

CASCADE LASER CORPORATION

Laser Power Probe

Product Information

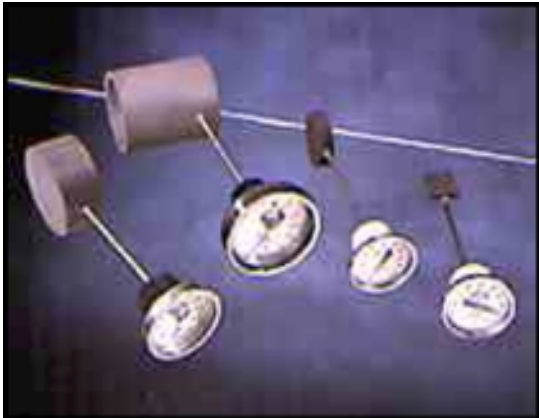


Figure 1: *Laser Power Probes*

Laser Power measurements should be quick and easy. They should not involve time consuming setup and alignment problems. Ideally, the measurements should be able to be made at any point in an optical system where losses are likely to occur.

Unfortunately, most laser power meters have sacrificed ease of use to gain continuous power readings. However, in most laboratory and production situations, the usual requirement is for a quick spot-check of power with a minimum of disruption. Even when tuning up a laser, researchers have found that it is best to tune for a desirable mode pattern using Thermal Image Plates*, then briefly check the laser power.

The Power Probes are calorimeter-type power meters which measure laser power using a timed exposure. They display average power absorbed on a calibrated readout scale and can be used with continuous or repetitively pulsed lasers ranging from small 2 watt YAG lasers to large 10,000 watt CO₂ lasers.

*Thermal Image Plates and Beam Probes are viewing devices for CO₂, CO, HF, and YAG lasers. Product information sheets are available from Cascade Laser Corporation.

Taking Measurements

Each Power Probe is a self-contained unit consisting of an absorbing head, a temperature measuring mechanism, a zeroing knob and a readout dial. In operation, the dial is zeroed. Then the absorbing head on the end of the Power Probe is exposed to the laser beam for a specified time interval. After the Power Probe has been removed from the laser beam, the

Notable Features:

- Conveniently sized absorbing head.
- Takes a power measurement in about one minute.
- Tough, absorbent coating.
- Zero adjustment mechanism to expedite and simplify the measurement process.
- An accurate and durable all-metal construction to insure a long life.

average laser power can be read out on the dial. The process takes about one minute. If it is necessary to make several power measurements in succession, the absorbing head can be rapidly cooled by immersing in a beaker of water between measurements.

The Laser Power Probes have proven to be so popular that Cascade Laser now offers 13 flat and 2 conical models. The models include 8 different power ranges and 2 different absorbing coatings. The "Y" series Power Probes have a broad spectral absorption coating which can be used from 0.2 to 11 μ . These Power Probes are designed for use with the YAG or CO₂ lasers. The "C" series Power Probe can only be used with CO₂ laser wavelengths. The "C" series is recommended for use with CO₂ lasers because the coating generally has a higher damage limit than the "Y" series.

For CO₂ lasers in excess of 1200 watts, there are two additional power probes available based on conical absorbing heads. These conical heads exhibit a higher damage threshold than the standard flat surface heads. However, the conical head power probes are thicker and have a smaller target area than the standard flat probe of equivalent power ranges. See the Conical Probe Data Sheet for more information.



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Laser Power Probe Statistics

	Power Range (watts)	Exposure Time (sec)	Watts/Division	Absorbing Head	Overall Length (cm)	Weight (gm)	Accuracy (1)	Repeatability
P20Y	0-20	20	0.2	4.06 x 2.54 cm (1.6" x 1")	22	89	+/- 5	+/- 1.5%
P50Y	0-50	20	0.5	4.24 x 2.54 cm (1.7" x 1")	22	98	+/- 5	+/- 1.5%
P100Y & P100C	0-100	20	1	5.08 x 3.18 cm (2" x 1.25")	22	120	+/- 5	+/- 1.5%
P200Y & P200C	0-200	20	2	5.08 cm dia. (2" dia.)	22	157	+/- 5	+/- 1.5%
P500Y & P500C	0-500	20	5	5.08 cm dia. (2" dia.)	22	183	+/- 5	+/- 1.5%
P1000Y & P1000C	0-1000	20	10	6.35 cm dia. (2.5" dia.)	22	287	+/- 5	+/- 1.5%
P2000Y & P2000C	0-2000	20	20	7.62 cm dia. (3" dia.)	22	522	+/- 5	+/- 1.5%
P4000Y & P4000C	0-4000	20	25	8.89 cm dia. (3.5" dia.)	28	753	+/- 5	+/- 1.5%
P10KY & P10KC	0-5,000 10,000	20 (3) 10 (2)	28	8.89 cm dia. (3.5" dia.)	28	1144	+/- 5	+/- 1.5%

Alternate power ranges can be obtained by doubling or halving exposure time and the indicated power. For CO₂ lasers, the "C" coating is recommended because this coating can withstand higher laser power than the broad band "Y" coating.

- (1) The accuracy and repeatability of the Power Probes partly depends on the accuracy of the exposure time. The average accuracy of exposures (hand held) has been found to be 0.2 seconds. This amounts to a 1% error for a 20 second exposure time. Many lasers are equipped with a shutter that can produce an exact time exposure.
- (2) 10 second exposure time for 10,000 watts.
- (3) 20 second exposure time for 5,000 watts.

Approximate Damage Threshold For Stationary Probes*

Power (watts)	Time (1) (sec)	CO2 Probes (w/cm ²)	YAG Probes (w/cm ²)
100	20	10,000	3,000
200	20	7,000	2,500
500	20	4,000	2,000
1,000	20	2,500	1,750
2,000	20	1,500	1,200
4,000	20	1,100	-
0-5,000	20	900	-
10,000	10		



* Moving the probe during exposure will increase (up to double) the damage threshold compared to the numbers shown for a stationary probe. To achieve this increase, the head must be moved in a circular motion so that the laser beam does not strike any one area continuously for more than 1.5 seconds.

- (1) Exposure time of the laser beam on a power probe head which is rated to accept the indicated power level.

Power Probe Carry Cases (sold separately)

Cascade Laser has cases to accommodate all power probes.

- PSCS Hard Plastic Case for P20 to P10K
- Soft Fabric Cases are also available

Contact Cascade Laser Corporation for ordering information or to request a quotation on any of these products.

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*Laser Power Probe
April 2001*