

# Series 7000 Precision LCR Meters

## USES:

- Production Testing of LCR Components
- Frequency Response Characterization of Components
- Component Screening
- Material Testing
- Quality Assurance Testing
- Measuring Dielectric Constant Using Standard Test Cell

## FEATURES:

- Frequency Range 10 Hz to 2 MHz (7600), 500 kHz (7400)
- 0.05% Basic Measurement Accuracy
- 7 Digit Measurement Resolution
- Programmable Test Voltage and Current
- Auto Ranging
- Test Setup and Measurement Data Storage
- Four-Terminal Kelvin Connections
- IEEE-488, RS-232, Handler, and Parallel Printer Interfaces
- Graphical and Tabular Display of Swept Frequency, Voltage and Current Measurements
- Sequence Testing of Up To 6 Individual Tests
- Load Correction
- Binning (15)
- Built-in Automatic Calibration Routine

## CE Marked Impedance Analyzer

### Introduction

The 7000 LCR Meter is designed to perform precision impedance measurements over a wide frequency range, 10 Hz to 500 kHz for the model 7400 and 10 Hz to 2 MHz for the 7600. The instrument is capable of measuring 14 different parameters with 0.05% accuracy to meet today's requirements for component and material testing. The ease of use and user friendly menu programming makes the 7000 Series ideal for applications in product development, incoming inspections, or production line testing.

### Description

**14 Different Impedance Parameters** Measure and display any two parameters simultaneously to achieve coverage and flexibility not previously available.

**Automatic Test Sequencing** Run up to six different tests in sequence with a single push of the start button. Each test can have different conditions and limits.

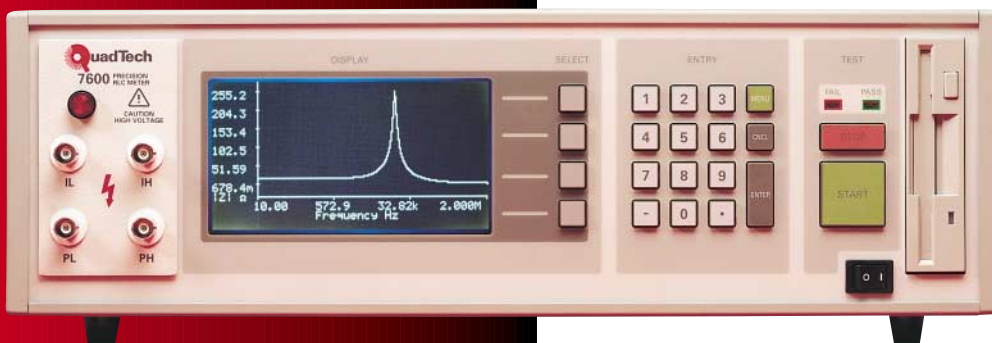
**Swept Measurements** Fast and accurate swept parameter measurements, graphical or tabular, for verification of component and material response to changes in AC test frequency, AC test voltage or AC test current, without the need for complex programming or an external controller.

**Program and Data Storage** Test setups can be stored and recalled from either internal memory or from standard DOS formatted 3 1/2" floppy disks. The front panel can be locked out, with password protection, to ensure procedures are run the same way every time. Measured data can be stored on a floppy disk and then transferred to PC for data reduction and analysis.

**Load Correction** Substantially improves instrument accuracy by performing measurements on a known standard and applying correction to subsequent measurements. Ideal for repetitive testing of identical devices at like test conditions.

**Automatic Calibration Procedure** The 7000 can be calibrated without returning the unit to the factory using the NIST traceable QuadTech Calibration Kit, reducing downtime and calibration costs.

**Easy to Use** Large LCD graphics display and user friendly menu driven interface allows the 7000 to be put on line fast, providing useful measurements by operators with little or no training.



## 7400/7600

**Measured Parameters:** Any two of 14 parameters measured and displayed simultaneously, user selectable

Parameter	Measurement Range	Basic Measurement Accuracy*		
		Speed		
		Fast	Medium	Slow
Cs, Cp	00000.01 fF to 9.999999 F	±0.5%	±0.25%	±0.05%
Ls, Lp	0000.001 nH to 99.99999 H	±0.5%	±0.25%	±0.05%
D	.0000001 to 99.99999	±0.005	±0.0025	±0.0005
Q	.0000001 to 999999.9	±0.005	±0.0025	±0.0005
Z , Rs, Rp, ESR, Xs	000.0001 mΩ to 99.99999 MΩ	±0.5%	±0.25%	±0.05%
Y , Gp, Bp	00000.01 μS to 9.999999 MS	±0.5%	±0.25%	±0.05%
Phase Angle	-180.0000 to +179.9999 degrees	±1.8°	±0.9°	±0.18°

\*At optimum test signal levels, frequencies, DUT values and without calibration uncertainty.

