

ADM750 Digital Multimeter User Manual

1. Introduction

The ADM750 Digital Multimeter meters CAT III 600V/CAT II 1000V requirement. These meters are designed with overvoltage and overcurrent alarm, with all modes withstanding 1kV overvoltage shock. ADM750 is suitable for electricians.

2. Features

Ergonomic design, comfortable and solid.
Can withstand a drop of 2 meters height.
3 times/second sampling rate.
Full protection which can withstand overvoltage shock up to 1kV, and designed with overvoltage and overcurrent alarm.
Fast capacitance measurement, response time is within 6s when capacitance $\leq 10\text{mF}$.
Audio/visual alarm in continuity and NCV modes.
Low power consumption, automatic power saving prolongs battery life up to 500 hours.

3. Accessories

Open the package box and take out the device. Please check whether the following items are deficient or damaged:

- 1) User manual ----- 1 pc
- 2) Test leads ----- 1 pair

If any of the above item is missing or damaged, please contact your supplier immediately.

Warning: Before using the instrument, please read the "Safety operation guidelines" carefully.

4. Safety Operation Guidelines

1) Safety Certification

Design according to IEC61010-1: 2010, 61010-2-030:2010, 61010-2-033:2012, 61326-1:2013, 61326-2-2:2013.

2) Safety Instructions and Precautions

- Do not use the device if the rear cover is not covered up or it will pose a shock hazard.
- Do not use the device if the device or test leads appear damaged or if you suspect that the device is not operating properly. Pay particular attention to the insulation layer.
- Keep the fingers behind the finger guard during operation.
- Do not input voltage over 1000V between the instrument terminal and ground to prevent electric shocks or damages to the instrument.
- Be cautious to prevent electric shock if the measured DC voltage > 60V or AC voltage > 30Vrms.
- Do not input overrange value.
- Functional dial should be switched to proper position.
- Do not switch the functional dial during measurement.
- Do not change the internal circuit of the device in order to avoid the damage to the device and users.
- Use the same specification fast-acting fuse for replacement.
- To avoid false reading, replace the battery when the battery indicator "▲" appears.
- Do not use or store the device in high temperature and high humidity environment, the performance of the device may deteriorate after exposure to moisture.
- Use damp cloth to clean the case; do not use detergent containing solvents or abrasivants.

5. Electrical Symbols

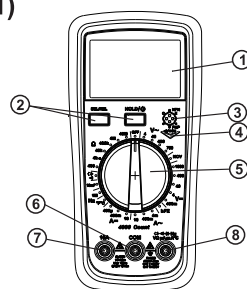
	Low battery		Fuse		High voltage hazard		AC
	Ground		Double insulation		Warning		DC

6. General Specifications

- 1) Max voltage between input terminal and ground: 1000Vrms.
- 2) Δ 10A terminal: Fuse 10A H 250V fast-acting fuse $\Phi 5 \times 20\text{mm}$.
- 3) mA/uA terminal: Fuse 500mA H 250V fast-acting fuse $\Phi 5 \times 20\text{mm}$.
- 4) Max Display Value: 3999; Overage display "OL", sampling rate 3 times/second.
- 5) Measuring range: Manual range
- 6) Backlight: Manual ON/OFF. Automatic turn off backlight when 30s inactive.
- 7) Polarity: Negative input display "-" symbol.
- 8) Data hold indicator: "H" at LCD upper left corner.
- 9) Low battery indicator: "▲" at LCD lower left corner.
- 10) Audio/visual alarm: During the continuity measurement and NCV measurement, the device will make sounds along with a red LED light indicator.
- 11) Battery: AA battery (zinc manganese) 1.5V x 2
- 12) Operating temperature: 0°C~40°C (32°F~104°F)
Storage temperature: -10°C~50°C (14°F~122°F)
Relative humidity: 0°C~below 30°C $\leq 75\%$; 30°C~40°C $\leq 50\%$.
Operating altitude: 0~2000m
- 13) Weight: About 328g (including batteries).
- 14) Electromagnetic compatibility:
RF $\leq 1\text{V/m}$, overall accuracy=specified accuracy+5% of range.
RF > 1V/m, no specified calculation.

