# RkP-575
# Pyroelectric Power Probe

- **Unique Cavity Configuration**
- **Flat Response, UV to Far-IR**
- **μW to 10 W**
- **Built-in Chopper**

The RkP-575 Probe is among the most versatile light measurement instruments available today. The unique cavity configuration yields a remarkably flat spectral response - better than ±1% from 0.25 - 2.0 μm. The durable surface absorber can handle up to 10 Watts (100 W/cm$^2$ power density), yet maintains msec risetime and μW sensitivity. The integrated Rk-570C optical chopper supports synchronous detection, resulting in superior S/N ratio and background rejection compared to other non-chopped thermal detectors.

The extremely wide spectral response and dynamic range make this probe the ideal measurement tool for broadband sources like flashlamps and blackbody emitters. Cover the full spectral range of Ti:Sapphire, Dye, OPO, and other tunable laser sources without having to worry about wavelength correction factors. The RkP-575 is equally suited to measuring Nd:YAG (fundamental and harmonics), Er:YAG, Nd:YLF, Excimer, Nitrogen, Copper Vapor, and $CO_2$ lasers.

The RkP-575 can be used for absolute radiometry, irradiance, and total power measurements. The flat spectral response and μW sensitivity allow for broadband radiometry, or mate the probe with the appropriate filter to examine specific wavelength ranges (photometry, for example). The detector aperture is manufactured to 1.0 cm$^2$ with a high degree of precision, so by flooding the aperture irradiance is automatically measured. By confining the light within the detector aperture the total output power of low-to-mid power lasers can be measured.

Besides being a versatile research instrument the RkP-575 is a superb transfer standard. Use calibrated neutral density filters to extend its dynamic range to match both low-power semiconductor detectors and high-power thermopile detectors.

LaserProbe inc.

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## SPECIFICATIONS

| | |
|---|---|
| Spectral response | 0.2 - 20.0 $\mu$m |
| Maximum total power | 10 W |
| Maximum average power density | 100 W/cm$^2$ |
| Noise equivalent power | 100 nW |
| Calibration accuracy | ±5% |
| Linearity | ±0.5% |
| Detector active area dimensions | 11.3 mm (1.0 cm$^2$) |
| Full scale ranges | 6; 200 (300) $\mu$W - 10 W (instrument dependent) |
| Probe dimensions (l x w x h) | 17.0 cm x 9.0 cm x 5.0 cm (6.7" x 3.6" x 2.0") |
| Probe and chopper (l x w x h) | 19.0 cm x 9.0 cm x 10.5 cm (7.5" x 3.6" x 4.2") |
| Probe weight | 0.7 kg (1.5 lb) |
| Probe and chopper weight | 1.6 kg (3.5 lb) |

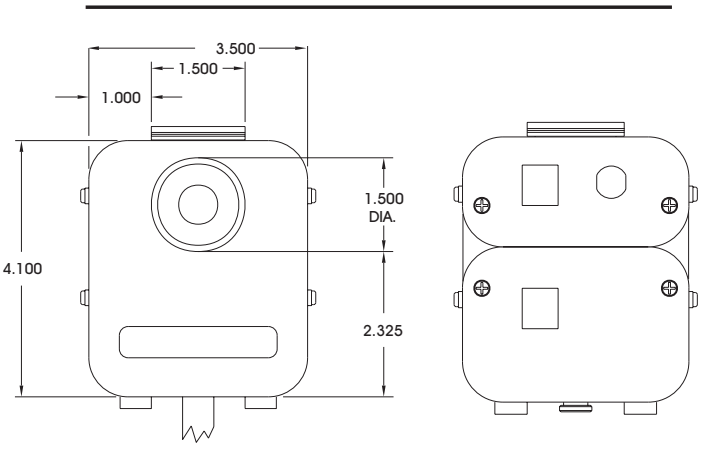
In a conventional flat detector photons strike the detector's surface only once, at which point they are either absorbed into the detector or reflected away. However, the geometry of the RkP-575 cavity detector insures that nearly all of the photons that are not absorbed at the initial contact point will be reflected further into the cavity, striking the detector surface again and again. This "light-trap" configuration produces almost total light absorption, resulting in an extremely broad, flat wavelength response and excellent sensitivity.

