

## LABORATORY GRADE INSTRUMENTS

### THRULINE® High-Accuracy RF Power Meter



#### MULTIFUNCTION POWER METER

#### MODEL 4421

Our Model 4421 power meter is an excellent choice for demanding calibration, process control and scientific applications. It directly measures power with an accuracy of  $\pm 3\%$  of reading without calibration charts, couplers, attenuators, or other external equipment which can degrade accuracy.

The backlit 3½-digit LCD displays forward and reflected power in either watts or dBm, VSWR, return loss in dB and Minimum or Maximum values. Ranging is selectable manual or autoranging. An optional GPIB or RS-232 computer interface can be used with the Model 4421 during AC operation.

Smart Power Sensors (see below) are required for operation. Each covers an extended frequency and power range. The microprocessor based sensors contain nonvolatile memory to store calibration data, and can easily be recalibrated in the field.

**Power Range:** 100 mW to 10 kW FS  
**Frequency Range:** 100 kHz to 2.5 GHz  
**VSWR Range:** 1.0 – 199.9  
**Functions:** Forward and reflected power in W or dBm, VSWR, return loss in dB and min/max values  
**Ranging:** Selectable manual or autoranging. Power sensor dependent.  
**Overrange Indication:** Audible warning when RF power input exceeds 120% of sensor's maximum power range.  
**Display:** 3½ digit-liquid crystal display with annunciator for mode, measurement units, battery condition, programming status, and trend arrows. Switchable backlight.

**Operating Power:** AC mains or batteries. 115/230 Vac, 50/60 Hz or 8 nickel cadmium 1.2 V C cells (NEDA type 10014).  
**Nominal Size:** 12<sup>9</sup>/<sub>32</sub>" L x 12<sup>5</sup>/<sub>32</sub>" W x 4<sup>1</sup>/<sub>4</sub>" H (312 mm x 309 mm x 108 mm) with handle extended 15<sup>7</sup>/<sub>16</sub>" L (392 mm)  
**Weight:** 11 lbs. (5 kg.)  
**Interconnects:** 1 meter latch-n-lok coiled cable.  
**Interfaces:** Optional field-installable IEEE-488 (PN: 4421-488) or RS-232 serial interface (PN: 4421-232). Dimensions: 4<sup>1</sup>/<sub>2</sub>" x 6<sup>1</sup>/<sub>2</sub>" (114 x 165 mm)  
**Required Product:** Order a Smart RF Power Sensor below  
**Recommended Accessories:** Case (page 7)



#### SMART POWER SENSORS

#### 4020 SERIES

MODEL	POWER INPUT	FREQUENCY RANGE	VSWR RANGE	MINIMUM DIRECTIVITY	INSERTION LOSS (DB)
4021	300 mW – 1000 W (1200 W max.)	1.8 MHz – 32 MHz	1.0 – 2.0	28	<0.05
4022	300 mW – 1000 W (1200 W max.)	25 MHz – 1000 MHz	1.0 – 2.0	28	25 – 512 MHz: <0.05 512 – 1000 MHz: <0.13
4023	100mW – 200W (240 W max.)	900 MHz – 2500 MHz	1.0 – 3.0	20	<0.2
4024	3 W – 10 kW (12 kW max.)	1.5 MHz – 32 MHz	1.0 – 2.0	28	<0.05
4025	3 W – 10 kW (12 kW max.)	100 kHz – 2500 kHz	1.0 – 2.0	28	<0.05

**Circuitry:** Microprocessor-based measurement and conversion.  
**Frequency/Power Coverage:** Single power sensor covers specified power and frequency range.  
**Bi-directional Operation:** Pick up of RF power in precision 50-ohm line.  
**Accuracy:**  $\pm 3\%$  of reading from rated maximum range down to 30% of full scale on the most sensitive range.  
**Signal Purity:** For rated accuracy, no more than 1% AM; harmonics –50 dB or less.  
**Calibration Technique:** Calibration vs frequency curve stored in nonvolatile memory within each sensor. Sensor output corrected at frequency of measurement within rated stage.

**Sampling Rate:** Approximately 2 readings/second.  
**Ambient Temperature Range:** Temperature compensated for rated accuracy from 0°C to 50°C (32°F to 122°F).  
**Connectors:** QC-type. Female N normally supplied; Other coaxial-type connectors available on page 60.  
**Nominal Size:** (includes connectors) 5<sup>7</sup>/<sub>32</sub>" L x 2<sup>1</sup>/<sub>2</sub>" W x 3<sup>1</sup>/<sub>4</sub>" H (132.5 mm x 64 mm x 83 mm).  
**Weight:** 1 lb. 11 oz. (0.76 kg).