Global® Specialties

PRO-1000

4 ½ Digit Bench Type Digital Multimeter

Instruction Manual

Revision: 11/2010

CONTENTS

1. PRODUCT DESCRIPTION

1-1. Introduction

Thank you for purchasing the Model PRO-1000. Please read this operation manual carefully to ensure its proper use.

Note

1. To fully maintain the meter's precision and reliability, it must be used within its intended operating environment. (Temperature 10 °C~35 °C, Humidity 45%~85%)
2. Upon power-up, please allow the instrument to pre-heat for 30 minutes before use.
3. The PRO-1000 requires a triple line power cord to ensure safe operation.
4. Specifications may change without notice.
5. If you have further questions concerning use of the PRO-1000, please contact customer service at 800-572-1028. For up-to-date specifications please visit www.globalspecialties.com.

The PRO-1000 is a portable, bench type digital multimeter with a 4 ½ digit LED display. The PRO-1000 can measure diodes, frequency, current, voltage, resistance, as well as test continuity.

■ **Features**

- Bench type True RMS Digital Multimeter with 4 1/2 digit (LED) display.
- Basic DC Voltage accuracy of 0.05 %
- Overload protection on all ranges
- AC/DC Voltage measurement up to 1000V DC and 750V AC
- AC/DC Current measurement up to 10A
- Resistance measurement up to 20MΩ
- Frequency Measurement up to 200kHz
- Audible continuity test

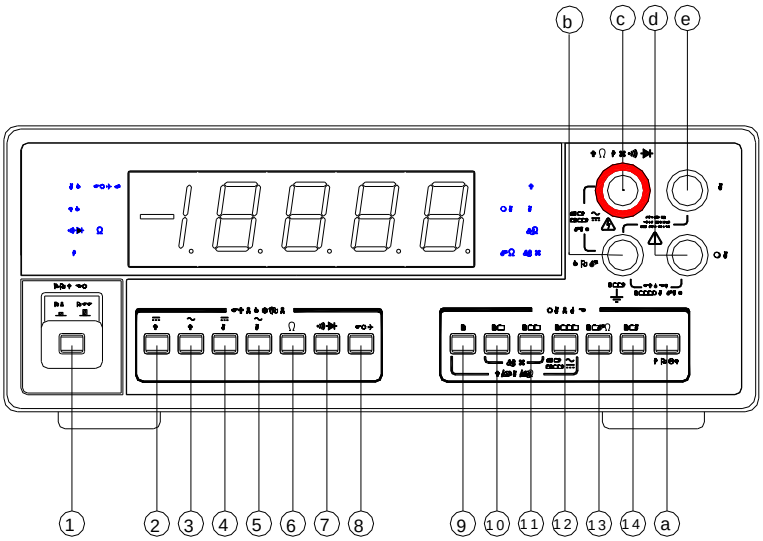

FIG.1 FRONT PANEL

■ Input Terminal

ⓑ COM: Common Terminal

ⓒ V/Ω /Hz: VOLT, OHM, CONTINUITY, FREQUENCY & DIODE TEST Input Terminal

ⓓ mA: Milliamp Input Terminal

ⓔ A: Amps Input Terminal

■ Function Selection

① I/O	Power ON/OFF	⑤ AC A	AC Current
② DCV	DC Voltage	⑥ Ω	Resistance
③ ACV	AC Voltage	⑦ DIODE	Diode & Continuity
④ DCA	DC Current	⑧ FRQ	Frequency

■ Range Selection

⑨2	2V, 2mA ,2kΩ	⑬ 20M	20 MΩ
⑩20	20V, 20mA , 20kΩ, 20kHz	⑭ 20A	10A
⑪200	200V, 200mA, 200kΩ, 200kHz	ⓐ HOLD	Data Hold
⑫2000	DC 1000V/AC750V, 2000mA, 2000kΩ		

