

Pro'sKit®

MT-5110 3 1/2 Capacitance Meter

CE



User's Manual

1st Edition' 2012

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1. FEATURES

- ◇ Easy and correct readout.
- ◇ High measuring accuracy.
- ◇ Measurements are possible even under a strong magnetic field.
- ◇ LSI-circuit provides high reliability and durability.
- ◇ Input overload protection is provided.
- ◇ LCD display for clear readout even in bright ambient light conditions.
- ◇ Light-weight and compact construction for easy operation.
- ◇ Low battery condition is indicated on the LCD display.
- ◇ Low power consumption.

2. SPECIFICATIONS

2-1.GENERAL SPECIFICATIONS

- Display: LCD (Liquid Crystal Display) Max. Indication 1999.
- Measurement: C (Capacitance)
- Range: single 9 position, whole range value (from 0.1pF to 20000uF)
- Zero Adjustment :Manual (range:±20pF)
- Calibrate Adjustment: Have two internal adjustments.
- Over-input: Display shows "1".
- Backlight Function: it went out by itself within 8 seconds.
- Sampling Time: 0~5second
- Operating Temp: 0°C to 40°C.
- Operating Humidity: 80% MAX.R.H.
- Power Supply: Single, standard 9 volt battery. NEDA 1604IEC6F22
- Typical consumption current: 3~4mA
- Standard Accessories: Test alligator clips (red & black)...1 pair.
Test leads (red & black).....1 pair.
Test socket 1 pc
- Instruction manual.....1 pc.

2-2. ELECTRICAL SPECIFICATION

Accuracy is \pm (percentage of reading + number of digit) at 23 ± 5
 $^{\circ}\text{C}$, $<80\%$ RH.

Range	Accuracy	Resolution	Test Frequency	Max indication value
200pF	$\pm(0.5\%+7)$	0.1pF	800Hz	199.9pF
2nF	$\pm(0.5\%+5)$	1pF	800Hz	1.999nF
20nF		10pF	800Hz	19.99nF
200nF		100pF	800Hz	199.9nF
2 μF		1000pF	800Hz	1.999 μF
20 μF		0.01 μF	80Hz	19.99 μF
200 μF		0.1 μF	8Hz	199.9 μF
2000 μF	$\pm(2\%+5)$	1 μF	8Hz	1999 μF
20000 μF	$\pm(3\%+10)$	10 μF	8Hz	1999($\times 10$) μF

pF= Pico Farad(10^{-12}F) , nF= nan Farad(10^{-9}F). μF = micro Farad(10^{-6}F)

Excitutive voltage: Max.2.8Vrms

Overload Rating: Protection by a 0.1A/250V fuse.

3. OPERATION PANEL

1. Model Number
2. LCD display: display the test value and unit.
3. Backlight key: press the button lightly; it was turning off by itself about 8 seconds.
4. Capacitance “+”input terminal.
5. Capacitance “-”input terminal.
6. Function Selector: It is used for power on and changes the range of function.
7. Zero knob: Knob to zero when test low capacitance.



4. CONSIDERATION OF MEASUREMENT

- (1) This C METER is intended for measuring the capacitance value of a capacitor. It is not intended for determining the "Q" factor for above reactive components. Misleading readings may be obtained if the measurement of capacitance of a resistor is attempted.
- (2) When measuring components within circuit that circuit must be switched off and de-energized before connecting the test leads.
- (3) Do not damage (black & red) test leads, if any worn please change
- (4) Instruments used in dusty environments should be stripped and cleaned periodically.
- (5) Do not leave the instrument exposed to direct heat from the sun for long periods.
- (6) Before removing the battery and fuse compartment cover, ensure that the instrument is disconnected with any circuit and the power switch is in the off position.
- (7) For all measurements, should connect BLACK test lead into "-" terminal and RED test lead into "+" terminal.

5. CAPACITANCE(C) MEASURING PROCEDURE

- (1) Select the range selector for the maximum expected capacitance.
- (2) The power will on when the selector switch away from OFF position.
- (3) Check "0" indication: If test range is 200pF, 2nF, 20nF, should check "0" indication before test.
- (4) Observe polarity when connecting polarized capacitors.
- (5) Full discharge any capacitors.
- (6) Connect the alligator clips to the capacitors leads.
- (7) Read the display. The value is direct reading in the electrical unit (pF, nF, uF) indicated at the selected range switch. If display show "1", It indicate on Out-of-Range measurement. If the display indicates one or more leading zeros, shift to the next lower range scale to improve the resolution of the measurement.

