Instruction Manuals for the

Power Probe

Professional Testing Electrical Kit

POWER PROBE®

INTRODUCTION

Thank you for purchasing the NEW Power Probe III (PP3). The PP3 is our most revolutionary circuit tester to date. The PP3 literally speeds you through the diagnosing of 12 to 24 volt automotive electrical systems. After connecting the PP3's clips to the vehicle's battery, the automotive technician can determine at a glance, the voltage level and the polarity of a circuit with out running for a voltmeter or reconnecting hook-up clips from one battery pole to the other. The power switch allows the automotive technician to conduct a positive or negative battery current to the tip for activating and testing the function of electrical components without wasting time with jumper leads. And yes, the PP3 is short circuit protected. It tests for bad ground contacts instantly without performing voltage drop tests. It allows you to follow and locate short circuits without wasting precious fuses. The Power Probe can also test for continuity with the assistance of its auxiliary ground lead. With a flip of the power switch, you will know at a glance that your PP3 is functioning without running to the battery as you would otherwise have to do with simple test lights. The PP3's 20ft (extendable) cable allows you to test along the entire length of the vehicle without constantly searching for ground hook-ups. An absolute must for every automotive technician looking for a fast and accurate solution to electrical systems diagnostics.

Before using the Power Probe III please read the instruction booklet carefully.

Warning! When the PP3 switch is depressed battery current/voltage is conducted directly to the tip which may cause sparks when contacting ground or certain circuits. Therefore the Power Probe should NOT be used around flammables such as gasoline or its vapors. The spark of an energized Power Probe could ignite these vapors. Use the same caution as you would when using an arc welder.

The Power Probe III and the ECT 2000 are NOT to be used with 110/220-volt HOME electrical, it is only for use with 12-24-volt systems.

Table of Contents

IMPORTANT TIP: When powering-up components, you can increase the life of your Power Probe switch if you first press the switch, then contact the tip to the component. The arcing will take place at the tip instead of the contacts of the switch.

Hook-Up

Unroll the Power Probe cable. Connect the RED battery hook-up clip to the POSITIVE terminal of the vehicle's battery. Connect the BLACK battery hook-up clip to the NEGATIVE terminal of the vehicle's battery. When the PP3 is first connected to a battery (power source), it will sound a quick high and then low beep and go into "Power Probe Mode (PPM) (See Mode #1 on page 10) and the 2 bright white LEDs (dual head lights) will be on to illuminate the test area of the probe tip.

Quick Self-Test (PPM)

While the PP3 is in Power Probe Mode, press the power switch forward to activate the tip with a positive (+) voltage. The positive sign (+) LED should light red and the LCD display will read the battery (supply) voltage. If the tone feature is turned on, a high pitched tone will sound. Press the power switch rearward to activate the tip with a negative (-) voltage. The negative sign (-) LED should light green and the LCD display will read "0.0" (ground). If the tone feature is turned on, a low pitched tone will sound. The Power Probe is now ready to use. If the indicator did not light, depress the reset button of the circuit breaker on the right side of the housing and try the self test again.

Turning the Audio Tone On/Off (PPM)

While the PP3 is in Power Probe Mode, just do a quick press of the mode button to toggle the tone on or off. While quickly pressing (a quick press and release) the mode button, if a short high beep is heard, this means the audio tone is turned on. If a short low beep is heard, the audio tone is turned off.

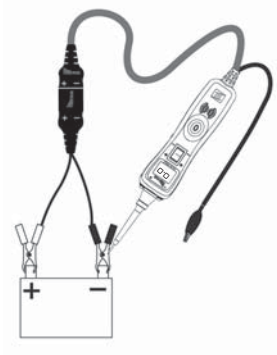
Circuit Breaker C B

In Power Probe Mode (Mode #1) with a the circuit breaker tripped, the LCD will display the symbol “C B”. (see page 11-12 for detail) All other functions of the PP3 are still active. This means that you can still probe a circuit and observe the voltage reading. When the circuit breaker is tripped, the PP3 will NOT be able to conduct battery current to the tip even when the power switch is pressed. Intentionally tripping the breaker and using the PP3 to probe can be considered an added precaution against accidental pressing of the power switch.

Voltage & Polarity Testing (PPM)

While the PP3 is in Power Probe Mode, contact the probe tip to a POSITIVE circuit. The red positive sign “+” LED will light and the voltmeter displays the voltage with a resolution of 1/10th of a volt (0.1v).
If the audio feature is turned on, a high pitched tone will sound. (See RED/GREEN POLARITY INDICATOR & AUDIO TONE on page 10)
While the PP3 is in Power Probe Mode, contact the probe tip to a NEGATIVE circuit. The green negative sign “–” LED will light and the voltmeter displays the voltage. If the audio feature is turned on, a low pitched tone will sound.

Contacting the Power Probe tip to an OPEN circuit will be indicated by neither of the LED indicators lighting.



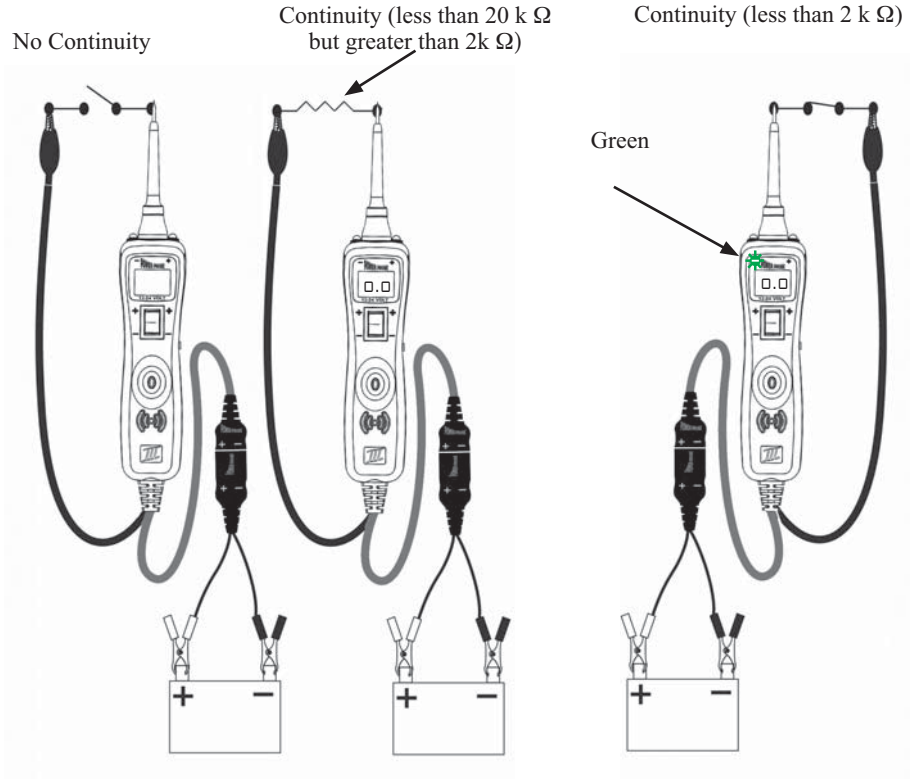
While the PP3 is in Power Probe Mode. Contact the probe tip to a NEGATIVE circuit. The green negative sign “-” LED will light. If the audio feature is turned on, a low pitched tone will sound.

While the PP3 is in Power Probe Mode, contact the probe tip to a POSITIVE circuit. The red positive sign “+” LED will light and the voltage reading of the circuit will be indicated on the LCD display. If the audio feature is turned on, a high pitched tone will sound.