■ **Input Terminal Limits**

Switch Function	Input Terminals Red	Black	Min. Display Reading	Max. Display Reading	Maximum Input
DC V	V/Ω/Hz	COM	0.0001V	1000.0V	1000VDC
AC V	V/Ω/Hz	COM	0.0001V	750.0V	750VAC
OHM	V/Ω/Hz	COM	0.0001kΩ	19.999MΩ	600V(1Min)
Diode/Cont.	V/Ω/Hz	COM	0.1	1999.9	600V(1Min)
DC mA	mA	COM	0.0001mA	1999.9mA	2A
AC mA	mA	COM	0.0001mA	1999.9mA	2A
DC A	A	COM	0.001 A	10.000A	10.00A
AC A	A	COM	0.001 A	10.000A	10.00A
Frequency	V/Ω/Hz	COM	0.001KHz	199.99kHz	600V(1 Min)

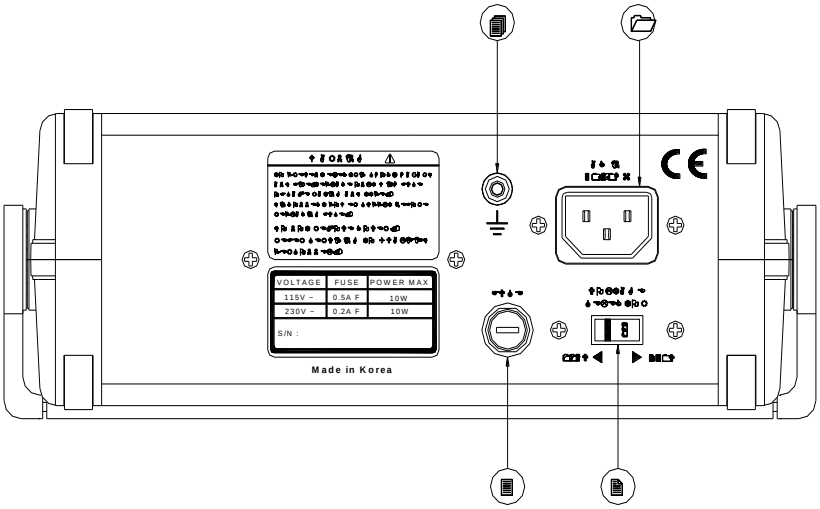

FIG.2 REAR PANEL

① AC INPUT : AC power input connector
② VOLTAGE SELECTOR : Selects AC Power (115V or 230V)
③ FUSE HOLDER : Replace fuse by unscrewing
④ GROUND TERMINAL

1-2 Technical Specifications

*** Important Note: All accuracies apply to 5% to 95% full scale of each range.**

DC VOLTS

Range	Resolution	Accuracy	Impedance
2V 20V 200V	100uV 1mV 10mV	±(0.05% + 10d)	10MΩ
1000V	100mV	±(0.1% + 5d)	

AC VOLTS

Range	Resolution	Accuracy		Impedance
		50-60Hz	60- 400Hz	
2V	100µV	±(0.75% + 10d)	±(1.5% + 10d)	10MΩ
20V 200V 750V	1mV 10mV 100mV		±(2.5% + 10d)	

DC CURRENT

Range	Resolution	Accuracy	Overload Protection
2mA 20mA 200mA	100nA 1µA 10µA	±(1.0% + 5d)	2A/250V
2A	100µA	±(1.0% + 10d)	
*10A	1mA	±(1.0 % + 10d)	10A/250V

*** 10A range specified for 30 seconds maximum for each 15 minute interval.**

AC CURRENT

Range	Resolution	Accuracy		Overload Protection
		50-60Hz	60- 400Hz	
2mA 20mA 200mA	100nA 1µA 10µA	±(0.75% + 10d)	±(2.0% + 10d)	2A/250V
2A	100µA	±(1.0% + 10d)		
*10A	1mA			10A/250V

*** 10A range specified for 30 seconds maximum for each 15 minute interval.**

RESISTANCE

Range	Resolution	Accuracy	Overload Protection
2kΩ 20kΩ 200kΩ 2MΩ	0.1Ω 1Ω 10Ω 100Ω	±(0.2% + 5d)	600V DC or Peak
20MΩ	1kΩ	±(1% + 10d)	

FREQUENCY

Range	Resolution	Accuracy	Overload Protection
20kHz	1 Hz	±(1.5% + 5d)	600V DC or Peak
200kHz	10 Hz	±(2.0% + 5d)	

- Frequencies under 500Hz requires a minimum amplitude of at least 4Vpp. Other sensitivities are not specified.
- Errors of less than 5 digits are added in the total measurement.