NOTE:

- (a) If the capacitance value is unmarked, start with the 200pF range and keep increasing until the over-range indication goes off and a reading is obtained.
- (b) A shorted capacitor will read over-range on all ranges. A capacitance with low voltage leakage will read over range, or a much higher value than normal. An open capacitor will read zero on all ranges (possibly a few pF on 200pF range, due to stray capacitance of the instrument).
- (c) Measure of very low capacitance should be performed using extremely short leads in order to avoid introducing any stray inductance.
- (d) When using the optioned test leads, remember that the leads introduce a measurable capacitance to the measurement. As a first approximation, the test lead capacitance may be measured by opening the leads at the trips, recording the open circuit value and subtracting that value.
- (e) Capacitors, especially electrolytic, often have notoriously wide tolerances. Do not be surprised if the measured value is greater than the value marked on the capacitor, unless it is a close tolerance type. However, values are seldom drastically below the rated value.
- (f) If changing range, measured value will be changed; leakage-voltage capacitors will be checked also. Leakage-resistance will be decreased in lower range.

6. MAINTENANCE

1) 9-Volt battery replacement

- a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.
- b. Remove the screw on the bottom case and lift the bottom case.
- c. Remove the spent battery and replace it with a battery of the same type.

2) Fuse replacement

- a. Ensure the instrument is not connected to any external circuit. Set the selector switch to OFF position and remove the test leads from terminals.
- b. Remove the screw on the bottom case and lift the bottom case.
- c. Replace the fuse with the same type and rating: 5×20mm, 100mA/250V, fast-blow fuse or as the replacements.

The specifications are subject to change without notice.

The content of this manual is regarded as correct, error or omits PIs. contact with factory.

We hereby will not be responsible for the accident and damage caused by improper operation.

The function stated for this User Manual cannot be the reason of special usage.

MT-5110 3 1/2 數位電容錶

1. 特色

- ◇ 測量準確, 讀數方便
- ◇ 測量精度高
- ◇ 在幹擾的磁場下依然可以測量
- ◇ LSI 電路提供高可靠性和耐久性
- ◇ 提供輸入過載保護
- ◇ 即使在明亮室內光線狀況下, LCD 清楚顯示測量結果
- ◇ 結構設計容易操作使用
- ◇ 若工作電池電壓低, LCD 上會顯示低電壓符號提醒
- ◇ 整機低功耗

2. 說明

2-1. 一般說明

- 顯示: LCD(液晶顯示螢幕) 最大讀值 1999
- 測量: C(僅電容量)
- 範圍: 9 個檔位, 全範圍值從 0.1pF to 20000uF
- 歸零調整: 手動(範圍: 大約 $\pm 20\text{pF}$)
- 校驗調整: 內含 2 個調整裝置
- 輸入超過: 螢幕顯示 "1"
- 背光功能: 8 秒內
- 採樣時間: 0 ~5second
- 操作溫度: 0 °C~40 °C.最大濕度: 80%.R.H.
- 電源: 1 個標準的 9 伏特電池。 NEDA 1604IEC 6F 22
- 標準消耗電流: 3~4 毫安培
- 標準配件: 測試鱷魚夾子(紅和黑色) 1 對
測試錶棒(紅和黑色) 1 對
測試座 1 只
操作說明書 1 本

2-2. 電氣規格

精度為 \pm (讀數的百分比+個位數) 在 $23 \pm 5^{\circ}\text{C}$, $<80\%$ 相對濕度。

範圍	精準度	解析度	測試頻率	最大顯示值
200pF	$\pm(0.5\%+7)$	0.1pF	800Hz	199.9pF
2nF	$\pm(0.5\%+5)$	1pF	800Hz	1.999nF
20nF		10pF	800Hz	19.99nF
200nF		100pF	800Hz	199.9nF
2uF		1000pF	800Hz	1.999uF
20uF		0.01uF	80Hz	19.99uF
200uF		0.1uF	8Hz	199.9uF
2000uF	$\pm(2\%+5)$	1uF	8Hz	1999uF
20000uF	$\pm(3\%+10)$	10uF	8Hz	1999($\times 10$)uF

pF= Pico Farad(10^{-12}F) , nF= nan Farad(10^{-9}F). uF= micro Farad(10^{-6}F)

