

CASCADE LASER CORPORATION

Digital Power Probe

Product Information



Figure 1: *Digital Power Probe*

The Digital Power Probe is a completely portable, easy-to-use calorimeter type power meter. The instrument consists of two components; a microprocessor based digital meter and Probe Head. Different Probe Heads are available to cover various laser types with power ranges from a few watts to over 11 kilowatts. The meter accepts any of the Probe Heads so it is easy to change power ranges as well as check a reading using a second Probe Head of the same type. The digital meter can be used with an optional thermocouple to become an accurate digital thermometer.

Like Cascade Lasers' highly successful dial type "Laser Power Probes," the Digital Power Probe uses timed exposures and is based on the idea that laser power measurement should be quick and easy. Setup should not require special fixturing or time consuming alignment. Ideally, it should be possible to take power measurement at any point in the optical system where losses are likely to occur. Unfortunately, most laser power meters have sacrificed ease of use to gain continuous power readings. In most laboratory and production situations, however, the usual requirement is for quick power spot-checks with minimum disruptions. The Digital Power Probe has several special features. They are:

1. Increased accuracy is achieved by microprocessor control and a digital readout. The meter automatically compensates for non-linearities and other sources for error in power measurements.
2. Laser power readings are retained until the meter is "reset". This makes taking remote power measurements easy. Extension cables are available for situations when the distance between the meter and the head must be greater than 1.5 meters (5 feet).
3. The Digital Power Probe measures laser power with full accuracy from 20 watts to over 11 kilowatts using four Probe Heads with overlapping ranges. Each probe has better than a 10 to 1 power range. For example, the 220 watt head can accurately measure laser power from 220 watts down to 20 watts. The range, resolution and accuracy for each Probe Head are given in Table 1.
4. The meter can also be used as a digital thermometer by substituting a thermocouple accessory for the Power Probe Head. Temperature may be displayed in either °C or °F. This feature is very useful for checking the temperature of a cooling system or monitoring the temperature rise of an optical component.
5. Power Probe Heads are inexpensive and easily switched. This permits alternating between two Probe Heads so that readings can be made using one head while the other head cools. The Probe Heads can be quickly cooled by water immersion.
6. New absorption coatings have been developed which are more resistant to damage. See "Probe Head Selection" (on back) for more information.



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Probe Head Selection

Seven different Probe Heads are available for use with the Model 30 Digital Meter. The Probe Heads have four different power ranges (designated H1, H2, H3, H4). The Probe Heads are also available with two (recently improved) absorbing coatings designated "Y" and "C". The "Y" series Probe Heads have a broad spectral absorption coating which is particularly useful for YAG lasers but covers a spectral range from 0.4 to 6 microns using the standard calibration. The new "Y" coating has a bulk absorption characteristic which permits the coating to better withstand Q switched pulses or concentrated beams without damage. This coating can also be used with CO₂ lasers but a correction of the exposure time is required.

If the Probe Head is to be used with only a CO₂ laser, then the "C" coating is preferred. The "C" coating does not exhibit damage until the aluminum substrate is close to melting. Table 1 designates the different Probe Head models. For example, H1-C and H1-Y have the same power range but differ in the use of the "C" or "Y" coating respectively.

Table 1

The following table gives the specifications of Model 30 meter used in conjunction with the Probe Head designated.

Probe Head	Models	Models	Models	Model
	H 1-C & H 1-Y	H 2-C & H 2-Y	H 3-C & H 3-Y	
Useful power range (W)	20 to 220	100 to 1100	200 to 2200	1000 to 11,000
Exposure time (sec)	20	20	20	10
Resolution (W)	0.1	1	1	10
Head dia. (c) mm (in.)	38 (1.5)	63 (2.5)	76 (3.0)	101 (4.0)
Head thickness (c) mm (in.)	12 (.47)	25 (.99)	31 (1.22)	48 (1.89)
Accuracy (a)	+/- 4% + .2 W	+/- 4% + 1 W	+/- 4% + 2 W	+/- 4% + 10 W
Repeatability	1.5%	1.5%	1.5%	1.5%
Net Weight (b) (g)	120	290	465	1160

(a) The accuracy and repeatability of the Digital Power Probes partly depends on the accuracy of the exposure time. The average accuracy of exposures (with minimal practice) has been found to be .2 seconds. This amounts to a 1% error for a 20 second exposure time. Using a laser shutter can improve the exposure time accuracy.

(b) This approximate weight does not include the weight of the digital meter.

(c) Dimensions are approximate.

Digital Power Probe Kit

It is possible to purchase the Digital Power Probe either as individual components, or as a complete kit. A complete kit (Fig 2) is recommended for an initial purchase. This kit includes;

1. The Model 30 Digital Power meter (including battery)
2. A Probe Head (you specify the model)
3. A padded cover to protect the probe head.
4. A 1.5m long unmounted thermocouple accessory to permit the meter to be used as a digital thermometer.
5. A padded carry case. The carrying case is made to accommodate a second Probe Head.

The model number for a Digital Power Probe Kit is 30/xx-x where xx-x is the Probe Head model number. For example, the 30/H2-Y Kit would contain the kit components mentioned above as well as Model H2-Y Probe Head.



Figure 2: Digital Power Probe Kit

Ordering Information

30DM	Digital Meter
Probe Head	7 models available. H1-C, H2-C, H3-C, H4-C; H1-Y, H2-Y, H3-Y
Kits	7 kits available 30/H1-C, 30/H2-C, 30/H3-C, 30/H4-C; 30/H1-Y, 30/H2-Y, 30/H3-Y
30E5	Extension cable 1.5m (5 ft) coiled
30E10	Extension cable 3m (10ft) not coiled
30TU	Thermocouple bead, unmounted 1.8m wire 400 °C maximum
30TP	Thermocouple probe 760 °C maximum
30CS	Padded case, small holds H1, H2 or H3 probes
30CL	Padded case, large holds H4-C probe

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

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