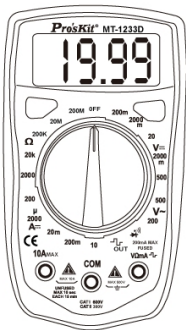


Pro'sKit®

MT-1233C/MT-1233D 3-1/2 Digital Multimeter

CE



User's Manual

1st Edition' 2013

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






INTRODUCTION

Warning

To avoid electric shock or personal injury, read "Safety Information" and its Warning and Precautions" before using the Meter

Safety information

- This series meter Comply with IEC 1010-1 CAT I 600V / CAT II 300V overvoltage standards. See specifications
- Use the Meter only as specified in this manual, otherwise the protection provided by the Meter may be impaired.
- In this manual a Warning identifies conditions and actions that pose hazards to the user.
- A caution identifies conditions and actions that may damage the meter or the equipment under test
- International symbols used on the Meter and in this manual are explained Table

Table 1. International Electrical Symbols	
	AC (Alternating Current)
	DC (Direct Current)
	AC or DC
	Battery
	Safety information* Refer to the manual
	Earth ground
	Fuse
	Conforms to European Union directive
	Double insulated

WARNING AND PRECAUTIONS

To avoid possible electric shock or personal injury, and to avoid possible damage to the meter or to the equipment under test, comply with the following practices:

- Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors.
- Inspect the test leads for damaged insulation or


- Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
- Do not operate the meter around explosive gas, vapor, or dust.
- Do not apply more than the rated voltage, as marked on the meter between terminals or between any terminal and earth ground.
- Before use, verify the meter's operation by measuring a known voltage.
- When measuring current, turn off circuit power before connecting the meter in the circuit.
- When servicing the meter, use only specified replacement parts. Do not use the Meter in a manner not specified by this manual or the safety features of the meter may be impaired.
- Use with caution when working above 30V ac rms, 42V ac peak, or 60V dc. Such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.
- Connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
- Remove the test leads from the meter before you open the battery door. Do not operate the meter

with the battery door or portions of the cover removed or loosened.

- To avoid false readings, which could lead to possible
 - Safety Compliance: IEC 61010-1, 2000 CAT I 600V overvoltage standards Do not measure voltages above 500V in Category installations
- Overvoltage installations categories per IEC 61010-1, 2000: The meter is designed to protect against transients in these categories:

- CAT I** From high-voltage low-energy sources, e.g., electric circuits or a copy machine
- CAT II** From equipment supplied from the fixed installation, e.g., TVs, PCs, portable tools and household appliances
- CAT III** From equipment in fixed equipment installations, e.g. installation panels, feeders and short branch circuits, and lighting systems in large buildings.

General specifications

- ◆ Maximum Voltage between any Terminal and Earth Ground: 1000V
- ◆ Measurement rate: updates 2-3/sec.
- ◆ Over range indication: "1" figure only in the display
- ◆ Automatic negative polarity indication.
- ◆ The  is displayed when the battery voltage drops below the operating voltage
- ◆ operating temperature: 0°C ~40°C, 0-75% RH.

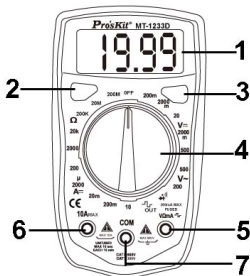
- ◆ Storage temperature: $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$, 0-75% RH.
- ◆ Power: Single standard 1.5V battery AAx2
- ◆ Dimensions: 130L*72W*28H mm
- ◆ Weight approx: 130g (not including battery)

FRONT PANEL DESCRIPTION

1. LCD Display
2. DATA HOLD button
3. BACK LIGHT button
4. FUNCTION AND RANGE SWITCH

This switch is used to select the function and desired range as well as to turn on the instrument. To extend the life of this battery, the switch should be in the "OFF" position when the instrument is not in use.

5. "VΩmA" JACK
6. "10A" JACK
7. "COM" JACK



SPECIFICATIONS

Accuracies are guaranteed for 1 year, $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, less than 80%RH

DC VOLTAGE

Range	Resolution	Accuracy
200mV	100uV	±0.8%+3d
2000mV	1mV	
20V	10mV	
200V	100mV	
500V	1V	±(1.0%+3d)

OVERLOAD PROTECTION: 220V rms AC for 200mV range and 500V DC or 500V rms for all ranges.

