HLPM II™

(Mar 18 2022)

Hobbyist Laser Power Meter

The HLPM II Laser Power Meter was designed with the hobbyist in mind. It was designed for people like myself that needed to know the output power of the numerous Lasers we had in the shop.

We didn't want to spend $500.00 or more to get a commercial Laser Power Meter. We just wanted to know which laser was stronger than another and needed to know approximately how many milliwatts of output power each Laser had.

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The HLPM II uses a sealed Silicone Optic Sensor and electronics that are pre-calibrated against a Newport 1825-C Laser Power Meter. Just attach a standard 9Volt battery and attach the output leads to a Digital Multi-Meter that is set to the 200 millivolt (200m) scale. You will get readings in 0.1 mW increments (1mV = 1mW).

(***See the notes on Checking your Digital Multi-Meter for Sensitivity attached below***)

Shine a Red Laser onto the Optical Sensor and read the power in milliwatts directly. For consistent results make sure that all measurements are taken at the same distance between the Optic Sensor and the Laser being tested. (1" to 12") and that the entire Laser Beam falls on the Optical Sensor of the HLPM.

If testing a Laser other than a red Laser (650-660nm) you will need to compensate for the Silicone Optic Sensor's Spectral Sensitivity Characteristics using the supplied chart. For example (looking at the chart), if you are testing a 488nm Laser, you would take the reading on your DMM and multiply it by a 1.99 to get the correct Milliwatt output for that wavelength. Be **CAUTIOUS** of Laser energy reflected off the Sensor's surface. **ALWAYS** wear Laser Safety Googles specific to the wavelength of your Laser.

Obviously… having an outside source of light shinning on the Laser Power Meter's Optic Sensor will created a power reading error. Readings should be taken in a DIMLY lit area.

Since this HLPM II can measure higher than 100mW it is required that you take a quick reading of your Laser's beam at over 100mW(Optical sensors can read very fast) so as to not heat up the Sensor's optical surface which would falsify the reading. Always let the Sensor cool down between higher power readings.
Remember to **NOT** focus your beam to a burning point… you will damage the Sensor..
Keep the beam as large as possible while still getting 100% of the beam on the Sensor.

CONVERSION CHART

The HLPM II uses 655nm Laser Diode Module as the reference wavelength. Using the spectral sensitivity characteristic conversion table below of the most common wavelengths, rough readings can be taken from 405nm to 1000nm.

(Converted Value = Meter reading x Correction Factor)

Wavelength (nm)	**Correction Factor**
405	x 4.51
445	x 3.72
473	x 2.06
488	x 1.99
532	x 1.63
633	x 1.05
655	x 1.00
780	x 0.81
808	x 0.76
980	x 0.96
1000	x 1.01

NOTE: To get a correct power reading DPSS Lasers must have an appropriate IR Filter installed between the Laser and the HLPM II Sensor

CHECKING YOUR DIGITAL MULTI-METER FOR SENSITIVITY

Since we are reading very low voltages (millivolts) we noticed that some Digital Multi-Meters required a 1 Megohm shunt resistor across the meter's inputs to give a correct reading. Not all meters are born the same.

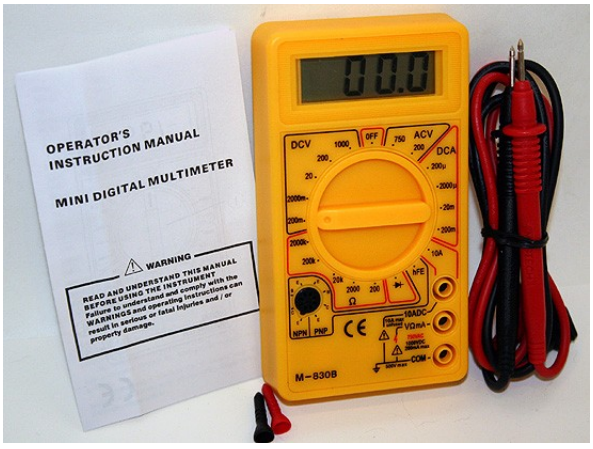
On the supplied drawing, we have included a way of testing your DMM to see if ir requires this 1Meg shunt resistor.

With the 3 supplied test resistors, a fresh 9 Volt battery and the DMM of your choice, build the circuit shown in the Meter Test drawing. Attach your DMM across terminal A and B.

