

ELECTRONIC COUNTERS

Microwave Counter/Power Meter

HP 5347A, 5348A

- Quick, easy power and frequency measurements
- Portable; battery operation
- Built-in sensor calibration tables
- Supports many HP power sensors



DESIGNED FOR
HP-IB
SYSTEMS

HP 5347A with optional soft carrying case and HP 8485A power sensor

HP 5347A and HP 5348A Microwave Counter/Power Meters

The HP 5347A and HP 5348A Microwave Counter/Power Meters offer the convenience of a single instrument that meets both your frequency and power measurement needs. The HP 5347A counter/power meter makes these measurements to 20 GHz; the HP 5348A, to 26.5 GHz. Both counter/power meters offer the accuracy and resolution that previously required a standalone counter and a separate power meter. Measurements are easy. The HP 5347A and 5348A are designed for ease of use; they have only 5 function keys. They are rugged, lightweight, and battery powered.

True Power Meter Performance

As power meters, the HP 5347A and 5348A offer excellent dynamic range, linearity, and accuracy. They use the same proven power sensors used with Hewlett-Packard's standalone power meters. Power sensors and accurate, wide-range measurements go hand in hand.

Power measurements can be made from -70 dBm to $+20$ dBm over a 10 MHz to 26.5 GHz frequency range, depending on the sensors used. Exceptional power-meter linearity and low sensor SWR combine to give you outstanding measurement accuracy. The instrumentation accuracy is $\pm 0.5\%$ in linear mode or ± 0.02 dB in logarithmic mode, making power-meter uncertainty a negligible part of your total measurement error.

Outstanding Frequency Measurements

The frequency counter performance rivals that of HP's highest-performance standalone CW microwave counters. The HP 5347A measures frequency from 10 Hz to 20 GHz; the HP 5348A, from 10 Hz to 26.5 GHz. You can select either 1 Hz or 10 kHz resolution while measuring signals down to -35 dBm.

Portable, Easy to Use

The HP 5347A and 5348A come in a rugged, lightweight, and portable package. Several features have been designed in for quick and easy, portable measurements. An internal-battery option, for example, provides up to 2 hours of cordless measurements.

Designed for Measurement Ease

How many times have you purchased test equipment only to find that you never use most of the available functionality? The excess functionality only clutters the front panel and makes measurements difficult. Hewlett-Packard recognizes the importance of quick and easy measurements to field service personnel. The HP 5347A and HP 5348A are designed for ease of use.

Five Function Keys Simplify Operation

Unnecessary functions were designed out of the HP 5347A and HP 5348A counter/power meters. Only 5 function keys are required to make accurate frequency and power measurements. The chance of getting an incorrect reading due to instrument setup is almost eliminated. Little or no time is required to learn how to use these instruments. A 1-page starter guide is shipped with every instrument.

No Need for Calibration Tables

An average calibration table is permanently stored in memory. You no longer need to spend time entering power sensor calibration factors. Using average calibration tables results in only a slight reduction in overall measurement accuracy. With the HP 5347A and 5348A, the press of a single key stores a frequency measurement for use in a power measurement. The stored frequency is then used to access the power sensor calibration factor in the permanently stored calibration-factor-versus frequency tables.

Internal Battery for Cordless Measurements

An optional internal battery allows you to make cordless measurements for up to 2 hours. In the field, you do not need a power cord. Just walk right up to the output port and make your measurement.

Because at times it might be more convenient to operate the instrument from a dc supply, an external dc input is available for even greater flexibility in choosing a power source.

A Rugged Package for Tough Environments

These instruments are designed to survive the harsh transportation and operation environments common to portable applications. Their membrane front panels keep dirt and moisture from entering the instruments. An optional soft carrying case stores accessories, protects the unit during transit, and frees your hands to make measurements.

For Benchtop and ATE Systems Too

Having frequency and true power measurements in a single portable package saves valuable bench space in a manufacturing environment. The ease-of-use features will also be greatly appreciated.

A rackmount kit and HP-IB option are available for using the HP 5347A or HP 5348A in an ATE system.

Counter Specifications

Input 1

Frequency Range:

HP 5347A: 500 MHz to 20.0 GHz

HP 5348A: 500 MHz to 26.5 GHz

Sensitivity:

HP 5347A/48A: 500 MHz to 12.4 GHz: -32 dBm
 (-35 dBm typical)
 12.4 GHz to 20.0 GHz: -27 dBm
 (-32 dBm typical)

HP 5348A: 20.0 GHz to 26.5 GHz: -20 dBm (-27 dBm typical)

Maximum Input: +7 dBm

Damage Level: +25 dBm, peak

Connector: HP 5347A: N(f); HP 5348A: APC 3.5(m)

Coupling: ac

Accuracy: ± LSD ± timebase error × frequency

Accuracy specification applies from 0° to 50° C when using internal timebase, 0° to 55° C with external timebase.

Resolution: 1 Hz or 10 kHz, selectable

Tracking Speed: Resolution = 1 Hz, speed = 1 MHz/s
 Resolution = 10 kHz, speed = 1 GHz/s

Acquisition Time: Resolution = 1 Hz, time = < 125 ms
 Resolution = 10 kHz, time < 60 ms

Maximum Deviation: 20 MHz peak-to-peak, automatic mode

Maximum FM Rate: 10 MHz

AM Tolerance: Any modulation index, provided the minimum signal level is not less than the sensitivity specification.