Continuity Testing (PPM)

While the PP3 is in Power Probe Mode, and by using the Power Probe tip in connection with chassis ground or the auxiliary ground lead, continuity can be tested on wires and components attached or disconnected from the vehicle's electrical system.

The PP3 indicates continuity using 2 resistance levels. When the Power Probe tip has a resistance to ground less than 20K Ohms but greater than 2K Ohms the LCD will indicate "0.0" volts but no Green "-" LED. But when the resistance to ground less than 2K Ohms the LCD will indicate "0.0" volts and also the Green "-" LED. The higher resistance continuity function is useful for checking Spark Plug Wires, (disconnected from ignition) Solenoids and magnetic pickup coils, and the lower resistance continuity for testing relay coils and wiring. However the best way to prove continuity of connections to either Ground or Battery is to power up the connection using the Power Switch. If the Circuit Breaker trips you know that you have a good solid low resistance connection.



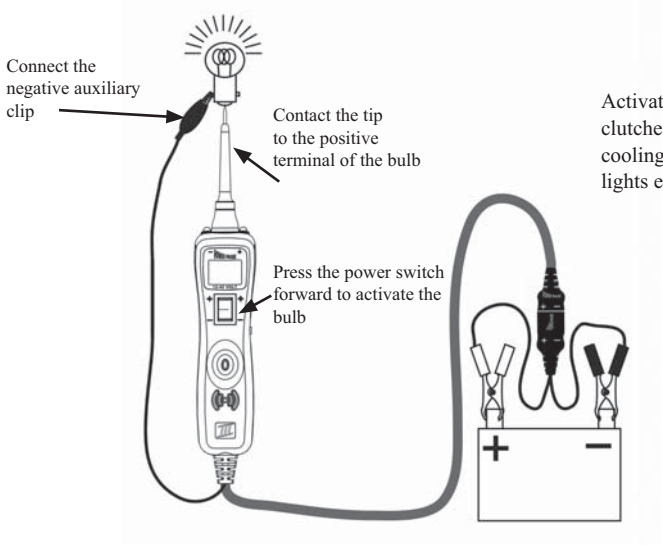
Activating Components in Your Hand (PPM)

While the PP3 is in Power Probe Mode and by using the Power Probe tip in connection with the auxiliary ground lead, components can be activated right in your hand, thereby testing their function. Connect the negative auxiliary clip to the negative terminal or ground side of the component being tested. Contact the probe to the positive terminal of the component, the green negative sign "-" LED indicator should light GREEN indicating continuity through the component.

While keeping an eye on the green LED negative sign, quickly depress and release the power switch forward (+). If the green negative sign "-" LED went out and the red positive sign "+" came on, you may proceed with further activation. If the green negative sign "-" LED went off at that instant or if the circuit breaker tripped, the Power Probe has been overloaded. This could happen for the following reasons:

- The contact you are probing is a direct ground or negative voltage.
- The component you are testing is short-circuited.
- The component is a very high current component (i.e., starter motor).

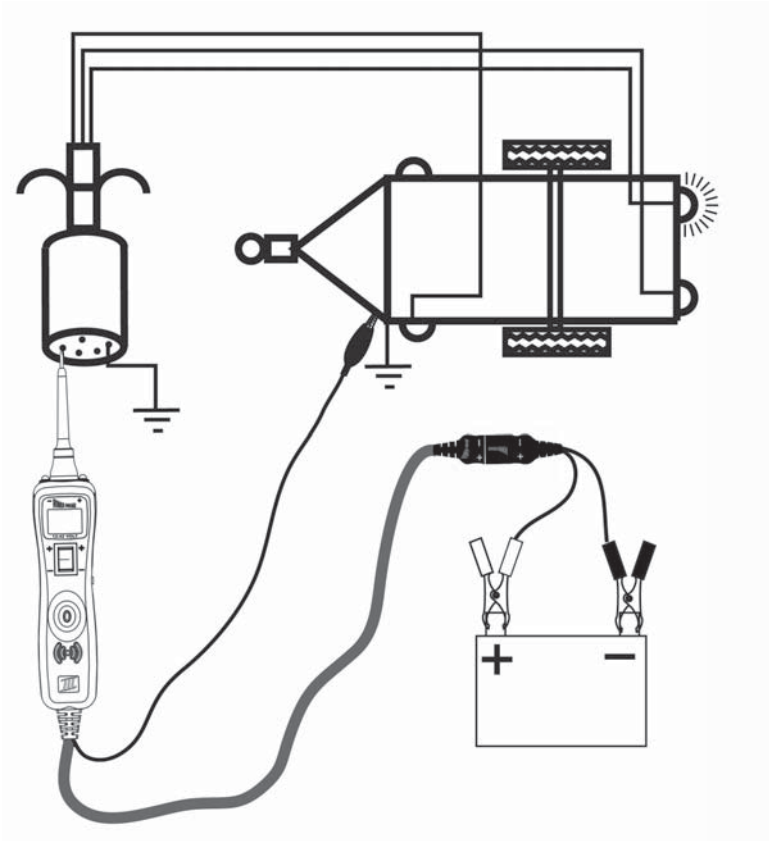
If the circuit breaker is tripped, reset it by waiting for it to cool down (15 sec.) and then depressing the reset button.



Activate fuel pumps, magnetic clutches, starter solenoids, cooling fans, blower motors, lights etc.

Testing Trailer Lights and Connections (PPM)

1. Connect the PP3 to a good battery.
2. Clip the auxiliary ground clip to the trailer ground.
3. Probe the contacts at the jack and then apply voltage to them. This lets you check the function and orientation of the connector and trailer lights. If the circuit breaker tripped, that contact is likely a ground. Reset the circuit breaker by letting it cool down (15 sec.) and depressing the reset button until in clicks into place.



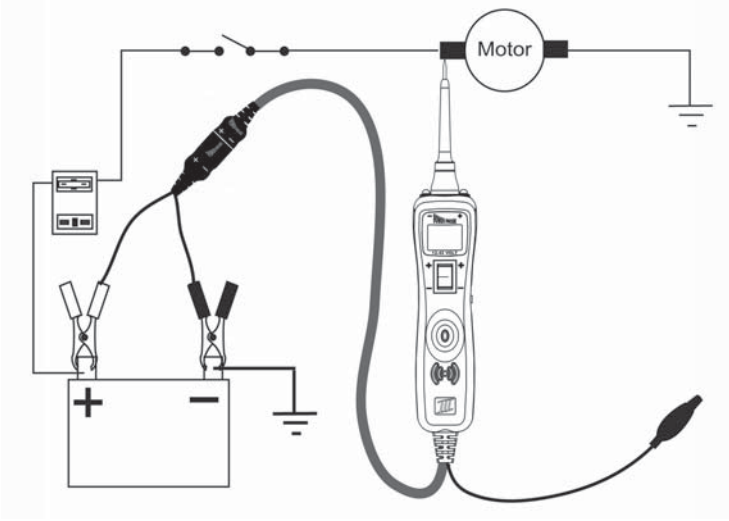
Activating components in the Vehicle (PPM)

To activate components with positive (+) voltage: Contact the probe tip to the positive terminal of the component, the green negative sign "-" LED should light. Indicating continuity to ground. While observing the green indicator, quickly depress and release the power switch forward (+). If the green indicator went out and the red positive sign (+) LED came on, you may proceed with further activation. If the green indicator went off at that instant or if the circuit breaker tripped, the Power Probe has been overloaded. This could happen for the following reasons:

- The contact is a direct ground.
- The component is short-circuited.
- The component is a high current component (i.e., starter motor).

If the circuit breaker tripped, reset it by allowing it to cool down (15 sec.) and then depress the reset button.

