



## **Model 2100B**

**Power Calibration System**  
**600 Volt - 100 Amp**

*Menu Driven Software*  
*Watt Hour & Energy Meter Calibration*  
*Uncertainty to <30 PPM*  
*All Power Factors*

### **General Description:**

The Model 2100B is designed to generate voltages up to 600V and currents to 100A at any power factor from zero lag through unity, to zero lead. Completely automated, the 2100B is ideal for calibrating wattmeters, energy meters, watt hour meters, watt transducers and VA measurements to <30 PPM.

Traceability is provided through a built in standard resistor for in-phase measurements and a standard capacitor for quadrature measurements. The system is also capable of calibrating its own resistance standard directly against an external standard. A controller and software are used to control the units together using an IEEE488 interface. The system is supplied in a 1.8 meter equipment rack on castors for mobility. The rack is equipped with a pull out tray for placing the unit under test (UUT). All connections to the UUT are made from the front panel of the system. Up to 3 wattmeters can be calibrated at a time.

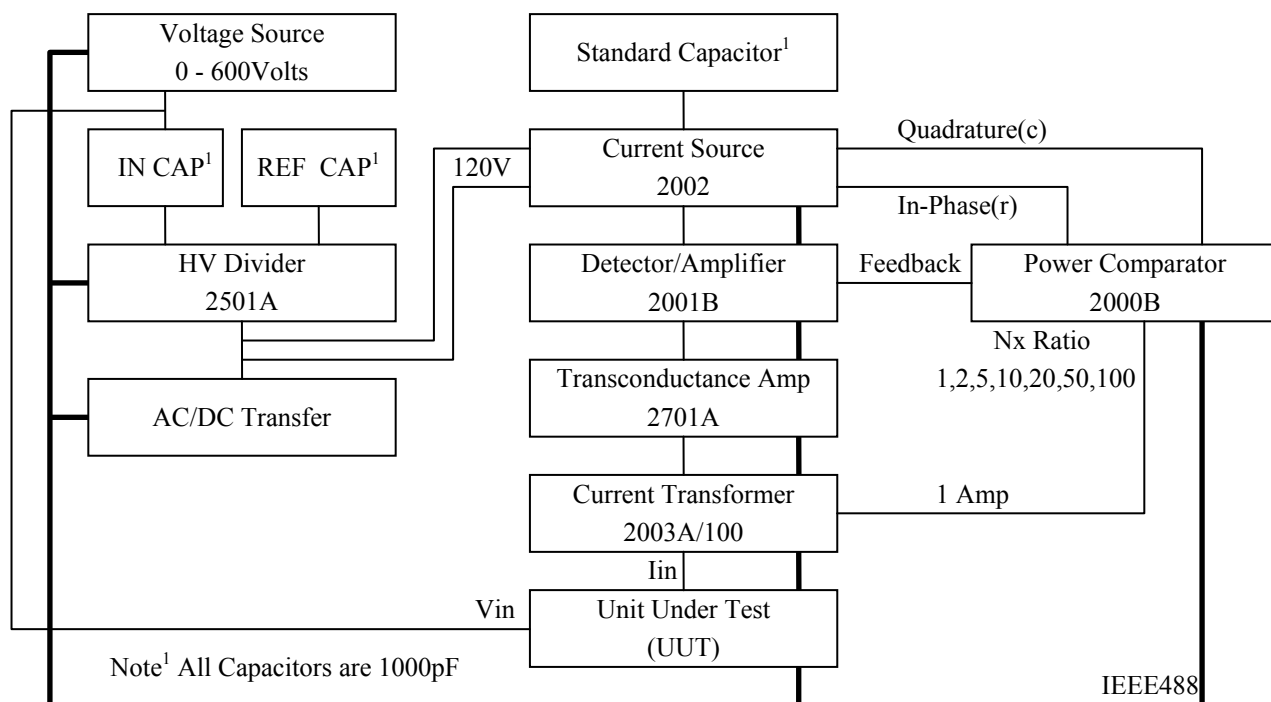
The system is comprised of a Power Comparator (2000B), a 10 mA in phase Quadrature Current Source (2002), Transconductance Amplifier (2701A), an Auto Ranging Current Transformer (2003A/100), a Detector Amplifier (2001B), 2501A AC Precision Divider. A commercially available AC Source such as the Fluke 5700A with high current option is required as the AC source and an AC/DC Transfer Standard is required to measure AC voltage. Several wattmeters, DVM's and AC/DC Transfer Standards have drivers built into the system software. The source code maybe purchased to allow other measurement devices to be added at anytime.

# Model 2100B

The 2100B Reference Power Calibration System is fully automated and programmable primary standard for AC power measurements. It can be used for calibrating both active and reactive power and energy meters under sinusoidal conditions.

Traceability for the measurements is provided through the standard resistor and standard capacitor internal to the 2002 current source, the AC/DC Transfer Standard measurement and the uncertainty of the Model 2501A High Voltage Divider. The resistor, capacitor and high voltage divider are supplied with calibration reports.

The system, using model 2000B AC Comparator and 2001B Detector, is capable of calibrating the standard resistor against external standards to better than 3 ppm uncertainty. An external resistor, the model 7050, 12K Ohm AC Standard Resistor, may be purchased and sent out for calibration periodically as the reference standard.