7. External Structure (picture 1)

1	LCD display
2	Functional buttons
3	Transistor input terminal
4	Audio/visual alarm indicator
5	Functional switch
6	COM input terminal
7	10A current input terminal
8	Other measurement input terminal



picture 1

8. Functional Buttons

*. SELECT/REL: Press to switch the range mode to diode/continuity, Celsius/Fahrenheit temperature. When measuring the capacitance, voltage, current, and resistance (400 Ω scale), press this button can clear the base values.

*. HOLD: Press the button to perform data hold/ cancel data hold. Press this button $\geq 2\text{s}$ to turn on/off the backlight.

9. Measurement Instructions

Please confirm the batteries have been installed first. To avoid false reading, replace the battery if the battery low power symbol "▲" appears. Also pay special attention to the warning sign "▲" besides the test lead plug, it indicates that the tested voltage or current must not exceed the values listed on the device.

1) AC/DC Voltage Measurement (see picture 2)

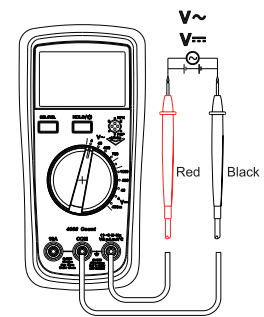
- Switch the dial to AC voltage position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured voltage (parallel to the load).

Notes:

- Do not input voltage over 1000Vrms, or it may pose shock hazard. If the measured voltage range is not known before the measurement, set the switch to the highest range, and then gradually reduce the measuring range according to the actual reading (LCD display 0L indicates over-range, need to increase the measuring range). Measurement accuracy might be affected when large circuit impedance is present.

*. Be cautious when measuring high voltage.

*. Before using the device, it is suggested to measure a known voltage for verification.



picture 2

2) Resistance Measurement (see picture 3)

- Switch the dial to resistance position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured resistor (parallel to the measured resistor).

Notes:

- To avoid instrument damage and injury to users, before measuring the resistance online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.

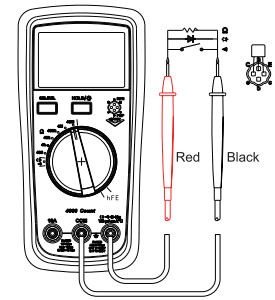
*. If the resistance when shorted is more than 0.5 Ω , please check if test leads are loosened or damaged.

*. If the resistor is open or over the range, the "OL" symbol will be displayed on the screen.

*. When measuring low resistance, the test leads may produce 0.1 Ω ~0.2 Ω measurement error. To obtain accurate measurement, please measure at the 400 Ω scale, the device will automatically subtract the resistance of test leads.

*. When measuring high resistance, it may take a few seconds to stabilize the reading, which is a normal phenomenon.

*. Do not input over 60V DC or 30V AC.



picture 3

3) Continuity Measurement (see picture 3)

- Switch the dial to continuity position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both measured ends.
- When measured resistance > 51 Ω , circuit is in open status and the buzzer will make no sound. When measured resistance $\leq 10\Omega$, circuit is in good conduction status and the buzzer will be beeping continuously, along with a red LED light indicator.

Notes:

- To avoid instrument damage and injury to users, before measuring the continuity online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.

4) Diode Measurement (see picture 3)

- Switch the dial to diode position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the PN junction.
- "OL" symbol appears when the diode is open or polarity is reversed.

Notes:

- To avoid instrument damage and injury to users, before measuring the PN junction online, all power supplies in the circuit must be turned off and the residual charge on all capacitors must be released.

*. ADM750 diode's test voltage range is about 4.0V/1.4mA

5) hFE Measurement (see picture 3)

- Switch the dial to "hFE" position.
- Insert the transistor (PNP or NPN type) poles (B, E, C) into the corresponding socket, the hFE value will be displayed on the screen.

