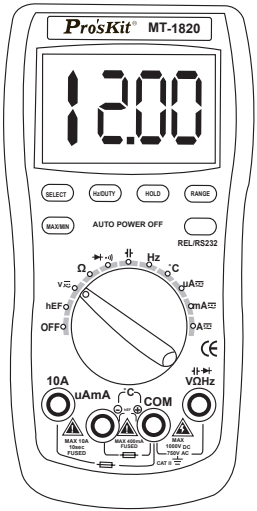
Pro'sKit®

Professional Digital Multimeter



MT-1820

User's Manual

Index

General

The instrument is a high performance, high accuracy, 3 5/6 digit multi-meter, it uses the LCD with 33mm high figure to make the reading clear, the display simple and the operation convenient.

The instrument can measure DC and AC voltage, DC and AC current, Resistance, Capacitance, Frequency, Duty Circle, Transistor, Diode and Continuity test; And it also has the features of Bar Graph, Unit Indication, Data Hold, Relative Value Measurement (REL), USB Interface, AUTO/MANUAL range selection, Auto Power Off and Alarm Buzzer. The instrument adopts the directly driven 4 digits microprocessor and dual-integral A/D converter, which provide the high solution and high accuracy digital displaying driver. Because of its outstanding features, it is an excellent tool and most suitable for lab, factory, maintenance and repair users.

Open-package Inspection

Open the gift box and take out the instrument, carefully check the following accessories. If any accessory was lost or damaged, please contact the manufactory at once.

- Digital Multimeter 1pc
- Operation Manual 1pc
- Test Lead 1set
- Temperature Cable 1pc
- USB Cable 1pc
- Software disc 1pc
- Transistor test accessory 1pc

Safety Note

The instrument meets the standard of IEC1010 (safety standard promulgated by the International Electrician Committee). Design and manufacture complied with the standard of Pollution Degree 2.

⚠Warning

To avoid endangering the safety of the users, should read the operation manual carefully before operation, and strictly abide by the safety warning information and operation description to use the instrument.

1. Caution to avoid the electric shock when measuring the voltage higher than 30V, the current higher than 10mA, AC Power Lines with Inductive Load and the AC Power Lines during the period of Electric Power Fluctuation.
2. Before measuring, should check if the function knob is set in the correct range, make sure the test lead connects reliably, links up correctly, and insulates properly to avoid the electric shock
3. It meets the requirements of the safety standard only to use the instrument with the equipped test lead. If the test lead is broken, should replace it by the same type and same electric specification test lead.
4. Do not replace the inside fuse by the unconfirmed one. Only replace it by the same type and specification fuse. Before replacement, should keep the test lead off the tested point to make sure there is no any signal at the input terminal.
5. Do not replace the inside battery by the unconfirmed one. Only replace it by the same type and electric specification battery. Before replacement, should keep the test lead off the tested point to make sure there is no any signal at the input terminal.
6. When measuring electricity, do not connect the body with the ground directly, and do not touch the possible exposed metal terminal, output socket or lead clamp with ground potential. Usually use the dry cloth, rubber overshoes, rubber cushion and other insulated materials to keep the body isolated with the ground.
7. Do not store and use the instrument in high humility, high temperature, combustible, explosive and strong magnetic places.
8. It is possible to damage the instrument and endanger the safety of the users when measuring the voltage over the range limit. The allowed

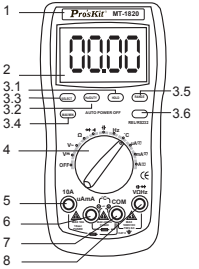
maximum voltage is printed on the front panel of the instrument, do not input the range limit specified to avoid the electric shock and instrument damage

9. Do not measure any voltage when connecting the test lead with the current terminal to avoid damaging the instrument and endangering the safety of the users.
10. Do not try to calibrate or repair the instrument, should operate it by the specially trained or qualified professional people.
11. The function/range selection knob should be set in the correct range when measuring. When switching the function/range selection knob, keep the test lead off the tested object to make sure there is no any signal at the input terminal. Do not switch the function/range selection knob when measuring.
12. When LCD displays "  ", please replace the battery in time to make sure the measuring accuracy.
13. Do not allow to measure the voltage when connecting the test lead with the current terminal!
14. Do not try to modify the inner circuit at will to avoid damaging the instrument and endangering the safety of the users.

Safety Symbol Description

	Warning		DCA
	High Voltage! Dangerous!		ACA
	GND		DCA & ACA
	Dual Insulation		Meets the direction of European IEC
	Low Battery		Fuse

Front Panel Description



1. Instrument Model Number
2. LCD Display
3. HOLD: Date Hold button, press the button, the value is held on LCD; Press the button again, exit the hold mode and get into the normal measuring status.
4. HZ/DUTY: Frequency/Duty Circle selection button, press the button to switch between the Frequency and Duty Circle mode at Frequency Range; Press the button to switch to Voltage or Current/Frequency/Duty Circle model at AC Voltage or AC Current Range.
   SELECT: button switch, press the button to switch the measuring function.
5. MAX/MIN: Maximum, Minimum, press the button, the instrument gets into the MAX mode, the measuring maximum value will be held at this mode; Press the button again to get into the MIM mode, the measuring minimum value will be held at this mode. At the MAX/MIN mode, the maximum or minimum value will be held on LCD. Under this circumstance, there are no Bar Graph and Auto Power Off function, hold pressing MAX/MIN button for 2 seconds, exit the MAX/MIN mode.
6. RANGE: Auto Range/ Manual Range switch, the default is set as Auto Range mode when turning on, press the button and switch to Manual Range. At the Manual Range mode, press the button once, the range is switched to the higher one, press the button again to switch the range to the lowest one when measuring the highest range, the cycle is in proper order from low to high. Keep pressing the button for 2 sec., return to Auto Range mode. There is no Auto Range mode at Frequency and Capacitance range.
7. REL: Relative Value Measurement, press the button to the mode of Relative Value Measurement, press again to cancel the Relative Value Measurement, circulated like this. Keep pressing the button more than 2 seconds to switch to RS232, RS232 symbol appears on LCD, it indicates the instrument is getting into the status of data transmission. Keeping pressing the button more than 2 seconds, RS232 symbol disappears, the data transmission is stopped.
8. Function/range selection knob: select the measuring function and range
9. 10A current input terminal: Measuring AC/DC 10A positive input terminal, insert red test lead.
10. uA/mA /℃ input terminal: Measuring AC/DC uA/mA and Temperature positive input terminal.
11. COM input terminal: negative input terminal, insert the black test lead.

