

### MODEL 2600 SERIES

- 0.05% basic accuracy
- Dual 5-digit display and auxiliary LEDs show test conditions and results.
- Wide measurement ranges for capacitance, resistance and inductance.
- Auto mode selects the best test mode for attached components.
- 4-wire drive/input improves measurement accuracy
- Fast 20 readings/second (50msec) measurement speed.
- Sorting and binning capabilities facilitate automated test/sort operations
- Test frequencies of 100 Hz, 120 Hz, 1 kHz, 10 kHz and 100 kHz
- Storage of up to 9 instrument configurations speeds the set up of frequently-used tests.
- Averaging feature calculates the mean-use of 2 to 20 readings.
- Open and short circuit compensation for accurate zeroing
- Built-in calibration procedures to help assure long-term measurement integrity.
- RS-232 and optional GPIB and handler interfaces

TEGAM's Model 2600 Series, Digital LCR Meters are easy-to-use instruments for precisely measuring inductance, capacitance, resistance, Q, and dissipation factor. The 2600 Series

### Digital LCR Meters

includes the standard Model 2600 Digital LCR Meter with RS-232 interface, and the Model 2610 which adds built-in GPIB and component handler interfaces. Advanced features such as dual digital displays, automatic mode and range selection, measurement averaging, triggering, binning, and built-in calculations give the 2600 Series one of the best performance / price ratios of any DC-100 kHz LCR meter. High speed coupled with a basic accuracy of 0.05% and a broad range of additional features make these LCR meters ideal for the test bench, or for automated



# MODEL 2600

## Digital LCR Meters

component testing and sorting on the production line. Measurement modes include:

- Resistance plus Quality Factor (R+Q) – Resistance is displayed as the primary parameter, and quality factor (Q) is displayed as the secondary parameter.
- Inductance plus Quality Factor (L+Q) – Series or parallel equivalent inductance value is displayed as the primary parameter, and Q is displayed as the secondary parameter.
- Capacitance plus Quality Factor (C+D) – Series or parallel equivalent capacitance is displayed as the primary parameter, and D (1/Q) is displayed as the secondary parameter.
- Capacitance plus Resistance (C+R) – Capacitance is displayed as the primary parameter, and equivalent series or parallel resistance is measured as a secondary parameter.

### Display

The Model 2600 Series display is a dual 5-character alpha-numeric design that provides a primary readout of the measured L, C, or R parameter, and a secondary readout of related information such as Q, dissipation factor or resistance. A series of front panel LEDs provide additional information about measurement settings and units (Q, D, R, %,  $\Omega$ , H, F), and the status of the communication interfaces.

### Mode, Ranging, and Test Conditions

The 2600 Series features an automatic measurement that determines the most appropriate measurement mode based on the component connected to the input leads. Ranging can be set to operate automatically or manually. Test frequencies include 100 Hz, 120 Hz, 1 kHz, 10 kHz, and 100 kHz, accurate to 0.01%. Convenient preset drive voltages of 0.1 Vdc, 0.25 Vdc, or 1.0 Vdc may be applied to the device under test, or the voltage can be set continu-

ously from 0.1 V to 1.0 Vdc by means of a vernier adjustment. Capacitance measurements rely on an internal 2.0 Vdc source, or a user-supplied external voltage up to 40 Vdc.

### Controls and Interfaces

The Models 2600 and 2610 LCR Meters can be controlled via an easy-to-use front-panel pushbuttons. The Model 2610 adds the capability to be programmed using GPIB commands, facilitating its use in automated test systems.

### Test Fixtures

The 2600 Series includes a variety of standard and optional input fixtures to accept a wide range of lead configurations. Its front panel is configured with separate source and measurement terminals for easy four-wire measurement setups. The standard Model RF2600 radial lead fixture attaches to the front panel. Options include the KC2600 Kelvin Clip Fixture and the TW2600 SMD Tweezer Fixture for surface mount components.

## Specifications

### DISPLAY

Measurement Modes:	Auto, R+Q, L+Q, C+D, C+R
Equivalent Circuit:	Series and Parallel
Parameters Displayed:	Value, Deviation, %Deviation or Bin Number. Deviation and %Deviation are calculated from a stored relative value.

