

# LCR & RESISTANCE METERS

Millichammeter

HP 4336A

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- Low and selectable test signal current: 1  $\mu$ A to 10 mA
- Wide measurement range: 10  $\mu$ Ω to 100 kΩ
- 10  $\mu$ Ω resolution

- 1 kHz ac measurement
- High-speed measurement: 34 ms
- Built-in comparator
- Auto-measurement mode



## HP 4336A Millichammeter

The HP 4336A millichammeter is a precise, reliable, high-speed test tool for measurements of low resistance.

### Precise, Low-Resistance Measurement

Control factors of electromechanical components in a low-current circuit is a key issue for component reliability. The HP 4336A offers selectable low ac test signals (1  $\mu$ A to 10 mA). Users can now characterize low resistance of electromechanical components under low-current conditions. A high resolution of 10  $\mu$ Ω allows you to determine the slightest differences in contact resistance during of relays, switches, connections, PC board traces and cables. The 1 kHz test signal eliminates potential errors introduced by parasitic inductance effects in the device-under-test (DUT) contacts. The 1 kHz ac test signal is the best solution to evaluate the internal resistance of batteries, because it avoids dc energy consumption.

### High-Speed Measurements

The high-speed (34 ms), built-in comparator and HP 4336A's built-in test data is possible to construct a measurement system using an automatic handler and external computer to maximize production test time.

### Auto-Measurement Mode

When performing gross-continuity testing where the test signal level is not a significant factor in the test, the auto-measurement function allows the instrument to select an appropriate test signal and measurement range setting.

### Specifications (Refer to data sheet for complete specifications.)

#### Measurement Function

Measurement parameters: R (ac resistance), X (reactance), L (inductance), C (capacitance),  $\theta$  (phase) (\*)  
 Combinations: R, R-X, R-L, C-X (series mode only)

#### Mathematical Functions: Deviation and percent deviation

#### Ranging: Auto and manual

Triggers: Internal, external, manual, and HP-IB

Relay Time: 0 to 1000 ms in 1 ms steps

Measurement Time: Short, medium, and long

Averaging: 1 to 20

#### Test Signal Characteristics

Test frequency: 1 kHz

Frequency accuracy:  $\pm 0.1\%$

Test signal levels: 1  $\mu$ A, 10  $\mu$ A, 100  $\mu$ A, 1 mA, 10 mA rms

Level adjustment:  $\pm 10\%$  ( $\pm 0.2 \mu$ A)

Maximum voltage across sample: 20 mV peak in any case

#### Measurement Range

Parameter	Measurement range
R	10 $\mu$ Ω to 100 kΩ
R, X, C	10 $\mu$ Ω to 100 kΩ (normal)
L	10 $\mu$ Ω to 10 H (normal)
$\theta$	-180° to +180° (normal)

Measurement Accuracy:  $\pm 0.4\%$  basic for R

Measurement Time: Time interval from a trigger command to the end of measurement (EOM) signal output at the handler interface port.

Mode	Time typical
Short	30 ms
Medium	70 ms
Long	300 ms

Display: 2 1/2 digit LCD display. Capable of displaying measured values, control settings, comparator limits and functions, self-test messages, and auto-measure.

#### Comparator Function

Zero-SLIP: Eliminates measurement errors due to possible impedance in the test leads.

#### Comparator Function

NOISE/NOISE LOW for each primary measurement parameter and the secondary measurement parameter.

#### Other Functions

Superimposed dc:  $\pm 40$  Vdc maximum may be present on measurement terminals.

Save/Recall: Test instrument setup can be saved/recalled from the internal nonvolatile memory.

Continuous memory capability: If the instrument is forced off, or if a power failure occurs, instrument settings are automatically reloaded.  $\pm 70$  volts at 25  $\pm 2^\circ$  C.

HP-IB interface: All control settings, measured values, and comparator information.

Handler interface: All output signals are negative-going, optically isolated open collector.

Output signals include: NOISE/NOISE LOW, auto of measurement, and short, input signals and lockout and external trigger.

### General Specifications

Power Requirements: 90 to 132 V ac or 100 to 240 V ac at 50 Hz, 40 VA min.

Operating Temperature: 0° to 50° C

Size: 130 mm W x 180 mm H x 500 mm D (10.8 in x 1.8 in x 19.7 in)

Weight: 4.3 kg (9.5 lb)

### Furnished Accessories

Operator's manual, power cable (Mating cable and test leads, or HP 16355A test lead set, must be ordered separately.)

### Key Literature

HP 4336A Millichammeter Data Sheet, pp. 500-1146E.

### Ordering Information

HP 4336A	Std Lead Set	\$261
HP 16143B	Mating Cable (Std)	\$201
HP 16201B	Spring Clip Lead (Std)	\$111
HP 16201B	Spring Clip Lead (Std) w/ 100 $\mu$ A, with large clip	\$133
HP 16201B	Spring Clip Lead (Std) w/ 100 $\mu$ A, with IC clip	\$80
HP 16201B	Pin-Type Probe Lead (Std)	\$80
HP 16201B	Adjustable Clip Leads (Std) w/ 1 red and clip	\$23
HP 16201B	Adjustable Clip Leads (Std) w/ 2 black clips	\$23
HP 16143B	LED Display 7-Segment Bus	\$70
HP 4336A	Millichammeter	\$2,491
Opt test Cables - Operations Manual		+24
Opt 16355 Extended Repair Service		+380

For off-the-shelf shipment, call 800-452-4844.

### Price

\$261
\$201
\$111
\$133
\$80
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\$70
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+380