6) Capacitance Measurement (see picture 4)

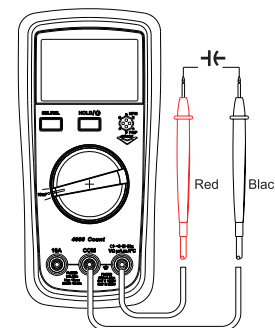
- Switch the dial to capacitance position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured capacitor.
- When there is no input, the screen will also show a fixed reading which is the inherent capacitance value of the device. For small capacitance measurement, the measured value must subtract the inherent capacitance value to ensure the measurement accuracy, please use the relative measurement function (REL) to measure (The device will automatically subtract the inherent value for easier reading).

Notes:

- If the tested capacitor is shorted or its capacitance is over the specified range, "OL" symbol will be displayed on the screen.

*. When measuring large capacitance, it may take a few seconds to obtain steady readings.

*. Please fully discharge the capacitors before measuring. This is extremely important for capacitors with high voltage to avoid shock hazard.



picture 4

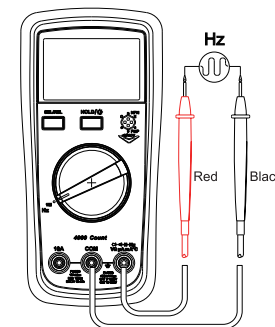
7) Frequency Measurement (see picture 5)

- Switch the dial to Hz position.
- Insert the red test lead to the "V Ω mA" jack, black to the "COM" jack, then connect the two test lead tips to both ends of the measured signal source.

Notes:

- When there is no input, the device may be influenced by the strong power frequency. There may be a reading of 50Hz or 60Hz which will not affect the measurement accuracy.

*. Do not input over 60V DC or 30V AC.



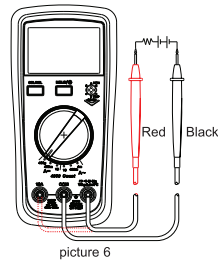
picture 5

8) DC Current Measurement (see picture 6)

- Switch the dial to DC current position.
- Insert the red test lead to the "VΩmA" jack or the "10A" jack, black to the "COM" jack, then connect the test leads with the circuit in series.

▲Notes:

- Before measuring, switch off the power supply of the circuit, and carefully check the input terminals and the dial position.
- If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- If the "VΩmA", "10A" input is overloaded, the internal fuses will break and must be replaced.
 - a. VΩmA terminal fuse specification: Fuse 0.5A/250V Φ5x20mm.
 - b. 10A terminal fuse specification: Fuse 10A/250V Φ5x20mm.
- To avoid instrument damage and injury to users, do not connect the test leads in parallel to any voltage circuit during the current test.
- If the tested current is close to 10A, each measurement time should be less than 10 seconds and the next test should be after 15 minutes.



picture 6

9) AC Current Measurement (see picture 6)

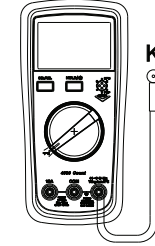
Similar to the DC current measurement.

10) Temperature Measurement (Celsius/Fahrenheit, see picture 7)

- Switch the dial to temperature position.
- Plug the K-type thermocouple into the device and put the sensing probe on the object. Read the temperature on the screen after the value is stable.

▲Notes:

The device will display "0L" when it turns on. And it is only suitable for the K type (Ni-Cr~Ni-Si) thermocouple, which is a temperature sensor. The measured temperature should be less than 250°C/ 482°F (°F=°C*1.8+32).



picture 7

11) NCV Measurement (see picture 8)

- To sense whether there is AC voltage or electromagnetic field in the space, please switch the dial to the NCV position.
- Place the front end of the device near the measured object. When the voltage of the electric field > 100Vac, LCD displays the electric field intensity by "-" symbol. More "-" (up to 4 segments) and the higher the electric field intensity, the higher the frequency of buzzer beeping and red LED flickering, and vice versa.
- Display of electric field intensity.



picture 8

- When electric field intensity is 0~50mV, LCD displays "EF".
- When electric field intensity is 50~100mV, LCD displays "-".
- When electric field intensity is 100~150mV, LCD displays "--".
- When electric field intensity is 150~200mV, LCD displays "---".
- When electric field intensity is >200mV, LCD displays "----".

