



The 13 PEM 001/J integrated 2-watt broadband power and energy meter is a high-sensitivity instrument for measuring optical radiation from the ultraviolet to the far infrared. The instrument features a sensitive, but low drift, thermopile sensor head. The sensor disc, made from high-density graphite, does not have a painted, plated, or anodized front surface that can be easily ablated. Consequently, the thermopile has a very high damage threshold. The 13 PEM 001/J is ideal for measuring the output power of cw lasers, the average power of pulsed (quasi-cw) laser sources, and the peak power of long-pulse lasers. It can also measure the energy of a laser pulse.

- Measures cw power from 10  $\mu\text{W}$  to 2 W
- Calibrated from 200 nm to 20  $\mu\text{m}$
- Handles 200 W/cm<sup>2</sup> average power, 100 MW/cm<sup>2</sup> pulsed power
- Includes broadband (400 nm–2  $\mu\text{m}$ ) optical filter to eliminate thermal background radiation
- Displays output in analog and digital formats
- Adjustable tilt base for easy viewing

#### SPECIFICATIONS: INTEGRATED 2-WATT BROADBAND POWER AND ENERGY METER SYSTEM

##### Measurement Specifications:

###### Calibrated Spectral Range:

200 nm to 20  $\mu\text{m}$  (400 nm to 2  $\mu\text{m}$  with filter)

###### Power (Energy):

Range: 10  $\mu\text{W}$  to 2 W (10  $\mu\text{J}$  to 2 J)

Resolution: 10  $\mu\text{W}$  (10  $\mu\text{J}$ )

Range Selection: 7-position switch, 3–3000 mW (mJ)

Offset:  $\pm 25$  mW (mJ) with 10-turn potentiometer

###### Pulse Repetition Rate (energy mode):

Single pulse or 1 Hz maximum

Maximum Pulse Width: 100 msec

Noise Equivalent Power (Energy): 10  $\mu\text{W}$  (10  $\mu\text{J}$ ) rms

Drift: Less than 15  $\mu\text{W}$  over 60 min

Response Time: <0.5 sec

Calibration:  $\pm 5\%$  NIST traceable

## Integrated 2-Watt Broadband Power and Energy Meter System

##### Detector:

**Type:** 10-mm-diameter large-area thermopile;  
high-density graphite disc

**Uniformity:**  $\pm 1\%$  over central 8 mm

**Maximum Power Dissipation:** 3 W

**Maximum Energy Density:**

$\sim 1$  J/cm<sup>2</sup> for pulse width  $\tau \geq 10^{-7}$  sec

$\sim \tau/10^{-7}$  J/cm<sup>2</sup> for pulse width  $\tau \leq 10^{-7}$  sec

(e.g.,  $\sim 10^{-5}$  J/cm<sup>2</sup> for pulse width  $\tau = 10^{-12}$  sec)

##### Displays:

**Digital:** 3½-digit LED display

**Analog:** Precision backlit mirror scale

**External Analog Output:**

Rear-panel BNC (1 Vdc full scale)

##### Power Requirements:

**Voltage:** 115 Vac  $\pm 10\%$  /  $-20\%$ , 230 Vac  $\pm 10\%$

Rear-panel selector switch

**Frequency:** 50–60 Hz

**Power:** <10 W

##### Temperature:

**Operating:**  $+15^\circ\text{C}$  to  $+35^\circ\text{C}$

**Storage:**  $-20^\circ\text{C}$  to  $+55^\circ\text{C}$

##### Dimensions:

**Control/Display Unit:** 185  $\times$  130  $\times$  125 mm  
(7.3  $\times$  5.1  $\times$  4.9 in.)

**Sensor Head:** 48 mm (1.9 in.) in diameter,  
60 mm (2.4 in.) long

**Cable:** 1.6 m (5.2 ft)

**Safety:** CE compliant

#### Integrated 2-Watt Broadband Power and Energy Meter System

PRODUCT NUMBER	
2-W Broadband Power and Energy Meter	13 PEM 001/J