

Pro'sKit®

MT-1505

Automatic Pocket Meter

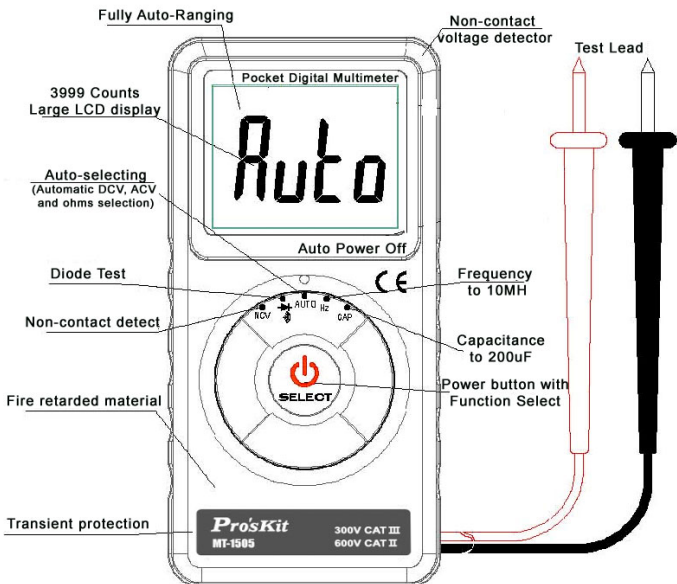


User's Manual

1st Edition 2012

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Front panel description



Introduction

This unique meter has a full complement of features in a compact package only 3/8 inch deep and weighing less than 3 oz. The essential shirt-pocket size meter for portability. Model MT-1505 is fully auto-ranging and has an oversized, easy-to-read digital display. It offers the Auto-Select feature that guides the meter to display AC volts, DC volts or resistance based on what you are measuring. This meter is fully rated to CAT III levels. The meter MT-1505 includes measurement extras such as non-contact voltage detector of

AC voltages, capacitance, frequency, diode and continuity plus safety extras such as transient protection to 4 kV and overload protection to either 600 V.

Safety Information

- The MT-1505 Automatic Pocket Meter is certified for EN61010-1:2001; CAT II 450 V, CAT III 300 V, class 2 and pollution deg. 2.
- This instrument is EN61010-1 certified for Installation Category II (600V). It may only be used to make measurements on energy limited circuits within equipment and not directly connected to mains.
- This instrument is EN61010-1 certified for Installation Category III (300 V). It is recommended for use with local level power distribution, appliances, portable equipment, etc., where only smaller transient over-voltages may occur, and not for primary supply lines, overhead lines and cable systems.
- Do not exceed the maximum overload limits per function (see specifications), the limits marked on the instrument itself. Never apply more than 600 between the test lead and earth ground.
- Inspect the DMM, test leads and accessories before every use. Do not use any damaged part.
- Never ground yourself when taking measurements. Do not touch exposed circuit elements or test probe tips.
- Do not operate the instrument in an explosive atmosphere.
- Remove test leads from circuit before opening the case.
- Always measure current in series with the load – NEVER ACROSS a voltage source.

Turning the Meter On and Off

- Press the Power button for approximately 3 seconds to turn the meter on.
- To turn the meter off, press the Power button until the display goes blank.

Making Measurements

All measurements described in this manual use the Red test lead for positive (+) polarity and Black test lead for Ground reference (-) unless otherwise specified

Auto-Select Mode

- The Auto-Select feature automatically selects measurement function of V dc, V ac, or resistance based on the input via the test leads.
- With no input, the meter displays Auto when it is ready.
- With no voltage signal but a resistance below 40M Ω is present, the meter displays the resistance value, this function is auto-ranging
- When a signal above the threshold of 0.6 V dc or 1.6V ac up to the rated 600 V is present, the meter displays the appropriate voltage value in dc or ac, whichever larger in peak magnitude, this function is auto-ranging
- The Auto-Select test With High input impedance: 10M Ω which ensure the Best accuracy.

Overload-Alert Feature

When above rated 600 V is present, the meter displays OL with a warning beep tone. Disconnect the test leads from the signal immediately to avoid hazards.

