Keysight Technologies
E4980A Precision LCR Meter
20 Hz to 2 MHz

An industry standard LCR meter
An Industry Standard LCR Meter

Keysight Technologies’ E4980A precision LCR meter provides the best combination of accuracy, speed, and versatility for a wide range of component measurements. Offering fast measurement speed and outstanding performance at both low and high impedance ranges, the E4980A is the ultimate tool for general R&D and manufacturing test of components and materials.

Fast measurement speed
The E4980A offers excellent speed:
- 5.6 ms (SHORT)²
- 88 ms (MED)²
- 220 ms (LONG)²

High-resolution LCD display
Full, 7-digit display and 6 display modes for clear and easy viewing.

Simple and intuitive operation
Easily configure measurements with soft keys (same interface as Keysight’s 4284A LCR), one-touch front panel keys and an intuitive user interface.

Accurate measurements
Exceptionally low noise at both low and high impedance for evaluating the characteristics of inductors and capacitors with excellent accuracy and repeatability.
- 0.05% basic impedance accuracy
- 1/2/4m cable extension capability
- Open/Short/Load correction

LED status lights
Conveniently view DC bias, DC source, and USB memory status.

USB interface
(memory devices only)
Easily save measurement states, data logs, and screen captures to USB memory devices.

DC source¹
Low noise DC source port provides more measurement flexibility. The DC source enables a one-box solution, making an additional DC source or multimeter unnecessary.
- 0 to ± 10 V¹

100 µV to 2 Vrms/20 Vrms¹ variable test signals
Provides high signal levels to evaluate the AC voltage characteristics of your devices.

DC bias
Built-in, wide, DC-voltage-bias-range source provides accurate bias dependency evaluation for semiconductor wafer, C, L, and material measurements.
- 1.5 V and 2 V (standard)
- 0 to ± 40 V¹
- Auto bias polarity control¹

For additional details, refer to the E4980A/E4980AL data sheet (literature number 5989-4435EN).

1. Option E4980A-001 required.
Key Features

Accurate measurements
Exceptionally low noise at both low and high impedance to improve test quality.
- 0.05 % basic impedance accuracy
- Open/Short/Load compensation support
- Cable extension (1/2/4m) support

Fast measurement speed
Fast speed provides more throughput reducing cost of test.
- 5.6 ms (SHORT)
- 88 ms (MED)
- 220 ms (LONG)

Compact and light weight
Small size for easy transportation
- 370 (W) x 105 (H) x 390 (D) mm
- 5.3 kg (11.7 lb.)

Measurement versatility
- 20 Hz to 2 MHz test frequency with 4-digit resolution at any frequency
- 16 impedance parameters
- 100 µV to 2 Vrms, 1 µA to 20 mA
- variable test signal
- Auto-level control
- 201 points of programmable list sweep

Standard LAN/USB/GPIB interface
Flexible PC connectivity and fast transfer speed
- 10/100 Base-T LAN
- USB (USBTMC) interface
- GPIB for robust instrument control and test automation

External trigger

Option E4980A-001 power and DC bias enhancement
- 0 to 20 Vrms/100 mArms test signal
- Built-in 40 V DC bias with 0.3 mV resolution
- Built-in 10 V DC source
- DC resistance, DC current, and DC voltage measurement capability

Optional handler and scanner interfaces
Two interface options to choose from:
- Handler interface with 9 BIN outputs
  (Option E4980A-201)
- Scanner interface with 128 multi-channel correction
  (Option E4980A-301)

1. Measurement time at 1 MHz. Supplemental information.
For additional details, refer to the E4980A data sheet (literature number 5989-4435EN).
Accurate, Fast Measurements up to 2 MHz

Accurate measurements provide design and test confidence

Broad range impedance measurements
The E4980A LCR meter offers excellent performance for all impedance measurements.

Reliable measurement performance is needed to meet the test requirements of today’s latest devices. Only the E4980A offers fast measurement speed and outstanding performance within “both” low and high impedance ranges with exceptional dissipation factor accuracy.

Stable small ESR/low impedance measurements
The equivalent series resistance (ESR) of capacitors is becoming smaller and smaller to meet high-speed and low power-consumption circuit needs; and is difficult to measure. The E4980A provides exceptional measurement stability.