AC VOLTAGE

Range	Resolution	Accuracy
200V	100mV	±1.2%+5d
500V	1V	

RESPONSE: Average responding, calibrated in rms of a sine wave.

FREQUENCY RANGE: 40Hz ~400Hz

OVERLOAD PROTECTION: 500V DC or 500V rms for all ranges.


DC CURRENT

Range	Resolution	Accuracy
2000uA	1 uA	$\pm(1.2\%+5d)$
20mA	10 uA	
200mA	100 uA	
10A	10mA	$\pm(2.5\%+5d)$


OVERLOAD PROTECTION: 200mA 250V fuse (10A range unused).

MEASURING VOLTAGE DROP: 200mV


AUDIBLE CONTINUITY


RANGE	DESCRIPTION
	Built-in buzzer sounds if resistance is less then $30\pm 20\Omega$

OVERLOAD PROTECTION: 5 second maximum 220V rms.

 **WARNING:** DO NOT input any voltage at this range for safety!

SQUARE-WAVE OUTPUT (MT-1233D Only)

RANGE	DESCRIPTION
	The output of about 50Hz square wave test signal

 **WARNING:** DO NOT input any voltage at this range for safety!

RESISTANCE

Range	Resolution	MT-1233C	MT-1233D
200Ω	0.1Ω	±(1.5%+5d)	
2000Ω	1Ω	±(1.0%+3d)	
20kΩ	10Ω		
200kΩ	100Ω		
20MΩ	10KΩ	±(1.0%+5d)	
200MΩ	100KΩ	-	±[1.0%(rdg -10)+10d]

MAXIMUM OPEN CIRCUIT VOLTAGE: 2.3V.

OVERLOAD PROTECTION: 5 seconds maximum
220Vrms.

⚠ WARNING: DO NOT input any voltage at
resistance range for safety!

TEMPERATURE (MT-1233C only)

RANGE	RESOLUTION	ACCURACY
-40°C~150°C	1°C	±(1.0%+3d)
150°C~1000°C		±(1.5%+15d)
-40°F~302°F	1°F	±(1.0%+4d)
302°F~1832°F		±(1.5%+15d)

⚠ WARNING: DO NOT input any voltage at this
range for safety!

OPERATING INSTRUCTIONS

⚠WARNING

- ✧ To avoid electrical shock hazard and/or damage of the Instrument, do not measure voltages that might exceed 600V above earth ground.
- ✧ Before the use of instrument, inspect test leads, connectors and probes for cracks, breaks, cracks in the insulation.
- ✧ Dangerous voltages may be present at the input terminals and may not be displayed.
- ✧ To avoid electrical shock or damage to the meter when measuring resistance or continuity in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

DC & AC VOLTAGE MEASUREMENT

1. Connect red test lead to "V Ω mA" jack, Black lead to "COM" jack.
2. Set RANGE switch to desired VOLTAGE position, if the voltage to be measured is not known before hand, set switch to the highest range and reduce it until satisfactory reading is obtained.
3. Connect test leads to device or circuit being measured.
4. Turn on power of the device or circuit being measured voltage value will appear on Digital Display along with the voltage polarity.


DC CURRENT MEASUREMENT

1. Red lead to "VΩmA". Black lead to "COM"(for measurements between 200mA and 10A connect red lead to "10A" jack with fully depressed.)
2. RANGE switch to desired DCA position.
3. Open the circuit to be measured and connected test leads INSERIES with the load in with current is to measure.
4. Read current value on Digital Display.
5. Additionally, "10A"function is designed for intermittent use only. Maximum contact time of the test leads with the circuit is 15 seconds with a minimum intermission time of seconds between tests.

RESISTANCE MEASUREMENT

1. Red lead to "VΩmA". Black lead to "COM".
2. RANGE switch to desired OHM position.
3. If the resistance being measured is connected to a circuit, turn off power and discharge all capacitors before measurement.
4. Connect test leads LO circuit being measured.
5. Read resistance value on Digital Display.