12. VΩHz input terminal: measure Voltage, Frequency/Duty Circle, Resistance, Capacitance, Diode and Continuity positive input terminal, insert the red test lead.

Property

General Feature

1-1 Display: LCD

1-2 Max Display: 5999 (3 5/6) counts automatic polarity display and unit display.

1-3 Measuring method: dual-integral A/D converter

1-4 Sampling rage: 3 times/second

1-5 Over range indication: display “OL”

1-6 Low battery indication: “ ” appearance

1-7 Operation environment: 0~40°C relative humidity <80%

1-8 Storage environment: -10~50°C relative humidity <80%

1-9 Power: 2pcs 1.5V batteries (AAA battery)

1-10 Dimension: 192mm x 95mm x 48mm

1-11 Weight: Approx. 390g (including batteries)

Technic Property

1. Accuracy: (a% × reading + digits) at 23 ± 5°C , relative humidity <75%.
2. One year calibration guarantee since the time dispatched from the factory.

DC Voltage (DCV)

1. Turn the function/range selection knob to DCV/ACV. Insert the red and black test lead separately to VΩHz and COM input terminal, press “SELECT” button to switch to DCV measurement mode.
2. The instrument was preset as the Auto Range mode of DCV measurement, displays “AUTO” symbol on LCD, press “RANGE” button to switch to the Manual Range mode.
3. Connect the test lead to the tested circuit in parallel, the polarity of the red test lead and the tested voltage value will be displayed on LCD simultaneously.

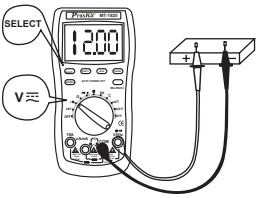
⚠Note:

a) Do not measure the voltage higher than DC 1000V or AC 750V.

b) When measuring the high voltage, caution to avoid electric shock. Cut the connection between the test lead and tested circuit at once after measurement.

C) At the Manual Range mode, if “OL” is displayed on LCD, it indicates the tested voltage value has exceeded the present range limit, please select the higher range to complete the measurement.

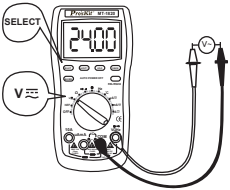
Range	Accuracy	Resolution
600mV	±(0.5%+4d)	0.1mV
6V		1mV
60V		10mV
600V		100mV
1000V	±(1.0%+6d)	1V



Input impedance: >60MΩ at Range 600mV , 10MΩ at other range.
Overload protection: 1000V DC or 750V AC peak value.

AC Voltage (ACV)

1. Turn the function/range selection knob to ACV/DCV, press “SELECT” button to switch to ACV measurement mode. Insert the red and black test lead separately to VΩHz and VCOM input terminal, displayed as the following picture.
2. The instrument was preset as the Auto Range mode, displays “AUTO” symbol on LCD, press “RANGE” button to switch to the Manual Range mode. Press “Hz/DUTY” button to measure Frequency/Duty Circle at the Auto Range or Manual ACA model. But the frequency response is very low, at this time, it suits to measure the circuit of high voltage and low



frequency under the circumstance of magnetic disturbance, such as 220V/50Hz-400Hz,380V/50Hz~400Hz

3. Connect the test lead to the tested circuit in parallel, the polarity of the red test lead and the tested voltage value will be displayed on LCD simultaneously

⚠ Note:

a) Do not measure the voltage higher than DC 1000V or AC 750V.

b) When measuring the high voltage, caution to avoid electric shock. Cut the connection between the test lead and tested circuit at once after measurement.

Range	Accuracy	Resolution
6V	±(0.8%+10d)	1mV
60V		10mV
600V		100mV
750V	±(1.0%+10d)	1V

Input impedance: 10MΩ. Overload protection: 1000V DC or 750V AC peak value. Frequency response: 40-400Hz. Indication: average value response (RMS of sine wave). Duty Circle indication (0.1%-99.9%)

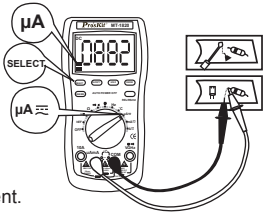
DC Current (DCA)

1. Insert the black test lead to “COM” input terminal and the red test lead to “uAmA ”or “10A”, displayed as the right picture.
2. Turn the function/range selection knob to current range, press “SELECT”, switch to DC measurement mode, then connect the test lead with the tested circuit in series, the polarity of the red test lead and the tested current value will be displayed on LCD simultaneously.
3. If “OL” is displayed on LCD, it indicates the test current value has exceeded the present range limit, please select the higher range to complete the measurement.

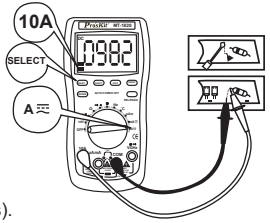
⚠ Note:

a) Do not measure the current higher than 10A at Range 10A and higher than 6000uA at uA Range and higher than 600mA at mA Range, otherwise the fuse will be burnt out or the instrument will be damaged.

b) Do not connect the test lead to any circuit in parallel when the test lead is inserted in the current input terminal, otherwise it is possible to damage the instrument or endanger the safety of the users. Cut the connection between the test lead and tested circuit at once after measurement.



Range	Accuracy	Resolution
600uA	±(1.0%+10)	0.1μA
6000uA		1μA
60mA		10μA
600mA		100μA
6A	±(1.2%+10)	1mA
10A		10mA



Max input current: 10A (less than 15 seconds).

Overload protection: 0.5A/250V fuse, 10A/250V fuse.