Continuity & diode

With Auto on the LCD, switch to Continuity function. The meter will show a symbol of diode display, then press the power button momentarily 1 times to enter into continuity function with a symbol of speaker. A continuous beep tone indicates a closed circuit.

Continuity is used for checking wiring connections and operation of switches.

Frequency

With Auto on the LCD, switch to frequency function, the meter displays Hz when it is ready. This function is auto-ranging.

Capacitance

With Auto on the LCD, switch to capacitance function, the meter displays nF when it is ready. This function is auto-ranging.

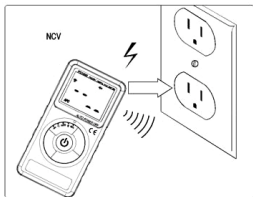
Electric Field EF-Detection, Non-Contact Voltage

When Auto displayed on the LCD, switch to select the NCV function. The meter displays EF. Signal strength is indicated as a series of bar graph segments on the display and variable beep tones. See the specifications later in this manual for a complete description of the bar graph indicators.

An antenna is located at the top right corner of the meter, which detects , electric field surrounding current-carrying conductors. It is ideal for tracing live wiring connections, locating wiring breakage and to distinguish between live or earth connections.

Probe-Contact EF-Detection

For more precise indication of live wires, such as distinguishing between live and ground sockets, use the V ac manual function selection for direct contact voltage measurements.



Product Maintenance

Maintenance

Do not attempt to repair this meter. It contains no user serviceable parts. Repair or servicing should only be performed by qualified personnel. Cleaning periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for periods of longer than 60 days, remove the battery and store it separately.

Troubleshooting

If the instrument fails to operate, check battery, leads, and replace battery as necessary. Double-check operating procedure as described earlier in this manual.

Battery Replacement

If the meter starts up with persistent resetting display or with low battery icon turns on, replace the battery. The meter uses one 3 V coin battery IEC-CR2032.

- To replace the battery, turn off the meter.
- Disconnect the test leads from live circuits.
- Loosen the screw on the case bottom.
- Lift the end of the case bottom nearest the input test leads until it unsnaps from the case top.
- Replace the battery cover and tighten the screw. Recycle the battery using approved methods.
- Replace the battery. Observe battery polarities with positive (+) faces up (towards the case bottom). Replace the case bottom, and ensure that the snap on the case top (near the LCD side) is engaged.
- Replace and tighten the screw.

To avoid electrical shock, disconnect test leads from live circuits before opening the case. Do not operate with open case.

Specifications

(1) General Specifications

- **Display and Update Rate:** 3-3/4 digits 3999 counts; Updates 3 per second nominal
- **Operating Temperature:** 0 °C - 40 °C
- **Operating Relative Humidity:** Maximum 80% R.H. up to 31 °C, decreasing linearly to 50% R.H. at 40 °C
- **Altitude:** Operation below 2000 m
- **Storage Temperature:** -20 °C ~ 60 °C, < 80% R.H. (with battery removed)
- **Temperature Coefficient:** Nominal 0.15 x (specified accuracy)/ °C @ (0 °C ~ 18 °C or 28 °C ~ 40 °C), or otherwise specified

- **Sensing:** Average sensing
- **Overload Protection:** 600V dc and V ac rms
- **Low Battery:** Below approx. 2.4 V
- **Power Supply:** 3 V standard button battery x 1 (IEC-CR2032)
- **Power Consumption (typical):** 1.2 mA
- **APO Consumption (typical):** 2.0 μ A
- **APO Timing:** Idle for 10 minutes
- **Dimension / Weight:** L115 mm x W 57 mm x H 12 mm / Approx. 75gm

(2) **Special Features Auto-Select (Automatic V and Ω selection) and Electric Field Detection**

Safety: Meets IEC61010-1(2001), CAT II 600 V and CAT III 300V, Pollution Degree 2, Class 2

E.M.C. Meets EN61326 (2006), EN61000- 3-2 (2000), and EN61000-3-3 (1995+A1:2001). CE Marking. However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit.

Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electronic interference.

