



Manufacturer of the First FAA Sign in 1955

## XTL Troubleshooting

### Section E: "Maintenance"

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## Troubleshooting the Lumaticurve XTL Lighting System *And Identifying Non-functioning Components*

The purpose of this guide is to help the airfield electrician troubleshoot a Lumaticurve XTL airfield sign when the sign is not lighting.

**WARNING:** Before working on Lumaticurve airfield guidance signs, the sign must be de-energized unless otherwise instructed. Failure to do so could result in a burned surge protector, damage to internal sign parts, or injury.

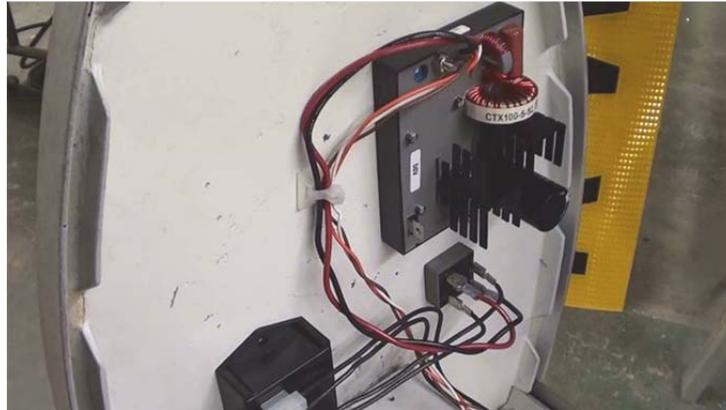
To isolate and identify non-functioning Lumaticurve airfield sign components, we recommend the following steps:

1. Check External Switch
  - If the sign has an external switch, check to be certain the switch is in the "on" position.
2. Visual Check of Sign Electrical Components
  - Look for melted parts or obvious burn marks (surge protection potentially). If there are melted parts or burn marks, contact our technical department.
3. Check Lamps (test p. 4)
  - Replace bad lamps if necessary. If lamps are being replaced more frequently than expected, you may need to adjust the controller to recommended voltage settings (not part of this guide).
4. Check Bridge Rectifier (test p. 5)
  - Replace bridge rectifier if necessary. (be sure to use heat sink compound)
5. Check Controller (test p. 8)
  - Replace controller if necessary.
6. Check Isolation Transformer
  - If controller is good, the isolation transformer may be the source of problems. Check to ensure the transformer is appropriately sized and performing properly.

## GETTING FAMILIAR WITH THE XTL SYSTEM COMPONENTS

Before testing, it is best to familiarize yourself with Lumacurve sign components. Illustrations 1 – 4 will help locate and identify the components. Illustration 5 shows the type of Multimeter recommended for testing.

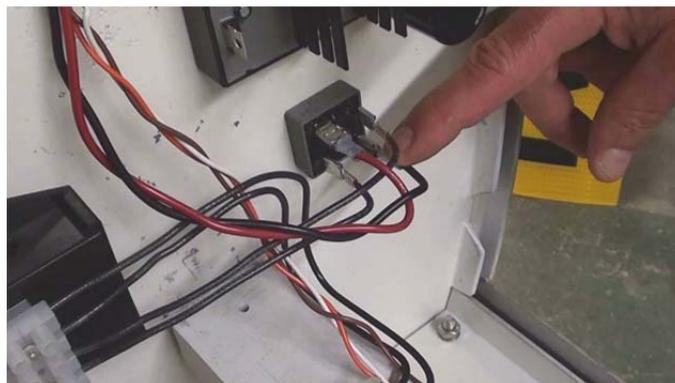
1. Lumacurve sign components are mounted on the end panel closest to the power cord.



