Measurements International
Metrology is Our Science, Accuracy is Our Business™

Model 8000A/8001A

Automated Potentiometer Binary Voltage Divider

- 20 Channel Scanner
- Accuracy <0.05 ppm
- Voltage Maintenance Programs
- Range to 1200 Volts
- Calibration of Fluke 5700A/5720A
- Linearity Calibration of DMM's
- Bipolar Voltage Measurements

MODEL INFORMATION

The Model 8000A is a highly versatile, accurate, self-balancing instrument that meets laboratory requirements for scaling between 10-volt references or any voltage between 1 mV to 10 volts. Automatic self-calibration ensures ratios to nine significant digits with linearity deviations of less than 0.02 ppm. The Model 8000A has a 20 channel "built-in" scanner addressed individually via the windows operating software for performing automatic measurements. Both hardware and software standard cell protection circuits are built in.

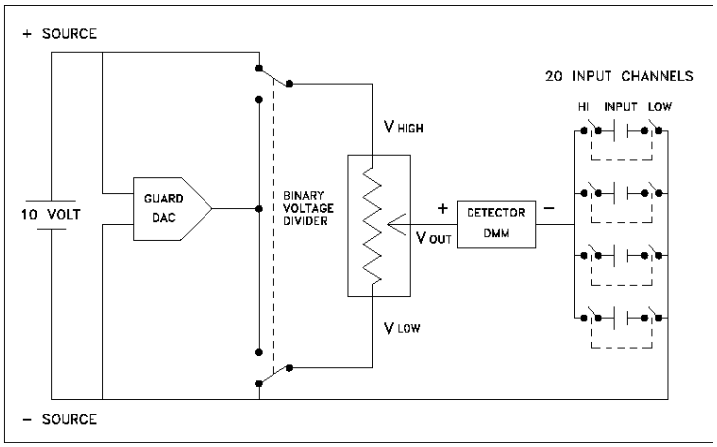
In order to address the increasing demand for automated calibration of DCV ranges of most precise Multifunction calibrators, as well as the linearity verification of the long scale DVM's, the option of fully automated bipolar measurement has been developed. This allows user to do measurement of +/- 10V range with 8000A and extend it to +/- 1200V when the 8001A extender is used.

Fully documented calibration of bipolar voltages at the output of the calibrator is traceable to laboratory's 10V reference standard. Determining the 8000A correction factors and Standardizing the source at both polarities gives additional confidence on calibration results.

The Model 8000A's range can be extended to 1200 volts with Measurements International's precision divider extender (Model 8001A). Latest development HW and SW features of 8000A allows fully automated bipolar measurements without manual intervention. This, in combination with model 8001A extender, brings full automation of DCV ranges calibration and linearity verification of multifunction calibrators and long scale DVM's at range up to +/- 1200V.

Operation:

The principle of the 8000A Automatic Potentiometer is based on the Binary Voltage Divider (BVD). The BVD requires two voltage references and a DMM detector. The first reference or source is a low drift, stable, noise free 10-Volt Source which is connected to the rear on the 8000A-source input. The most important thing about the source is its stability. The reference to the BVD is supplied from a calibrated stable voltage reference, MI Model 1000A or Fluke Model 732A or B. The source and 8000A are standardized against the calibrated reference for making absolute voltage measurements.



8000A Block Diagram

The DMM detector with an input impedance of 10G or higher is then used to measure the difference between the output of the BVD and the voltage under test. An isolated guard circuit is provided to guard the BVD and the DMM detector when performing measurements. The guard voltage can also be used to drive the guards of the cell enclosures under test to reduce leakage problems.

8000A Ratio Verification (RVB)

The Model 8000A ratio can be calibrated directly against the 10V Josephson Array or the ratio can be verified by measuring the normal and inverse ratio of two stable resistors using the 8000A Ratio Verification Box.

The RVB contains a low thermal reversing switch and wiring so that the 8000A can be calibrated within its linearity specification. The program is built into the software and all measurements and data are stored to the measurement file. The software also performs the calculations of the ratio of the two resistors and the error of the bridge. Only the short term stability of the resistors is important.

Model 8001A 1200 Volt Range Extender

The model 8001A Range Extender extends the measurement range of the model 8000A Potentiometer to 1200 volts. All voltages are calibrated directly against the 10V reference on the 8000A. The 8001A includes ranges of 10, 30, 120, 300 and 1200 volts.

Model 8001A 1200V Range Extender

The 8001A maintains excellent short term drift and is self calibrating using the 8000A Potentiometer and a stable 10 volt reference. The 8000A and 8001A combination can be used to calibrate and verify the linearity of both calibrators and DMM's up to 1200V.