AUDIBLE CONTINUITY

Test Voltage	Threshold	Overload Protection
3V	Less Than 200Ω	600V DC or Peak

DIODE TEST

Test Voltage	Max. Test Current	Overload Protection
2V	Approx. 1.0mA	600V DC or Peak

1-3. Equipment Ratings

- Plug and Socket: 3 wire AC power plug and 3 wire outlet
- Power & Fuse Ratings

Input Voltage	Fuse	Power Max.
103 ~ 126V AC (50/60Hz)	F 0.5A / 250V	10W
206 ~ 252V AC (50/60Hz)	F 0.2A / 250V	

- Operating Environment:
  TEMPERATURE: 0 °C to + 40 °C (Accuracy Specified at 23 °C ± 5 °C)
  HUMIDITY: Up to 85%RH to 40°C without temperature extremes which may cause condensation within the instrument.
- Storage Environment:
  TEMPERATURE: -20°C to +70°C
  HUMIDITY: <85% RH
- Temperature Coefficient: 1.0 x (Specified Accuracy) per °C for temp. < 18°C or > 28°C
- Insulation Category: II
- Pollution Degree: 2
- Protection to IEC 529: Ordinary
- Dimensions: 9.5” x 3.5” x 11” (240 x 90 x 280 mm)
- Weight: 4.4 lbs (approx. 2.0kg)

1-4. Supplied Accessories

- User’s Manual ---------- 1
- Test Leads---------- 1
- Power cord---------- 1
- Spare Fuse---------- 1

1-5. Safety

SAFETY RULES

- Read these operating instructions thoroughly and completely before operating the PRO-1000.
- Pay particular attention to WARNINGS and CAUTIONS described in this manual that may pose hazards to the user, and/or damage to the instrument.
- Always inspect the instrument's test probes and accessories for any sign of damage or abnormality before each use.
- Never ground yourself and keep your body isolated from ground.
- Never touch exposed wiring, connections or any live circuit conductors.
- Disconnect the live test probe before disconnecting the common test probe.
- Use caution when working above 60V DC or 25V AC RMS as such voltages pose a shock hazard.

SAFETY SYMBOLS

ϟ	DANGEROUS VOLTAGE	⚠	SEE EXPLANATION IN MANUAL
~	AC-ALTERNATING CURRENT	⏚	GROUND
⎓	DC-DIRECT CURRENT	▭	FUSE

Note: Specifications and information are subject to change without notice.

2. INSTALLATION

2-1. Initial Inspection

The PRO-1000 was carefully inspected both mechanically and electrically before shipment and should be free of any physical damage. Please inspect the instrument for any physical damage that may have occurred in transit.

2-2. Connecting AC Power

This instrument may be used with either 115V AC, or 230V AC (50-60 Hz) input voltages. Please ensure that the power socket includes a protective earth contact (PE-contact).

CAUTION

AC POWER OF THIS INSTRUMENT IS FACTORY-SET TO 115V. BEFORE POWER-UP, CHECK AND MAKE SURE THE VOLTAGE OF THE POWER SOURCE IS SAME THE INSTRUMENT'S FACTORY PRESET.

FOR 230V AC INPUT VOLTAGE REQUIREMENTS, ADJUST THE VOLTAGE SELECTOR SWITCH ON THE REAR OF THE METER.

2-3. Cooling and Ventilation

No special cooling or ventilation is required for proper operation however the instrument should be operated within its intended ambient temperature specifications for optimum use.

2-4. Position

The PRO-1000 is a bench-type instrument with rubber feet and handle-type tilt stand. The viewing angle can be adjusted by rotating angle of carrying handle.

