

BWM Generator Circuit Test Plan Team 14418

Before Testing Begins:

Assemble the circuit per the schematic posted on edge. Gather all necessary testing equipment listed below:

-20V+ Power supply with a 2A+ current rating

-Digital multimeter

-Camera

-Notebook

What will be tested:

The generator circuit has two main functions; to regulate the voltage and the provide a visual display to the user regarding their power output. The generator circuit will be tested to ensure that the voltage will not rise above 15V. It will also be tested to ensure that the LEDs are activated at the proper voltages.

Failure criteria for the voltage regulation stage of the circuitry:

If the circuit allows the voltage to rise above 15.2V it will be deemed a failure. 15.2V is chosen because this voltage is outside of the tolerances of the LM7815 chip being used to regulate the voltage. Thus it would indicate a problem with the supporting circuitry or a complete failure of the LM7815 chip.

Failure criteria for the LED stage of the circuitry:

The first failure criteria is if the LED(s) do not turn on at any voltage. This indicates improper usage of the LED(s) and/or improper usage of the LM311 comparators being used to drive the LED(s).

The second failure criteria is if the LEDs turn on at atleast .3V away from their designed voltage. Eg. if the 13.1V LED turns on at 12.8 or 13.4 V it will be considered a failure.

Ideal results:

- 1) Circuit will cap voltage at 15V.
- 2) Circuit will drive 1 tri-color LED.
- 3) A different color LED will turn on at 13.1V, 14V, and 15V (after the regulator).

Test Setup and procedure:

There will be a lead on the circuit for the input power. There will be another lead on the circuit for the output. For testing, the input will be provided by the power supply detailed above. The output load will be the actual pump and bulb unit. The multimeter will be used only to diagnose a problem if one arises.

The test procedure will be to input increasing voltages using the power supply and to monitor what happens. The voltages used to test will be as follows:

Voltage 1: 13V

Voltage 2: 13.5V

Voltage 3: 14V

Voltage 4: 14.5V

Voltage 5: 15V

Voltage 6: 15.5V

Voltage 7: 16V

Voltage 8: 16.5V

Voltage 9: 17V

Voltage 10: 20V+

These voltages are chosen because they represent a large range that includes voltages both above and below the normal operating voltages. Data will be recorded and compared to the above failure criteria to determine if the test was successful or not.