Excititive voltage: Max.2.8Vrms

功率超載：由 0.1A/250V 保險絲保護。

3. 操作面板

- 1.產品型號.
- 2.LCD 螢幕：顯示測試值和單位
- 3.背光按鍵：輕輕按下按鈕，約 8 秒後自動關閉
- 4.電容輸入端 “+”
- 5.電容輸入端 “-”
- 6.功能旋鈕：用於啟動及更改功能範圍
- 7.調零旋鈕：低電容測試時調節為零



4. 測量注意事項

- (1) 這台電容測試器用於測量一般電容器的電容量值。不能確定器件的“Q”因素。也不能用於測量電壓，電阻等參數，否則獲得誤導性的讀值。
- (2) 當測量零件時，必須確認這個零件在沒有通電的狀態下進行，所連接的電路必須被關掉並且切斷。

- (3) 注意檢查（黑色和紅色）測試線，若損壞請更換。
- (4) 在佈滿灰塵的環境裡使用儀器應該定期進行清潔。
- (5) 不要長期把儀器暴露在太陽下。
- (6) 取出電池和打開保險絲蓋子之前，確認儀器任何連接或電源開關處於關閉位置。
- (7) 所有的測量，應該連接到黑色測試線“-”和紅色測試線“+”。

5. 電容 (C) 測量步驟

- (1) 將功能旋鈕轉到待測試電容的預期最大值選擇的範圍
- (2) 電源會同步開啓。
- (3) 檢查“0”位：如果測試的範圍是 200pF，2nF，20nF，應測試前檢查儀表顯示為“0”，若有偏離請調整“ADJ”調零旋鈕。
- (4) 當測試有極性電容器時，檢查其極性，以對應測試插座“+”端，“-”端連接。
- (5) 任何電容器測量前，應對電容器進行完全放電。
- (6) 把鱷魚夾子和電容器各引腳連結起來。
- (7) 讀取螢幕顯示的數值，電容值單(pF, nF, uF)裡的直接讀取，如果螢幕顯示“1”表示測量結果超過選定測量範圍。如果螢幕顯示一個或多個零在數字前面，切換到下一個較低的範圍檔位提高解析度。

注意：

- (a) 如果不知道待測零件電容量值，從 200pF 範圍開始並且持續增加，直到超量指示熄滅及讀取到讀值。
- (b) 一個短路的電容測量時會顯示超過量測範圍的讀值，並顯示“1”。與正常的電容相比較，有低電壓漏電的電容器其測量讀值將會較高或超過範圍。
- (c) 爲了避免引起任何雜訊干擾，測量非常低的電容量應該使用極其短的測試線執行。
- (d) 當使用任選的測試錶棒時，記住錶棒可能引入一個的電容。首先，測試錶棒應在打開筆尖的情況下，測出該錶棒的電容，記錄其開路值並從測試結果中減去此值。

- (e) 電容器，特別是電解電容，往往有廣泛的公差。不要感到驚訝，如果測量值大於標在電容器上的值，除非它是一個緊公差，不管如何測量，測量值很少大幅低於額定值。
- (f) 如果更改測量檔位，測量顯示值將不同。電容器漏電壓也將隨檔位不同而變化，在低檔測量位置，漏電電阻會變小。

6. 維修

1) 9 伏特的電池更換

- a. 確認儀器不連接任何外部電路。確定儀器功能旋鈕轉向為 OFF 位置並且除去測試線。
- b. 取下底蓋的螺絲與蓋子。
- c. 取出電池並更換一個同類型的電池。

2) 保險絲更換

- a. 確認儀器不連接任何外部電路。確定儀器功能旋鈕轉向為 OFF 位置並且除去測試線。
- b. 取下底蓋的螺絲與蓋子。
- c. 用相同的類型和等級的保險絲替換：5×20mm, 100mA/250V

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務和危害。

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。

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