2-5. Warm-Up

Allow 30 minutes for the unit to warm up in order to provide the most accurate and stable readings.

3. OPERATION

3-1 Voltage Measurement

Voltage is the difference of electrical energy (potential) between two points. Measuring voltage allows you to verify the following.

- Presence of voltage. The presence of voltage indicates that the circuit is delivering voltage to the component you are testing.
- The voltage level. The voltage level indicates whether the proper voltage is arriving at each component.
- The voltage drop. The voltage drop indicates how much voltage is being consumed by each component.

WARNING---HIGH VOLTAGE

TO AVOID POSSIBLE ELECTRIC SHOCK AND/OR EQUIPMENT DAMAGE, DO NOT ATTEMPT TO TAKE ANY VOLTAGE MEASUREMENTS IF THE VOLTAGE IS ABOVE 1000V DC OR 750V AC. THE "COM" TERMINAL POTENTIAL SHOULD NOT EXCEED 500V WITH RELATION TO GROUND.

(1) Plug the red and the black test leads into the VΩ and the COM input terminals respectively.
(2) Set the range switch to the desired voltage range. For unknown voltages, always start from highest range and move down to a lower range to the select scale for the best readings.
(3) Connect the probe tips in parallel with the voltage source to be measured.
(4) Read the voltage value on the display.

3-2 Current Measurement

Current is defined as amount of electrons flowing through a conductor. Amps are the value assigned to the measurement of these electrons.

CAUTION

DO NOT ATTEMPT TO TAKE A CURRENT MEASUREMENT MORE THAN THE SPECIFIED METER SETTING. ALWAYS START WITH THE HIGHEST RANGE CURRENTS SETTING AND MOVE DOWN A RANGE AT A TIME FOR THE BEST READINGS. THE “mA INPUT” TERMINAL IS PROTECTED BY A 2000mA/250V “F” TYPE FUSE AND THE “A INPUT” TERMINAL IS FUSED WITH A 10A/250V “T” TYPE FUSE.

WARNING

MAKE SURE NO POWER IS PRESENT BEFORE DISCONNECTING THE CIRCUIT. EVEN SMALL AMOUNTS OF CURRENT CAN BE DANGEROUS. DO NOT ATTEMPT A CURRENT MEASUREMENT WHERE VOLTAGE IS ABOVE 600 V.

(1) Plug the red test leads into the “mA input” for inputs less than 2000 mA or into the “A input” terminal for inputs between 2000mA and 10A.
(2) Plug the black test leads into the COM input terminal.

(3) Set the range switch to the desired current range. For unknown current measurements, always start from highest range and move down to lower range to select scale for the best readings.
(4) Connect the probe tips in series with the current source to be measured.
(5) Read current value on the display.

Fuse Replacement:

- Disconnect and remove all connections from any live power source.
- Open the top case.
- Locate the defective fuse on-board and remove it.
- Install a new fuse of the SAME SIZE AND RATING.
- Close the top case.

**** 10A AC/DC Measurement - "Maximum 30sec for each 15 minute interval"**

3-3 Resistance Measurement

Resistance is the hindrance of current flow through a conductor. Ohms are the unit of measure for this resistance.

- The resistance displayed on the meter is the total resistance through all possible paths between the red and black probes.
- Resistance must always be measured with meter in series with the circuit.
- Resistance in each test lead is about 0.1 - 0.2 ohm
- Be sure that the contact between the probes and the circuit is clean. Contact resistance coming from dirt, oil, paint, etc. can seriously affect measurement accuracy.

CAUTION
IF AN EXTERNAL VOLTAGE IS PRESENT ACROSS A COMPONENT, IT WILL CAUSE ERRONEOUS RESISTANCE READINGS. THEREFOR ALL RESISTANCE MEASUREMENTS SHOULD BE TAKEN ON DE-ENERGIZED CIRCUITS ONLY. POWER TO THE CIRCUIT UNDER TEST MUST BE OFF AND ALL CAPACITORS SHOULD BE DISCHARGED

(1) Plug the red and black test leads into the VΩ input and the COM input terminals respectively.
(2) Set the range switch to the desired resistance range.
(3) Connect the probe tips in series with the resistance to be measured.
(4) Read the resistance value on the display.

