



Model 8000A Automated Potentiometer

*20 Channel Scanner
Accuracy < 0.05 ppm
Voltage Maintenance Programs
Linearity Calibrations of DMM's
IEEE-488 Operation*

General Description:

The Model 8000A is a highly versatile, accurate, self-balancing instrument that meets laboratory requirements for scaling between 10-volt references and the 1.018-volt standard cells 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.

The system detector can be any low noise DMM having a resolution of 100nV or less. Control of the DMM detector is achieved over the IEEE-488 interface bus. Several DMM drivers are already built into the software including the HP 3458A, Keithley 182 and Fluke 8842A. Provisions have been made so that the drivers of other DMM detectors can be added at any time. For optimum performance the HP 3458A is recommended.

Measurements International's (8000SW) operating software is available in both windows 95/98 and NT platforms. The system requires a stable 10V source (Model 1000) and a DVM Detector (Fluke 8842A, HP3458A). Optimum performance is achieved using the HP 3458A as a guarded detector.

The Model 8000A source voltage maybe supplied by any stable 10-volt reference. Only the short-term stability of the source is important. To make a direct reading, it is necessary to standardize the system against a known voltage reference calibrated by the Josephson Array for optimum accuracy. For users that maintain a 4-bank standard cell enclosure as their primary reference, the program allows the user to standardize against the four cells and uses the mean as the reference value.

Model: 8000A

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. The Model 8000A's range can be extended to 1200 volts with Measurements International's precision divider extender (Model 8001A).

Operation:

The principle of the 8000A Automatic Potentiometer is based on the Binary Voltage Divider (BVD). The reference to the BVD is supplied from a stable voltage reference, MIL Model 1000 or Fluke Model 732A or B. The source should be a low drift, stable, noise free 10-Volt Source, connected to the rear on the 8000A-source input. All 20-measurement channels are also located on the rear of the potentiometer. The DMM detector with an input impedance of 10 G Ω 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.

System Software:

The Measurements International's 8000A SW controls all of the above automatically. The software feature reports generation, historical analysis and tracks and corrects for drift rates. Combined with the Measurements International Model 8001A Extender, automatic voltage measurements can be performed to 1000 Volts. 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. Instrument controllers, printers, system software, IEEE interface, installation and training are all available for complete system packages.

System Requirements:

To run the MI Software (8000SW) requires a computer, 486 or higher running at 166 MHz or higher, with 32 MEG of RAM, Windows 95, 98 and an IOTECH IEEE488 Interface Card (not included).

Data Subject to Change



Measurements International

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Measurements International

A Metrology Based Company

8000SW – Windows Operating Software:

Setup Menu

Setup Menu

8000A Serial Number: Data Files Directory:
 Company Name: History Files Directory:

1200 V Range Extender
 None Source: V Source Voltage: V
 MIL 8001A (1 Channel) Uncertainty: ppm

Set Directory to Save Files
 Data File
 History File
 Select

DVM Commands
 Microvolt Range Cmd:
 Auto Range Cmd:
 Internal Trigger Cmd:
 External Trigger Cmd:
 Termination Character Cmd:
 Reading Trigger Cmd:
 Reading Rate Cmd:
 Setup Function Cmd:

Software Version
 Customer Lab

Rotronic AM3 (Temp / Hum) N/A Active
 Mensor 15000 (Pressure) N/A Active

Save Setup Exit

Source ID Menu

Source Menu

ID File Name: Mfg / Model Number: Source Value (Volts): Source Channel:
 Designator: Serial Number: Uncertainty (ppm): Re-Cal Date (m/d/y):
 ID Number: Auto Update Data: Yes No

Copy to List Save to File Clear Entries Clear Prog Clear All Notepad Write Exit

Ref	Mfg / Model #	Serial #	ID #	Value (Volts)	Uncert (ppm)	Source Channel	Auto Update	Re-Cal Date
01	MI 8000	965708 (SI)	10	0	0	CH_1	Yes	
02	MI 8000	965710	HV DC Source	10.00000000	0.2564	CH_1B	Yes	12/01/96
03	short circuit	123456	sc	-2.00000000	0.1000	CH_1B	Yes	12/01/96
04	Fluke 732A	4295004	DC Reference	10.00000000	0.11	CH_1	No	
05	Fluke 732A	4295004	DC Reference	10.00002000	0.25	CH_20	Yes	
06	Fluke 732A	4295004	DC Reference	10.00002000	0.25	CH_1	No	
07	Fluke 732A	4295004	DC Reference	10.00002000	0.25	CH_1B	No	
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