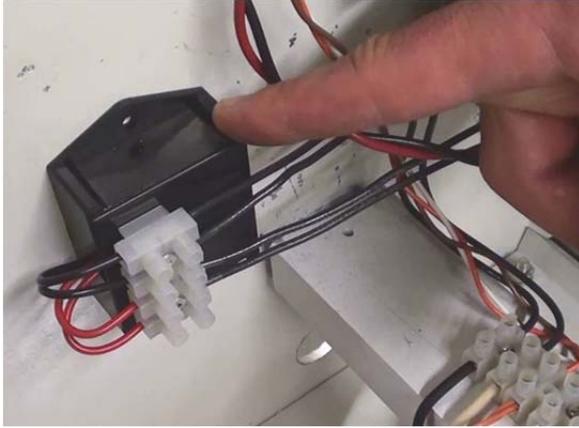
2. Top right of the end panel is the controller (in this case, the E410 marked "50V")



3. Below the controller on the lower right is the bridge rectifier



4. Lower left is the surge protection system.



*XTL surge prior to Aug 2011*



*XTL surge after Aug 2011*

## Use a True RMS Multimeter

It is recommended to use a True RMS (root – means - square) Multimeter. The True RMS readings do not fluctuate as much, and are more accurate than a regular Multimeter. For the purpose of this guide we are using a Fluke True RMS Multimeter (model 87 V) to troubleshoot the components.



## STEP ONE: Checking for burned-out lamps.

Before checking the sign's electronic components, it is best to first check the sign lamps. A Multimeter can be used to test a lamp for continuity but we recommend using a Lumacurve Lamp Tester as shown in the picture below.



De-energize the sign and replace bad lamps before doing any further testing. **Do not touch the lamp's globe.** Dirt or oils from your finger deposited on the globe will greatly reduce lamp life. New lamps come in individual plastic bags. Leave the bag over the globe portion of the lamp during installation to ensure you won't directly touch the glass. Just remember to remove the bag before powering up the sign. Dirt and oils can be cleaned from the globe using rubbing alcohol.

***WARNING:** the use of non-OEM replacement lamps may damage electrical components as well as cause premature lamp failure. Only OEM Lumacurve lamps will maintain FAA photometric requirements and factory warranties.*



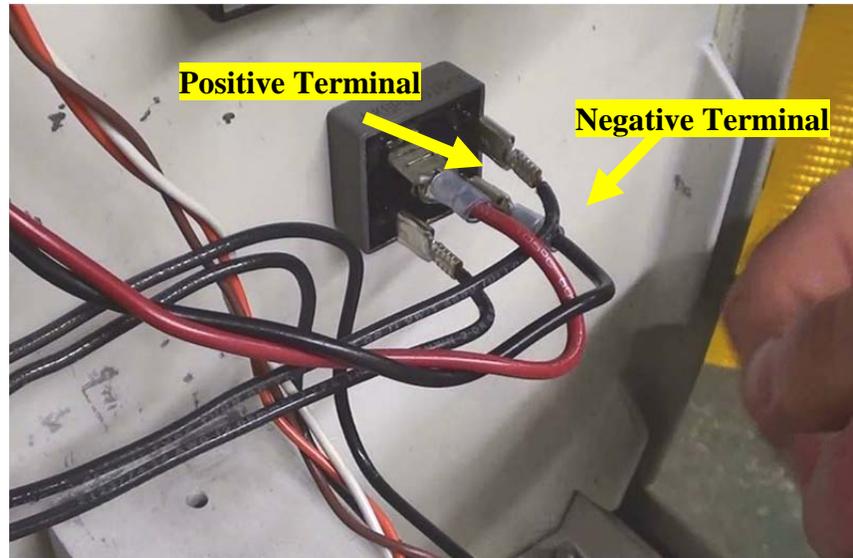
**IMPORTANT NOTE:** XTL lamps have gray bases and labeled "PRT# XTL"; LOVA lamps have white bases and labeled "PRT# LOVA". **They are not interchangeable.**

If no lamps are burned out, continue through this guide and check for faulty XTL electrical components.