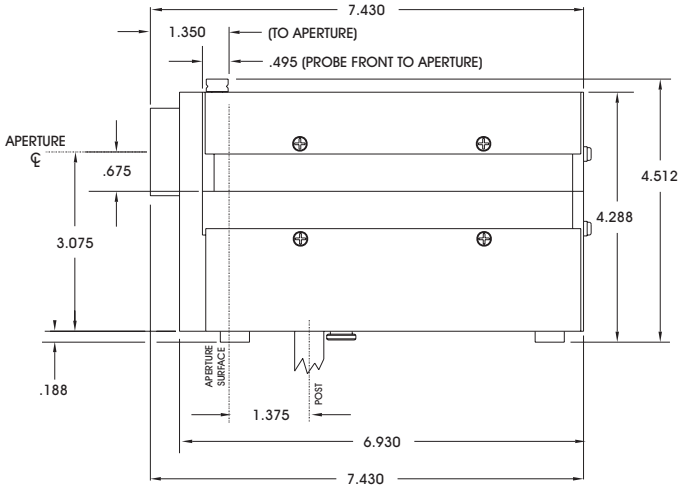
Because pyroelectric detectors respond only to changes in temperature ($\Delta$T), cw light sources must be chopped to produce the $\Delta$T necessary to stimulate the detector. The Rk-570C Optical Chopper, designed to mate directly to the RkP-575, accurately chops the optical source. In addition, when used with the appropriate instrument it provides the electrical reference signal required for synchronous detection. The advantage of synchronous detection is that only the optical signal with the same frequency as the reference signal will be measured - all other optical signals are ignored. Positioning the chopper so that just the source is chopped minimizes background noise, yielding the maximum S/N ratio. With this technique it is possible to measure a signal level that is smaller than the background.

The RkP-500 Series probes are designed to work with the Rk-570C Optical Chopper. The probe's detector assembly and preamplifier are in one housing, the chopper's motor and control circuitry in another. The probe housing mates to the chopper housing, aligning the detector aperture directly behind the chopper aperture. Electrical connections to the instrument are made via a jumper from the probe. A longer jumper is provided for remote chopping.

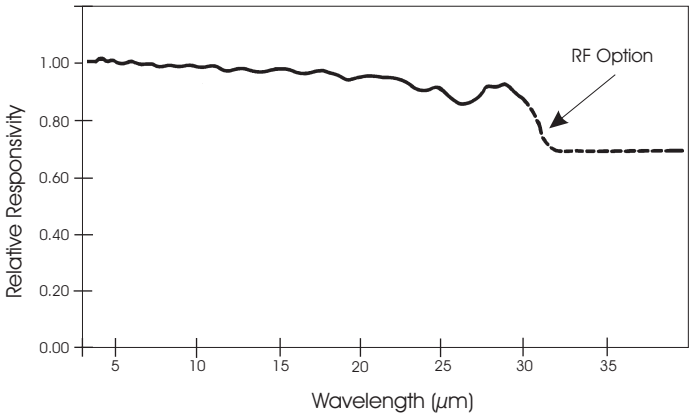
There are several accessories available for the RkP-500 Series, including probe extension cables, the kTA-141 support stand, and various filters and windows. The options and accessories are detailed in a separate data sheet.

All RkP-500 Series probes are provided with a certificate of calibration showing traceability to the National Institute of Standards and Technology (NIST) and compliance with MIL-45662 and ANSI-Z540 Sections 7-18.




Spectral Curve




As a result of our ongoing commitment to product improvement specifications are subject to change without notice.

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