DIODE MEASUREMENT

1. Red lead to "VΩmA", Black lead to "COM".
2. RANGE switch to "" position.

3. Connect the red test lead to the anode! of the diode to be measured and black test lead to cathode.
4. The forward voltage drop in mV will be displayed. If the diode is reversed, figure "1" will be shown.

TEMPERATURE MEASUREMENT

(MT-1233C only)

1. Connect the K type thermoelectric couple to "VΩmA" and "COM" jacks.
2. RANGE switch to TEMP position.
3. The display will read Temperature value °C

AUDIBLE CONTINUITY TEST

1. Red lead to "VΩmA", Black lead to "COM".
2. RANGE switch to "•)))" position.
3. Connect test leads to two points of circuit to be tested. If the resistance is lower than $30\Omega \pm 20\Omega$, the buzzer will sound.

TEST SIGNAL USE (MT-1233D only)

1. RANGE switch to "⏏" position.
2. A test signal (50Hz) appears between "VΩmA" and "COM" jack, the output voltage is approx 3V p-p with about 50KΩ impedance.

MAINTENANCE

Beyond replacing batteries and fuses, do not attempt to repair or service your Meter unless you are qualified to do so and have the relevant calibration, performance test and service instruments. The recommended calibration cycle is 12 months.

To clean the terminals

- a) Push the Meter OFF and remove test leads.
- b) Shake out any dirt that may be in the terminals.
- c) Soak a new swab with isopropyl and work around the inside of each input terminal
- d) Use a new swab to apply a light coat of fine machine oil to the inside of each terminal.

FUSES TEST

Warning

To avoid electric shock or injury, remove the test leads and any input signals before replacing the fuses

1. Turn the rotary switch to 200mA position.
 2. Use a multimeter to measure resistance of "V Ω mA" terminal or 10A terminal to COM terminal.
- ✧ A good mA terminal or 10A terminal fuse is indicated by a reading between 0 Ω and 10 Ω .
 - ✧ If the display is overloaded, replace the fuse and

If the display shows any other value, have the meter serviced. See "Service and Parts" later in this manual.

BATTERY AND FUSE REPLACEMENT

- 1) Battery and fuse replacement should only be done after the test leads have been disconnected and power is off.
- 2) Loosen screws with suitable screwdriver and remove case bottom.
- 3) The meter is powered by 1.5V battery (AAAx2). Snap the battery connector leads to the terminals of a new battery and reinsert the battery into the case top. Dress the battery leads so that they will not be pinched between the case bottom and case top.
- 4) The meter is protected by fast action fuse 0.2mA/250V, dimensions is ϕ 5*20mm.
- 5) Replace the case bottom and reinstall the three screws, never operate the meter unless the case bottom is fully dosed.

ACCESSORIES

- User's manual
- Set of test leads(CAT I 600V work)
- K type thermoelectric couple (MT-1233C only)

SERVICE AND PARTS

If the Meter fails, check the batteries and fuses first, and then review this manual to make sure that you are operating the Meter correctly

一、 概述


MT-1233C/D 儀錶是一種功能齊全，性能穩定，結構新穎，安全可靠的小型掌上型 3 1/2 位元數位萬用表，可用於測量交直流電壓、直流電流、電阻、二極體正向壓降，有些還可以測量溫度和線路通斷，是廣大用戶隨身攜帶的理想維修工具。本使用說明書包括有關的安全資訊和警告提示等，請仔細閱讀有關內容，並嚴格遵守所有的警告和注意事項。

二、 裝箱部件

- | | |
|-----------------------|-----|
| 1. 使用說明書 | 1 本 |
| 2. 測試錶棒 | 1 副 |
| 3. 溫度探頭（僅限於 MT-1233C） | 1 個 |

三、 安全操作準則

請注意“警告標識及警告字句”。警告表示對使用者構成危險。對儀錶或被測設備可能造成損壞的情況或行動。MT-1233C/D 系列儀錶嚴格遵循電子測量儀器安全要求以及安全標準 IEC61010 進行設計和生產，符合雙重絕緣、過電壓標準(CAT I 600V、CAT II 300V)和污染等級 2 的安全標準。請遵循手冊的使用說明使用儀錶，否則儀錶所提供的保護功能可能會削弱或失去。