(3) **Electrical Specifications (Accuracy @ 23 °C +/- 5 °C and < 75% R.H.)**

Auto-select

DC Voltage

Range	Resolution	Accuracy
4V	1mV	$\pm(0.7\%rd+4d)$
40V	10mV	
400V	100mV	
600V	1V	$\pm(0.8\%rd+5d)$

Input Impedance: 10 M Ω , Max Input:600V DC

AC Voltage

Range	Resolution	Accuracy
4V	1mV	$\pm(0.8\%rd+4d)$
40V	10mV	
400V	100mV	
600V	1V	$\pm(1.2\%rd+4d)$

Range Accuracy: 40 Hz – 1K Hz, Input Impedance: 10 M Ω ,
Max Input: 600V AC

Resistance

Range	Resolution	Accuracy
400 Ω	0.1 Ω	$\pm(0.8\%rd+2d)$
4K Ω	1 Ω	
40K Ω	10 Ω	
400K Ω	100 Ω	

4M Ω	1K Ω	
40M Ω	10K Ω	$\pm(2.0\%rd+5d)$

Max Input: 250V DC/AC

Capacitance

Range	Resolution	Accuracy
40nF	10pF	$\pm(4.5\%rd+6d)$
400nF	0.1nF	
4 μ F	1nF	
40 μ F	10nF	
200 μ F	100nF	

- 1) Accuracy below 40 nF is not specified
- 2) Top range. Updates > 1 minute on large values
- 3) Specified with battery voltage above 2.8 V (half full battery). Accuracy decreases gradually to 12% at low battery warning voltage of approx. 2.4 V.
- 4) Max Input: 250V DC/AC

Frequency

Range	Resolution	Accuracy
40Hz	0.01Hz	$\pm(1.0\%rd+5d)$
400Hz	0.1Hz	$\pm(0.5\%rd+5d)$
4KHz	1Hz	
40KHz	10Hz	
400KHz	100Hz	

4MHz	1KHz	
10MHz	10KHz	$\pm(1.5\%rd+5d)$

Max Input: 250V DC/AC

EF Detection

Indication: Bar graph segments & audible beep tones proportional to field strength
 Detection Frequency: 50/60 Hz
 Detection Antenna: Top right corner of the meter

Typical Voltage	Bar Graph Indication
15V-55V	-
30V-85V	--
55V-145V	---
ABOVE120V	----

Audible Continuity Tester

Resolution:<100Ω

Open Circuit Voltage: 0.5 V DC typical

Max Input:250V DC/AC

Diode Test


Range: 0.1-2V

Resolution: 1mV

MT-1505 智能口袋型電錶

使用說明書

爲了確保人身安全和防止損壞儀錶，使用者在使用之前必須仔細閱讀本說手冊中的安全注意事項。

1. 接通儀錶電源時顯示  符號說明電池工作電壓低應及時更換電池。
2. 檢查表筆，絕緣應完好無損，無斷線、脫頭和銅線裸露現象。
3. 檢查儀錶殼體，應無破裂損壞現象。
4. 按測量需要將檔位元開關置於正確位置。
5. 表筆接入被測電路時應先接黑表筆，表筆與被測電路分離時應先斷開紅表筆。
6. 當改變功能或檔位時任何一根表筆均要與被測電路斷開。
7. 爲避免損壞儀錶，不要輸入超每個功能檔位所規定的最大值。
8. 在測量高電壓時，應謹慎小心避免觸電，特別是不要接觸被測電路並保持一定距離，以確保人身安全。
9. 當使用儀錶進行測量時，絕對不要打開後蓋，以免有觸電危險。
10. 在打開後蓋更換電池前，應將表筆離開被測電路，並關斷電源。
11. 在進行電流測量時，應確保儀錶是串接在被測回路中。
12. 當你的儀錶或手是濕的時候請勿使用儀錶進行測量。
13. 爲避免電擊。切勿使用已經損壞或不能進行正常操作的儀錶。



14. 雖然有自動關機功能，但測量完畢後，還是要即刻關斷電源。
15. 不要改動儀錶內部電路，以免損壞儀錶及安全。
16. 應避免在直射陽光、高溫、高濕、易燃易爆及蒸汽和粉塵大的環境中使用或存放。

