The Model 6000B is a fully automated bridge using the Cutkosky Divider principle. This technology offers new solutions for measuring high value resistors more accurately and at lower currents. The Cutkosky or Binary Voltage Divider Technology, solves all errors normally associated with a direct current comparator while offering significantly improved uncertainties. An internal guard circuit is used to guard the measuring circuit. This guard may also be used to drive the measuring leads, a guarded detector and resistor enclosures to increase the effective insulation resistance and improve overall performance.

The system requires a stable voltage source (Model 1000B) and a DVM Detector (Fluke 8508A, Agilent 3458A, or Keithley 2000). Optimum performance is achieved using the Agilent 3458A as a guarded detector.

The Model 6000B has a four-channel matrix scanner with inputs labeled R1, R2, R3 and R4. The number of inputs can be expanded to 40 when the 6000B is used in conjunction with 4200 Series Low Thermal Four Terminal Matrix Scanners.

Calibration of the 6000B is performed easily and automatically. Calibration data is stored to file for history analysis. New calibration data is compared to the last calibration data for tracking drift of the BVD.

The principle of the 6000B Automated High Resistance Ratio Bridge is based on the Binary Voltage Divider (BVD). The reference to the BVD is supplied from a stable voltage reference, Model 1000B. The Model 1000B is a low drift, stable, low noise, programmable DC reference. The DC reference is connected to the rear of the 6000B Source input terminals. The DVM detector with an input impedance of 10GΩ or higher is used to measure the difference between the output of the BVD and the test voltage. An isolated guard circuit is provided to guard the BVD and the DVM detector when performing measurements. The guard voltage can also be used to drive the cans and/or shields of resistors under test to reduce leakage problems between the case and the resistor.
System Software and Applications:

The Measurements International’s 6000SW controls all of the above automatically. The software features report generation, historical analysis, while tracking and correcting for resistor drift rates. All measurement data is displayed in graph form as the measurement progresses. All uncertainties are calculated at 2 sigma. The software allows selection on standard deviation and uncertainty calculations.

For SR104 measurements, the 6000SW allows users to measure the temperature of the SR104 at time of measurement using an external thermistor. The thermistor is placed in the well of the SR104 and is measured against a 1MΩ reference resistor. The 1MΩ standard resistor is used to keep the current in the thermistor as low as possible as not to cause self heating. The software can then apply a correction for 23 or 25°C.

The 6000B can also be used in conjunction with Measurements International’s 4200 Series Matrix Scanner and 4220-1 interface adapter for calibration of SR1010 series of Hamon resistance boxes.

Combined with the Measurements International Model 9300 or 9300A air bath, alpha and beta calculations can be performed automatically on resistors under test.

All data can be exported directly to Excel for various test patterns or mainframe applications. External atmospheric pressure, humidity and temperature indicators are optional and the entire system can be enclosed in a 4 or 6 ft. rack. Resistor baths (oil or air), instrument controllers, printers, system software, IEEE interface, installation and training are all available for complete system packages.

6000SW – Windows Operating Software:

Measurements International’s 6000SW was developed by metrologists for metrologists. The software features real time uncertainty analysis, graphing, history logging and graphing, data storage with export to Excel and regression analysis. The 6000SW provides ultimate programmability and control for all your high value resistor measurements now and in the future.
Specifications:

<table>
<thead>
<tr>
<th>Resistor Range</th>
<th>Accuracy (95%) (2s) Ratio 0.1 Through 10</th>
<th>Applied Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10k to 10k Ohm</td>
<td>&lt;0.02 ppm</td>
<td>10 to 20V</td>
</tr>
<tr>
<td>10k to 100k Ohm</td>
<td>&lt;0.1 ppm</td>
<td>10 to 50V</td>
</tr>
<tr>
<td>100k to 1M Ohm</td>
<td>&lt;0.1 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>1M to 10M Ohm</td>
<td>&lt;0.1 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>10M to 100M Ohm</td>
<td>&lt;0.5 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>100M to 1G Ohm</td>
<td>&lt;5 ppm</td>
<td>10 to 110V</td>
</tr>
</tbody>
</table>

Measurements Above 1G Ohm Require Special Resistor Configurations

<table>
<thead>
<tr>
<th>Resistor Range</th>
<th>Accuracy</th>
<th>Applied Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10G Ohm</td>
<td>&lt;20 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>100G Ohm</td>
<td>&lt;200 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>1T Ohm</td>
<td>&lt;500 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>Ratio 100:1</td>
<td>&lt;2 ppm</td>
<td>10 to 110V</td>
</tr>
<tr>
<td>Ratio 1000:1</td>
<td>&lt;20 ppm</td>
<td>10 to 110V</td>
</tr>
</tbody>
</table>

Note: specifications are achievable with the resistors in MIL 9400A oil bath at 25°C ± 10m°C for 10K & 100k ohm measurements and MIL 9300A Air Bath at 23°C ± 10m°C for 1M to 1T ohm measurements.

Linearity 0.01 ppm
Short Term Drift (2 hours) stabilization < 0.2 ppm for 8 hours
Operating Environment 18 to 34°C, 10 to 80% RH

Product Detail

Warranty 1 Year Parts & Labor
Dimensions (W x D x H) 450 x 420 x 280 mm
Weight 15 kg
Shipping Weight 20 kg
Operating Power 100, 120, 220, 240V - 50/60Hz

How to Order:

6000B - Automated High Resistance Ratio Bridge

Accessories:

1000B - Programmable Voltage Source - 110V
1000A - Precision Voltage Source
4200 Series Scanners - 10, 16, and 20 Channel
9400 - Standard Resistor Oil Bath
9300A - Standard Resistor Air Bath/GPIB

Form MI 66, Rev. 6, Dated 09-03-03 (QAP19, App. "N")

Data Subject to Change

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