AC Current (ACA)

1. Insert the black test lead to “COM” input terminal and the red test lead to “uAmA ”or “10A”input terminal,displayed as the right picture.
2. Turn the function/range selection knob to current range, press “SELECT”, switch to AC measurement mode, then connect the test lead to the tested circuit in series, the polarity of the red test lead and the tested current value will be displayed on LCD simultaneously.

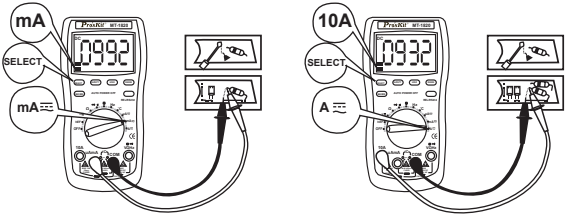
3. If “OL” is displayed on LCD, it indicates the tested current value has exceeded the present range limit, please select the higher range to complete the measurement.

⚠Note:

a) Do not measure the current higher than 10A at Range 10A and higher than 600mA at mA Range

b) Do not connect the test lead to any circuit in parallel when the test lead is inserted in the current input terminal, otherwise it is possible to damage the instrument or endanger the safety of the users. Cut the connection between the test lead and tested circuit at once after measurement.

Range	Accuracy	Resolution
600uA	±(1.5%+10d)	0.1μA
6000uA		1μA
60mA		10μA
600mA		100μA
6A	±(2.0%+15d)	1mA
10A		10mA



Max input current: 10A (less than 15 seconds). Overload protection:0.5A/250V fuse, 10A/250V fuse.

Frequency response: 40-100Hz.
Duty Circle Indication: (0.1%-99.9%)

Resistance (Ω)

1. Turn the function/range selection knob to Ω, insert the red and black test lead separately to VΩHz and COM input terminal.
2. Connect the test lead to the tested resistance in parallel, the tested resistance value will be displayed on LCD
3. Auto Range mode is preset when turning on, press “RANGE” button to switch to Manual Range mode.
4. If “OL” is displayed on LCD, it indicates the tested resistance value has exceeded the present range limit, please select the higher range to complete the measurement.

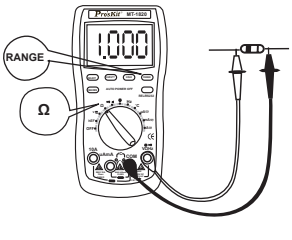
⚠Note:

a) When measuring the in-circuit resistance, Make sure all the power of the tested circuit has been turned off and all capacitors are fully discharged.

b) It will cause the reading incorrect to input any voltage when measuring the resistance. If the voltage exceeds 250V, over-range protection voltage, it is possible to damage the instrument and endanger the safety of the users.

c) At Range 600Ω, short-circuit the test lead to measure the wire resistance, and then subtract it from the real measurement.

Range	Accuracy	Resolution
600Ω	±(0.8%+5d)	0.1Ω
6kΩ	±(0.8%+4d)	1Ω
60kΩ		10Ω
600kΩ		100Ω
6MΩ		1kΩ
60MΩ	±(1.2%+10d)	10kΩ



Open circuit voltage: 400mV.

Over range protection: 250V AC/DC peak value.

Diode and Continuity Test

1. Turn the function/range selection knob to " ⊣◀))) "Range, displayed as the right pictures.
2. Insert the red and black test lead separately to VΩHz and COM input terminal. Press "SELECT" button to choose the Buzzer and Diode measurement function.
3. Connect the RED test lead to the positive pole of the tested diode, BLACK test lead to the negative pole.
4. Read the present test result from LCD. (Note: no Bar Graph display at Diode Range)

⚠ Note:

a) If the diode is open circuit or the polarity is connected counter, "OL" will be displayed on LCD.

b) When measuring the in-circuit diode, make sure all the power of the tested circuit has been turned off and all capacitors are fully discharged.

c) Cut the connection between the test lead and tested circuit at once after measurement.

Range	Display	Test Condition
⊣◀	Diode Forward voltage drop	Forward AC Current: 1.0mA, Counter Voltage: 3.0V
)))	Buzzer sound at less than 50Ω	Open Voltage: 0.5V

Overload protection: 250V DC/AC peak value.

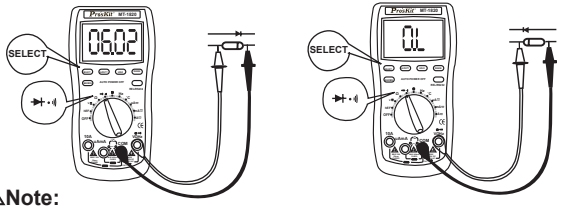
Warning: Do not input the voltage at the range for safety.

Capacitance (C)

1. Turn the function/range selection knob to Capacitance Range. Insert the

red and black test lead separately to VΩHz and COM input terminal.

2. Connect the test lead to the tested capacitor in parallel, the tested capacitor value will be displayed on LCD.
3. If “OL” is displayed on LCD, it indicates the test capacitor value has exceeded the present range limit or the capacitor is short-circuit, please select the higher range to complete the measurement.
4. Read the present test result from LCD.



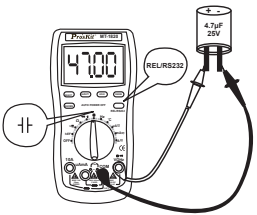
⚠Note:

a) When measuring the in-circuit capacitor, make sure all the power of the tested circuit has been turned off and all capacitors are fully discharged. (Note: no Bar Graph display at this range)

b) It requires longer testing time when measuring the large capacitor, it takes about 15 seconds at Range 100uF.

c) Cut the connection between the test lead and tested circuit at once after measurement.

Range	Accuracy	Resolution
40nF	±(5.0%+30d)	10pF
400nF	±(3.5%+8d)	100pF
4μF		1nF
40μF		10nF
200μF	±(5.0%+10d)	100nF



Overload protection: 250V DC/AC peak value.