If your reading on your DMM is between 20 and 26 millivolts your DMM is good to go as it is. If on the other hand the reading on your DMM is much higher, then you need to add a 1 Meg resistor across the input of your DMM.

We have already installed a 1 Meg shunt resistor on the HLPM PBC for you should you need it. To put it across your DMM's output, just tie the short Black wire from the HLPM II to ground (the long Black wire).

An inexpensive Digital Multimeter that works well is pictured below. They can be found on eBay for under $10.00 and do not require the shunt resistor.



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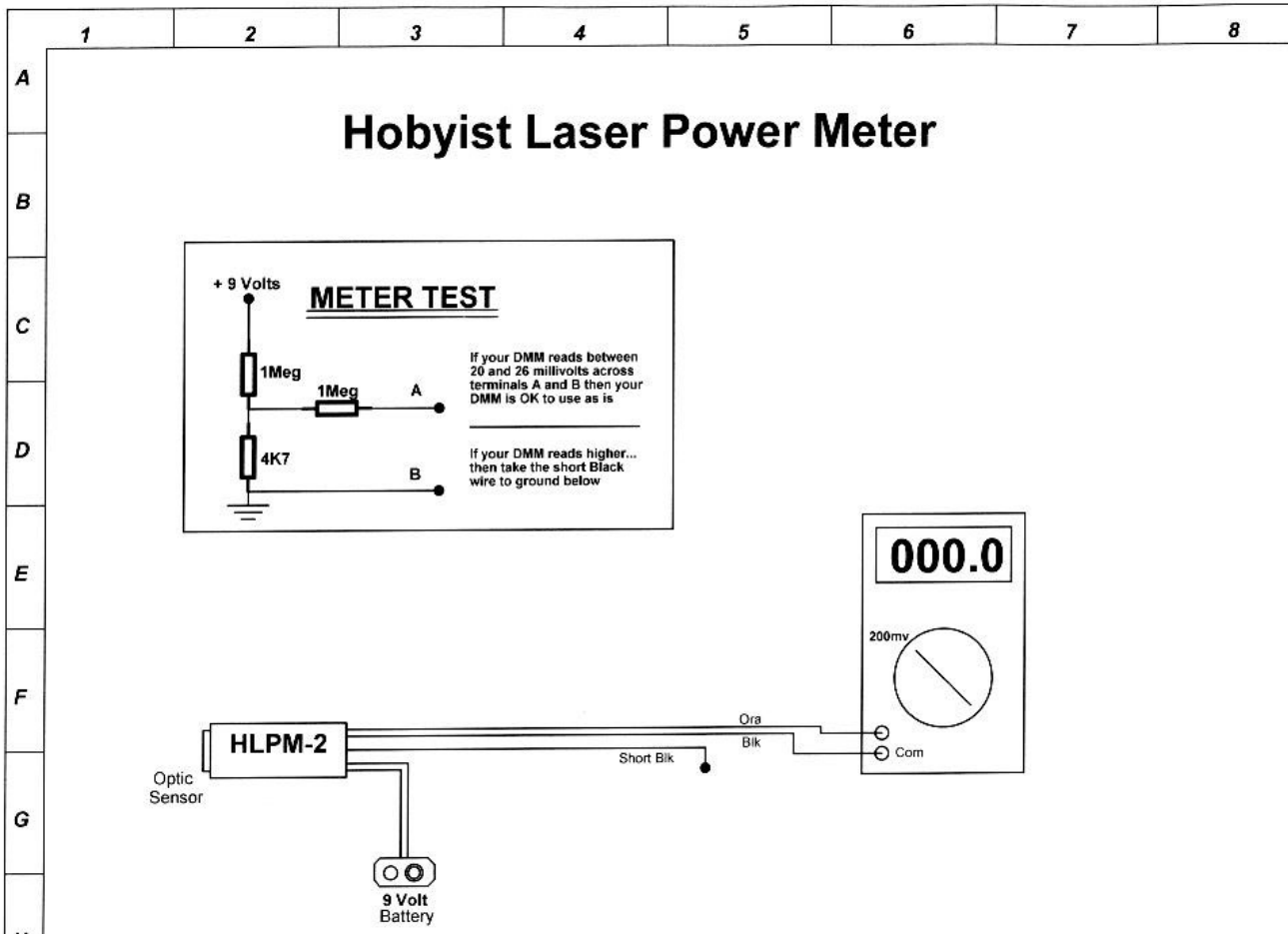

BAUER Electronic Engineering (Feb 2007)