



Macken Instruments, Inc.

for CO<sub>2</sub> and other molecular lasers



## Description

Macken Instruments' Model 23-S consists of seven Beam Probes and one plastic case. Each Beam Probe covers a different sensitivity range from 200 w/ cm<sup>2</sup> to 0.05 w/ cm<sup>2</sup>. The 7 Beam Probes models correspond to surfaces #1, 2, 3, 4, 5, 7, & 8 described in Macken Instruments' Thermal Image Plate DataSheet.

Each Beam Probe is  $\frac{1}{8}$ " thick, 1" wide and 6" long. The end of each probe is tapered to  $\frac{1}{32}$ " thickness so that the thermal-sensitive surface can be brought close to optical parts.

Operation of the Beam Probes requires the use of a UV lamp such as Macken Instruments' Model 22-UV to illuminate the surface. Although any long-wave ultraviolet lamp can be used, Model 22-UV offers small size, high illumination level, and the ability to stand on end.

## Power Dissipation

The Beam Probes are designed primarily to be used with medium and low-power laser beams. The thinness of the plates, while allowing accurate positioning, does limit the heat dissipation of this model. The maximum allowable power is 50 watts for intermittent duty. When used with laser beam powers between 50 watts and 10 watts, the plates should be allowed to cool after absorbing 700 watt seconds of energy. The Beam Probes can be used indefinitely with beam powers of 7 watts or less.

The CO<sub>2</sub> Laser Beam Probes are hand-held plates designed to simplify the alignment of optical systems. They display the laser beam as a dark image on a fluorescent background using the same UV-excited, thermal-sensitive surfaces developed for Macken Instruments' Thermal Image Plates.

The small size of the Beam Probes permits them to be placed close to optical parts and accurately show the position of a laser beam relative to an aperture. Tasks such as determining when a CO<sub>2</sub> laser beam is striking the center of a mirror or entering the aperture of a power meter are simplified with the use of the Beam Probes.

## Ordering Information

23-S CO<sub>2</sub> Beam Probe Set includes Beam Probes, 22UV Lamp and case

Individual Beam Probes are:

- 23-1 (60-200 w/cm<sup>2</sup>)
- 23-2 (30-100 w/cm<sup>2</sup>)
- 23-3 (15-50 w/cm<sup>2</sup>)
- 23-4 (7.5-25 w/cm<sup>2</sup>)
- 23-5 (2.5-11 w/cm<sup>2</sup>)
- 23-7 (0.4-3.2 w/cm<sup>2</sup>)
- 23-8 (0.06-0.4 w/cm<sup>2</sup>)



## USER INSTRUCTIONS:

1. Illuminate the surface of the Beam Probes with Model 22UV Ultraviolet Light or equivalent to produce a uniform fluorescence. Stand the UV lamp on end and place it 6 to 9 inches from the surface.
2. Permit the laser beam to strike the fluorescing surface. When working with a beam of unknown power density, start with the least sensitive surface (Surface 1) and progress numerically to the more sensitive surfaces until the darkened image of the beam is obtained.
3. Once a surface is found that has the proper sensitivity to indicate the locations of the beams do not attempt to use the next most sensitive Beam Probe even if the image is not as dark as would be ideal. The change in sensitivity between successive Beam Probes will be too great to permit ideal viewing of all power densities. Macken Instruments' Model 22 Thermal Image plates are more well suited for viewing detail, within a laser beam.
4. Avoid power densities in excess of those that cause a portion of the image to saturate (complete loss of fluorescence). When this condition occurs, a less sensitive surface should be used.
5. Do not pass a Beam Probe through the focus of a laser beam unless the total power of the beam is less than 0.04 watts.
6. To increase the sensitivity of any surface, decrease the level of UV illumination to produce a thin fluorescence and if necessary, dim the room lights.

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## PHOTOSENSITIVITY

Some darkening of the surfaces may result if the Beam Probes are exposed for long periods of time to direct sunlight. For best results, store the Beam Probes in the case provided.

## CARE OF SURFACES:

The thermal sensitive surface of the beam probes are delicate and should always be treated with care. A Beam Probe should never be laid down on its sensitive surface. Even touching the surface might leave dirt in the matte surface, which would require cleaning. The Beam Probe surface may be cleaned using a cotton applicator or soft paper tissue freshly dampened with acetone. Cleaning should be done with a light smooth stroke. Since there is some slight degradation of the surface with each cleaning, frequent cleanings should be avoided. Never clean the surface with water since this degrades an invisible coating on the surface.

## SAFETY:

Precautions have been taken to eliminate specular reflections from the Beam Probes. Both the thermal sensitive surfaces and the anodized aluminum have matte finishes and show little surface reflection at 10.6 microns. However, standard safety precautions, such as wearing protective glasses should always be observed when working with IR lasers. Naturally, it is expected that the users are familiar enough with their equipment not to get their hands burned when using the Beam Probes. For use with lasers emitting at other wavelengths, tests should be made by the user to determine the appropriate safety precautions.

The laser beam should never be allowed to strike the UV lamp or its cord.

The ultraviolet radiation from Model 22-UV lamp is not harmful. If other UV lamps are used, they should only emit "long wave" ultraviolet.