1. 使用前應檢查錶棒絕緣層應完好，無破損及斷線。如發現錶棒線或儀錶殼體的絕緣已明顯損壞，或者您認為儀錶已無法正常工作，請勿再使用儀錶。
2. 在使用錶棒時，必須始終確保您的手指放在錶棒手指保護環之後。
3. 不要在儀錶終端及接地之間施加 500V 以上的電壓，以防電擊和損壞儀錶。
4. 被測電壓高於直流 60V 和交流 42V rms 的場合，應小心謹慎，防止電擊危險。
5. 儀錶後蓋沒有蓋好前，嚴禁使用儀錶，否則有電擊的危險。
6. 被測信號不允許超過規定的極限值，以防電擊和損壞儀錶。
7. 嚴禁量程開關在測量中改變檔位，以防損壞儀錶。
8. 不允許使用 10A 測試端子或用電流檔去測量電壓。
9. 必須用同類標稱規格快速熔斷保險絲更換已損壞的保險絲，確保安全。
10. 請勿隨意改變儀錶內部接線，以免損壞儀錶和危及安全。
11. 當液晶顯示器顯示“ ”符號時，應及時更換電池，以確保測量準確度。
12. 不要在高溫，高濕和強電磁場環境中使用儀錶，尤其不要在潮濕環境中存放儀錶，受潮後的儀錶，其性能可能變差。

13. 維護保養請使用濕布和溫和的清潔劑清潔儀錶外殼，不要使用研磨劑或溶劑。

四、 電氣符號

	電量 不足		警告		接地
	AC (交流)		DC (直流)		保險絲
	雙重絕 緣		蜂鳴器		二極體
	AC 或 DC				

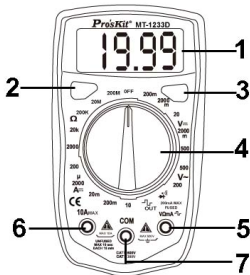
五、 綜合指標

- 電壓輸入端子和地之間的最高電壓：500Vrms
- 10A 端子：無保險絲
- mA 端子：F200mA/250V 保險絲
- 量程選擇：手動
- 背光功能：手動點亮，延時熄滅
- 最大顯示：1999，每秒約更新 3 次
- 極性顯示；自動顯示，負極性顯示“-”符號
- 過量程顯示：“1”
- 資料保持功能：液晶顯示幕顯示“”符號
- 電池電量不足：液晶屏顯示“”符號
- 儀錶內使用電池：1.5V AAA x2

- 工作溫度：0°C~40°C（32°F~104°F）
- 儲存溫度：-10°C~50°C（14°F~122°F）
- 外形尺寸：約為 130L*72W*28/H 毫米
- 重量：約重 130 克（不包括電池）

六、外表結構

- 1· 液晶顯示屏
- 2· 數據保持開關
- 3· 背光按鍵開關
- 4· 量程旋鈕
- 5· 電壓,電流,電阻,
溫度測量輸入端
- 6· 10A 電流輸入端
- 7· 公共輸入端



七、按鍵功能

- 1· 資料保持顯示：按下“HOLD”鍵，儀錶液晶顯示幕上保持顯示當前測量值，再次按鍵則取消此功能。
- 2· 背光控制：按下背光按鍵即可點亮液晶屏的背光燈，點亮後約延時 10 秒左右即熄滅。

八、 測量操作說明

1. 直流電壓及交流電壓測量

- 將紅錶棒插入“VΩmA”，黑錶棒插入“COM”插孔。
- 將功能量程開關置於直流電壓檔位，並將錶棒並聯到待測電源或負載上。
- 從液晶顯示幕讀取測量結果。

△注意：不要測量高於 500V 的電壓，雖然有可能讀得讀數，但也可能會損壞內部電路及傷害到您。在測量之前如不知被測量電壓值的範圍時，應將最程開關置於最高量程檔，根據讀數需要逐步調低測量量程。當液晶顯示幕只在高位顯示“1”時，說明已超量程，須調高最程。在每一個量程檔，儀錶的輸入阻抗均為 10MΩ，這種負載效應在測量高阻電路時會引起測量誤差，如果被測電路阻抗 $\leq 10\text{K}\Omega$ ，誤差可以忽略(0.1%或更低)。