一、特點

此卡片表是擁有自動測量功能（ACV、DCV、OHM）專利技術的智慧數位電錶。採用大螢幕LCD 4000位元顯示。可用來測量交直流電壓，電阻，電容，頻率，二極體，通斷等。具有自動選擇，自動檔位，自動關機及全功能符號顯示等功能。該儀錶具有結構精巧，操作容易，攜帶方便等優點，是電氣測量的理想工具，該產品具有以下特點：

- 安全設計符合IEC1010國際標準。全系列產品通過CE國際安全認證。
- 殼體採用ABS阻燃材料，安全更有保證。
- 智慧自動選擇測量（ACV、DCV、OHM），10分鐘自動關機功能
- 全功能、檔位元超載保護，保護電壓250V有效值。
- 高內阻保證最小的測量誤差（10 MΩ）液晶顯示字高18mm。

二、一般特性

- 2.1：安全規範：IEC1010- II 級
- 2.2：最大顯示：3999
- 2.3：採樣速率：每秒3次
- 2.4：過量程顯示：顯示OL,並有蜂鳴器聲音提示
- 2.5：自動負極性： 指示
- 2.6：低電壓指示：顯示符號 “ ”
- 2.7：自動關機：開機10分鐘後自動切斷電源，重複開機按鈕操作可開機

- 2.8：工作環境：0-40°C，相對濕度<75%
- 2.9：儲存環境：溫度-10-50°C，相對濕度<75%
- 2.10：電源：3V鈕扣電池一顆。型式：CR2032，功耗：約2mW
- 2.11：外形尺寸：114.8mm X 56.9mm X 11.6mm
- 2.12：重量：約75g(包括電池和表筆)
- 2.13：附件：透明蓋，使用說明書，彩盒包裝。

三、使用方法


3-1：直流電壓(DCV)

量程	解析度	準確度
4V	1mV	±(0.7%rd+4d)
40V	10mV	
400V	100mV	
600V	1V	±(0.8%rd+5d)

輸入阻抗10MΩ，最大輸入電壓600V DC或AC（有效值）。

當輸入的測量電壓高於36V安全電壓時，高壓警示符號“OL”會出現，提示安全操作。

警告：為避免觸電或損壞儀錶，請不要嘗試測量高於600V DC的電壓。

- 1-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。
- 1-2：將功能選擇開關旋至AUTO的位置，
- 1-3：用紅、黑表筆分別接觸到被測電源的兩端。
- 1-4：此時液晶顯示幕顯示出被測信號的數值、單位、和極性等，如紅、黑測棒和被測電源的正負極性接反，則液晶顯示幕的極性指示標記“ ”會出現。此時表示被測電源與表筆的指示的極性相反，調換表筆即可。

3-2：交流電壓(ACV)

量程	解析度	準確度
4V	1mV	±(0.8%rd+4d)

40V	10mV	
400V	100mV	
600V	1V	

輸入阻抗10M Ω ，最大輸入電壓600V DC或AC（有效值）。

頻率範圍：40Hz-1KHz. 回應：平均值（正弦波有效值）

當輸入的測量電壓高於36V安全電壓時，高壓警示符號

“ OL ” 會出現，提示安全操作。

2-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

2-2：將功能選擇開關旋至AUTO的位置

2-3：用紅、黑表筆分別接觸到被測電源的兩端。

2-4：此時液晶顯示幕顯示出被測信號的數值、單位、和極性等。

3-3：電阻(OHM)

檔位	解析度	準確度
400 Ω	0.1 Ω	$\pm(0.8\%rd+2d)$
4K Ω	1 Ω	
40K Ω	10 Ω	
400K Ω	100 Ω	
4M Ω	1K Ω	
40M Ω	10K Ω	$\pm(2.0\%rd+5d)$

開路電壓約為0.5V，超載保護：250V DC 或 AC(有效值)

3-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

3-2：將功能選擇開關旋至AUTO的位置

3-3：用紅、黑表筆分別接觸到被測電阻的兩端。

3-4：此時液晶顯示幕顯示出被測電阻的數值、單位等。

3-4：電容 (CAP)