Warning: Haphazardly applying voltage to certain circuits can cause damage to a vehicle's electronic components. Therefore, it is strongly advised to use the vehicle manufacturer's schematic and diagnosing procedure while testing.



TRICK: When powering-up components, you can increase the life of your Power Probe switch if you first press the switch, then contact the tip to the component. The arcing will take place at the tip instead of the contacts of the switch.

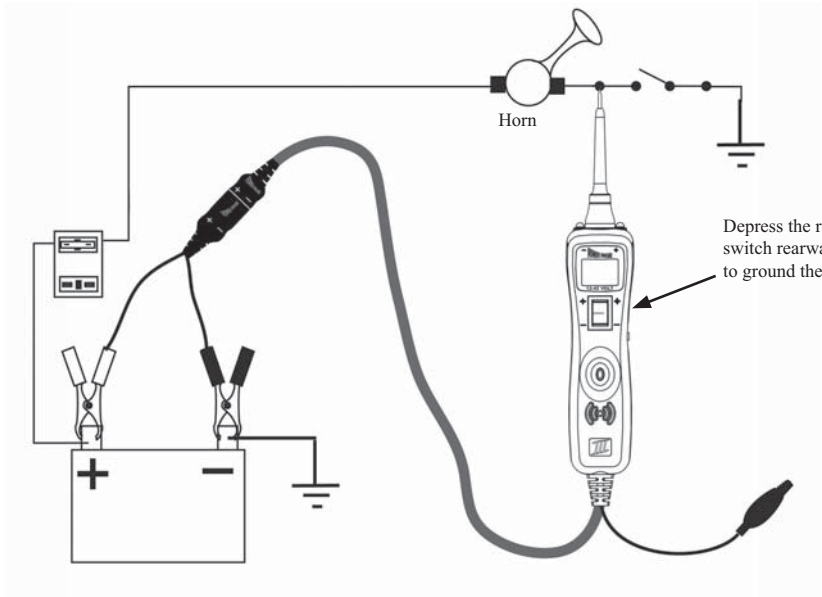
Activating Electrical Components w/Ground (PPM)

Contact the probe tip to the negative terminal of the component, the LED indicator should light RED. While observing red positive sign "+" LED, quickly depress and release the power switch rearward (-). If the red indicator went out and the green negative sign (-) came on you may proceed with further activation. If the green indicator went off at that instant or if the circuit breaker tripped, the Power Probe has been overloaded. This could have happened for the following reasons:

- The contact is a direct positive voltage.
- The component is short-circuited.
- The component is a very high current component (i.e., starter motor).

If the circuit breaker tripped, reset it by allowing it to cool down (15 sec.) and then depress the reset button.

WARNING: With this function, if you are contacting a protected circuit, a vehicle's fuse can be blown or tripped if you apply ground to it.



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Checking for Bad Ground Contacts (PPM)

Probe the suspected ground wire or contact with the probe tip.
Observe the green negative sign "-" LED. Depress the power switch forward then release.
If the green negative sign "-" LED went out and the red positive sign "+" came on, this is not a true ground.
If the circuit breaker tripped, this circuit is more than likely a good ground. Keep in mind that high current components such as starter motors will also trip the circuit breaker.

Following & Locating Short Circuits (PPM)

In most cases a short circuit will appear by a fuse or a fusible link blowing or an electrical protection device tripping (i.e., a circuit breaker). This is the best place to begin the search.
Remove the blown fuse from the fuse box. Use the Power Probe tip to activate and energize each of the fuse contacts. The contact which trips the PP3 circuit breaker is the shorted circuit. Take note of this wire's identification code or color. Follow the wire as far as you can along the wiring harness, for instance if you are following a short in the brake light circuit you may know that the wire must pass though the wiring harness at the door sill. Locate the color-coded wire in the harness and expose it. Probe through the insulation with the Power Probe tip and depress the power switch forward to activate and energize the wire. If the Power Probe circuit breaker tripped you have verified the shorted wire. Cut the wire and energize each end with the Power Probe tip. The wire end which trips the Power Probe circuit breaker again is the shorted circuit and will lead you to the shorted area. Follow the wire in the shorted direction and repeat this process until the short is located. ECT200 uses a wireless non-contact technique that guides you to the short/open location.

Red/Green Polarity Indicator & Audio Tone

The "RED/GREEN Polarity Indicator" lights-up when the probe tip voltage matches the battery voltage within ± 0.5 volts. This means that if you contact a circuit that is not a good ground or a good hot, you will see this instantly by the "RED/GREEN Polarity Indicator" NOT lighting. The Audio Tone runs parallel to the "RED/GREEN Polarity Indicator and will also NOT react when contacting a circuit that does not match the battery voltage thin ± 0.5 volts.

Modes

The Power Probe III has been designed to work the same as the previous Power Probe circuit testers. Using the advanced features and modes is optional. However, understanding them will expand your diagnosing capabilities. The LCD display indicates voltage levels of the circuit along with an identifying symbol showing you what mode it is in. The additional features contain 5 new modes which give you specific information about how the circuit is reacting.

The 5 Modes can be accessed by depressing the Mode button and cycling through each one.

Mode #1 Power Probe Mode: While the PP3 is in "Power Probe Mode" and the probe tip is floating (not contacting a circuit), the LCD backlight is on but the display is blank. If the audio tone is turned on you will see a speaker symbol in the lower right corner of the display. Once you contact the probe tip to a circuit the LCD display will indicate the average voltage level of the circuit. The red/green polarity indicator (See section Red/Green Polarity Indicator and Audio Tone) will respond also, showing weather the circuit is positive or negative.
A secondary feature in this mode is the peak to peak threshold detection and signal monitoring. When contacting a signal generating circuit such as a speaker wire with audio signals on it, the PP3 detects the peak to peak signals and displays the peak to peak voltage on the display, the sound of the signals will be monitored and heard through the PP3 speaker. The peak to peak threshold levels are pre-selected by the operator in "Mode 5". See Mode #5 for more information on setting threshold levels. Placing the PP3 probe tip next to a sparkplug wire (NOT probing it directly), allows you to monitor the sound of the ignition pulses at the same time display a peak to peak reading The PP3 senses the pulses in ignition wires through capacitive coupling (DO NOT CONTACT PROBE TIP DIRECTLY TO THE SECONDARY IGNITION CIRCUIT). By monitoring each plug wire in this way you can locate missing cylinders.

Mode #2 Negative Peak Mode: The Negative Peak Mode monitors a positive circuit and captures the lowest voltage that it has dropped to. To do this: Place the PP3 in "Negative Peak Mode" by pressing and holding the mode button for 1 second until you hear a low pitched beep and the LCD display indicates a negative (minus) sign in the lower left corner. The display should also indicate a reading of "0.0" with the probe floating. (This is because no voltage is present). Probe the positive circuit you want to test and tap the mode button once. The LCD display will show the lowest detected voltage of the circuit. If the circuit drops in voltage at anytime, a new lowest reading will be captured and displayed. You can then do a quick tap of the mode button once again to reset the LCD display and indicate the new voltage level on the circuit. Reset the LCD display by doing a quick tap of the mode button as often as necessary.

An APPLICATION for the use of the "Negative Peak Mode": Lets say you have a circuit that is suspect of loosing a connection and the voltage drops, causing something to turn off or malfunction. Probing the circuit and monitoring it in "Negative Peak Mode" will instantly indicate as the circuit drops in voltage. You can monitor the circuit while wiggling wires and pulling on connectors to see if the voltage drops. Since the minimum voltage reading is captured and held on the display, you can inspect it at a later time. You could also perform a battery crank test.