12) Others:

- The device enters normal measurement status in 2 seconds after start-up.
- The device automatically shuts down if there is no operation for 15 minutes. You can wake up the device by pressing any key, the buzzer will beep once. To disable auto shutdown, switch the dial to OFF position, long press SEL/REL button and turn on the device.
- The buzzer will beep once (about 0.25s) at any valid press or switch of the dial.
- Buzzer alarm prompt during measurement:
 - a. When the input voltage ≥ 1000V (AC/DC), the buzzer will beep continuously indicating that it is at the range limit.
 - b. When the current > 10A (AC/DC), the buzzer will beep continuously indicating that it is at the range limit.
- The buzzer will make 5 consecutive beeps about 1 minutes before automatic shutdown, and make one long beep when it shuts down.
- Low voltage detection: Battery voltage < 2.5V, "⚡" under-voltage symbol appears, but it can still work normally, and "⚡" flickers for 3s in every 3s. If the voltage < 2.2V, turn on the device will only show the under-voltage symbol, the device can not work.

10. Technical Specifications

- Accuracy: ±(a% of reading + b numerical value in least significant digit slot), 1 year warranty.
- Ambient temperature: 23°C±5°C (73.4°F±9°F), relative humidity: ≤75%
- Notes:
 - To ensure accuracy, operating temperature should be within 18°C~28°C and fluctuation range should be within ±1°C. Temperature Coefficient= 0.1*(specified accuracy)/°C (<18°C or >28°C).

1) DC Voltage Measurement

Measuring Range	Resolution	Accuracy
Scale		
400.0mV	0.1mV	±(0.5%+5)
4.000V	0.001V	
40.00V	0.01V	
400.0V	0.1V	
1000V	1V	±(0.7%+3)

▲Input impedance:

- Input impedance: About 10MΩ. Results might be unstable at mV range when no load is connected. The value becomes stable once the load is connected (Least significant digit ≤±3).
- Max input voltage: ±1000V, when the voltage ≥ 1010V, "OL" symbol appears.
- Overload protection: 1000Vrms (AC/DC).

2) AC Voltage Measurement

Measuring Range	Resolution	Accuracy
Scale		
4.000V	0.001V	± (1.0%+2)
40.00V	0.01V	
400.0V	0.1V	
750V	1V	

- Input impedance: about 10MΩ.
- Frequency response: 40Hz~400Hz, display sine wave true RMS (average response).
- Max input voltage: ±750V, when the voltage ≥ 760V, "OL" symbol appears.
- Overload protection: 1000Vrms (AC/DC).

3) Resistance Measurement

Measuring Range	Resolution	Accuracy
Scale		
400.0Ω	0.1Ω	± (1.0%+2)
4.000kΩ	0.001kΩ	
40.00kΩ	0.01kΩ	± (0.8%+2)
400.0kΩ	0.1kΩ	
4.000MΩ	0.001MΩ	± (1.0%+2)
40.00MΩ	0.01MΩ	

- Measurement result = reading of resistor – reading of shorted test leads
- Overload protection: 1000Vrms (AC/DC).

4) Continuity and Diode

Position	Resolution	Remark
	0.1Ω	Set Value: Open circuit: resistance > 50Ω, no beep. Well-connected circuit: resistance ≤ 10Ω, continuous beeps.
	0.001V	Open circuit voltage is about 4V, test current is about 1.4mA.

▲ Overload protection: 1000Vrms (AC/DC).