2. 直流電流測量

- 將紅錶棒插入“VΩmA”或 10A 插孔，黑錶棒插入“COM”插孔。
- 將功能量程開關置於直流電流檔位，並將錶棒串聯到待測電源或電路中。
- 從顯示器上讀取測量結果。

△注意：如果不知被測電流值的範圍時，應將量程開關置於高量程檔，根據讀數需要，逐步調低。在 mA 輸入插孔，輸入超載會將內置保險絲熔斷，須及時予以更換，保險絲尺寸為： $\Phi 5 \times 20\text{mm}$ ，電氣規格 F200mA/250V；10A 輸入插孔，內部沒有設置保險絲，為了安全使用，每次測最時間應 ≤ 10 秒，間隔時間 ≥ 15 分鐘。

3· 電阻測量

- a)將紅錶棒插入“VΩmA”插孔，黑錶棒插入“COM”插孔。
- b)將功能量程開關置於電阻測量檔位，並將錶棒並聯到待測電阻上。
- c)從顯示器上讀取測量結果。

△注意：檢測線上電阻時，爲了避免儀錶受損，須確認被測電路已關掉電源，同時電容已放完電，方能進行測量。在200Ω檔測量時，測試錶棒引線會帶來0.5Ω左右的測量誤差，爲了獲得更精確的讀數，可以將讀數減去紅、黑兩支表和短路的讀數值，作爲最終讀數值。

4· 二極體和通斷測量

- a)將紅錶棒插入“VΩmA”插孔，黑錶棒插入“COM”插孔。
- b)將功能量程開關置於二極體測量檔位元，並將紅錶棒連接到被測二極體的正極，黑錶棒連接到被測二極體的負極。
- c)從顯示器上讀取測量結果。
- d)將錶棒連接到待測線路的兩端，如果兩端之間電阻值低於約50Ω時，內置蜂鳴器發聲。

△注意：爲了避免儀錶損壞，線上測試二極體，應先確認電路已被切斷電源，電容已放完電。用二極體檔可以測量二極體及其它半導體器件PN結的電壓降，對一個結構正常的矽半導體，正向壓降的讀數應

該是 0.6V 左右；反向顯“1”即為開路，此時黑錶棒對應的極為“+”，紅錶棒對應的極為“-”。

5·溫度測量（僅 MT-1233C）

- a)將溫度探頭的輸出端（正、負極）分別插入“VΩmA”與“COM”插孔。
- b)將功能量程開關置於溫度測量檔位，並將溫度探頭的測溫端置於待測物面上或內部。
- c)從顯示器上讀取測量結果。

△注意：隨機所附溫度探頭為 K 型熱電偶，此類熱電偶的極限溫度為 250°C。如果要測量更高的溫度，須另選購其他型號的溫度探頭。無溫度探頭插入儀錶時，液晶屏顯示的值為儀錶內部溫度值。不要輸入高於直流 60V 或交流 30V 的電壓，避免損壞儀錶及傷害到您。

6·方波試驗信號輸出（僅 MT-1233D）

將功能量程開關置於方波檔，則儀錶從“VΩmA”與“COM”端之間輸出方波信號。

△注意：方波試驗信號其諧波較為豐富，可作為建議信號源修理音響設備等。頻率約為 50Hz，在接 1MΩ 負載情況下，輸出幅度大於 3V。為了避免儀錶損壞，嚴禁輸出端（紅錶棒）接觸 10V 以上的電壓。

九、技術指標

準確度： $\pm (a\% \text{讀數} + \text{字數})$ ，保證期為 1 年
環境溫度為： $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，相當濕度 $< 75\%$

1. 直流電壓

量程	分辨力	MT-1233C	MT-1233D
200mV	100uV	$\pm (0.8\% + 3d)$	
2000mV	1mV		
20V	10mV		
200V	100mV		
500V	1V	$\pm (1.0\% + 3d)$	