TCXO Timebase: See page 193 for specifications. See page 198 for a general description of timebases.

External Timebase: 10 MHz, 0.7 V min. to 8 V max peak-to-peak sine wave or square wave into > 1 KΩ shunted by < 30 pF, via front-panel BNC connector.

Input 2

Frequency Range: 10 Hz to 525 MHz

Sensitivity: 25 mV rms (15 mV rms typical)

Impedance: 1 MΩ nominal shunted by < 70 pF (10 Hz to 80 MHz) or 50 Ω nominal (10 MHz to 525 MHz)

Maximum Input: +10 dBm (50 Ω input), 1 V rms (1 MΩ input)

Connector: BNC (f)

Coupling: ac

Resolution: 1 Hz or 10 kHz, selectable

Options

Battery (Option 002): 1 to 2 hours of operation (typical); 12 hours to charge (typical)

Microwave Level Limiter (Option 006)

Damage level: 500 MHz to 6 GHz: 39 dBm; 6 GHz to 18 GHz: 36 dBm; 18 GHz to 26 GHz: 34.8 dBm

Sensitivity, reduced by: 500 MHz to 12.4 GHz: 3 dBm; 12.4 GHz to 20 GHz: 4 dBm; 20 GHz to 26 GHz: 5 dBm

Oven Timebase: Special option

Power Meter Specifications

Frequency Range: 10 to 26.5 GHz, sensor-dependent

Power Range: -70 dBm to +20 dBm (100 pW to 100 mW), sensor-dependent

Power Sensors: HP 8481A, HP 8481D, HP 8484A, HP 8485A (The HP 8481D is a direct replacement for the HP 8484A.)

Dynamic Range: 50 dB in 10 dB steps

Display Units: Watts, dBm

Resolution: 0.01 dB in log mode, 0.1% of full scale in linear mode

Accuracy

Instrumentation: ±0.02 dB or ±0.5%

Zero set (digital settability of zero): ±0.5% of full scale on most sensitive range

Power Reference

Power output: 1.00 mW. Factory set to ±0.7% traceable to U.S. National Institute of Standards and Technology.

Accuracy: ±1.2% worst case (±0.9% RSS) for one year.

General

Diagnostics: Rear panel or HP-IB selectable, service diagnostics and user information

Data Output: Counter: varies with frequency (90 measurements/sec with 10 kHz resol, DUMP mode); Power Meter: 18 measurements/sec

HP-IB Interface Functions: SH1, AH1, T5, L4, SR1, RL1, DC1, DT1, E1 (see page 85)

Operating Temperature: 0° to 55° C

Power Requirements: 50 VA maximum

Line Select: 100V (90 to 105 Vac rms; 47.5 440 Hz)
 115/120V (104 to 126 Vac rms; 47.5 to 440 Hz)
 220V (198 to 231 Vac rms; 47.5 to 66 Hz)
 230/240V (207 to 252 Vac rms; 47.5 to 66 Hz)

External dc: 14 to 26 Vdc, 40 W, binding post

Accessories Supplied: Power cord, operating/programming manual, power sensor cable (HP 11730B)

Size: 144 mm H × 325 mm W × 456 mm D (5.66 in × 12.8 in × 18.0 in)

Weight: 9.1 kg (20 lb); with battery, 10.4 kg (23 lb)

Ordering Information

HP 5347A 20 GHz Counter/Power Meter \$8,750
HP 5348A 26.5 GHz Counter/Power Meter \$9,850

Options for HP 5347A and HP 5348A

Opt 002 Battery Pack	+ \$450
Opt 006 Microwave Level Limiter	+ \$1,000
Opt 011 HP-IB Interface	+ \$350
Oven Timebase Special Option	Call HP
Opt 070 Soft Carrying Case	+ \$350
Opt 913 Rack Mount Kit	+ \$450
Opt 915 Service Manual	+ \$250
Opt 916 Additional Operating/Programming Manual	+ \$125
Opt W30 (HP 5347A) Extended Repair Service (see page 624)	+ \$190
Opt W30 (HP 5348A) Extended Repair Service (see page 624)	+ \$215
Opt W32 (HP 5347A/48A) Calibration Service (see page 624)	+ \$835

Power sensors

HP 8481A Power Sensor	\$775
HP 8481D Power Sensor	\$1,100
HP 8485A Power Sensor	1,200

HP Power sensor cables

HP 11730A 1.5-m (5-ft) Sensor Cable	\$100
HP 11730B 3.0-m (10-ft) Sensor Cable	\$120
HP 11730C 6.1-m (20-ft) Sensor Cable	\$175
HP 11730D 15.2-m (50-ft) Sensor Cable	\$250
HP 11730E 30.5-m (100-ft) Sensor Cable	\$350
HP 11730F 61.0-m (200-ft) Sensor Cable	\$550

Additional equipment available:

Transit Case 9211-2649 (see page 610) \$480