

# POWER METERS

## Power Meter

Model HP 438A

- Ideal for ATE applications
- Dual power sensors
- Innovative ratio & difference measurements



HP 438A

DESIGNED FOR  
**MATE**  
SYSTEMS

DESIGNED FOR  
**HP-IB**  
SYSTEMS

The HP 438A Power Meter is a dual channel power meter designed specifically for ATE systems. The compact front panel is designed to save space in rack mounted systems, while the dual channel design allows simple measurements of the ratio and difference of power levels from two separate sensors. Compatible with the HP 8480 series of thermocouple and diode sensors, the power and frequency range of the meter extends from  $-70$  dBm to  $44$  dBm and from  $100$  kHz to  $50$  GHz.

Important measurement contributions are a programmable digital filter for optimizing resolution and measurement speed, independent offset (in dB) values for each channel,  $0.001$  dB resolution available, and a power difference mode for displaying absorbed power in transmission lines. Up to 19 different operating states of the meter can be stored into non-volatile memory for later recall.

The programmable digital averaging filter gives the user control over the inherent tradeoff between speed and accuracy. The AUTO filter mode is usually adequate for fully settled readings with  $0.01$  dB resolution. Less digital averaging leads to faster but noisier readings, if speed is the critical issue.

The Hewlett-Packard Interface Bus (HP-IB) capability is standard on the HP 438A with programming codes printed on the front panel for easy reference. For U.S. Air Force MATE (Modular Automatic Test Equipment) system applications, Option 700 provides the HP 438A with the internal capability to be controlled by the MATE language CIIL (Control Interface Intermediate Language). All measurement modes are programmable including zeroing, calibration, and Cal Factor. Complete interrupt capability with flexible SRQ operation optimizes the efficiency of program execution in automatic systems.

### HP 438A Specifications

**Frequency range:**  $100$  kHz to  $50$  GHz (depending on power sensor used).

**Power range:**  $-70$  dBm to  $+44$  dBm ( $100$  pW to  $25$  W), sensor dependent. Uses HP 8480 series power sensors; see sensor specs for details.

**Operating temperature range:**  $0$   $-55^{\circ}\text{C}$ .

#### Instrumentation Accuracy

**Single channel, linear mode:**  $\pm 0.5\%$ .

**Log mode:**  $\pm 0.02$  dB.

**Dual channel, linear mode:**  $\pm 1\%$ .

**Log mode:**  $\pm 0.04$  dB.

**Zeroing:** automatic,  $\pm 0.5\%$  full scale on most sensitive range.

#### Power Reference

**Power output:**  $1.00$  mW. Factory set to  $\pm 0.7\%$ , traceable to the U.S. National Institute of Standards and Technology.

**Accuracy:**  $\pm 1.2\%$  worst case ( $\pm 0.9\%$  rss) for 1 year.

**Connector:** front panel type N female (also on rear panel, Opt 002).

#### Meter Adjustments

**Cal factor:** values from  $1\%$  to  $150\%$  in  $0.1\%$  steps can be entered to account for sensor frequency response. Sensor calibration: automatic self calibration to  $1.00$  mW.

### General

**Display:** four digit display (five digits in high resolution mode) with  $20\%$  over-range capability on all ranges. Annunciators to indicate measurement mode, Cal Factor, offset value, fixed or automatic range and filter values, and error conditions.

**Recorder output:** linearly proportional to power in watts. One volt corresponds to full scale;  $1k$  output impedance, BNC rear panel female connector.

**Line voltage:**  $100$ ,  $120$ ,  $220$  or  $240$  Vac  $+5\%$   $-10\%$ .  $100$  and  $120$  volts,  $48$  to  $66$  Hz and  $300$  to  $440$  Hz.  $220$  and  $240$  volts,  $48$  to  $66$  Hz only.

**Power requirements:**  $65$  VA,  $35$  watts, maximum.

**Weight:** net,  $5.9$  kg ( $13$  lb). Shipping,  $9.1$  kg ( $20$  lb).

**Dimensions:**  $89$  mmH x  $213$  mmW x  $418$  mmD ( $3.5$  x  $8.4$  x  $16.8$  in).

**HP-IB interface codes:** SH1, AH1, T5, TEO, L4, LEO, SRI, RL1, PP1, DC1, DT1, C0.

### Accessories

**Furnished:** HP 11730A, 2 each,  $1.5$  metre ( $5$  ft) power sensor cables. Power cable, 1 each,  $2.4$  metres ( $7.5$  ft). Mains plug matches destination requirements.

**Available:** To select or substitute non-standard lengths for power sensor cables, see below.

### HP 11730A-F Power Sensor Cables

The HP 11730 series power sensor cables are for use with the HP 435B, 436A, 437B, 438A and 70100A power meters and the HP 8480 series thermocouple and diode power sensors. These cables are designed to reduce RFI effects on low power readings with an improved shielding design in the cable itself. Cables may be ordered individually or in pairs in any combination desired for single and dual channel measurements.

The HP 11730A cable is the standard cable for the HP 435B, 436A, 437B, 438A (2 cables shipped) and 70100A meters. To order a non-standard cable, select Option 004 for the meter in question, and order the desired cable from below.

### Ordering Information

**HP 438A Dual Channel Power Meter**

**Option 002:** Rear panel sensor connectors (in parallel with front panel) and additional reference oscillator with rear panel output.

**Option 700:** Internal MATE programming

**Option 004:** Delete power sensor cables

**Option 910:** Additional manual

**Option W30:** Two additional years of return-to-HP warranty

**HP 11730A**  $1.5$  metre ( $5$  ft) sensor cable

**HP 11730B**  $3.0$  metre ( $10$  ft) sensor cable

**HP 11730C**  $6.1$  metre ( $20$  ft) sensor cable

**HP 11730D**  $15.2$  metre ( $50$  ft) sensor cable

**HP 11730E**  $30.5$  metre ( $100$  ft) sensor cable

**HP 11730F**  $61.0$  metre ( $200$  ft) sensor cable

☎ Fast-ship product—see page 734.

### Price

**\$5,100** ☎

**-\$325**

**+1000**

**-\$150**

**\$25**

**-\$130**

**\$90** ☎

**\$100** ☎

**\$140** ☎

**\$200** ☎

**\$265** ☎

**\$425** ☎