

POWER METERS

Power Meter, Peak Power Meters, Peak Power Sensor

HP 435B, 8900C/D, 84811A



HP 435B

HP 435B Power Meter

The HP 435B power meter is an analog power meter, compatible with the entire series of HP 8480 power sensors. Depending on which sensor is used, the HP 435B can measure power from -65 dBm to $+44$ dBm, full scale, at frequencies from 100 kHz to 110 GHz. This versatile instrument also features <1 percent instrumentation uncertainty, low noise and drift, auto-zero, recorder output, optional battery operation, and long cable options up to 61 m (200 ft).

HP 435B Specifications

Frequency Range: 100 kHz to 110 GHz (sensor dependent)

Temperature Range: 0° to 55° C

Power Range (calibrated in watts and dB in 5 dB steps)

With HP 848xB: $+5$ dBm (3 mW) to $+44$ dBm (25 W) full scale

With HP 848xH: -5 dBm (0.3 mW) to $+35$ dBm (3 W) full scale

With HP 848xA: -25 dBm (3 μ W) to $+20$ dBm (100 mW) full scale

With HP 848xD: -65 dBm (300 pW) to -20 dBm (10 μ W) full scale

Accuracy

Instrumentation: $\pm 1\%$ of full scale on all ranges

Zero: Automatic, operated by front-panel switch

Zero Set: $\pm 0.5\%$ of full scale on most sensitive range, typical

Zero Carryover: $\pm 0.5\%$ of full scale

Power Reference: Internal 50 MHz oscillator with type-N female connector on front panel (or rear panel, Option 003 only)

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 one year

Supplemental Characteristics

Recorder Output: Linearly proportional to indicated power with 1 volt corresponding to full scale: 1 k Ω output impedance, BNC connector

RF Blanking Output: Provides a contact closure to ground. Used for turning off RF input to sensor during auto-zeroing. BNC connector

Power Consumption: 110 or 120 V ($+5\%$, -10%), 48 to 66 Hz and 360 to 440 Hz; also 220 or 240 V ($+5\%$, -10%), 48 to 66 Hz only: <20 V \cdot A

Size: 130 mm W x 155 mm H x 279 mm D (5.1 in x 6.3 in x 11 in)

Weight: Net, 2.7 kg (5.9 lb); shipping, 4.2 kg (9.2 lb)

Accessories

Furnished: HP 11730A, 1.52 m (5 ft) cable for the power sensor; 2.3 m (7.5 ft) power cable (mains plug shipped to match destination requirements)

Available

To select or substitute nonstandard lengths for power sensor cables, see HP 11730A-F power sensor cables section.

HP 5060-8762: Rack adapter frame (holds three instruments the size of the HP 435B)

Key Literature

HP 435B, HP 436A Power Meters Technical Data, p/n 5953-6460

Ordering Information

HP 435B Power Meter	Price
Opt 001 Rechargeable battery installed provides up to 16 hours of continuous operation	+\$204
Opt 002 Input connector placed on rear panel in parallel with front	+\$51
Opt 003 Parallel sensor inputs front and rear panels, reference oscillator output on rear panel	+\$51
Opt 004 Delete power sensor cable	-\$50
Opt 910 Extra Operating and Service Manual (00435-90040)	+\$8
Opt W30 Extended Repair Service (see page 592)	+\$50
Opt W32 Calibration Service (see page 592)	+\$775



HP 8900C



HP 8900D

HP 8900C/D Peak Power Meters

The HP 8900C and 8900D peak power meters directly display the peak power of RF pulses over a 100 MHz to 18 GHz frequency range. Measurements can be made on pulses with widths from 1 μ s (100 ns in compare mode) to CW, and repetition rates from 100 Hz (0 Hz in compare mode) to 100 kHz.

The HP 8900C is an economical analog meter calibrated in watts and dBm. The analog display with its large, easy-to-read scale makes it simple to peak or null pulsed power systems. The HP 8900D has a high-resolution 3 $\frac{1}{2}$ -digit digital display calibrated in watts. The direct reading display and range annunciators make the digital version a good choice for production and field applications where unambiguous or frequent readings are required.

HP 84811A Peak Power Sensor

The HP 84811A peak power sensor works with the HP 8900C/D peak power meters to measure the peak power of RF pulses. It is supplied with a 4-foot flexible cable to easily reach the pulse source being measured. The HP 84811A also conveniently detaches from the meter for storage, recalibration, or replacement.

HP 8900C/D Peak Power Meters Specifications

Frequency Range: 100 MHz to 18 GHz

Dynamic Range: 20 dB (0 to $+20$ dBm)

HP 8900C: 4 ranges of 3, 10, 30, and 100 mW full scale

HP 8900D: 2 ranges of 10 and 100 mW full scale

Pulse Response:

Direct Mode

Pulse Width: 1 μ s to CW

Repetition Rate: 100 Hz to 100 kHz

Compare Mode

Pulse Width: 100 ns (typical) limited by rise-time specification

Repetition Rate: 0 to 100 kHz

Rise Time: 75 ns

Fall Time: 125 ns (as measured on video output)

Power Consumption: 100 and 120 Vac $+5$, -10% , 48 to 66 Hz and 360 to 440 Hz; 220 and 240 Vac $+5$, -10% , 48 to 66 Hz

Meter accuracy	CW	Pulse	Transfer accuracy CW to pulse
Direct	± 0.2 dB	± 0.35 dB	± 0.2 dB
Compare	± 0.2 dB	± 0.25 dB	± 0.1 dB

HP 84811A Peak Power Sensor Specifications

Power Range: 0 to $+20$ dBm (1 mW to 100 mW)

Frequency Range: 100 MHz to 18 GHz

SWR: 100 MHz to 12 GHz <1.5 . 12 GHz to 18 GHz <2.0

Maximum Peak Power: $+24$ dBm (250 mW) for 5 minutes

Connector Type: Type-N (male)

Calibration Accuracy: ($+10^{\circ}$ to $+40^{\circ}$ C), ± 0.7 dB 0.1 to 12 GHz, ± 1.0 dB to 18 GHz. 0° to 10° C and 40° to 55° C: add ± 0.2 dB

Key Literature

HP 8900C/D Peak Power Meters and HP 84811A Peak Power Sensor Technical Data, p/n 5952-8258

Ordering Information

HP 8900C Analog Peak Power Meter

HP 8900D Digital Peak Power Meter

Opt W30 Extended Repair Service (for HP 8900C/D) (see page 592)

Opt W32 Calibration Service (see page 592)

HP 84811A Peak Power Sensor

Opt W30 Extended Repair Service (see page 592)

Opt W32 Calibration Service (see page 592)

Price

\$3,365

\$4,080

+\$75

+\$740

\$1,350

+\$50

+\$285