Mode #3 Positive Peak Mode: The "Positive Peak Mode", monitors the probed circuit and captures the highest detected voltage. Place the PP3 into "Positive Peak Mode" by pressing and holding the mode button for 1 second until you hear a beep. Repeat this until you hear a quick high pitched beep and the LCD display indicates a positive (plus) sign in the lower left corner. The display should also indicate a reading of "0.0" with the probe tip floating. Probe the circuit and the PP3 instantly displays and holds the highest voltage reading. This means you can remove the probe away from the circuit and the voltage reading remains displayed for your reference. Reset the LCD display by doing a quick tap of the mode button.

An APPLICATION for the use of the "Positive Peak Mode": Let's say you have a circuit that is supposed to be off and is suspected of turning on inappropriately or getting a signal for some reason. Probing the circuit and monitoring it in the "positive peak mode" will instantly indicate as the circuit increases in voltage. You can monitor the circuit while wiggling wires and pulling on connectors to see if the voltage increases. Since the maximum voltage reading is captured and held on the display, you can inspect the reading at a later time.

Maybe you have to probe a circuit deep under a dash and the display is obstructed from view. In "Positive Peak Mode" just probe the wire then remove the probe and look at your voltage reading. Connect to starter terminal to capture maximum voltage to the starter while cranking. Quickly finds voltage drops in the wiring & start connection (Solenoid).

Mode #4 Peak to Peak Mode: The Peak to Peak Mode measures the difference between the positive and negative peak voltage levels over a 1 second period. With this feature you can measure and monitor for example, the diode rectifier in a charging system while the engine is running. The peak to peak readings will give the technician the data necessary to determine if a diode rectifier is defective or not. A normal peak to peak reading while testing a charging circuit is usually under a volt. If a defective rectifier is present the peak to peak reading will be over 1 volt and possibly over 3 volts.
When probing in "Peak to Peak Mode" the display shows activity of circuits such as fuel injectors, distributor pick-ups, cam and crank sensors, oxygen sensors, wheel speed sensors, hall effect sensors. Measures fly back voltage of injectors to quickly find a problem.

Mode #5 Threshold Level Setting for the Peak to Peak Detection in Power Probe Mode" (Mode #1) This mode is only used to adjust the threshold voltage in "Power Probe Mode" for Peak to Peak Detection and Signal Monitoring.
To set the threshold level for the peak to peak detection in "Power Probe Mode", press and hold the mode button for one second until you hear a beep. Repeat this a second, third and forth time and/or until an alternating positive (+) and negative (–) sign is present in the bottom left corner of the LCD display. You can now toggle the threshold level by a quick tap of the mode button and observing the voltage level settings. The peak to peak threshold voltage settings loop incrementally from 0.2, to 0.5, to 1.0, to 2.0, to 5.0, to 10.0, to 50.0 and return back to 0.2 again. AN audio installer would find the 0.2v setting convenient. Once you select the desired threshold voltage, press and hold the mode button again until it beeps. This returns you to the "Power Probe Mode" (Mode #1). You will know that you are in the "Power Probe Mode" when the LCD display is blank and/or with the "Speaker Symbol" shown in the bottom right corner.

Navigation	Mode#	Display	Mode/Function	Output
When the Power Probe III is initially connected to the vehicles battery or a 12-24 volt power supply, it enters Mode #1 automatically. To enter into Mode #2 press & hold Mode button until you hear a low pitched beep.	**#1**		**Power probe Mode:** with Audio Tone On	Displays the average D.C. voltage. Displays the Peak to Peak A.C. voltage when the voltage is greater than *Mode 5 Threshold* setting. Limited to 65v
			Power probe Mode: with Audio Tone Off	
			**Power probe Mode:** with the Circuit Breaker tripped with Audio Tone Off	
			**Power probe Mode:** with the Circuit Breaker tripped with Audio Tone On	
To enter into Mode #3 press & hold Mode button until you hear a high pitched beep.	**#2**		**Negative Peak to Peak Mode**	Captures the most *Negative* voltage transition.
To enter into Mode #4 press & hold Mode button until you hear a low to high pitched beep.	**#3**		**Positive Peak to Peak Mode**	Captures the most *Positive* voltage transition.
To enter into Mode #5 press & hold Mode button until you hear a mid pitched beep.	**#4**		**Peak to Peak Mode**	Displays the difference between *Peak to Peak* voltage.
To return to Mode #1 press & hold Mode button, until you hear the high & low beep.	**#5**	 Actively alternating + to - to + , etc.	**Peak to Peak Threshold Setting Mode:** Detects Peak to Peak in Power Probe Mode.	Sets the *Peak to Peak Threshold Level* for the Mode #1 display to transition from D.C. to A.C.

Power Probe 3 Specifications

DC 0 – 70V + 1 digit
P-P 0 – 70V

Frequency response of tone pass through
10Hz to greater than 10 Khz

PP display
15Hz Square Wave
35Hz Sine Wave

Power Probe Mode – Continuity to ground
First level – display is enabled less than 20K
Second level – green LED is enabled less than 2K

– & + Peak Detector Response
Single event capture less than 200ms pulse width
Repetitive events less than 1ms pulse width

Peak to Peak Mode

0 – 70V + 1 digit
4Hz to over 500Khz Square Wave input
4Hz to over 250Khz Sine Wave input

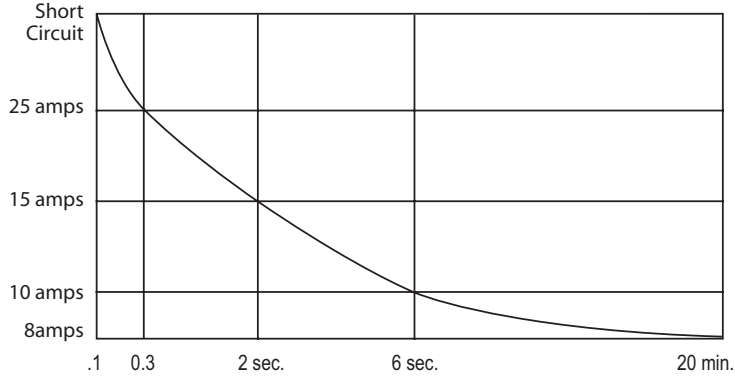
Threshold for PPAC/Audible passthrough

Circuit Breaker

8 amp thermal response – Manual reset

Typical Response

8 amp	*10 amps*	*15 amps*	*25 amps*	*Short Circuit*
No trip	*20 min.*	*6 sec.*	*2 sec.*	*0.3 sec.*

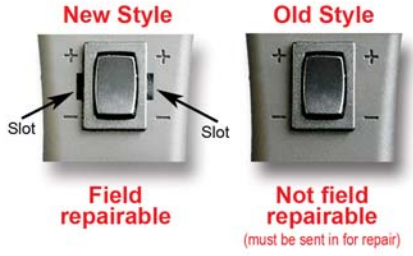


Rocker Switch Replacement

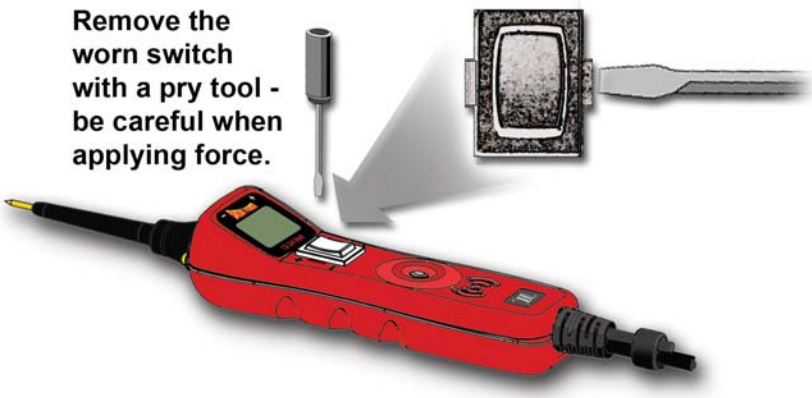
Power Probe 3

(with Rocker Switch slots)

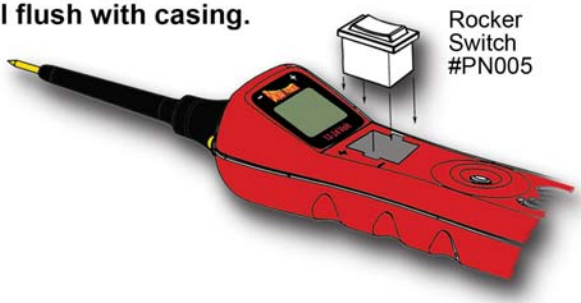
The NEW PP3 with the Rocker Switch slots makes it easy to replace a worn switch in the field without having to send it in for repair.