5) Capacitance Measurement

Measuring Range	Resolution	Accuracy
4.000nF	0.001nF	In REL mode: ±(4%+10)
40.00nF	0.01nF	In REL mode: ±(4%+10)
400.0nF	0.1nF	± (4%+10)
4.000μF	0.001μF	± (4%+5)
40.00μF	0.01μF	± (4%+5)
400.0μF	0.1μF	± (4%+5)
10.00mF	0.01mF	±10%

▲ Overload protection: 1000Vrms (AC/DC).

When the capacitance ≤ 200nF, to ensure accuracy, please use the relative measurement function (REL) to measure.

6) Temperature Measurement

	Range	Resolution	Accuracy
°C	-40 ~ 1000°C	-40 ~ 40°C	±4°C
		> 40 ~ 500°C	±(1.0%+3)
		> 500 ~ 1000°C	±(2.0%+2.5)
°F	-40 ~ 1832°F	-40 ~ 104°F	±5°F
		> 104 ~ 932°F	± (1.5%+5)
		> 932 ~ 1832°F	± (2.5%+5)

▲ Overload protection: 1000Vrms (AC/DC).

Remark: The K-type (Ni-Cr~Ni-Si) thermocouple is only applicable for temperature less than 250°C/482°F.

7) DC Current Measurement

Measuring Range	Resolution	Accuracy
Scale		
400.0μA	0.1μA	± (0.8%+3)
400.0mA	0.1mA	
10.00A	0.01A	± (1.2%+5)

- Alarm when input current ≥ 10A; when input current > 10.10A, "OL" symbol appears.

▲ Overload protection: 250Vrms

μA mA range: F1 Fuse 0.5A/250V Φ5x20mm.

10 A range: F2 Fuse 10A/250V Φ5x20mm.

8) AC Current Measurement

Measuring Range	Resolution	Accuracy
4.000 mA	0.001mA	± (1.0%+2)
40.00mA	0.01mA	
400.0mA	0.1mA	± (1.0%+2)
10.00A	0.01A	

- Frequency response: 40 ~ 400Hz.
- Display: RMS. Accuracy guarantee range: 5 ~ 100% of the range, shorted circuit allows least significant digit < 2.
- Alarm when input current ≥ 10A; when input current > 10.10A, "OL" symbol appears.
- Overload protection: Refer to DC current measurement.

9) Frequency Measurement

Measuring Range	Resolution	Accuracy	Description
10.00Hz~1.000MHz	0.01Hz~1kHz	± (0.1%+4)	Measurement sensitivity: 10Hz~1MHz ≤ 100kHz: 200mVrms ≤ Input amplitude ≤ 30Vrms > 100kHz~1MHz: 600mVrms ≤ Input amplitude ≤ 30Vrms

▲ Overload protection: 1000Vrms (AC/DC).

11. Maintenance

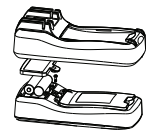
▲ Warning: Before opening the rear cover, switch off the power supply (remove test leads from the input terminal and the circuit).

1) General Maintenance

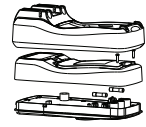
- Clean the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- If there is any malfunction, stop using the device and send it to maintenance.
- The maintenance and service must be implemented by qualified professionals or designated departments.

2) Replace Battery or Fuse (see picture 9a, picture 9b)

- To avoid false reading, replace the battery when the battery indicator "⚡" appears.
 - Battery Specification: AA 1.5Vx2
- Switch the dial to "OFF" position, remove the test leads from the input terminal, remove the protective cover also.
- Loosen the screw on battery cover (top), remove the cover to replace the battery. Please identify the positive and negative pole.
- When the fuse is burned out due to wrong measurement of voltage or over-current, some functions may not work properly, and the fuse should be replaced immediately.
- Switch the dial to "OFF" position and remove the test leads from the input terminal, remove the protective cover also.
- Loosen the both screws on the rear cover, and then remove the rear cover to replace the fuse.
- Fuse specification: F1 Fuse 0.5A/250V Φ5x20mm ceramic tube
F2 Fuse 10A/250V Φ5x20mm ceramic tube



picture 9a



picture 9b

ADM750

数字万用表使用说明书

一、概述

ADM750是一款便携式万用表，产品采用新一代智能ADC芯片，具有测量过压、过流报警提示，电路配备完善的防高压误测装置；符合安规CAT III 600V/CAT II 1000V要求，是商业、工业电工界优先选择的数字万用表。