Frequency (Hz)

1. Turn the function/range selection knob to Hz Range. Insert the red and black test lead separately to VΩHz and COM input terminal.
2. Connect the test lead to the tested signal source in parallel, Read the present test result from LCD. (Note: no Bar Graph display at this range)
3. When measuring Frequency, press “Hz/DUTY” button once to get into the mode of DUTY measurement, and press “Hz/DUTY” button again to return to the mode of Frequency measurement.
4. When measuring AC current or voltage, press “Hz/DUTY” button to get into the mode of Frequency measurement, and press “Hz/DUTY” button again to get into the mode of Duty Circle measurement, and press the button third to return to the mode of AC current or voltage measurement.

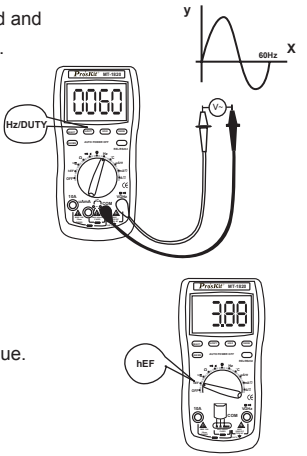
⚠Note:

a) Do not input the signal more than 60V. Otherwise it is possible to damage the instrument and endanger the safety of the users.

b) Cut the connection between the test lead and

c) tested circuit at once after measurement.

Range	Accuracy	Resolution
100Hz	±(0.5%+4d)	0.01Hz
1000Hz		1Hz
10kHz		10Hz
100kHz		100Hz
1MHz		1kHz
20MHz		10kHz



Input sensitivity: 1.0V.

Overload protection: 250V DC/AC peak value.

Duty Circle Indication: (0.1%-99.9%)

Transistor Test

1. Turn the function/range selection knob to “HFE” Range, displayed as the right picture.
2. Insert the accessory of Transistor test into the “uAmA ”
3. and “COM” input terminal, displayed as the picture.According to the model of the tested transistor, insert the accessory accordingly into the terminal of “EBC” of “NPN” or “PNP”.
4. Read the present test result from LCD.

⚠Note:

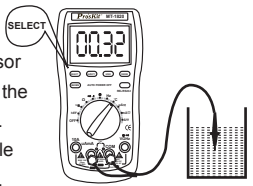
a) Do not input the current or voltage at the input terminal of “uAmA ”, “COM” or transistor accessory, otherwise it is possible to damage the instrument or endanger the safety of the users.

b) There are no Data Hold, MAX/MIN, Bar Graph function at Transistor Test mode.

Range	Scope of Display	Test Condition
HFE(NPNorPNP)	0-1000	Base Current:1mA VCE:2.1V

Temperature Test

1. Turn the function/range selection knob to Temperature Range.
2. Insert the two ends of the temperature sensor Into the “COM” and “uAmA” input terminal, the positive end into the “uAmA” input terminal.
3. Connect the sensor of the temperature cable to the surface or inside of the tested object, displayed as the right picture.



4. Read the present test result from LCD.
5. Press “SELECT” button to choose F temperature measurement mode, and press “SELECT” button again to choose C temperature measurement mode, circulated like this.

⚠Note:

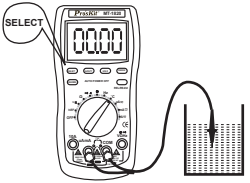
a) Without the signal input, LCD automatically displays the normal temperature.

b) Do not replace the temperature sensor at will. Otherwise the accuracy can't be assured.

c) Do not input the voltage at Temperature Range, caution to avoid damaging the instrument.

Range	Accuracy	Resolution
-20˚C~400˚C	±(1.0%+50)	0.1˚C
400˚C~1000˚C	±(1.5%+15)	1˚C
0˚F~750˚F	±(1.0%+50d)	1˚F
750˚F~1832˚F	±(1.5%+5d)	

Overload protection: 0.5A/250V



Other Functions and Instrument Maintenance

• Other Functions

1. Date Hold
   Press "HOLD" button, the present value is held on LCD; Press the button again, exit the hold mode and get in the normal measuring status.
2. Auto Power Off
   Stop working for 15 seconds, the instrument will auto power off, and get into the sleeping mode. The buzzer inside will sound 5 times one minute before powering off, there is a long sound one minute later and the instrument gets into the sleeping mode. Press any key to restart the power.
3. Ress "REL/RS232"button to get into the Relative Value Measurement mode, Keep holding "REL/RS232" button more than 2 seconds, RS232 symbol is displayed on LCD, it indicates it is the status of the instrument connecting with PC, then connect the instrument to PC by USB Cable,

accessory of the instrument, and then can transmit the measuring data to PC, it is convenient to record, analyze, process and print the measuring results, etc.

Please refer the details to the description in the software.

• Instrument Maintenance

This is a highly precise instrument, do not try to modify the inner circuit at will.

1. Keep the instrument dry, and keep it away form dust and shock.
2. Do not store and use the instrument in high humility, high temperature, combustible, explosive and strong magnetic places.
3. Clean the surface of the instrument with the damp cloth and gentle detergent, do not use the strong solvent like the abrasive cleaner and alcohol, etc.
4. Take out the batteries if do not use the instrument for a long time to prevent the batteries from leaking the liquid to corrode the instrument.
5. When LCD displays "  " symbol, should replace the batteries as the following steps:

5-1. Loose the screw that fixes the batteries, and remove the battery case.

5-2. Remove the spent 1.5V batteries, and replace them by two same type new batteries. It is better to use alkaline batteries for lengthening the usage time.

5-3. Fit on the battery case and tighten the screw.

5-4. The steps of replacing the fuse are same as the above. When replacing the fuse, please use the same specification, same type of fuse.

⚠Note:

1. Do not input the voltage more than 1000V DC/AC peak value.
2. Do not measure the voltage at the Current, Resistance, Diode and Buzzer Range.
3. Do not use this instrument to measure before fixing the battery or tightening the bottom case.

4. Please remove the test lead from the tested point and turn the power off before replacing the battery or fuse.

The instruction manual is subject to chance without notice.
The contents in the instruction manual are considered to be correct, if the users find any errors or pretermission, etc., please contact the manufacturer.
The manufacturer hereby will not be responsible for any accident and damage caused by the improper operation.
The functions described in this instruction manual do not be the reason for special usage.