Software menus allow for changing voltages, currents, power factors and number of readings easily. The MEAN, SIGMA, STD. DEVIATION and VARIANCE are calculated and displayed on the calibration report.

The 2100B system includes the model 2501A AC Precision Divider. The 2501A has ranges of 600, 480, 240 & 120 with uncertainties of less than 10 PPM. The AC/DC Transfer Standard is not exposed to voltages greater than 120V. Accuracy of the 2100B is based on uncertainties associated to measuring R and C and the input voltage via an automated AC/DC Transfer Standard and the uncertainty associated with the 2501A High Voltage Divider. The resistor and capacitor are included in the model 2002 Current source are supplied with an NRCC calibration report. Calibration of the resistor and capacitor are performed at the test voltage of 120V, 50 or 60 Hz frequency.

### Data Subject to Change

Printed in Canada

**Measurements International**

118 Pirelli Dr., PO Box 2359, Prescott, Ontario, Canada K0E 1T0  
Ph. 613.925.5934 • Ex. 613.925.1195 • North America: 1.800.324.4988

# Model 2100B

## Model 2100 Power Reference System Software Main Menu

MEASUREMENTS INTERNATIONAL PRESCOTT, ONTARIO, CANADA		
SELF-BALANCING POWER & ENERGY CALIBRATION SYSTEM		
POWER CALIBRATION	<E> - ENERGY	<P> - POWER
Actual Parameters	<F1=Start Balancing>	Ready For Balancing
AC Voltage - <F2=Change> 100.0000 Vrms +/- 2.00ppm	<F12=No of Measurements> 5	Reference Capacitor 1000.0000pF +/- 2.0 ppm
Current/Power Fact. Pairs Entered: 1 <F3=Change>	<F11=Set Readings To Mean> 5	Reference Resistor 11.999436K $\Omega$ +/- 2.1 ppm
Wattmeter: none Voltmeter: not used	<F7=Choose Wattmeter> <F10=Printer On/Off>	<Ctrl+F5=New Value of C> <Ctrl+F6=New Value of R>
<F4=Set Waiting Time> 4 sec	Frequency 50 Hz +/- 2.0 ppm	<F8=Exit To DOS>

## SELF-BALANCING POWER & ENERGY REFERENCE CALIBRATION SYSTEM CALIBRATION REPORT

Wattmeter Under Test: MIL 2010A      Serial Number: 950701  
 Voltmeter: not used  
 Time 09:15:22 Date : 06-11-1997

WATTMETER RANGE  
 Voltage [V].....120  
 Current [mA].....1000  
 SI UNITS.....WATTS

### TEST CONDITIONS

Voltage [V].....120 +/- 1.00 ppm  
 Current[mA].....1000 mA  
 Power Factor... 1

MIL Watts	MIL Uncertainty	Test Watts	Test Uncertainty	Test Error
+120.0000	+4.73	+120.0005	+5.49	+4.35
+120.0000	+4.73	+120.0003	+5.37	+2.29
+120.0000	+4.73	+120.0004	+5.28	+3.43
+120.0000	+4.73	+120.0004	+5.68	+3.23
+120.0000	+4.73	+120.0006	+5.25	+5.24
+120.0000	+4.73	+120.0004	+6.02	+3.67
+120.0000	+4.73	+120.0005	+5.57	+4.20
+120.0000	+4.73	+120.0003	+6.10	+2.86
+120.0000	+4.73	+120.0007	+5.23	+5.44
+120.0000	+4.73	+120.0007	+5.32	+5.93

	Test Meter =====
MEAN.....	+4.06
SIGMA.....	+0.38
STD.DEVIATION.....	+1.19
VARIANCE.....	+1.41

Data Subject to Change

Printed in Canada



**Measurements International**  
 118 Pirelli Dr., PO Box 2359, Prescott, Ontario, Canada K0E 1T0  
 Ph. 613.925.5934 • Fx. 613.925.1195 • North America: 1.800.324.4988

# Model 2100B

## Specifications:

Output Voltage	600 Volts Maximum
Voltage Accuracy	15 PPM
Output Current	100 Amps Maximum
Current Accuracy	10 PPM
Test Frequency	50, 60 and 400 Hz
Current Ratios	1, 2, 4, 10, 20, 40, 100, 200
Power Factor	-0 to 1 to +0 (All)
Power Uncertainty	<30 ppm Magnitude <30 ppm Quadrature
Operating Environment	18 to 34°C, 10 to 80% RH
Warranty	1 Year Parts & Labor

## Dimensions:

1.8 m High

## Weight:

350 kg

## Shipping Weight:

400 kg

## Accessories:

7050 AC resistor

## Operating Power:

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

## Distributed By:

## How to Order:

Model: 2100B - Power Calibration System

*Data Subject to Change*

Printed in Canada



## Measurements International

118 Pirelli Dr., PO Box 2359, Prescott, Ontario, Canada K0E 1T0  
Ph. 613.925.5934 • Fx. 613.925.1195 • North America: 1.800.324.4988

Form MI 67, Rev. 1, Dated 01-11-15 (QAP 19, App. "O")