## Precision Impedance Meter

### 1689 & 1689M RLC Digibridge™

#### Features:
- The world’s de facto standard for ac resistance, low-frequency inductance, and capacitance measurement
- 0.02% accuracy for R, L, and C
- 0.0001 accuracy for Dissipation and Q
- 5 Impedance Parameters
- Programmable test frequencies from 12 Hz to 100 kHz for testing versatility
- Programmable test voltages from 5 mV to 1.275 V
- Dual display featuring 5-digit readout for RLC and 4-digit readout for D and Q
- Extremely reliable: over 30 years of history
- Optional IEEE-488 interface available
- Built-in 4-terminal, shielded kelvin fixture for testing axial and radial components while protecting measurement integrity

#### Applications:
- Metrology Laboratories
- Laboratory Component Analysis
- Material Measurement
- Quality Assurance
- Research and Development
- Direct measurements and transfers

The GenRad 1689 Precision Impedance Meter gives you the best performance for your most demanding applications, whether they be production testing, incoming inspections, component design and evaluation, process monitoring or dielectric measurements. It is a versatile, full-function, microprocessor-based passive component tester.

An alternative unit configuration, the 1689M shown above, offers 4 bnc connection terminals in place of the shielded kevin fixture and comes with bnc-to-bnc extender cable. The 1689M is easy to rack mount with an optional Rack Mount Kit (1689-9611) also available from IET Labs.

The 1689 and the 1689M RLC Digibridge is controlled by a microprocessor, allowing for many automated functions including:
- testing
- parameter selection
- test frequency and voltage selection
- limit comparison
- binning
- zeroing

The automated capabilities of this meter can be further extended with the addition of an optional IEEE-488 interface (shown on the left), which allows for remote operation, programming, and data acquisition.
SPECIFICATIONS

Measurement parameters:
R/Q, L/Q, C/D, or C/R (series or parallel)

Parameter selection:
Auto parameter (RLC) with manual selection

Accuracy:
Basic RLC: ±0.02%
Basic QD: ±0.0002 (±0.0001 in ppm mode)
For more information on calculating accuracy, visit IET website for the 1689 accuracy calculations: [http://www.ietlabs.com/notes/digibridge_accuracy_calculator](http://www.ietlabs.com/notes/digibridge_accuracy_calculator)

Test frequencies:
Range: Over 500 selectable test frequencies ranging from 12 Hz to 100 kHz
Accuracy: 0.01%

Binning:
Pass bins: 13 pass bins for RLC
Fail bins: 2 fail bins, RLC & DQR

Ranges:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Direct Reading Range</th>
<th>Ratio and DQ in PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.00001 Ω to 9999 kΩ</td>
<td>0.00010 Ω to 9999.9 GΩ</td>
</tr>
<tr>
<td>L</td>
<td>0.00001 mH to 99999 H</td>
<td>0.00010 nH to 9999.9 MH</td>
</tr>
<tr>
<td>C</td>
<td>0.00001 pF to 99999 µF</td>
<td>0.00010 aF to 9999.9 F</td>
</tr>
<tr>
<td>R with C</td>
<td>0.0001 Ω to 9999 kΩ</td>
<td>not extended</td>
</tr>
<tr>
<td>D with C</td>
<td>0.0001 to 9999</td>
<td>1 to 9999 ppm</td>
</tr>
<tr>
<td>Q with R or L</td>
<td>0.0001 to 9999</td>
<td>1 to 9999 ppm</td>
</tr>
</tbody>
</table>

Sorting capabilities:
Bin number, Delta RLC, Delta %, Value

Applied voltage:
5 mV to 1.275 V (programmable in 5 mV steps)

Bias:
Internal: 2.0 Vdc
External: 60 Vdc max

Range selection:
Autoranging with manual hold

Measurement mode:
Continuous or triggered, with averaging of up to 256 measurements

Measurement speed:
Up to 19 measurements per second

Display format:
Dual display featuring 5 full digit LED for RLC and 4 full digit LED's for DQ
Automatically positioned decimal points and minus signs where appropriate
Individual LED indicators for parameters, and measurement units

Interfaces:
Optional IEEE-488.2 with updated SCPI commands

General features:
Charged capacitor protection (1 joule)
Keyboard lock (protects test conditions)
Constant voltage mode (25 source)
Programmed delay (1 to 99,999 ms)
DQ in ppm
Bin count summary
Programmed integration time
Median value

Power:
90-250 Vac
50-60 Hz
60 W max

Environmental conditions:
Operating conditions: 0° to +50°C, <85% RH
Storage conditions: -45°C to +75°C
ORDERING INFORMATION

1689 RLC Digibridge standard set:
- 1689 RLC Digibridge
- Power cable
- Calibration certificate traceable to SI
- Instruction manual

1689M RLC Digibridge standard set:
- 1693 RLC Digibridge
- Extender cable, bnc-to-bnc (1-meter long)
- Power cable
- Calibration certificate traceable to SI
- Instruction manual

OPTIONAL ACCESSORIES:

- Digibridge BNC Adaptor
  (A bnc interface for 1689)
  1689-9601

- Remote Test Fixture
  (A radio-axial connection for 1689M)
  1689-9600

- Digibridge Calibration Kit
  1689-9604

- Kelvin Test Leads
  1700-03

- Alligator Clip Leads, 1 Meter
  (May also be used as bnc-to-banana-plug connector)
  7000-04

- bnc-bnc Extender Cable, 2-Meter
  1689-9602-2

- Chip Component Tweezers
  7000-05

- IEEE Digibridge Interface
  1689-9640

- Rackmount Kit
  1689-9611

- Banana-Plug Extender Cable
  1657-9600

- Digibridge BNC Adaptor
  1689-9601

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