目　　錄

一．概述

MT-1820一種性能穩定、高可靠性3 5/6數位萬用表，儀錶採用33mm字高LCD顯示器，讀數清晰，顯示直觀，操作方便,可用來測量直流電壓、交流電壓、直流電流、交流電流、電阻、電容、頻率、占空比、三極管、二極體及通斷測試；同時還設計有61段類比棒條顯示、單位符號顯示、資料保持、相對值測量，帶USB電腦介面,自動/手動量程轉換、自動斷電及報警功能。整機採用了一個能直接驅動LCD的4位元微處理器和雙積分A/D轉換積體電路，一個提供高分辨力、高精度的數位顯示驅動，該表功能齊全，測量準確度高，使用方便，是實驗室、工廠、無線電愛好者及家庭的理想工具。

二、開箱檢查

打開包裝箱取出儀錶，仔細檢查以下附件是否缺少或損壞，如有缺少或損壞請立即與經銷商聯繫。

・數字多用表	一台
・使用說明書	一本
・表筆	一副
・溫度探頭(K型熱電偶)	一隻
・PC介面電纜	一根
・軟體光碟	一張
・三極管附件	一個
・鱷魚夾	一套
・防震套	1個
・皮盒	1個

三、安全注意事項

MT-1820符合IEC1010條款（國際電工委員會頒佈的安全標準）。使用污染等級2的安全要求進行設計和生產。

⚠警 告:

為避免危險及使用者的安全,在使用儀錶之前請仔細閱讀本使用手冊,並嚴格遵守安全警告資訊和操作說明來使用本儀錶。

1.在測量30V以上電壓,測量10mA以上電流,測量帶電感負載的交流電力線;測

量電力波動期間的交流電力線時，謹防電擊。

2.測量前，檢查測量功能開關是否置於正確的檔位，，要檢查表筆是否可靠接觸，是否正確連接、是否絕緣良好等，以避免電擊。

3.儀錶只有和所配備的表筆一起使用才符合安全標準要求。如表筆線破損時，必需更換上同樣型號或者相同電氣規格的表筆線。

4.不要使用其他未經確認或未認可的保險管來更換儀錶內部的保險管。只能換上同樣型號或相同規格的保險管。更換前，表筆必需離開被測量點，確保輸入端無任何信號。

5.不要使用其他未經確認或未認可的電池來更換儀錶內的電池。只能換上同型號或相同電氣規格的電池。更換前，表筆必需離開被測量點，確保輸入端無任何信號。

6.在進行電氣測量時，身體切勿直接接觸大地，不要接觸可能存在地電勢裸露的金屬端子、輸出口、引線夾等。通常使用的乾燥的衣服、膠鞋、膠墊以及其他絕緣材料，保持你的身體與大地絕緣。

7.不要在高溫、高濕、易燃、易爆和強磁場環境中存放及使用。

8.測量超過儀錶所允許的極限電壓值有可能損壞儀錶和危及操作人員的安全。在儀錶面板上標有儀錶所允許測量的極限電壓值，切勿測量超過此標準的安全，請勿輸入超過規定的極限值，以防電擊和損壞儀錶。

9.當表筆線插入電流插座時切勿測量任何電壓以免損壞儀錶和危及操作人員的安全。

10.不要嘗試校準或維修儀錶。的確有需要時必須有專門培訓或認可的有資格專業人員才能進行。

11.在測量時功能/量程選擇開關必需置於正確的量程檔位，在轉換功能/量程選擇開關時，請一定要先將表筆線與被測物件斷開，確保輸入端沒任何信號輸入。嚴禁在測量進行中轉換功能/量程選擇開關。

12.當LCD顯示“  ”時，請及時更換電池以確保測量精度。

13.不允許表筆插在電流端子去測量電壓！

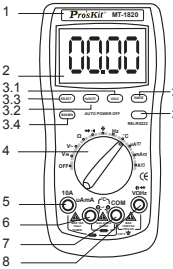
14.請不要隨意改變儀錶線路，以免損壞儀錶和危及安全。

四、安全符號說明

⚠	警告!	⎓	直流
⚠	高壓!危險!	∼	交流
⏚	大地	≂	交直流
▣	雙重絕緣	CE	符合歐洲工會指令
▭	電池欠壓	▭	保險絲

五、儀錶面板及按鍵功能說明

1. 儀錶型號
2. 61段類比棒條LCD屏顯示。
3. 功能按鍵：用於選擇各種測量功能。



3-1. HOLD：讀數保持，按此鍵顯示值被鎖定，再按此鍵鎖定狀態被解除.

3-2. Hz/DUTY：頻率/占空比選擇鍵，在頻率檔位元按此鍵可以在頻率和占空比之切換；在交流電壓或交流電流檔位按此鍵可以在電壓或電流/頻率/占空比之間切換

3-3. SELECT：按鍵開關，用於選擇各種測量功能

3-4. MAX/MIN：最大值，最小值，按下此功能，進入MAX模式，此模式保持測量的最大值：再按一此鍵進入MIN模式，此模式保持最小值，進入MAX/MINM模式後，顯示器保持最大值或最小值。在此工作環境下無類比棒條顯示和自動關機功能，按MAX/MIN鍵2秒後，退出MAX或MIN測量測試。

3-5. RANGE：自動/手動量程切換，開機時預設為自動量程，按一下切換為手動量程，在手動量程模式下，每按一下往上跳一檔，到最高檔時再按此鍵又跳到最低檔，依次輪回。如按此鍵超過2秒則切換回到自動量程。頻率及電容檔沒有手動量程。

3-6. REL：相對值測量，按一下此鍵為相對值測量，再按一次取消相對值測量，以此輪回，如按此鍵超過2秒則切換到RS232，LCD屏上有RS232顯示，此時為RS232資料輸出打開，如再按此鍵超過2秒則RS232在LCD屏

上消失，此時關閉RS232資料輸出，以此輪回。

4. 功能量程選擇開關，用於選擇各種測量功能和量程。
5. 10A電流輸入插孔：測量交直流電流10A檔的正輸入端，插入紅表筆。
6. uA/mA/℃輸入孔：測量交直流微安、毫安培和溫度檔的正輸入端。
7. COM輸入孔：負輸入端，插入黑表筆。
8. VΩHz 輸入插孔：測量電壓、頻率/占空比、電阻、電容、二極體以及通斷測試的正輸入端，插入紅表筆.