Capacitance (Cs/Cp), Inductance (Ls/Lp), Resistance (Rs/Rp), Dissipation (D) and Quality (Q) Factors, Impedance |Z|, Admittance |Y|, Phase Angle (θ), Equivalent Series Resistance (ESR), Conductance (Gp), Reactance (Xs), Susceptance (Bp)

Note: s = series, p = parallel, ESR equivalent to Rs

<b>Test Frequency:</b>	<b>7400</b>	Range: 10 Hz to 500 kHz, continuous Resolution: 0.1 Hz from 10 Hz to 10 kHz, 5 digits>10kHz Accuracy: +/- (0.002% + 0.02Hz)
	<b>7600</b>	Range: 10 Hz to 2 MHz, continuous Resolution: 0.1 Hz from 10 Hz to 10 kHz, 5 digits>10kHz Accuracy: +/- (0.25% + 0.02Hz)
<b>Measurement Speed:</b>	<b>7400</b>	Basic: 40 meas/sec Enhanced: 8 meas/sec Extended: 1 meas/sec
	<b>7600</b>	Fast: 25 meas/sec Medium: 8 meas/sec Slow: 1 meas/sec
<b>Ranging:</b>	Automatic, Range Hold or user selectable	
<b>Trigger:</b>	Internal (automatic), External (RS-232, IEEE-488.2 or Handler interfaces) and Manual	
<b>AC Test Signal:</b>	Voltage: 20 mV to 5.0 V (open circuit) up to 500kHz in 5 mV steps	
	<b>7600</b>	20 mV to 1.0 V (open circuit) 500kHz-1MHz in 5 mV steps 20 mV to 0.5 V (open circuit) >1MHz in 5 mV steps
	Current: 250 μA to 100 mA (short circuit) in 50 μA steps (Max. Compliance 3V < 500kHz)	
<b>Source Impedance:</b>	25Ω, 400Ω, 6.4kΩ, or 100kΩ, range dependent	
<b>DC Bias Voltage:</b>	Internal: 2.0 V External: 0 to +/-200V 0 to +/-500V on <b>7400A/7600A</b>	
<b>Display:</b>	LCD Graphics with back light and adjustable contrast	

<b>Result Formats:</b>	Engineering or scientific notation % Deviation from nominal of primary parameter Deviation from nominal of primary parameter Pass/Fail Binning summary No Display for maximum throughput
<b>Sweep Result:</b>	Primary parameter vs. frequency, voltage or current Graphical or Tabular Format Up to 200 measurement points per sweep
<b>Sequencing Result:</b>	Displays up to 6 sequential test results, primary and/or secondary
<b>AutoAcc:</b>	Automatic calculation and display of overall instrument accuracy for selected settings, test conditions and device under test
<b>Standard Interfaces:</b>	IEEE-488.2, RS-232, Handler, Printer Port, 3.5" Disk Drive
<b>Charged Capacitor Protection:</b>	$\sqrt{8/C}$ for $V_{max} \leq 250$ V; $\sqrt{2/C}$ for $V_{max} \leq 1000$ V C = Capacitance in farads of the device under test Additional Fuse Protection on <b>7400C</b>
<b>Measurement Delay:</b>	Programmable from 0 - 1000 ms in 1 ms steps
<b>Averaging:</b>	Programmable from 1 - 1000 Median value mode
<b>Data Storage:</b>	40,000 measurements/disk ASCII format DOS compatible
<b>Program Storage:</b>	125 per disk 25 setups internal Password protected ASCII format
<b>Calibration:</b>	Recommended Calibration Interval 1 year Complete NIST Traceable Calibration using QuadTech 7000-09 Cal Kit Built-in automatic calibration procedure
<b>Usage &amp; Cal Data:</b>	Displays last calibration date, standard values used in calibration and # of hours operation
<b>Self-Test Routine:</b>	Verifies critical instrument operation at power-up or when selected from menu
<b>Contact Check:</b>	Time to detect, 2ms
<b>Test Terminals:</b>	Front panel, four terminal (BNC) guarded
<b>Mechanical:</b>	Bench mount with tilt bail Dimensions: (w x h x d): 16 x 6 x 14in (410 x 150 x 360mm) Weight: 17 lbs (8kg) net, 23 lbs (10.5kg) shipping
<b>Environmental:</b>	Meets MIL-T-28800E, Type 3, Class 5, Style E & F Operating: 0 to + 50° C Humidity: <75% for 11 to 30' operating Storage: - 40 to + 71° C
<b>Power:</b>	• 90 - 250Vac • 47/63Hz • 100W max

## Ordering Information

<b>7400/7600 Precision LCR Meters</b>	7400C LCR Meter, Charged Capacitor Protection	7000-01 BNC Cable Set, 1 meter
7600 LCR Meter		7000-02 BNC Cable Set, 2 meters
7600-CE LCR Meter, CE Marked	7400C-CE LCR Meter, Charged Capacitor Protection, CE Marked	7000-03 Kelvin Clip Leads
7600A LCR Meter, +/-500V External Bias		7000-04 Alligator Clip Leads
7600A-CE LCR Meter, +/-500V External Bias, CE Marked	<b>Includes:</b> Instruction Manual Power Cord	7000-05 Chip Component Tweezers
7400 LCR Meter		7000-06 Axial/Radial Lead Component Test Fixture
7400-CE LCR Meter, CE Marked	Calibration Certificate Traceable to NIST	7000-07 Chip Component Test Fixture
7400A LCR Meter, +/-500V External Bias	<b>Optional Accessories:</b>	7000-08 High Voltage Test Fixture
7400A-CE LCR Meter, +/-500V External Bias, CE Marked	7000-00 Rack Mount Kit	7000-09 Calibration Kit

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