二、特点

- 外观新颖，把握手感舒适，结构扎实
- 可承受2米高度的跌落
- 大屏LCD 4000位模数显示，快速ADC/数转换器（3次/秒）
- 全功能误测保护，最大可承受1000V过电压冲击。并设置有过压、过流报警提示
- 大容量电容扩展量程，测量响应速度快，尤其是电容档比较同类产品， $\leq 10\text{mF}$ 响应时间约6秒内
- 产品Continuity通断测量、NCV非接触测量，同步配置“声光”提示功能。
- 可测量高达DC1000V、AC750V、10A 的交流和直流电压和电流。
- 产品设置背光启动功能，可以在阴暗条件下使用。
- 整机功耗约1.6mA，电路设有自动省电功能，睡眠状态下低功耗约11 μA ，有效延长电池使用寿命达500小时

三、附件

打开包装箱，取出仪表，请仔细检查下列附件是否缺少或损坏：

1. 使用说明书 一本
 2. 表笔 一副
 3. 温度探头 一根
- 如发现以上任何一项缺失或损坏，请立即与您的供货商联系。
▲警告：在使用仪表之前，请仔细阅读有关“安全操作准则”。

四、安全操作准则

1. 安规

依据IEC61010-1:2010, 61010-2-030:2010, 61010-2-033:2012, 61326-1:2013, 61326-2-2:2013 进行设计。

2. 安全说明及使用注意事项

- 1) 后盖没有盖好前严禁使用，否则有电击危险！
- 2) 使用前应检查并确认仪表和表笔绝缘层完好，无破损及断线。如发现仪表壳体绝缘层有明显损坏，或者您认为仪表已经无法正常工作时，请勿再使用该仪表。
- 3) 在使用仪表时，用户的手指必须放在表笔手指保护环之后。
- 4) 不要在仪表终端及接地之间施加1000V以上电压，以防电击和损坏仪表。
- 5) 被测直流电压高于60V或交流电压高于30Vrms的场合，应小心谨慎，防止触电！
- 6) 被测信号不允许超过规定的极限值，以防电击和损坏仪表！
- 7) 量程开关应置于相应的测量档位上。
- 8) 严禁在测量中拨动量程开关更改量程档位，以防损坏仪表！
- 9) 请勿随意改变仪表内部接线，以免损坏仪表和危及安全！
- 10) 必须使用同类规格快速反应的保险丝更换已损坏的保险管。
- 11) 当液晶显示“ \blacksquare ”符号时，为确保测量精度，请及时更换仪表供电电池。
- 12) 不要在高温、高湿环境中使用仪表；尤其不能在潮湿环境中存放，受潮后仪表性能可能变劣。
- 13) 维护和保养请使用湿布和温和的清洁剂清洁仪表外壳，请勿使用研磨剂或溶剂！