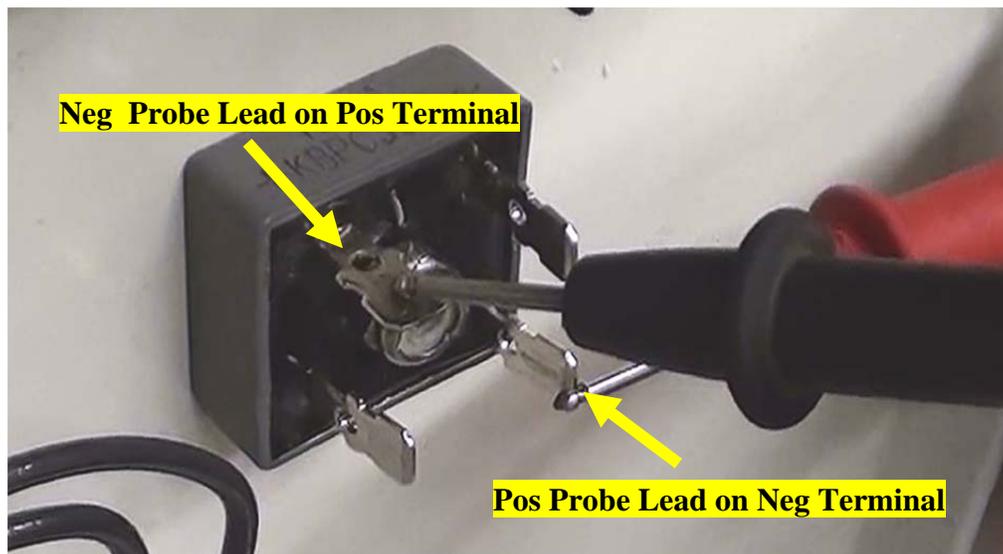
## STEP TWO: Checking the Bridge Rectifier

Once burned out lamps are ruled out, the bridge rectifier is the first component to check. **For this test the power needs to be turned off.**

1. With the power off, pull the wires off the bridge rectifier. The red and black intertwined wires are DC from the controller. The other two black wires are AC from the surge protector. Note that the red wire on the upper left side is connected to the positive terminal. The positive terminal is always 90°, or perpendicular, to the other three terminals.



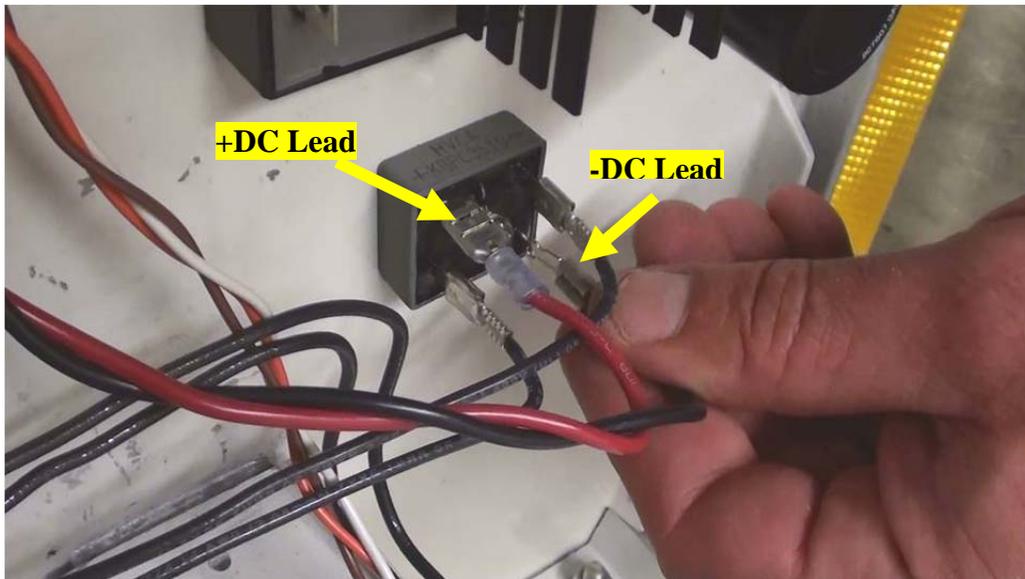
2. Next, set the Multimeter to a diode setting and place the meter's negative lead on the positive terminal of the bridge rectifier (90° from the other three terminals). Then place the positive lead on the negative terminal of the bridge rectifier (diagonal from the positive terminal).



3. You are looking for one of two possible voltage readings:  
If the meter reads approximately 1.0 volt the Bridge Rectifier is good.  
If the meter reads approximately 0.5 volt, the Bridge Rectifier is not good.