六、其他功能

1. 自動斷電

   當儀錶停止使用15分鐘後，儀錶便自動斷電（關機），然後進入睡眠（關機）狀態，斷電前一分鐘內置蜂鳴器會發出5聲提示，一分鐘後長響一聲進入休眠（關機）狀態，若要重新啓動電源（開機），請按任意鍵或撥動開關撥盤，均可重新開機。

2. 按“REL/RS232”鍵，為相對值測量，常按“REL/RS232”鍵，大於兩秒，顯示幕上有RS232顯示，此時為為儀錶與電腦連接狀態，利用隨儀錶所附的USB電腦介面線連儀錶到電腦上，可以對所測量的資料進行記錄、分析、處理和列印。詳細請參考軟體中的說明。
3. 資料輸出功能：安裝本機附帶的光碟內容，將儀錶通過USB電腦介面線與電腦連接好，可將測量的資料傳輸到電腦，便於測量結果進行記錄、分析、處理和列印等。詳細請參考軟體中的說明。

七、特性

一般特性

- 顯示方式：液晶顯示
- 最大顯示：5999、3 5/6位元自動極性顯示和單位顯示
- 測量方式：雙積分式A/D轉換
- 採樣速率：約每秒3次
- 過量程顯示：顯示“OL”

・低電壓顯示：“ ▭ ”符號出現

・工作環境：0～40℃，相對濕度<80%

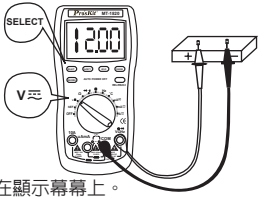
・儲存環境：-10～50℃，相對濕度<80%
・電　源：兩節1.5V電池（“AAA”電池）
・體積（尺寸）：192mm×95mm×48mm（長×寬×高）
・重　量：約390g（包括電池）

技術特性

・準確度：±（讀數的% + d數位），保證準確度環境溫度23±5℃，相對濕度<75%，
・校準保證期從出廠日起為一年。

八、直流電壓（DCV）

1. 將功能/量程開關旋至交直流電壓，紅黑表筆分別插入“VΩHz”和“COM”孔中,按“SELECT”鍵選擇直流電壓，如圖所示。
2. 儀錶的起始狀態為自動量程直流電壓模式，顯示“AUTO”符號，按“ RANGE“鍵，轉換為手動量程方式。
3. 將測式表筆接觸測試點並聯到被測電路上，紅色表筆線的極性和被測電壓值將同時顯示在顯示幕幕上。



⚠注 意：

a) 不能測量高於DC1000V或AC750V的電壓。
b) 在測量高壓時，特別注意避免觸電。在測試完後立即斷開表筆與被測電路。
c) 手動量程方式如LCD顯示“OL”，表明已經超過量程，須請選擇更高的量程檔位來完成此次測量。

量　程	準確度	分辨力
600mV	±(0.5%+4d)	0.1mV
6V		1mV
60V		10mV
600V		100mV
1000V	±(1.0%+6d)	1V

輸入阻抗：600mV量程>60MΩ，其餘為10MΩ。超載保護：1000V直流或

750V交流峰值。

九、交流電壓(ACV)

1.將功能/量程開關旋至交直流電壓，按 “SELECT”選擇交流電壓，將紅黑表筆分別插入“VΩHz”和“COM”。如下圖

2.儀錶的起始狀態為自動量程，顯示“AUTO”符號，按“RANGE“鍵，轉換為手動量程方式。在自動或手動交流模式下按“Hz/DUTY”可測量頻率/占空比測量，但此時頻響低，適用於磁場干擾環境下的高壓低頻測量，如220V/50Hz-400Hz,380V/50Hz~400Hz。

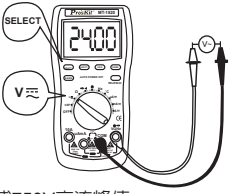
3.將測式表筆接觸測試點並聯到被測電路上，紅色表筆線的極性和被測電壓值將同時顯示在顯示幕幕上。

⚠注 意：

a) 不能測量高於DC1000V或AC750V的電壓。

b) 在測量高壓時，要特別注意避免觸電。並在測試完後表筆與被測電路立即斷開。

量 程	準確度	分辨力
6V	±(0.8%+10d)	1mV
60V		10mV
600V		100mV
750V	±(1.0%+10d)	1V



輸入阻抗： 10MΩ。超載保護：1000V直流或750V交流峰值。

頻率回應： 40~400Hz,顯示: 平均值回應（以正弦波有效值校準）。

占空比顯示：(0.1%-99.9%)。

十、直流電流(DCA)

1.將黑表筆插入“COM”孔中，紅表筆插入“uAmA ”或“10A”孔中，如右圖所示。

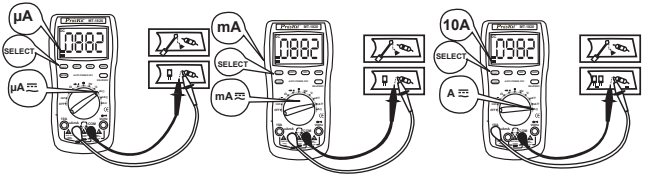
2.將功能開關轉至電流檔，按“SELECT”鍵，選擇DC測量方式，然後將儀錶串入被測回路中，被測電流值及紅表筆點的電流極性將同時顯示在螢幕上。

3.如果顯示幕上顯示“OL”，表示被測量電流已超過當前量程，請選擇更高的量程來測量。

⚠注 意：

a)在10A檔不能測量大於10A的電流，“uA”檔不能測量大於6000uA的電流，“mA”檔不能測量大於600mA的電流，否則會將保險絲燒斷或損壞儀錶。

b)當表筆插在電流輸入端時，嚴禁將表筆並聯在任何電路上，否則有可能損壞儀錶和危及使用者安全，在完成所有得測量後，要立即斷開表筆與被測電路。



量　程	準確度	分辨力
60OuA	±(1.0%+10d)	0.1μA
60O0uA		1μA
60mA		10μA
600mA		100μA
6A	±(1.2%+10d)	1mA
10A		10mA