Exceptionally accurate, high impedance measurements
The capacitance values of chip-capacitors and semiconductor wafers are now down to femto-farad (fF) range. Thus, very stable and accurate high impedance measurements are required for higher yields and design reliability. Surpassing Keysight’s previous industry-standard LCR meter (4284A), the E4980A further improves measurement stability for these small capacitance devices.

Offering the industry's best combination of speed and accuracy

Fast measurement speed for more throughput in manufacturing
- 5.6 ms per point at 1 MHz with SHORT mode
- 88 ms per point at 1 MHz with MED mode
- 220 ms per point at 1 MHz with LONG mode

Average function (up to 999)
Enables users to improve measurement repeatability.

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Figure 1. 10% impedance measurement accuracy range. Test signal 1 Vrms, MED mode, cable 0m.
Figure 2. Low impedance evaluation (1 mΩ at 100 kHz).
Figure 3. High impedance evaluation (1 pF at 1 MHz).
Figure 4. Measurement time: standard E4980A LCR vs. 4284A LCR.

1. Measurement time at 1 MHz. Supplemental information. For additional details, refer to the E4980A data sheet (literature number 5989-4435EN).

www.keysight.com/find/e4980a
Versatile Measurement Capability to Meet your Application Needs

Powerful features increase test reliability and efficiency

Six convenient display modes
Select one of six display modes to suit your particular measurement needs.
- Normal view for a data overview
- Large display view for enhanced readability
- BIN No. view for measurement comparison and device sorting
- BIN count view for statistical evaluation
- LIST sweep view for continuous data
- Blank page view for ultimate speed

201 points list sweep
Frequency, measurement range, and stimulus conditions, can be set as list parameters (max 201 points). You can choose two parameters independently to test under a variety of measurement conditions.

DC resistance measurement
For inductor measurement, Ls or Lp and Rdc parameters can be measured at the same time.

E4980A power and DC bias enhancement (Option E4980A-001)
20 Vrms test signal (Opt. 001)
A powerful AC test signal provides up to 20 Vrms, 100 mA (maximum). This allows you to evaluate AC level dependency without an external amplifier.

DC parameter measurement (Opt. 001)
Simultaneously measure DC voltage and DC current as well as impedance. Leakage current measurements are available for capacitance evaluation.

40 V DC bias (Opt. 001)
Built-in, wide range (± 40 Vdc/100 mA) DC bias source enables accurate DC bias versus impedance evaluation.

DC source (Opt. 001)
Provides an additional, independent DC source port to expand the flexibility of DC control and bias applications. For example, this option enables measurement of three terminal devices, allowing you to control your DUT, add extra bias, and control additional devices at the same time.
Exceeding Expectations in Productivity

Support for a large variety of test fixtures
The E4980A can be used with over twenty fixtures to meet a variety of evaluation needs; from materials to SMD components. Also, built-in compensation functions minimize the influence of test fixtures.

USB memory support
The front panel USB memory interface allows you to quickly and easily save state files, measurement log data, and display images to an external USB memory device (mass storage).

PC connectivity
Standard GPIB/LAN/USB control interfaces provide a variety of paths for controlling the instrument. Using a LAN cable, you can even control the E4980A with a computer and Web browser.

Scanner or handler interface options
The E4980A offers an optically-isolated 9-BIN handler (Option 201) for integration into handler systems. A 128-channel scanner interface (Option 301) facilitates applications requiring a component scanner. Both interfaces have standard compatibility with other LCR system instruments (e.g., 4284A/88A/78A, etc.) for easy integration into systems. The multi-compensation function enables open/short/load compensations to perform scanning measurements independently in each scanner channel. This minimizes inconsistency in measured values between channels for more accurate measurements throughout the scanner system.

Materials measurements with N1500A measurement suite
The N1500A Option 006 supports the E4980A with the 16451B and 16452A for materials measurements. The N1500A's easy-to-use user interface for calibration, limit test, and report generation functions provide versatility when making materials measurements. The N1500A can run on an external PC.