Remove the worn switch with a pry tool - be careful when applying force.

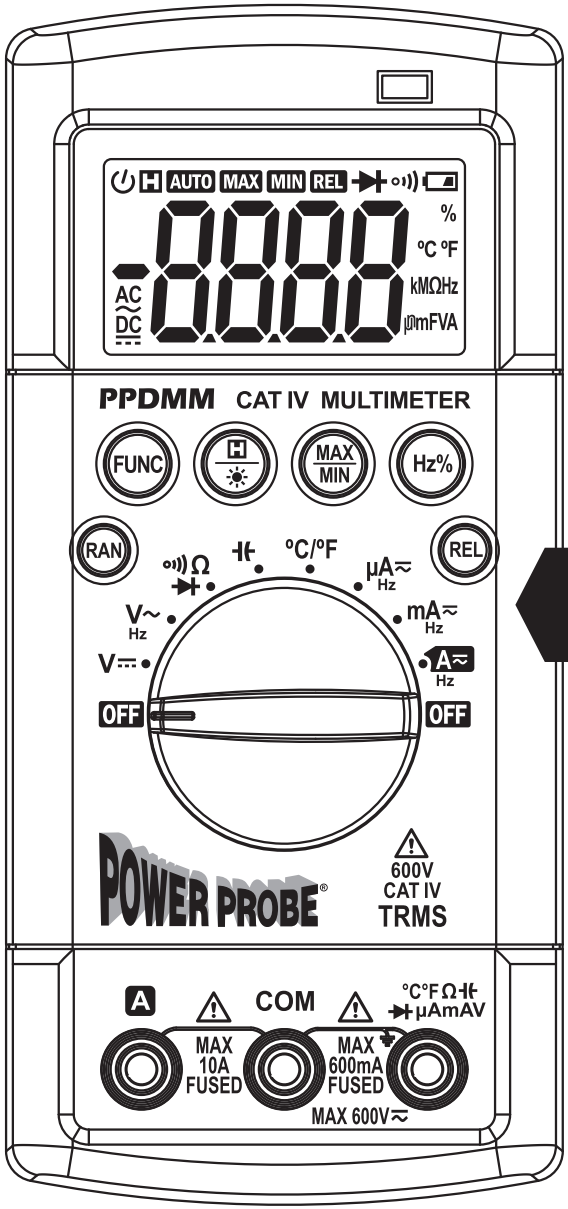


Make sure to install the switch straight and press until flush with casing.



POWER PROBE®

DIGITAL MULTIMETER



PPDMM

C ETL LISTED US
Intertek
3080912

CE

CAT.IV
600V

1. GENERAL SPECIFICATIONS

PPDMM is a stable, safe, reliable compact digital handheld 6000 count auto-ranging multimeter. This meter can measure AC/DC voltage, AC/DC current, resistance, capacitance, frequency, duty cycle, temperature, diodes and continuity. This meter is ideal for many situations, whether you're a professional or causal user.

- **Operating Altitude:** 2000m
- **Relative Humidity:** 75% max operating
- **Operating Temperature:** 0°C~40°C/32°F~104°F (<80% RH)
- **Storage Temperature:** -10°C~60°C/14°F~140°F (<70% RH)
- **Accuracy Temperature:** -18°C~28°C/64°F~82°F (<80% RH)
- **Temperature Coefficient:** 0.1x(specified accuracy)/°C (<18°C or >28°C)
- **Sampling Frequency:** approx. 3 times/sec.
- **Fuse Protection:** μA/mA input: F600mA/600V 10A input: F10A/600V

- **DC/AC Voltage:** 600V
- **DC/AC Current:** 10A
- **Resistance:** 60MΩ
- **Capacitance:** 60mF
- **Frequency:** 10kHz
- **Duty cycle:** 0.1%~99%
- **Diodes:** 2.7V
- **Continuity:** <50Ω
- **Temperature:** -20°C~1000°C/-4°F~1832°F

- **LCD Display:** 3 ¾ digit display (6000 counts)
- **Product Supply:** 3×1.5V AAA batteries
- **Product Size:** 160mm×74mm×49mm / 6.3"×2.9"×1.9"
- **Product Weight:** 482g / 1.06lb
- **Safety Rating:** CAT IV 600V; pollution degree: II
- **Safety Standards:** IEC61010-1
- **Pollution Degree:** 2
- **Accuracy:** ±(of reading + # of least significant digits)

2. ⚠ WARNINGS

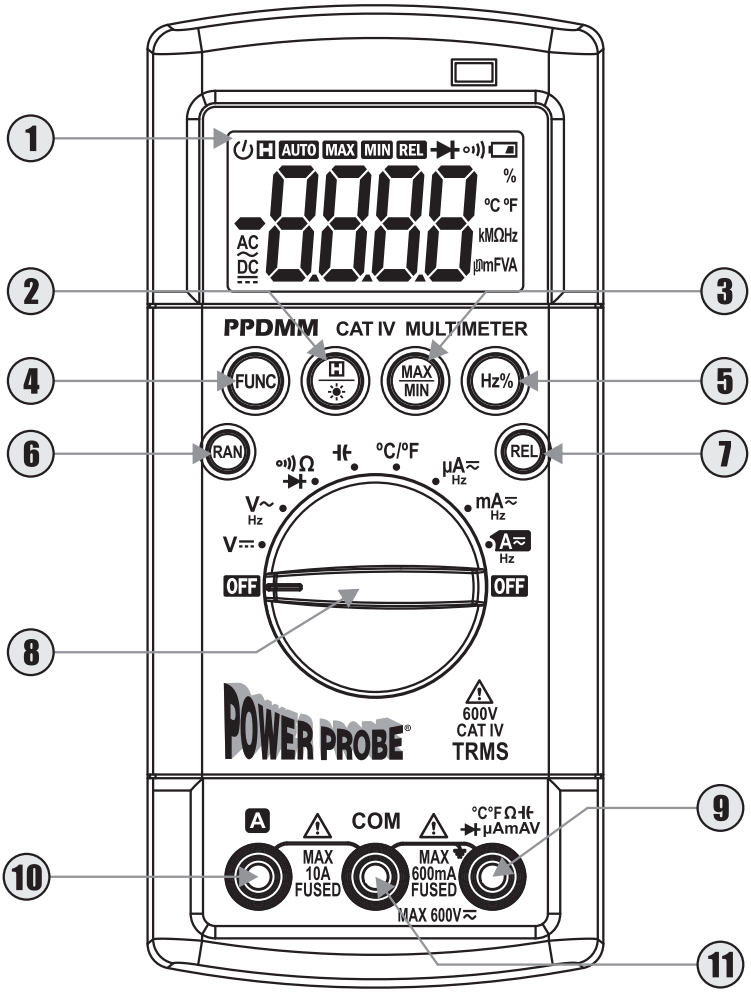
To avoid electric shock and injury or damage to the meter, observe the following safety methods:

- Check the meter before use to make sure there was no damage during transit.
- Check that the insulation on the test leads is not damaged and/or wires are not exposed.
- If any faults or abnormalities are observed, the meter should not be used and should be checked out prior to use.
- Never exceed the protection limit values indicated in specifications for each range of measurement.
- Always be careful when working voltages above 60V DC or 30V AC rms, keep fingers behind the probe barrier while measuring.
- Make sure the rotary switch is in the correct position before measurement.
- Never use the meter in an environment with explosive gas, vapor or dust.
- Always keep fingers behind probe barriers when making measurements.
- When connecting test leads to a circuit, connect the black test lead first, then the red lead. Disconnect in the opposite order.
- Turn off power and discharge all capacitors first before measuring resistance, continuity or diodes.
- Failure to follow safety guidelines could compromise the safety features of this meter.
- Do not use the meter without the battery cover in place.
- Replace the batteries as soon as the low battery symbol "  " to avoid false reading that could lead to electric shock and injury.
- Remove test leads from all circuits before opening the battery cover.

3. SAFETY SYMBOLS

⚠	Important safety information	⏚	Ground
~	AC(alternating current)	▣	Double insulation protection
⎓	DC(direct current)	▭	Fuse
≂	DC/AC Voltage or Current	CE	Compliance with EU regulations

4. FEATURE DETAILS



1.LCD Display

2.Hold/Backlight Button

Press "  " to hold the current reading on the display. Press the button again to release the hold Hold "  " to turn on the backlight.
Hold the button again to manually turn off the backlight.

3.Max/Min Button

In all modes (except continuity, diode, capacitance), press "Max/Min" and the display will show the maximum value recorded since the button was pressed. Press the button again and the display will show the minimum value recorded. Pressing the button a third time will show the difference between the max and min value. Hold "Max/Min" to return the display to normal readings.

4.Function Switch Button

Press "**FUNC**" to switch between functions or between AC/DC current.

5.Frequency/Duty Cycle Button (Hz/%)

In AC voltage/current modes, press "Hz%" and the display will show the frequency measurement. Press the button again to switch to duty cycle. Press the button a third time to return to normal display.

6.Range Button

In voltage, current and resistance modes, the default range is auto.
To enter manual range, press "**RAN**". Each press of the button increases the range, and returns to the lowest range when pressed in the highest range. Hold "**RAN**" to return to auto range.
(Only auto range is available in capacitance mode)

7.Relative Measurement Button

In all modes (except resistance, continuity, diode), press "REL" and the display will show the relative value, i.e. the difference between the stored value when the button was pressed and the currently measured value. (REL = stored value – currently measured value) Press the button again to return the display to normal. (In REL mode, auto range is disabled)

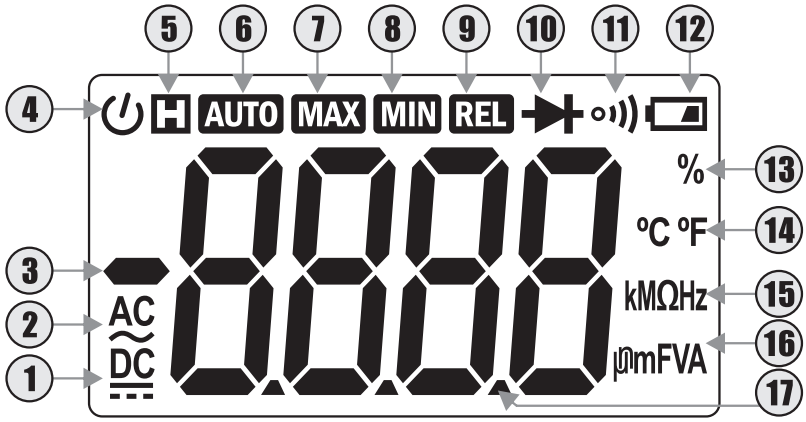
8.Rotary Switch

9.Input Jack (all measurements; current below 600mA)

10.A Jack (current measurements between 600mA-10A only)

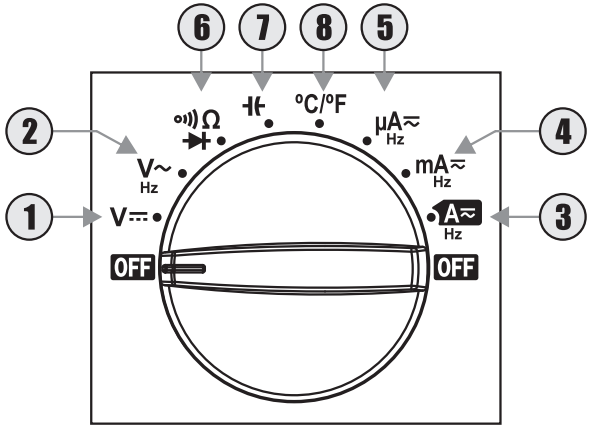
11.Common Jack (all measurements)

5. DISPLAY FUNCTION INSTRUCTIONS

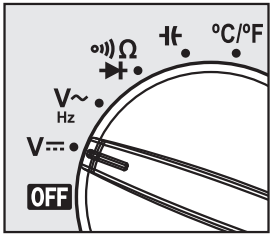


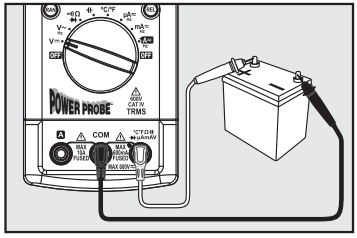
1	DC	Direct Current
2	AC	Alternating Current
3	▬	Negative DC Value
4	⏻	Auto Power Off
5	H	Data Hold
6	AUTO	Auto Range Active
7	MAX	Maximum Display
8	MIN	Minimum Display
9	REL	Relative Display
10	▶|	Diode Test
11	•))	Continuity Test
12	▭	Low Battery
13	%	Duty Cycle Mode
14	°C	Temperature in Celsius
14	°F	Temperature in Fahrenheit
15	kMΩ	Resistance
15	Hz	Frequency
16	µF	Capacitance
16	µmA	DC/AC Current
16	mV	DC/AC Voltage
17	▲	Main Display

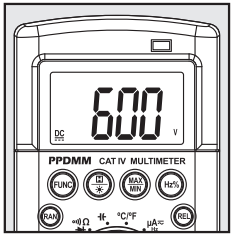
6. ROTARY SWITCH FUNCTION INSTRUCTIONS



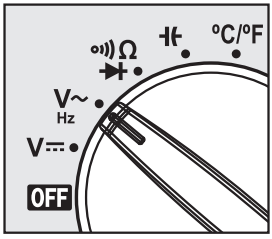
1. DC Voltage: <600V (RAN) (H) (MAX MIN) (REL)

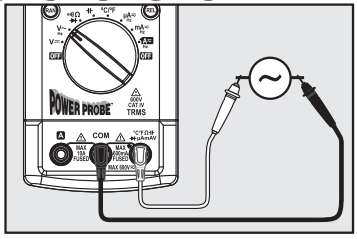


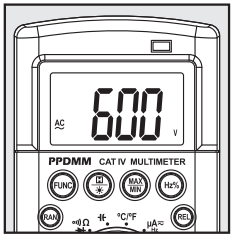




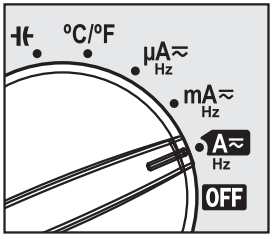
2. AC Voltage: <600V (RAN) (H) (MAX MIN) (Hz%) (REL)