檔位	解析度	準確度
40nF	10pF	$\pm(4.5\%rd+6d)$
400nF	0.1nF	

4uF	1nF	
40uF	10nF	
200uF	100nF	

超載保護：250V DC 或 AC(有效值)

4-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

4-2：將功能選擇開關旋至CAP的位置。

4-3：用紅、黑表筆分別接觸到被測電容的兩端。

4-4：此時液晶顯示幕顯示出被測電容的數值、單位等。

3-5：頻率(FREQ)

檔位	解析度	準確度
40Hz	0.01Hz	$\pm(1.0\%rd+5d)$
400Hz	0.1Hz	$\pm(0.5\%rd+5d)$
4KHz	1Hz	
40KHz	10Hz	
400KHz	100Hz	
4MHz	1KHz	$\pm(1.5\%rd+5d)$
10MHz	10KHz	

輸入電壓範圍：0.5V－10V AC(有效值)（隨著被測量的頻率增大，輸入電壓也應隨之增大）。

超載保護：250V DC 或 AC（有效值）

頻率回應：0－10MHz

5-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

5-2：將功能選擇開關旋至Hz的位置，

5-3：用紅、黑表筆分別接觸到被測頻率的兩端。

5-4：此時液晶顯示幕顯示出被測頻率的數值、單位等。

3-6：二極體測試

量程	解析度	功能
Diode	1mV	顯示近似二極體正向電壓值

正向直流電流約為1mA,反向直流電壓約為0.5V

超載保護：250V DC 或 AC（有效值）

6-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

6-2：將功能選擇開關旋至二極體的位置，

6-3：用紅、黑表筆分別接觸到被測二極體的兩端。

6-4：此時液晶顯示幕顯示出被測二極體的數值、單位等。如顯示OL，則說明二極體和表筆接反，調換表筆即可。

3-7：通斷測試

量程	功能
Beep	如果被測線路電阻小於100Ω，儀錶內置蜂鳴器將發聲

開路電壓約為0.5V

超載保護：250V DC 或 AC（有效值）

7-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

7-2：將功能選擇開關旋至通斷的位置，顯示幕將顯示二極體符號，快速按下電源鍵，進入到通斷測試，此時顯示幕顯示蜂鳴器符號。

7-3：用紅、黑表筆分別接觸到被測器件的兩端。

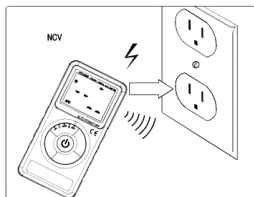
7-4：如果被測線路電阻小於100歐姆，則內置蜂鳴器會發聲。

3-8：非接觸電壓檢測

檔位	功能
NCV	如果被測線路有交流電壓存在，儀錶內置蜂鳴器將發聲

8-1：按壓儀錶中心的矽橡膠按鍵3秒以上開機。

8-2：將功能選擇開關旋至NCV的位置，這時，手持儀錶，用儀錶的右上端靠近被測源，如被測源的信號幅度大於15伏的峰值，則第一條模擬指示會上移到液晶中間位置。




8-3：具體的測試顯示靈敏度和電壓幅度的對應關係，請參照下表。

檢測範圍	類比指示顯示
15V-55V	-
30V-85V	--
55V-145V	---
ABOVE120V	----

四、保養

4-1：更換電池

在打開底殼之前，應將表筆從測量電路移開，以避免電擊危險。

4-1-1：如果“”符號出現，表明應該更換鈕扣電池（CR2032）。

4-1-2：旋開底殼的4顆緊固螺絲，取下後殼。

4-1-3：將舊電池移開，更換新的電池（注意更換相同規格的電池）

4-1-4：將底殼按原樣裝回。並緊好4顆固定螺絲。

4-2：更換表筆

更換表筆時，必須更換同樣的或相同等級的表筆，表筆必須完好。表筆的等級：600V,1A。

4-2-1：如果表筆絕緣層破環，如導線的金屬絲裸露，必須更換表筆。

4-2-2：旋開底殼的4顆緊固螺絲，取下後殼。

4-2-3：更換舊表筆。

4-2-4：然後剝好導線並焊接在原來的位置。

4-2-5：將底殼按原樣裝回。並緊好4顆固定螺絲。

Pro'sKit[®]



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