RjP-445
Pyroelectric Energy Probe

- **Measure Energy up to 1 kHz**
- **Sub-μJ Sensitivity**
- **1.0 cm² Active Area**
- **Deep-UV to Far-IR Response**

Measurement of high pulse repetition rate lasers is no longer limited to average power. The RjP-445 Pyroelectric energy probe can measure the integrated energy of individual pulses, in real time, at pulse repetition rates up to 1 kHz. Its combination of speed and sensitivity, unprecedented in a large area (1.0 cm^2) detector, makes this the probe of choice for high rep rate, short pulse width sources.

The surface absorber material for the RjP-445 was selected in part for its broad spectral response, which extends from below 180 nm to greater than 20 μm. The flat spectral response makes the RjP-445 perfectly suited for tunable laser sources like Ti:Sapphire, Dye, and Optical Parametric Oscillators. Short pulse flashlamps also benefit from the RjP-445's broad spectral response. The 1 kHz pulse repetition capability is utilized when measuring fixed wavelength lasers like Nd:YAG, Nd:YLF, Nitrogen, CO, and CO_2.

For many applications it is essential to know the integrated energy of each pulse in real time. The traditional methods for this have been to use a photodiode to observe the pulses on an oscilloscope, or to monitor fluctuations in the average power with a calorimeter. In both cases information about the individual pulses is lost. This is particularly true for IR sources that fall outside the response range of photodiodes. Fortunately this is no longer the case. When used with the Rm-3700 or Rm-6600 Universal Radiometers the RjP-445 can measure, calculate, and transmit (via the Rs-232 or GPIB computer interface) the integrated energy of individual pulses at 1 kHz. Thus it is now possible to carefully monitor the conversion efficiency of biochemical reactions, study non-linear optical effects, etc. Couple the RjP-445 with the Rm-6600 Dual Channel Universal Radiometer and a second

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SPECIFICATIONS

Spectral response	0.18-20 μm
Maximum total energy	1.0 J
Maximum energy density	1.0 J/cm^2
Max. peak pulse power density *(30 ns pulse)*	1.0 MW/cm^2
Max. average power density	5.0 W/cm^2
Minimum detectable energy	100 nJ
Maximum pulse rep rate	1 kHz
Maximum pulse width	50 μsec
Calibration accuracy	±5%
Linearity	±0.5%
Detector active area	1.0 cm^2
Full scale ranges	6; 30 μJ - 1 J
Head dimensions (dia x depth)	6.0 cm x 4.6 cm (2.4" x 1.8")
Preamplifier dimensions (l x w x h)	11.5 cm x 7.7 cm x 5.1 cm (4.5" x 3.0" x 2.0")
Probe weight (head and preamp)	0.5 kg (1.0 lb)

probe to do high-speed, automated transmission measurements of filters, attenuators, and laser goggles. Or take it in the field to characterize laser rangefinders and target designators.

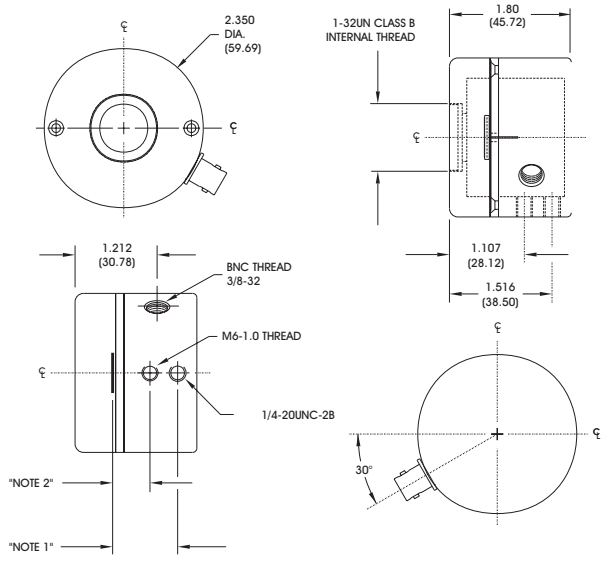
The compact size and modular design make the RjP-445 ideal for OEM applications as well. Incorporate the detector and preamplifier directly into lasers, detector calibration fixtures, or fire-control systems for real-time diagnostics, output stabilization, and process control.

The RjP-445 uses a $LiTaO_3$ pyroelectric detector element manufactured specifically to minimize noise, providing superior sensitivity and signal-to-noise ratio over other comparably sized detectors. The spectrally flat surface absorber material is applied in a manner designed to maximize surface uniformity, making the probe's response more uniform with input angle.

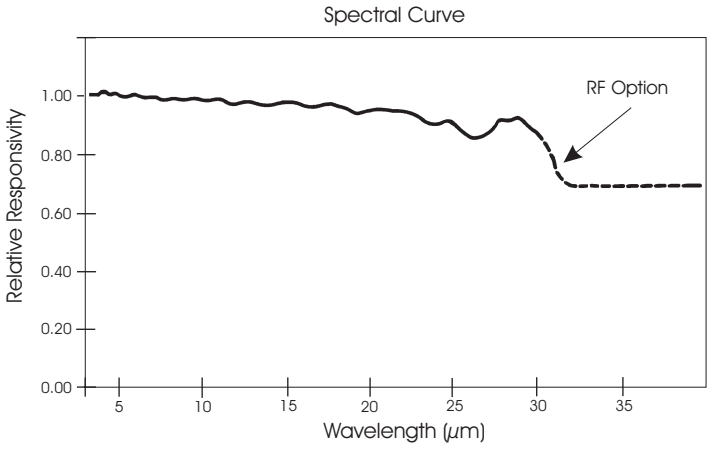
As a member of the 400 Series Probe family, the RjP-445 uses the same detector housing and preamplifier enclosure as all other 400 series probes. In addition, most 400 Series probes are designed so the detector plane is the same distance from the mounting post plane, allowing for easy interchange of probes in an experiment. The compact 400 Series detector housing measures 2.35" in diameter by 1.8" deep. The side-mounted BNC connector requires no additional clearance in the beam path. Standard metric and English mounting holes and a 1" (25 mm) filter holder facilitate use, while the black anodized finish reduces unwanted back-reflection. A separate enclosure houses the preamplifier. Probe parameters, including wavelength correction factors and calibration date, are stored in memory for access by Laser Probe's Universal Radiometers. Carefully designed gain stages insure excellent linearity and S/N ratio over 6 decades of dynamic range.

There are many options and accessories available for the RjP-400 Series probes, including a precision aperture, light baffle, and the kTA-141 support stand. The options and accessories are detailed in a separate data sheet.

All 400 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.



NOTE 1: The distance from the detector plane to the center of the ¼ - 20 mounting is 1.00" (25.4mm).
NOTE 2: The distance from the detector plane to the center line of the M6 mounting is .552" (14.02mm)



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

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