最大輸入電流：10A（不超過15秒）超載保護：0.6A/250V保險絲；
10A/250V保險絲。

十一、交流電流（ACA）

1.將黑表筆插入“COM”孔中，紅表筆插入“uAmA ”或“10A”孔中，如右圖所示。

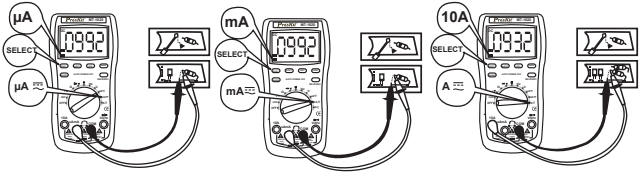
2.將功能開關轉至電流檔，按“SELECT”鍵，選擇AC測量方式，然後將儀錶串入被測回路中，被測電流值及紅表筆點的電流極性將同時顯示在螢幕上 。

3.如果顯示幕上顯示“OL” ，表示被測量電流已超過當前量程，請選擇更高的量程來測量。

⚠注 意：

a) 在10A檔不能測量大於10A的電流， “mA”檔不能測量大於600mA的電流。

b) 當表筆插在電流輸入端時，嚴禁將表筆並聯在任何電路上，否則有可能損壞儀錶和危及使用者安全，在完成所有得測量後，要立即斷開表筆與被測電路。



量 程	準確度	分辨力
60OuA	±(1.5%+10d)	0.1μA
60O0uA		1μA
60mA		10μA
600mA		100μA
6A	±(2.0%+15d)	1mA
10A		10mA

最大輸入電流：10A（不超過15秒）。

超載保護：0.5A/250V保險絲；10A/250V保險絲。

頻率回應： 40~100Hz。
占空比顯示：(0.1%-99.9%)

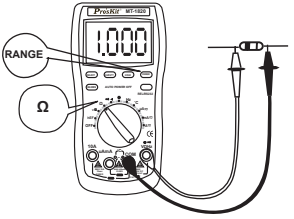
十二、電阻（Ω）

1.將功能/量程開關旋至“Ω”檔，將紅黑表筆分入“VΩHz”和“COM”。
2.將表筆的測試端並聯到被測量電阻上被測電阻將顯示在顯示幕上。
3.開機為預設為自動量程，按“RANGE”鍵選擇手動量程操作方式。
4.如果顯示幕上顯示“OL”表明已經超過當前量程，請選擇更高的的量程來完成。

⚠注 意：

a) 測電阻時，必須先將被測電路內所有的電源關斷，並將所有的電容充分放電。
b) 在測量電阻時，任何電壓的出現都會引起測量讀數不准，如果超過250V保護電壓，則有可能損壞和危及使用者的安全。
c) 在使用600Ω量程時，應先將表筆短路，測得引線電阻，然後在實測中減去。

量　程	準確度	分辨力
600Ω	±(0.8%+5d)	0.1Ω
6kΩ	±(0.8%+4d)	1Ω
60kΩ		10Ω
600kΩ		100Ω
6MΩ		1kΩ
60MΩ	±(1.2%+10d)	10kΩ



開路電壓：400mV。
超載保護：250V直流或交流峰值。

十三、二極體及通斷測試

1. 將功能/量程選擇開關旋到“⊣◀))”檔，如右圖。

2. 將紅、黑色表筆分別插入“VΩHz”和“COM”輸入端，再按“SELECT”選擇蜂鳴器及二極體測量。

3.將紅色表筆接到二極體的正極，黑色表筆接到二極體的負極。

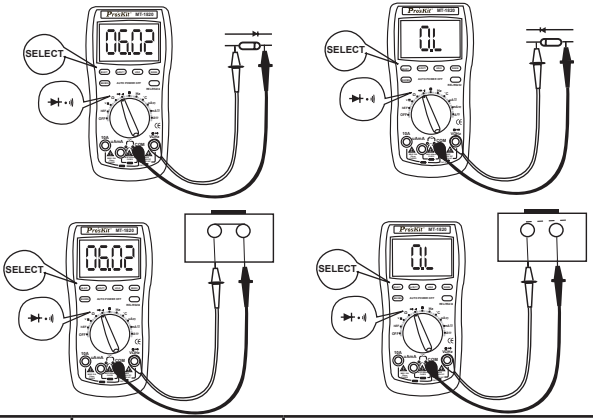
4.從顯示幕上讀出結果。(注：二極體檔無類比棒條顯示)

⚠注 意：

a) 如果二極體開路或極性接反時，顯示幕上將顯示“OL”

b) 檢查二極體時，必須先將被測線路內所有的電源斷開，並將所有的電容充分放電。

c) 在完成測量之後，要立即斷開表筆與被測電路的連接。



量 程	顯 示 值	測 試 條 件
▶|—	二極體正向壓降	正向直流電流約1.0mA，反向電壓約3.0V
•))	峰鳴器發聲長響，測試二點電阻約50Ω	開路電壓約0.5V

超載保護：250V直流或交流峰值。

⚠警 告：為了安全在此量程禁止輸入電壓值！

十四、電容(C)

1.將功能開/量程開關旋到電容檔。將紅黑表筆線分別插入“VΩHz”和“COM”輸入端。

2.將表筆線的測試端並聯到被測電容上，被測電容值將顯示在顯示幕上。

3.如果顯示幕上上顯“OL”，則表明被測電容值已超過當前量程或電容短路，請選擇更高的量程檔測量。

4.從顯示幕上讀出當前的結果。

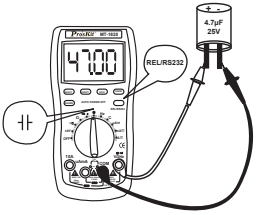
⚠注 意：

a) 在測電容時，必須先將被測線路內所有的電源斷開，並將所有的電容充分放電。（注意：該檔無類比棒條顯示）

b) 在測量大電容時，需要較長的時間，在100uF時約15秒。

C) 從完成所有的測量後，要立即斷開表筆與被測電路的連接。

量　程	準確度	分辨力
40nF	±(5.0%+30d)	10pF
400nF	±(3.5%+8d)	100pF
4μF		1nF
40μF		10nF
200μF	±(5.0%+10d)	100nF



