LASER POWER METER GUIDE

Before Measuring Laser Power

1. **Determine the laser home position**

   Before measuring the power of the laser with the power meter, the “home position” of the laser must first be determined. In most cases, this is easily done by simply powering on the laser. During the laser’s start up sequence, the lens housing should move to the home position. If the laser lens housing does not align to the home position upon startup, consult the laser’s user manual to determine which corner of the laser bed is the default home position.

2. **Ensure laser optics are clean**

   In order to produce an accurate laser power reading, it is important that the lenses and mirrors are clean. Clean lenses and mirrors with an appropriate optic cleaner before measuring laser power.

3. **Check laser beam alignment**

   Laser beam misalignment is one of the most frequent causes of laser power loss. Before measuring laser power with the meter, be sure that the laser beam alignment is correct between all mirrors and lenses. Consult the laser’s user manual for directions on how to check and adjust laser beam alignment.

Laser Power Meter Setup

1. Place the laser power meter at the home position on the laser bed. Align the laser target to be in the corner of the home position (closest to the “zero point” of the bed). Ensure that the meter is touching the guide rails of the laser bed, as this will simplify laser job alignment.

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2. Adjust the focus of the laser to the surface of the laser target.
   CAUTION: Laser lens must be set **OUT OF FOCUS** to the laser target. Never measure laser beam power with the beam in focus to the laser target as it will damage the meter.

Options for Proper Laser Beam Measurement

Option 1: Remove the focus lens from the laser lens housing.

- If the focus lens can be removed from the laser lens housing, remove the lens so that the laser beam will not be focused on the meter target. The laser beam will simply reflect down, unfocused onto the laser meter target.
  - If using this option, it is recommended that the laser lens housing be correctly focused to the laser meter target, even though the focus lens is removed.
  - Do not remove the mirror from the lens housing.

Option 2: If the focus lens cannot be removed, adjust the laser focus point to be out of focus of the meter target.

- If the laser lens housing does not allow the focus lens to be removed, the laser focus should be adjusted out of focus to avoid damaging the meter.
- All laser lenses have a given tolerance of what is still considered "in focus". *Example:* 1.5" lenses are in focus with 1.5" of space between the lens surface and the substrate. With a tolerance of +/- 0.075", the 1.5" lens may still be considered "in focus" at measurements between 1.425" and 1.575" focus distances.
- **An additional 0.50" should be added to the focal length (including tolerances).** See chart below for suggested focus compensations to avoid meter damage based on lens sizes.

Approximate "out of focus" distance suggestions for laser beam measurement		
Lens size (focus distance)	Normal focus tolerance	Suggested compensated focus
1.5" lens	+/- 0.075"	+ 2.075"
2.0" lens	+/- 0.100"	+ 2.600"
2.5" lens	+/- 0.150"	+ 3.150"
3.0" lens	+/- 0.180"	+ 3.680"
4.0" lens	+/- 0.200"	+ 4.700"

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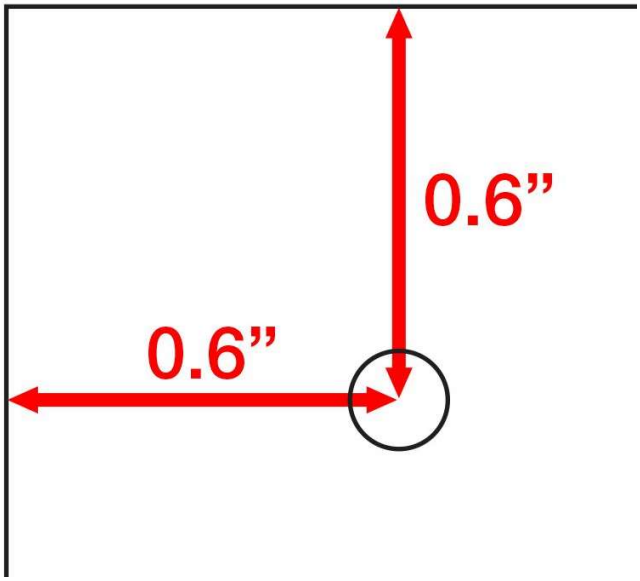
Artwork Setup for Laser Power Measurement

1. Open a new document in the layout software, Make layout size the same dimensions as the laser bed.

2. Create a 0.15”x 0.15” circle. If necessary, adjust the line weight to 0.003”, “hairline” thickness, or the line weight required for vector cutting on the laser.
    a. Raster engraving mode will not measure laser wattage properly. Only use vector mode.

3. Position the circle to the corner of the document corresponding to the zero point/home point of the laser bed.
    a. Example: If the zero point/home point of the laser bed is the top left corner, move the circle to the top left corner of the document.

4. Adjust the position of the circle so that the center of the circle measures 0.6” away from the edges of the document.



5. Send the circle graphic to the laser, ensuring that the laser will run the job as a vector cut.
    a. Use laser settings: 100% power, 3%-5% speed.

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Measuring Laser Power

1. Turn the power meter on by pressing and holding the red power/reset button for at least 2 seconds. Numbers will appear on the screen. The numbers should settle to 0.0 watts (may also read +/- 0.3 watts). If the numbers read higher than 0.0 watts (+/- 0.3 watts), try the following:
    a. Momentarily press the power button again to reset the counter.
    b. If several readings have been done, turn the meter off by holding the power button. Allow the meter to cool 3-5 minutes.
2. Once the power meter is powered on and power/reset button is released, the meter will immediately read for 5-6 seconds. When the meter reads 0.0, release the power button and immediately shut the laser lid and start the circle cut job. The meter will read the approximate wattage while the job runs. A series of five beeps from the meter will indicate that the reading sequence is complete. The meter will hold the measured wattage on screen for 12-15 seconds. After the 12-15 second hold time, another series of fast beeps will indicate the meter is automatically powering down.
3. To take additional measurements, repeat steps 1-2.
    a. At least 2-3 measurements recommended to ensure accuracy.
    b. Measurements may read 3-5% less than the rated wattage of the laser tube due to absorption of laser mirrors and lenses.
    c. **After several consecutive measurements, it is important to let the meter cool down before continuing additional measurements.** See chart below for details.

Measuring Guidelines

The amount of recommended consecutive laser readings will differ depending on the laser tube wattage. The meter can handle multiple consecutive readings from lower wattage laser tubes. Fewer readings with cooling time between readings should be taken when measuring higher wattage tubes. See the chart below for recommendations.

Laser tube wattage	Number of consecutive readings
25W	10
50W	5
75W	2
100W	2
250W	1

- Continuous beeping indicates the meter is overheated.
- Allow the meter to cool 3-5 minutes if overheated, or between readings if necessary to avoid overheating.
- Cooling the meter can be accelerated by placing the meter under a fan. **Do not cool the meter by immersing in water.**
- **Overriding safety switches/sensors to measure laser power is not recommended.**