Resistor Testing on BOSSLASER Machines
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Resistor testing will be needed in the event that your laser will not fire, and it can also be used if you feel that your tube is not as powerful as it once was.

Resistor testing is not hard, but does require some patience and requires you to be gentle with some things, such as your glass tube.

We are going to first be covering the resistor test on power supplies that are not the gold 60W. The gold power supply does not have a test button and will require some different steps to complete a resistor test. Skip to page 18 if you have a power supply like the one shown below.
For every other power supply, we will begin trouble shooting with the steps below:

1. Find the green six pin connector from your tool box that you received with the machine

2. Locate your power supply, most power supplies can be found on the right-hand side of the machine if you are facing the front, through a large white door on the bottom.
3. Locate the green six pin connector on the side of the power supply, this connector can be removed by prying outwards on it to remove it from the power supply.

4. After you have removed the green six pin connector you are going to replace it with the one that has the red wire looped through it (shown at the top of page 4)
5. Once you have the six-pin connector in place you will then move onto the glass tube, removing the silicone sleeve that is covering the high voltage side of the glass tube. This is found at the back of the machine on the left side, through a “tube extension” door.

6. Once the silicone sleeve has been removed from the glass tube you will now gain access to the high voltage side of the tube. With the silicone sleeve off, take a screwdriver with an insulated handle and touch it between the frame of the machine and the terminal of the glass tube. This will discharge any remaining electricity that has been stored inside of the capacitors from the power supply. The power supply contains capacitors that hold an electrical charge, and discharging it will make it safe to be worked on. You will only need to discharge the power supply if you have used it within the past hour. Here is a link to our YouTube video on how to remove a tube, which explains how to discharge any remaining electricity from the system.

https://youtu.be/oSVbqnuBPJk?t=1m42s
7. Once you have discharged the stored energy you can remove the red wire.
8. Once the red wire has been removed you can remove the black wire, you will not have to discharge anything from this wire.

***Sometimes removing these wires can be tricky to get to as it is tight in the cabinet with the tube inside. Use extreme caution when removing this, as the post is very brittle when it goes into the tube, and the connections are very tight***
High Voltage Side of Glass Tube

9. Once the wires have both been removed you can pull it out of the cabinet and leave it hanging outside. You may not have much slack on your wire so if you need to leave it inside of the cabinet, this will be ok as well.

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Ground Side of Glass Tube
Some tubes may not have the same connections as the one shown above, other tubes may have the connection shown below. This terminal uses the same method for install and removal but requires a different set of tools. You can use a stubby Phillips tip screwdriver or even a 90 degree Phillips screwdriver to make good contact with the screw to remove it.
10. After you have removed both the hot and ground leads from the glass tube, you will go into your toolbox again and grab the green resistor. The green resistor is going to be a ceramic tube that has been painted green. It will have both a red wire with an alligator clip and a black wire with an alligator clip fastened to it.
11. Take the red wire coming from the resistor and fasten it to the red wire from the machine using the alligator clip. With the red wire securely fastened you will do the same thing on the black wire, taking the black wire from the resistor and securing it to the black wire from the machine using the alligator clip.
The picture above was used for demonstration purposes, and you should sleeve the resistor using the silicone sleeve to prevent arcing during testing, like pictured below. You are going to want to ensure that none of the connections are touching the frame of the machine or arcing will occur.

12. After you have installed the resistor you are now good to run the tests using the pulse/test button on the power supply itself.
13. With the machine powered on you are going to be hitting the test button on the power supply while watching the mA meter on your machine (shown on page 15). As you pulse if you are getting a high mA reading, this shows that the power supply is putting out adequate power, but the glass tube may have gone bad or there may be a loose wire somewhere. If you are getting no mA reading or a low mA reading while hitting the test button this shows that the glass tube is good but the power supply has gone bad or a wire coming from the power supply may be bad.

*** Please contact tech support at this point with your mA readings***
Milliamp reader on machine

***If you do not have a built-in milliamp reader on your machine***

If you do not have a mA reader on your machine you will need a multimeter. You will wire the multimeter in-line with the resistor, and set the multimeter to read mA. See page 17 for correct multimeter setting.

The way you will wire the multimeter in-line with the resistor will be red wire from the tube to red wire of the resistor, black wire of the resistor to red wire of the meter, black wire of the meter to black wire of the tube. The resistor should be sleeved with the silicone tube once everything has been hooked up.
This is how the resistor test will look with a multimeter wired in-line.
This is what your meter will be set for to read milliamps, not only will the dial be turned to 200mA but your multimeter leads will also be black on 10A and red for V-mA like illustrated in the photo above.

Some digital multimeters do not need the leads to be changed around. Most digital multimeters will do it automatically, it is all dependent on what type of multimeter that you have at your disposal. In this case, you will still set your multimeter for 200mA and leave the black lead in COM and the red lead in the volt/milliamp port.
Resistor testing with a gold 60W power supply

Resistor testing using a gold 60W power supply will mostly be the same as the testing above. The only difference we will encounter this time is that we cannot use the six-pin connector as it bypasses the use of the control panel. If we lose the control panel functionality we will no longer be able to pulse the laser due to it not having a test button located on the power supply.

1. We are first going to locate the machines power supply unit
2. Grab your multimeter and set it for 20V DC.
   DC is illustrated by the two lines parallel to each other the top line solid, bottom dashed.
3. Once you have your meter set for 20V DC you are going to put the red meter lead to pin five on the six-pin connector, pin five is the second from last pin if you are counting from top to bottom.
4. With the red lead on pin five of the six pin connector you will put the black lead from the meter on the wire that is yellow with a green tracer on the three-pin connector at the same time.
Red meter lead will go here.
Black meter lead will go here.
5. With the meter set to 20V DC and landed on both pin five of the six pin and pin three of the three pin you should be reading close to 5V DC.
6. With the meter leads still on the two pins you are going to need to push the pulse button located on the control panel, with the max power set for 95%.

7. With max power set for 95%, and 5V displayed on the meter you will hit the pulse button on the control panel. You should be getting a 0V DC reading on the meter after pulsing. What this indicates, is that the control panel is sending out the correct signal to the power supply and we can now rely on the fact that the control panel is doing its job of sending the proper signals.

8. Now that we can rely on the control panel and the signals it is sending, we will take the six-pin connector going into the power supply and add a few wires to it. We will be adding a wire in-between pins 3 and 4, and a wire in-between pin 1 and 2. We are not replacing wires, just adding to what is already there.
9. With the six-pin connector outfitted with the two new wires in place you will place the six-pin connector back into the laser power supply. You will go back to page six and go through the steps provided, only difference being when pulsing the machine, you will pulse at the control panel, rather than the power supply itself.

10. After you have gone through and gathered your mA readings for tech support you will now go through and remove the two wires that you installed in step 8 and reinstall everything as it once was before troubleshooting.

***PLEASE CONTACT TECH SUPPORT WITH THE RESULTS OF YOUR TESTING AT 888.652.1555 OR EMAILING US AT TECHSUPPORT@BOSSLASER.COM***