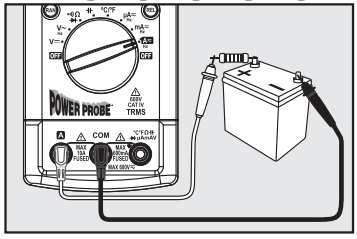


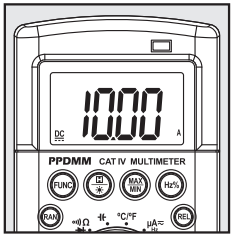




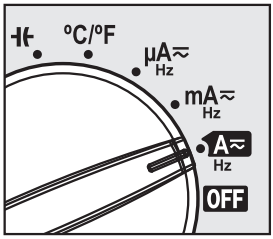
3.1 DC Current (large): <10A (RAN) (FUNC) (H) (MAX MIN) (REL)

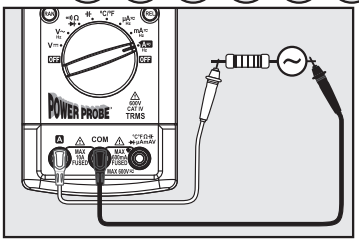


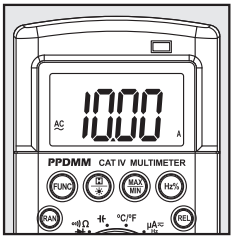




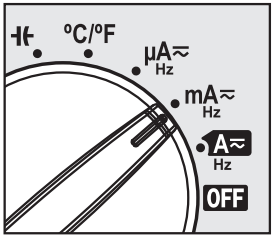
3.2 AC Current (large):<10A (RAN) (FUNC) (☼) (MAX MIN) (Hz%) (REL)

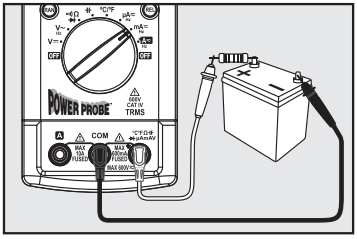


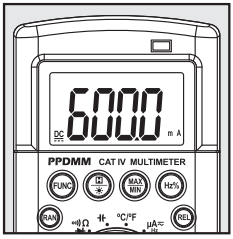




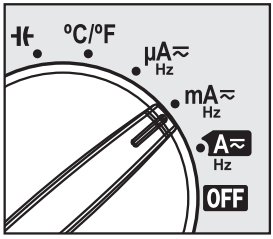
4.1 DC Current (Middle):<600mA (RAN) (FUNC) (☼) (MAX MIN) (REL)

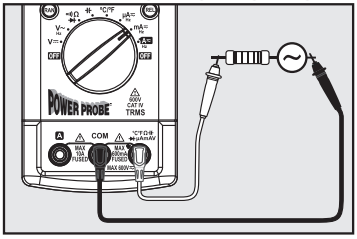


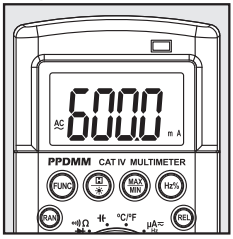




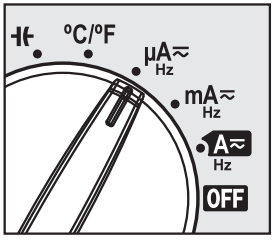
4.2 AC Current (Middle):<600mA (RAN) (FUNC) (☼) (MAX MIN) (Hz%) (REL)

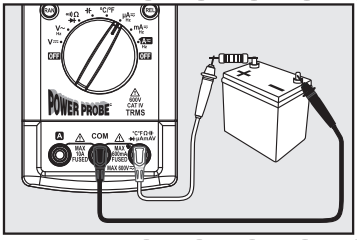


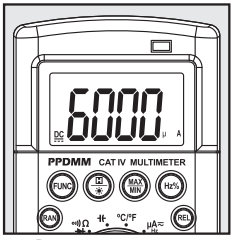




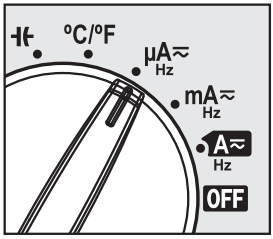
5.1 DC Current (Small):<6000μA (RAN) (FUNC) (☼) (MAX MIN) (REL)

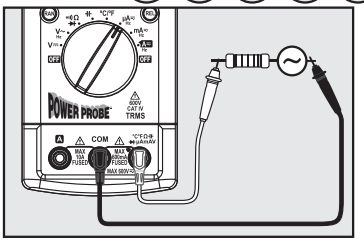


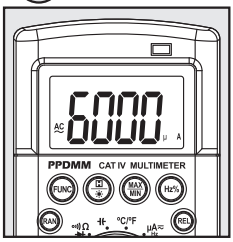




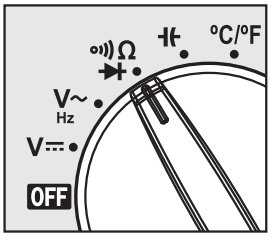
5.2 AC Current (Small):<6000μA (RAN) (FUNC) (☼) (MAX MIN) (Hz%) (REL)

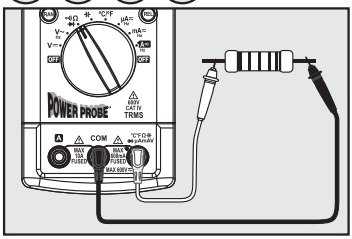


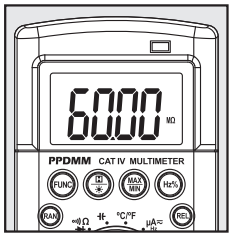




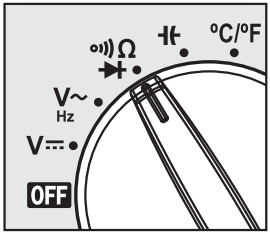
6.1 Resistance: <60MΩ (RAN) (FUNC) (☼) (MAX/MIN)

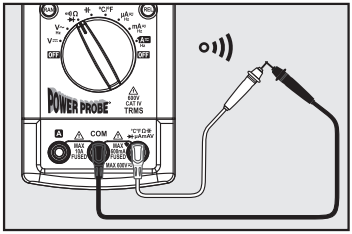


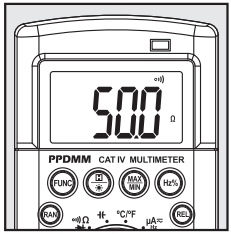




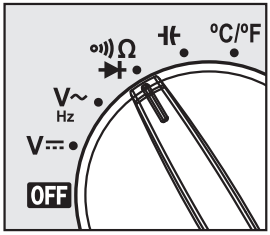
6.2 Continuity: <50Ω (FUNC) (☼)

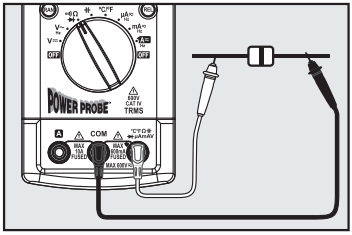


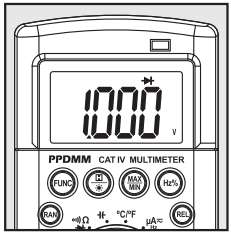




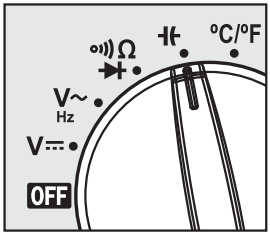
6.3 Diode Test: <1V (FUNC) (☼)