超載保護：250V直流或交流峰值。

十五、頻率（Hz）

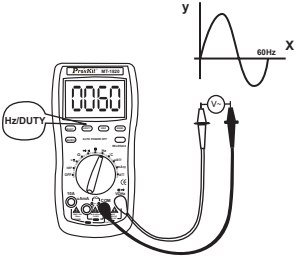
1. 將功能/量程開關旋到“Hz”檔。將紅黑表筆線分別插入“VΩHz”和“COM”輸入端。
2. 將表筆線的測試端並聯到待測信號源上，從顯示幕上讀出結果（注意：該檔無類比棒條顯示）。
3. 在進行頻率測量時，按一次“Hz/DUTY”鍵進入占空比測量狀態，再按一次“Hz/DUTY”鍵進入頻率測量狀態。
4. 在進行交流電流電壓測量時，按“Hz/DUTY”鍵進入頻率測量狀態，再按一次“Hz/DUTY”鍵進入占空比測量狀態，第三次按“Hz/DUTY”鍵返回到原測量狀態。

⚠注 意：

a) 不要輸入高於60V的信號，否則可能損壞儀錶並危及人身安全。

b) 在完成所有的測量後，要立即斷開表筆與被測電路。

量　程	準確度	分辨力
100Hz	±(0.5%+4d)	0.01Hz
1000Hz		1Hz
10kHz		10Hz
100kHz		100Hz
1MHz		1kHz
20MHz		10kHz



輸入靈敏度：1.0V。

超載保護：250V直流或交流峰值。

占空比顯示：(0.1%-99.9%)。

十六、三極管測量

1. 將功能/量程開關旋到“HFE”，檔如右圖。
2. 將三極管附件如圖插入“uAmA”與“COM”孔中。
3. 根據被測三極管的型號，插入三極管附件所對應的：“NPN”或“PNP”的“E B C ”孔中。
4. 從顯示幕上讀出結果。

⚠注 意：

a) 嚴禁在“uAmA ”與“COM”及三極管附件孔輸入電流或電壓，否則有可能損壞儀錶和危及使用者安全。

b) 在三極管測試功能下無鎖存、最大值、最小值、類比棒條顯示功能。

量程	顯示範圍	測試條件
HFE(NPN或PNP)	0-1000	基極電流約1mA VCE約2.1V

十七、溫度測量

1.將功能/量程選擇開關旋到溫度檔。

2.將溫度探頭的輸入端插入“COM”和“uAmA”孔中 ， 正端插入“uAmA”中

3.將溫度探頭的感應端置於被測物件的表面上，如右圖的水中

4.從顯示幕上讀出當前測量結果。

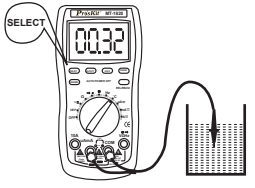
5.按“SELECT”選擇華氏度，再按“SELECT”選擇攝氏度，以次迴圈。

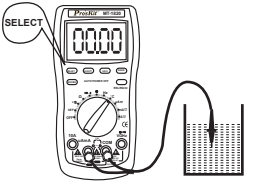
⚠注 意：

a)當輸入端開路時，顯示常溫。

b)請勿隨便更換溫度感測器，否則將不能保證測量的準確度。

c)嚴禁在溫度檔輸入電壓,否則有損壞儀錶的危險！





量程	準確度	分辨力
-20˚C~400˚C	±(1.0%+50d)	0.1˚C
400˚C~1000˚C	±(1.5%+15d)	1˚C
0˚F~1832˚F	±(1.0%+50d)<750˚F	0.1˚F
	±(1.5%+5d) ≥750˚F	1˚F

K型熱電偶（鎳鉻－鎳硅）香蕉探頭。

十八、通訊連接

1.按包裝所提供的光碟對應儀錶的型號,選擇setup的文件安裝。

2.將儀錶通過USB電腦介面線與電腦連接好。

3.常按“RS232/REL”大於兩秒，螢幕上出現RS232顯示。

4.測量的資料傳輸到電腦，此時可以對資料進行記錄、分析、處理和列印等。

詳細請參考軟體中的說明。

十九、儀錶保養

該儀錶是一台精密儀器，使用者不要隨意更改電路。

1.請注意防水，防塵、防摔。

2.不宜在高溫高濕、易燃易爆和強磁場的環境下存放、使用儀錶；

3.請使用濕布和溫和的清潔劑清潔儀錶外表，不要使用研磨劑及酒精等烈性溶劑。

4.如果長時間不使用，應取出電池，防止電池漏液腐蝕儀錶；

5.注意電池使用情況，當LCD顯示出 “  ” 符號閃爍時，應更換電池；步驟如下：

5-1.取出後蓋上固定電池的螺絲，退出電池門；

5-2.取下1.5V電池，換上兩個新的電池，雖然任何標準1.5V電池都可使用，但為加長使用時間，最好使用鹼性電池；

5-3.裝上電池門，上緊螺絲；

5-4.保險絲更換：步驟同上。更換保險絲時，請使用規格、型號相同的保險絲。

⚠注 意：

1.不要將高於1000V直流或交流峰值電壓接入；

2.不要在電流檔、電阻檔、二極體檔和蜂鳴器檔上，去測量電壓值；

3.在電池沒有裝好或後蓋沒有上緊時，請不要使用此表；

4.在更換電池或保險絲前，請將測試表筆從測試點移開，並關機。

本說明書如有改變，恕不另行通知

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故和危害。

本說明書所講述的功能，不作為將產品用做特殊用途的理由。

NOTE

Pro'sKit®

Certificate Number : TW98/12323QA

寶工實業股份有限公司
PROKIT'S INDUSTRIES CO., LTD.
http://www.prokits.com.tw
E-mail : pk@mail.prokits.com.tw