their tips 5-7 mm apart, and connect the HVT input wires (+ gray and - black) to a low voltage (9-13 volts DC) source.</p> <p>Does the arc occur consistently during this test?</p>	Go to Step 4	Go to Step 6
6	Replace the HVT and electrode assembly.	-	-

The stream of fire is shorter than expected (less than 4.5 meters / 15 feet).

The system should be able to send out a continuous appearing blast of flaming fuel nearly 8 meters (25 feet) in length at the beginning of each blast sent. When holding the trigger down, the fuel and flames will pull back slightly due to the fact that after the initial stream is emitted, the unit is sending fuel into an already existing fireball and burning it up faster.

Step	Action	Yes	No
1	<p>Ensure the nozzle valve is fully open.</p> <p>Wind may be negatively affecting the stream's consistency, causing it to scatter and atomize into droplets more easily and burn up faster.</p> <p>If you have access to an indoor warehouse or otherwise windless environment, place a rock or other marker just under 8 meters (25 feet) and film from the side while the operator sends a few 2 second bursts.</p> <p>Does the initial flame blast reach the distance indicated by the marker?</p>	-	Go to Step 2
2	<p>Is the stream contacting the electrode tips?</p>	See Diagram: <a href="#">Electrode Alignment</a>	Go to Step 3
3	<p>Inspect for obstructions in air/fuel flow:</p> <ul style="list-style-type: none"> <li>• Use a pick or very small screwdriver to gently press the center piston of the check valve installed in the fuel cap and verify that it moves easily.</li> <li>• Inspect for obstructions rearward of the fuel pump: within the tank outlet hose fitting, hose, and fitting at rear of pump.</li> <li>• Inspect for obstructions forward of the fuel pump: within the check valve and nozzle. If the check valve is installed too tightly, the moving piston inside can bind, causing blocked or partial flow. The nozzle and check valve should be tightened to 9 N-m (80 in-lb) and might have been overtightened from the factory due to a miscommunication. Try loosening and re-torquing.</li> </ul> <p>Was the problem found and resolved?</p>	-	Go to Step 4
4	<p>Replace the nozzle and check valve.</p> <p>Was the problem resolved?</p>	-	Go to Step 5
5	<p>Replace the fuel pump.</p>	-	-