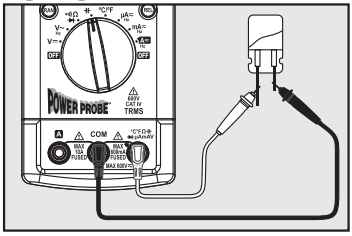


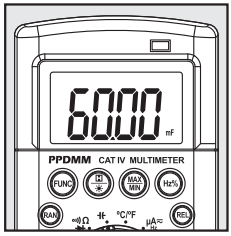




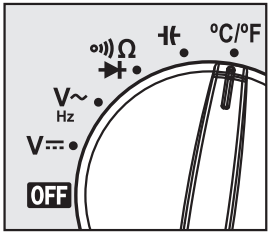
7. Capacitance: <60mF (☼) (REL)

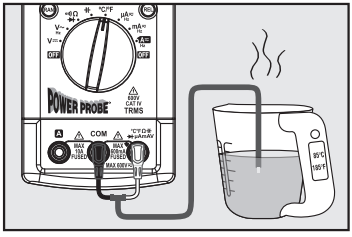


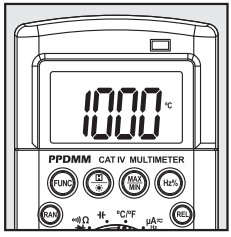




8. Temperature: -20°C~1000°C/-4°F~1832°F (FUNC) (☼) (MAX/MIN) (REL)







7. ELECTRICAL SPECIFICATIONS

DC Voltage Measurement		
Range	**Resolution**	**Accuracy**
600mV	0.1mV	±(0.5% of reading +2 digits)
6V	0.001V	
60V	0.01V	
600V	0.1V	

- **Input impedance: 10MΩ**
- **Max. input voltage: 600V rms**

AC Voltage Measurement		
Range	**Resolution**	**Accuracy**
600mV	0.1mV	±(1.0% of reading +5 digits)
6V	0.001V	
60V	0.01V	
600V	0.1V	

- **Input impedance: 10MΩ**
- **Max. input voltage: 600V rms**
- **Frequency response: 40~400Hz, calibrated to rms of sine wave (average response)**

DC Voltage Measurement		
Range	**Resolution**	**Accuracy**
600μA	0.1μA	±(1.0% of reading +5 digits)
6000μA	1μA	
60mA	0.01μA	
600mA	0.1μA	
10A	10mA	±(2.0% of reading +10 digits)

- **Overload protection:**
  μA/mA input: Fuse(F600mA/600V) 10A input: Fuse (F10A/600V)
- **Max. input current:**
  μA/mA input: 600mA rms 10A input: 10A rms

AC Voltage Measurement		
Range	**Resolution**	**Accuracy**
600μA	0.1μA	±(1.2% of reading +5 digits)
6000μA	1μA	
60mA	0.01μA	
600mA	0.1μA	
10A	10mA	±(2.5% of reading +10 digits)

- **Overload protection:**
  μA/mA input: Fuse(F600mA/600V) 10A input: Fuse (F10A/600V)
- **Frequency response: 40~400Hz,**
  calibrated to rms of sine wave (average response)
- **Max. input current:**
  μA/mA input: 600mA rms 10A input: 10A rms

Resistance Measurement		
Range	**Resolution**	**Accuracy**
600Ω	0.1Ω	±(0.8% of reading +5 digits)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	±(2.0% of reading +5 digits)

- **Max. input voltage: 600V rms**

Continuity Test	
Overload Protection	**Open Circuit Voltage**
600V RMS	Appx. 3.0V

- **Max. input voltage: 600V rms**

Diode Test		
Overload Protection	**Test Current**	**Open Circuit Voltage**
600V RMS	Appx. 1mA	Appx. 3.0V DC

- **Max. input voltage: 600V rms**

Capacitance Measurement		
Range	**Resolution**	**Accuracy**
1nF	0.001nF	±(4.0% of reading +10 digits)
10nF	0.01nF	±(3.0% of reading +10 digits)
100nF	0.1nF	
1μF	1nF	
10μF	10nF	
100μF	100nF	
1mF	1μF	
10mF	10μF	±(4.0% of reading +10 digits)
60mF	10μF	

- **Max. input voltage: 600V rms**

Frequency (cont.) (AC voltage)		
Range	**Resolution**	**Accuracy**
99.99Hz	0.01Hz	±(1.5% of reading +5 digits)
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
>10kHz	0.01kHz	Reference only

- **Signal input range: ≥0.2V AC rms**
  (voltage input will increase as frequency increases)
- **Input impedance: 10MΩ**
- **Max. input voltage: 600V rms**

Frequency (AC current)		
Range	**Resolution**	**Accuracy**
99.99Hz	0.01Hz	±(1.5% of reading +5 digits)
999.9Hz	0.1Hz	
>1kHz	0.001kHz	Reference only

- **Signal input range: μA: ≥60μA rms mA: ≥6mA rms A: ≥0.6A rms**
  (current input will increase as frequency increases)
- **Max. input current: 10A rms**

Duty Cycle		
Range	**Resolution**	**Accuracy**
0.1%~99.9%	0.1%	±3.0%

- **In current mode:**

  Signal input range: μA: ≥60μA rms mA: ≥6mA rms A: ≥0.6A rms
  (current input will increase as frequency increases)
  Max. input current: 10A rms

- **In voltage mode:**

  Signal input range: ≥0.6V AC rms
  (voltage input will increase as frequency increases)
  Input impedance: 10MΩ
  Max. input voltage: 600V rms

Temperature Measurement		
Range	**Resolution**	**Accuracy**
-20°C~1000°C	1°C	±(2.0% of reading +3 digits)
-4°F~1832°F	1°F	

- **Overload protection: Fuse (F600mA/600V)**

8. MAINTENANCE

This section provides basic maintenance principles, including replacing batteries and fuses.

Do not attempt to repair or perform any maintenance on the meter not included in the section below unless you are qualified personnel.

9. CLEANING

⚠ WARNINGS

To prevent injury or damage to the meter, do not allow moisture inside the casing. Before opening the battery cover/case, disconnect test leads from all circuits.

Clean the meter regularly with a damp cloth and a small amount of detergent; do not use abrasives or solvents. Dirty/wet input jacks can affect readings.

To clean input jacks:

1. Turn off the meter and remove test leads.
2. Brush off any dirt or contaminants from the input jacks.
3. Use a cotton swab with a cleaner/lubricant (i.e. WD40) to clean the input jack.
4. Use a new swab on each jack to prevent cross contamination.

10. REPLACING THE BATTERIES

⚠ WARNINGS

To avoid false reading that could lead to injury or damage to the meter, replace the batteries as soon as the "▭" symbol appears. Turn off the meter and remove the test leads before opening the battery cover to avoid injury or damage to the meter.

To replace the batteries:

1. Turn off power to the meter.
2. Remove test leads from input jacks.
3. Loosen the screw on the battery cover and remove cover from meter.
4. Replace used batteries with new batteries.
5. Replace battery cover and secure to meter.

11. REPLACING THE FUSES

⚠ WARNINGS

To prevent injury or damage to the meter, turn off power to the meter and disconnect test leads from input before opening case.

To replace the fuses:

1. Turn off power to the meter.
2. Remove test leads from input jacks.
3. Remove the 6 screws on the back case and remove back case from meter.
4. Replace blown fuse(s) with a new fuse.
5. Replace back cover and secure to meter.

12. DISPOSAL / RECYCLE

Caution: This symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal.

POWER PROBE®

SERVICE

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