Upgradability
Upgrade options such as E4980AU-001 (power and DC bias enhancement), E4980AU-201 (handler interface), E4980AU-301 (scanner interface) allow you to maximize the ROI. Refer to the configuration guide for more details.
To our 4284A/4279A LCR Users, the E4980A Provides Even Greater Value!

Enhanced test efficiency
Both the Keysight 4284A Precision LCR Meter and 4279A 1 MHz C-V Meter have long been recognized as industry standard equipment for a wide range of impedance measurement applications.

The E4980A LCR combines fast, accurate measurements with powerful features to enhance your measurement efficiency and make your job easier.

High compatibility to ease migration
Almost all E4980A functions are compatible with the 4284A and 4279A, enabling users to migrate to the E4980A with ease. For detailed migration information, refer to the technical overview, Migrating from a Keysight 4284A to a Keysight E4980A Precision LCR Meter and Migrating from a Keysight 4279A to a Keysight E4980A Precision LCR Meter available on our Web site. www.keysight.com/find/E4980A

Key specifications and function compatibility

<table>
<thead>
<tr>
<th></th>
<th>E4980A Precision LCR</th>
<th>4284A Precision LCR</th>
<th>4279A C-V meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>20 Hz to MHz</td>
<td>20Hz to 1 KHz</td>
<td>1 MHz</td>
</tr>
<tr>
<td>Test signal level</td>
<td>0 to 2 Vrms/0 to 20 mArms</td>
<td>0 to 2 Vrms/0 to 20 mArms</td>
<td>20 m, 50 m, 100 m, 200 m, 500 m, 1 Vms</td>
</tr>
<tr>
<td></td>
<td>0 to 2 Vrms/0 to 100 mArms</td>
<td>0 to 2 Vrms/0 to 200 mArms</td>
<td></td>
</tr>
<tr>
<td>Auto level control (ALC)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>DC bias capability</td>
<td>Built-in 1.5 V, 2 V ± 40 V¹</td>
<td>Built-in 1.5 V, 2 V ± 40 V²</td>
<td>Built-in ± 38 V External bias input</td>
</tr>
<tr>
<td>DC source</td>
<td>± 10 V¹</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Programmable list sweep</td>
<td>201 points</td>
<td>10 points</td>
<td>51 points</td>
</tr>
<tr>
<td>Remote control</td>
<td>GPIB, LAN, USB</td>
<td>GPIB</td>
<td>GPIB</td>
</tr>
<tr>
<td>Web browser control</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Control commands</td>
<td>4284A compatible</td>
<td>4284A unique</td>
<td>4279A unique</td>
</tr>
<tr>
<td>Basic accuracy</td>
<td>0.1% @ SHORT 0.05% @ MED/LONG</td>
<td>0.1% @ SHORT 0.05% @ MED/LONG</td>
<td>0.1% @ SHORT</td>
</tr>
<tr>
<td>Parameters</td>
<td>C-D/Q/G/Rp, Cs-D/Q/Rs, Lp-D/Q/Rp, Ls-D/Q/Rs, R-X, Z-Ød/Ør, G-B, Y-Ø/Ør, Lp-Rdc, Ls-Rdc, Vdc-Idc¹</td>
<td>C-D/Q/G/Rp, Cs-D/Q/Rs, Lp-D/Q/Rp, Ls-D/Q/Rs, R-X, Z-Ød/Ør, G-B, Y-Ø/Ør</td>
<td>C-D/Q/ESR/G</td>
</tr>
<tr>
<td>Measurement time mode (SHORT/MED)</td>
<td>Standard model</td>
<td>1500 ms / 1500 ms @ 20 Hz</td>
<td>1500 ms / 1500 ms @ 20 Hz</td>
</tr>
<tr>
<td></td>
<td>330 ms / 380 ms @ 20 Hz</td>
<td>270 ms / 400 ms @ 100 Hz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>20 ms / 110 ms @ 1 kHz</td>
<td>40 ms / 190 ms @ 1 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>7.7 ms / 92 ms @ 10 kHz</td>
<td>30 ms / 180 ms @ 10 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>5.7 ms / 88 ms @ 100 kHz</td>
<td>30 ms / 180 ms @ 100 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>5.6 ms / 88 ms @ 1 MHz</td>
<td>30 ms / 180 ms @ 1 MHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>5.6 ms / 88 ms @ 2 MHz</td>
<td>30 ms / 180 ms @ 2 MHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>Entry model (E4980A-005)</td>
<td>1500 ms / 1500 ms @ 20 Hz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>1040 ms / 1150 ms @ 20 Hz</td>
<td>270 ms / 400 ms @ 100 Hz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>240 ms / 380 ms @ 100 Hz</td>
<td>40 ms / 190 ms @ 1 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>37 ms / 200 ms @ 1 kHz</td>
<td>30 ms / 180 ms @ 10 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>25 ms / 180 ms @ 10 kHz</td>
<td>30 ms / 180 ms @ 100 kHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>23 ms / 180 ms @ 1 MHz</td>
<td>30 ms / 180 ms @ 1 MHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td></td>
<td>23 ms / 180 ms @ 2 MHz</td>
<td>30 ms / 180 ms @ 2 MHz</td>
<td>10 ms @ 1 MHz (List sweep mode, bias ON)</td>
</tr>
<tr>
<td>Storage devices</td>
<td>Internal/USB memory</td>
<td>Internal/memory card</td>
<td>Internal</td>
</tr>
<tr>
<td>Cable lengths</td>
<td>0, 1, 2, 4, m</td>
<td>0, 1, 3, 4, 5, m</td>
<td>0, 1, 2, m</td>
</tr>
<tr>
<td>Cabinet dimensions (mm)</td>
<td>370 (W) x 105 (H) x 390 (D) mm</td>
<td>426 (W) x 177 (H) x 498 (D) mm</td>
<td>426 (W) x 177 (H) x 498 (D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5.3 kg</td>
<td>15 kg</td>
<td>15 kg</td>
</tr>
</tbody>
</table>