3-4 Diode Measurement

Diodes allows current to flow in one direction only. To test a single diode, turn the power off and remove the diode from circuit.
(1) Connect the red probe to the plus (+) side of diode and the black probe to the minus (-) side.
(2) If diode is good, the voltage drop will be displayed, for example 300.0 ~ 800.0

(3) Reverse the probes and measure the voltage across the diode again.

- If diode is good, the display will read “000.0” (flickering).
- If diode is shorted, the display will show 000.0 with a beeping sound when measured in both directions.
- If the display shows “000.0” and is flickering in both directions, the diode is open.

3-5 Continuity test

Continuity testing verifies if a circuit is closed or open. Shorts are indicated by a continuous beeping tone.

(1) Set the range switch to the continuity function & diode range.
(2) Connect the probes to the circuit and listen for the beeping tone. The continuity tone confirms that the circuit is closed.

3-6 Frequency Measurement

(1) Plug the red and black test leads into the VΩ input and the COM input terminals respectively.
(2) Set the range switch to the desired frequency range. For unknown frequencies, always start from highest range and move down to lower range to select the scale for best readings.
(3) Connect the probe tips in parallel with the circuit to be measured.
(4) Read the frequency value on the display.

NOTE:

Errors of less than 5 digits are added in measurement value. To compensate for this error, check the digit error by shorting the test leads (+,-) before measuring unknown frequency and deduct this value from the final measurement.

4. MAINTENANCE

CAUTION

PLEASE OBSERVE PROPER SAFETY PRECAUTIONS WHEN ATTEMPTING TO MAINTAIN AND SERVICE THIS INSTRUMENT.

WARNING

VOLTAGES WITHIN THIS INSTRUMENT ARE SUFFICIENT ENOUGH TO BE LIFE-THREATENING, AND THEREFORE INSTRUMENT COVERS MUST ONLY BE REMOVED BY AUTHORIZED AND QUALIFIED PERSONNEL ONLY.

4-1. Fuse Replacement

- Disconnect and remove all connections from any live power source.
- Unscrew the fuse holder with a screw driver.
- Locate the defective fuse and gently remove it.
- Install a new fuse of the SAME SIZE AND RATING.
- Replace fuse holder.

CAUTION

MAKE SURE THAT THE REPLACEMENT FUSE IS OF THE EXACT SPECIFIED VALUE.

4-2. Adjustment and Calibration

The PRO-1000 should be calibrated yearly by authorized personnel only.

4-3. Cleaning and Decontamination

The PRO-1000 should be cleaned with a soft clean cloth to remove any oil, grease or grime. Never use liquid solvents or detergents. If the instrument gets wet for any reason, dry the instrument using low-pressure clean air at less than 25 PSI. Use care and caution around the window cover areas where water or air could enter into the instrument while drying.

WARRANTY

Limited One-Year Warranty

Global Specialties, LLC warrants to the original purchaser that this product and its component parts will be free from defects in workmanship and materials for a period of one year from the date of purchase.

Global Specialties, LLC will without charge, repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form a sales receipt.

To obtain warranty coverage, this product must be registered by visiting www.globalspecialties.com/warranty.php and completing the online registration form within fifteen (15) days of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alternations or repairs. Warranty is void if the serial number is altered, defaced or removed.

Global Specialties, LLC shall not be liable for any consequential damages.

Model Number: _____ **Date Purchased:**_____

Service Information

Prior to sending any unit in for warranty or non-warranty repair, the user must obtain a Return Merchandise Authorization (RMA) number from the factory. Please use the information below for the most convenient method of contact. After receipt of the RMA, return all merchandise to Global Specialties, LLC with pre-paid shipping.

Warranty Service: Please return the product in the original packaging with proof of purchase to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device.

Non-Warranty Service: Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. For the most current repair charges contact the factory before shipping the product.

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Include with the instrument your complete return shipping address, contact name, phone number and description of problem.

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