System Software:

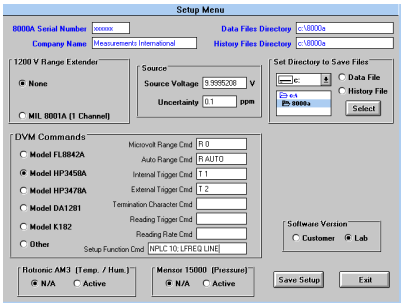
Measurements International's Model 8000SW was developed by metrologists for metrologists. The software features "real time" uncertainty analysis and graphing of measurement data and corrects for drift rates. Upon completion, measurement results can be saved for historical and regression analysis, report generation and can be exported to to spreadsheet format.

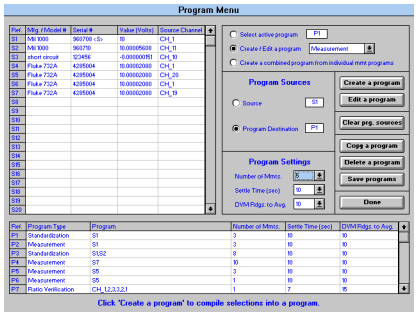
Combined with the Measurements International Model 8001A Extender, automatic voltage measurements can be performed to 1200 Volts. graphing, history logging, and data storage with export to Excel and regression analysis.

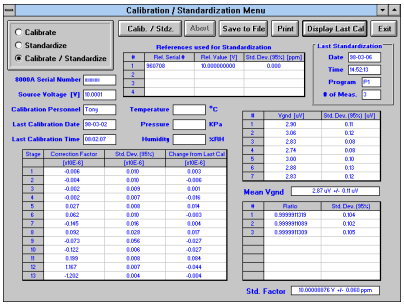
The software includes drivers for Fluke 5700 and 5720 calibrators so that the DC voltage portion can be calibrated automatically. Drivers for other calibrators or DMM's can also be created. All data can be exported directly to Excel for various test patterns or mainframe applications.

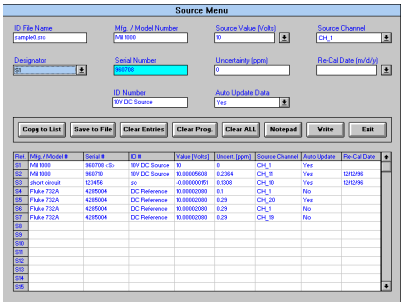
System Requirements:

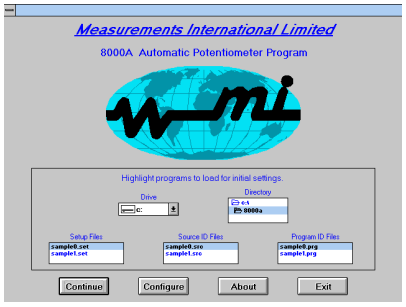
To run the MI Software (Model 8000SW) requires a computer running Windows 98 or later and USB to IEEE488 Interface (not included). graphing, history logging, and data storage with export to Excel and regression analysis.

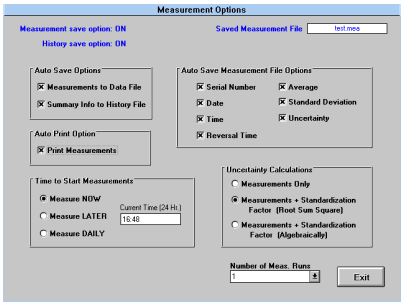












Specifications

Automatic Self Calibration	Completely Self Checking
Range: 8000A (8001A)	100nV to 10 Volts DC (10V to 1200V)
Measurement Uncertainty	0.05 ppm of Reading (<2 ppm with range extender)
Insulation Resistance	10^{11} Ohms
Effective Linearity	<0.02 ppm of Full Scale
Long Term Drift	N/A - Corrected by Self Calibration
Short Term Drift	Dependant on drift of source
Input Impedance	40k Ohms
Output Impedance (8001A)	1.2M Ohms Maximum
Operating Environment	18 to 34°C, 10 to 80% RH
Warranty	1 Year Parts & Labor
Dimensions	265 x 439 x 380 mm
Weight	14 kg
Operating Power	100, 120, 220, 240 – 50/60 Hz

Options

- Computer Interface IEEE488 for remote control
- IEEE-488 Cables, 1 and 4 m
- Model 1000A Voltage Source
- 19” rack with smoked glass door and castors
- DVM/Detector Model 3458A DMM
- Model SPSCW XX YY 2(xx = length, yy = # of cables) 2 = 2 conductor low voltage shielded cables

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