1. Option E4980A-001 required. 2. Option 4284A-001 required. 3. Option 4284A-006 required.

www.keysight.com/find/e4980a
Ordering Information

**E4980A** Precision LCR Meter, 20 Hz to 2 MHz (ultimate accuracy and speed)

**E4980A-005** Entry Model Precision LCR Meter, 20 Hz to 2 MHz (same accuracy, less speed)

**Power and DC bias enhancement option**
E4980A-001 Power and DC bias enhancement

**DCR measurement option (mandatory)**
E4980A-200 DCR measurement

**Interface options**
E4980A-710 No interface
E4980A-201 Handler interface
E4980A-301 Scanner interface

**Additional options**
E4980A-ABA Add hardcopy user's guide (English)
E4980A-ABJ Add hardcopy users guide (Japanese)
E4980A-1A7 Add ISO 17025 compliant calibration
E4980A-1CM Add rack mount kit

**Power/DC bias related options (select one of two options below)**

<table>
<thead>
<tr>
<th>Features</th>
<th>E4980A Standard model</th>
<th>E4980A-001 Power and DC bias enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC test signal</td>
<td>0 to 2 Vrms, 20 mArms</td>
<td>0 to 2 Vrms, 20 mArms</td>
</tr>
<tr>
<td>DC bias</td>
<td>1.5 V and 2 V</td>
<td>0 to ±40 V, ±100 mA</td>
</tr>
<tr>
<td>DC Source</td>
<td>–</td>
<td>Yes (0 to ±10V)</td>
</tr>
<tr>
<td>DCR/DCI/DCV measurement</td>
<td>–</td>
<td>Yes</td>
</tr>
<tr>
<td>Auto bias polarity control</td>
<td>–</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Interface related options (select two of three options below)**

<table>
<thead>
<tr>
<th>Options</th>
<th>E4980A-710</th>
<th>E4980A-201</th>
<th>E4980A-301</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Blank panel</td>
<td>Enables connection to handler system</td>
<td>Enables connection to scanner system</td>
</tr>
</tbody>
</table>

**Web Resources**

Visit our E4980A Web site for additional product information and literature.
www.keysight.com/find/E4980A

LCR meters & Impedance Measurement Products
www.keysight.com/find/impedance

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1. A carrying handle is included with the standard option.
2. Two interface slots on the rear panel must be filled by selecting two different interface options: E4980A-201, -301 and -710. However, if only a GPIB interface is required, two blank panels
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