Averaging: 2–10 measurements

R+Q:	R: 0.0001 $\Omega$ – 2000 M $\Omega$ Q: 0.00001 – 50
L+Q:	R: 0.0001 $\mu$ H – 99999 H Q: 0.00001 – 50
C+D:	C: 0.0001 pF – 99999 $\mu$ F Q: 0.00001 – 10
C+R:	C: 0.0001 pF – 99999 $\mu$ F Q: 0.00001 $\Omega$ – 99999 k $\Omega$

## Specifications (continued)

### TEST CONDITIONS

Test Frequencies:	100 Hz, 120 Hz, 1 kHz, 10 kHz and 100 kHz. Frequency Accuracy: $\pm 100$ ppm.
Drive Voltage:	Preset Levels: 0.10, 0.25, 1.0 V rms. Vernier: 0.1 to 1.0 V rms with 50 mV resolution. Drive Voltage Accuracy: $\pm 2\%$
Measurement rates:	For test frequencies of 1 kHz or greater: Slow: 2 measurements/sec. Medium: 10 measurements/sec. Fast: 20 measurements/sec.  For test frequencies of 100 Hz and 120 Hz (approx.): Slow: 0.6 measurements/sec. Medium: 2.4 measurements/sec. Fast: 6 measurements/sec.
Ranging:	Auto or Manual.
Triggering:	Continuous, Manual or Remote over RS-232, GPIB, or Handler interface.
Bias Voltage:	Internal: +2.0 Vdc $\pm 2\%$ External: 0 to +40 Vdc (fused at 0.25A).

### ACCURACY

Conditions:	Allow 30 minute warmup before measurements. All accuracies are at $23^{\circ}\text{C}$ ( $73.4^{\circ}\text{F}$ ) $\pm 5^{\circ}\text{C}$ ( $\pm 9^{\circ}\text{F}$ ) – $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ( $73.4^{\circ} \pm 9^{\circ}\text{F}$ ). Basic accuracy is $\pm 0.05\%$ @ $23^{\circ}\text{C}$ . Refer to the accuracy section of the Reference Manual for detailed specifications.
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The following summarizes typical accuracy specifications:

Better than $\pm 1\%$ for:	$0.125 \Omega < R < 16 \text{ M}\Omega$ $2.5 \mu\text{H} < L < 25 \text{ kH}$ $1.25 \text{ pF} < C < 12.8 \text{ mF}$
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Better than $\pm 5\%$ for:	$21 \text{ m}\Omega < R < 96 \text{ M}\Omega$ $420 \text{ nH} < L < 150 \text{ kH}$ $0.21 \text{ pF} < C < 77 \text{ mF}$
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Under the following conditions:

1.0 V, 0.5 V, or 0.25 V output voltage  
Slow or medium measurement speed  
 $Q$  and  $D < 0.1$  for R and C  
 $Q > 10$  for L  
100 Hz, 120 Hz, or 1 kHz test frequency for R  
100 Hz test frequency for  $L_{\text{max}}$  and  $C_{\text{max}}$   
10 Hz test frequency for  $L_{\text{min}}$  and  $C_{\text{min}}$

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## Specifications (continued)

### GENERAL SPECIFICATIONS

Fixture:	4-wire Kelvin fixture for parts with radial and axial leads.
Protection:	Protected up to 1 joule of stored energy, 200 Vdc for charged capacitors; fused at 0.25 A output current for biased measurement.
Zeroing:	Open and short circuit compensation.
Compensation limits:	Short circuit: $R < 20 \Omega$ , $Z < 50 \Omega$ . Open circuit: $Z > 10 \text{ k}\Omega$ .
Binning:	Up to 8 pass bins, QDR and general fail bins, all defined by the front panel or computer interface. Binning setups may be stored in non-volatile memory.
Self Test:	Tests ROM, CPU, non-volatile RAM, clock generator, A/D converter, internal bias, multiplier, output drive circuitry, gain circuitry, and source resistances.
Store and Recall Memory:	Stores and recalls nine complete instrument setups. Recalls 0 the default setup.
RS-232 Interface:	All instrument functions can be controlled or read over the interface.
Operating conditions:	0° to 50°C at relative humidity of 0% to 80%.
Power:	20 Watts, 120/220 Volts 50/60 Hz
Dimensions:	Height: 4-1/4 inches (109mm) Width: 14-1/4 inches (363mm) Depth: 14-1/2 inches (386mm)
Weight:	12.75 lbs (5.8 Kg)
Warranty:	Two year parts and labor on materials and workmanship
Model 2610 only:	IEEE-488 Interface: Instrument functions can be controlled and read over this interface.
Handler/sorter interface:	25 PIN DB male connector provides signal lines for binning, instrument status, and input trigger.

### ACCESSORIES

Standard:	RF-2600 Radial Fixture Power cord User manual
Optional:	KC-2600 Kelvin Clip Fixture – Provides 4-wire connection to devices that are not easily accommodated by the standard test fixture. Polarity is indicated for biased measurements.  TW-2600 SMD Tweezer Fixture – Provides connection to surface mount components.

The Model 2600 is  Marked

Specifications subject to change without notice.

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