Program ID Menu

Program ID Menu

Ref	Mfg / Model #	Serial #	Value (Volts)	Source Channel
01	MI 8000	965708 (SI)	10	CH_1
02	MI 8000	965710	10.00000000	CH_1B
03	short circuit	123456	-0.00000000	CH_1B
04	Fluke 732A	4295004	10.00000000	CH_1
05	Fluke 732A	4295004	10.00000000	CH_20
06	Fluke 732A	4295004	10.00002000	CH_1
07	Fluke 732A	4295004	10.00002000	CH_1B
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Select active program: All
 Create / Edit a program:
 Create a combined program from individual mfg programs

Program Sources
 Source
 Program Destination:

Program Settings
 Number of Meas:
 Settle Time (sec):
 DVM Range to Avg:

Click "Create a program" to compile selections into a program.

Ref	Program Type	Program	Number of Meas	Settle Time (sec)	DVM Range to Avg
P1	Standardization	SI	2	10	10
P2	Measurement	SI	3	10	10
P3	Standardization	SI152	8	10	10
P4	Measurement	SI	10	10	10
P5	Measurement	SI	2	10	10
P6	Measurement	SI	1	10	10
P7	Fluke Verification	CH_12-33-1	1	7	15

Opening Screen

Measurements International Limited

8000A Automatic Potentiometer Program

Highlight programs to load for initial settings.

Drive: Directory:

Setup Files: Source ID Files: Program ID Files:

Continue Configure About Exit

Measurement Options

Measurement Options

Measurement save option: Saved Measurement File:
 History save option:

Auto Save Options
 Measurements to Data File
 Summary Info to History File

Auto Save Measurement File Options
 Serial Number Average
 Date Standard Deviation
 Time Uncertainty
 Reversal Time

Auto Print Option
 Print Measurements

Time to Start Measurements
 Measure NOW Current Time (24 Hr):
 Measure LATER
 Measure DAILY

Uncertainty Calculations
 Measurements Only
 Measurements + Standardization Factor (Root Sum Square)
 Measurements + Standardization Factor (Algebraically)

Numbers of Meas. Runs: Exit

Calibration & Standardization

Calibration / Standardization Menu

Calibrate Standardize Calib. / Stdz. About Save to File Print Display Last Cal Exit

References used for Standardization

Ref	Serial #	Ref. Value [V]	Std. Dev. (PPM) [ppm]
1	965708	10.00000000	0.000

8000A Serial Number: Source Voltage [V]:
 Calibration Personnel: Temperature: °C
 Last Calibration Date: Pressure: kPa
 Last Calibration Time: Humidity: %RH

Stage	Correction Factor [mV (-)]	Std. Dev. (PPM) [mV (-)]	Change from Last Cal [mV (-)]
1	-0.004	0.010	0.002
2	-0.004	0.010	-0.006
3	-0.002	0.009	0.001
4	-0.002	0.007	-0.006
5	0.027	0.006	0.004
6	0.062	0.010	-0.003
7	-0.145	0.016	0.004
8	0.092	0.020	0.017
9	-0.070	0.006	-0.027
10	-0.022	0.006	-0.027
11	0.199	0.008	0.014
12	1.167	0.007	-0.014
13	-1.202	0.004	-0.004

Mean Vgnd:
 Std. Factor:

Measurements International's 8000SW was developed by metrologists for metrologists. The software features real time uncertainty analysis, graphing, history logging and graphing, data storage, regression analysis and direct exporting to Excel.

Model: 8000A

Specifications:

Automatic Self Calibration	Completely Self Checking
Range	100nV to 10 Volts DC
Read Out	Over IEEE488
Insulation Resistance	10 ¹¹ Ohms
Effective Linearity	<0.02 ppm of Full Scale
Long Term Drift	No Effect - Self Calibration Corrected
Measurement Uncertainty	0.05 ppm of Reading (2 sigma)
Short Term Drift	Follows Drift of Source
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

Shipping Weight:

18 kg

Accessories:

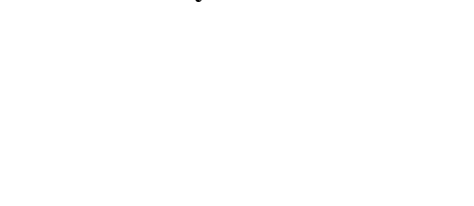
1000

8001A

Operating Power:

100, 120, 220, 240V - 50/60 Hz

Distributed By:



How to Order:

Model 8000A - Automated Potentiometer

Rev. 02/99/08

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