輸入阻抗：所有量程為 $10\text{M}\Omega$

超載保護：對於 200mV 量程為 250V 直流或交流，其餘量程為 500V 直流或交流。

2. 交流電壓

量程	分辨力	MT-1233C	MT-1233D
200V	100mV	$\pm (1.2\% + 5d)$	
500V	1V		

輸入阻抗：約為 $5\text{M}\Omega$

頻率回應： $40\text{Hz} \sim 400\text{Hz}$

顯示：正弦波有效值（平均值回應）

超載保護：均為 500V 直流或交流

3 · 直流電流

量程	分辨力	MT-1233C	MT-1233D
2000uA	1uA	$\pm(1.2\%+5d)$	
20mA	10uA		
200mA	100uA		
10A	10mA	$\pm(2.5\%+5d)$	

⚠超載保護：F200mA/250v 保險絲

10A 量程無保險絲，測量時間要求 ≤ 10 秒，間隔時間 ≥ 15 分鐘。

4 · 電阻

量程	分辨力	MT-1233C	MT-1233D
200 Ω	0.1 Ω	$\pm(1.5\%+5d)$	
2000 Ω	1 Ω	$\pm(1.0\%+3d)$	
20 K Ω	10 Ω		
200K Ω	100 Ω		
20M Ω	10K Ω	$\pm(1.0\%+5d)$	
200M Ω	100K Ω	-	$\pm[1.0\% (讀數 - 10d) + 10d]$

最大開路電壓：2.3V

⚠警告：爲了安全在此量程禁止輸入電壓值！


5. 溫度 (僅 MT-1233C)

量程	分辨力	準確度
-40°C~150°C	1°C	±(1.0%+3d)
150°C~1000°C		±(1.5%+15d)
-40°F~302°F	1°F	±(1.0%+4d)
302°F~1832°F		±(1.5%+15d)

溫度感測器：國際標準 K 型（鎳鉻—鎳矽）熱電偶



⚠警告：為了安全在此量程禁止輸入電壓值！

6. 方波輸出(僅 MT-1233D)

量程	說明
	輸出約 50Hz 方波試驗信號， 輸出電阻約 50KΩ


⚠警告：為了安全在此量程禁止輸入電壓值！

7. 二極體、通斷測試

功能	量程	備註
二極體		顯示正向壓降近似值
通斷測試		約 < 50Ω 時蜂鳴器發聲

⚠警告：為了安全在此量程禁止輸入電壓值！

十、更換電池

如果液晶顯示幕上出現“”符號，表示電池需要更換，請按以下步驟操作：

1. 錶棒離開被測電路，從輸入插孔中拿掉錶棒，並將儀錶上的旋鈕開關撥到“OFF”檔位以關閉儀錶電源
2. 用螺絲刀擰開背面電池門的螺絲，將其移走
3. 取出舊電池，更換新的電池（AAA 1.5×2）
4. 重新安裝好電池門，並鎖好螺絲。

十一、保養和維護


警告：

- 在打開儀錶後蓋之前，應確認電源已關閉和錶棒已離開被測電路。
- 清潔儀錶只能使用濕布和少量洗滌劑，切忌用化學溶劑擦拭表殼。
- 如發現儀錶有任何異常，應立即停止使用並送維修。
- 在有需要對儀錶進行校驗或維修時，請由有資格的專業維修人員或指定的維修部門維修。

十二、故障排除

如果您的儀錶不能正常工作，下面的方法可以幫助您快速解決一

般問題。如果故障仍排除不了，請與維修中心或經銷商聯繫。

故障現象	檢查部位及方法
沒顯示	電源未接通 換電池 換保險絲
 符號出現	換電池
顯示誤差大	換電池

- 本說明書如有改變，恕不通知；
- 本說明書的內容被認為是正確的，若用戶發現有錯誤、遺漏等，請與生產廠家聯繫。
- 本公司不承擔由於用戶錯誤操作所引起的事務和危害。
- 本說明書所講述的功能，不作爲將產品用做特殊用途的理由。

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