*NOTE: Meter readings are typically more precise than what is required for this test. Round the reading to the nearest 1/10<sup>th</sup> volt. (Rounding up is typically required.)*

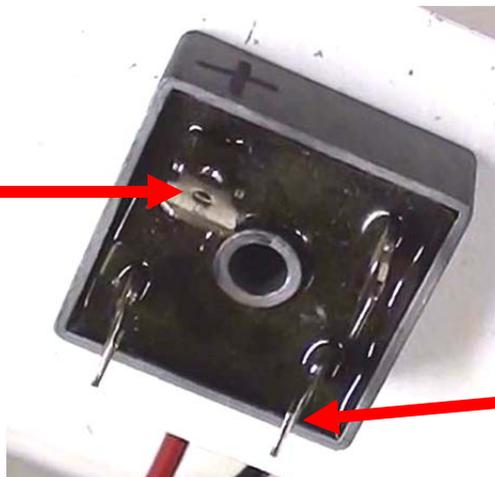
4. Be careful when re-connecting the bridge rectifier wires. Do not mistakenly reverse the positive and negative DC wires from the controller (twisted red and black wires) to the bridge rectifier.



### Review: Identifying a faulty bridge rectifier

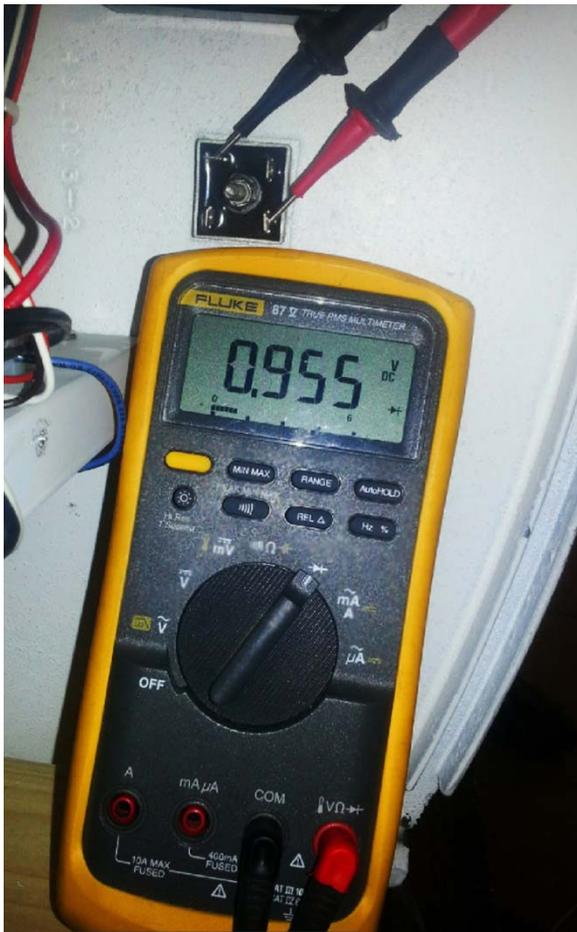
The positive terminal is normally on the upper left side of the bridge rectifier, and it will be the terminal turned 90 degrees from the other three.

**Pos DC Terminal**  
**Note: Turned 90°**  
**from the other**  
**three terminals.**



**Neg DC Terminal**  
**Note: Diagonal**  
**from Pos Terminal**

Place the meter's positive lead on the negative terminal, and the negative lead on the positive terminal. You are looking for a full 1.0 volt across it. On this example (as shown on the meter below) there is about 0.5 volt. This signifies a faulty bridge rectifier.



*NOTE: If the reading is close to 1.0 volt then the bridge is good, closer to 0.5 then the bridge is faulty.*

### Step Three: Checking for a Faulty Controller

For the final test, we will check the controller to be certain it is functioning correctly. **To do this test properly the sign must be powered and one lamp removed.** This will cause an open circuit on the load side of the controller and the controller will go to maximum power.

Take meter readings across the terminal strip at the orange and brown wires coming from controller. Set the meter to DC volts. Locate the terminal strip and touch the meter's positive lead to the set screw of the orange wire and the negative lead to set screw of the brown wire.



*Note: You are looking for voltage greater than maximum voltage of all the lamps in the sign. For example: if the sign has four XTL lamps at 10V each, the controller should be putting out 40V minimum. If the sign has six XTL lamps at 10V each, the controller should be putting out 60V minimum.*

### **Conclusion:**

There are several typical sources of problems that cause a Lumacurve XTL sign not to light. The airfield sign should light if the following components are functioning properly:

1. All lamps are good or have been replace
2. The bridge rectifier is verified as good
3. The controller is verified as functioning properly
4. The surge protection system shows no visual signs of damage (charring or melting)
5. The isolation transformer is properly sized and performing properly