五、电气符号

	电池电量不足		高压警示
	接地		交流
	保险丝		直流
	双重绝缘		警告提示

六、综合范围

1. 输入端子和接地之间的最高电压：1000Vrms。
2. ▲10A端子设：
Fuse 10A H 250V快熔式保险丝 $\Phi 5 \times 20\text{mm}$
3. ▲mA/ μA 端子设：
Fuse 500mA H 250V快熔式保险丝 $\Phi 5 \times 20\text{mm}$
4. 最大显示：3999，过量程显示“OL”，每秒更新3~4次。
5. 量程选择：手动。
6. 背光功能：手动点亮，30秒后自动熄灭。
7. 极性：负性输入显示“-”符号。
9. 数据保持功能：LCD左上角显示“ \square ”。
10. 电量不足：LCD左下角显示“ \blacksquare ”。
11. 声光报警指示：在导通测量和NCV测量的时候，发声的同时，并伴有红色LED发光指示。
12. 仪表内部电池：AA电池（锌锰）1.5V \times 2节。
13. 工作温度：0 $^{\circ}\text{C}$ ~40 $^{\circ}\text{C}$ (32 $^{\circ}\text{F}$ ~104 $^{\circ}\text{F}$)
储存温度：-10 $^{\circ}\text{C}$ ~50 $^{\circ}\text{C}$ (14 $^{\circ}\text{F}$ ~122 $^{\circ}\text{F}$)
相对湿度：0 $^{\circ}\text{C}$ ~30 $^{\circ}\text{C}$ 以下 $\leq 75\%$ ，30 $^{\circ}\text{C}$ ~40 $^{\circ}\text{C}$ $\leq 50\%$
工作海拔高度：0~2000m
14. 重量：约328g（包括电池）。
15. 电磁兼容性：
在1V/m的射频场下：总精度=指定精度+量程的5%，超过1V/m以上的射频场没有指定指标。

七、外表结构(图1)

1. LCD显示屏
2. 功能按键
3. 三极管测量四脚插孔
4. 声光报警指示灯
5. 量程开关
6. COM输入端
7. 10A电流输入端
8. 其余测量输入端

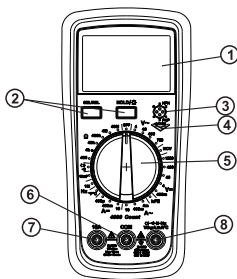


图1

八、按键功能

- * SELECT/REL按键：点击以切换二极管/通断量程、摄氏/华氏温度量程。每点击一次对应的测试功能档量程交替切换。在电容、电压、电流、电阻（400欧姆档）档功能下按此键可清底数。
- * HOLD/☒按键：点击进入数据保持/取消数据保持模式；当按此键 ≥ 2 秒，则打开/关闭背光。

九、测量操作说明

首先确保产品已安装电池，仪表开机后如果电量不足，显示屏上将会显示“ \blacksquare ”符号，为保证测试精度，则须及时更换电池后再使用。还要特别注意测试笔插口旁警示符号“▲”，这是警告你要留意被测电压或电流不要超出指示的数值，以确保测量安全！

1. 直流电压与交流电压测量(见图2)

- 1) 将功能量程开关拨到交流电压档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测电压的两端（并联到负载上）进行测量；
- 3) 从显示屏上读取测试结果。

▲注意：

- * 不要测量高于1000Vrms的电压，虽然测量更高的电压是有可能的，但可能会损坏仪表及危及用户！在测量之前如果不知道被测电压的范围时，应将量程开关置于最高档位，然后根据实际读数需要逐步降低测量档位（当LCD显示OL时，说明已超量程，需要调高量程）。每个量程档的输入阻抗均为10M Ω ，这种负载效应在测量高阻电路时会引起测量误差，如果被测电阻阻抗 $\leq 10\text{k}\Omega$ ，误差可以忽略（0.1%或者更低）。
- * 在测量高电压时，要特别注意安全，避免触电！
- * 在使用前可以测试已知电压，以确认产品功能是否完好！

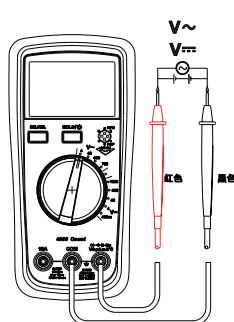


图2

2. 电阻测量(如图3)

- 1) 将功能量程开关拨到电阻测量档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触所测电阻的两端（与被测电阻并联）进行测量；
- 3) 从显示屏上读取测试结果。

▲注意：

- * 当在线测量电阻时，为避免仪器损坏和危及用户，在测量前必须先将被测电路内所有的电源关断，并将所有电容器上的残余电荷放尽，才能进行测量。
- * 如果表笔短路时的电阻值不小于0.5 Ω 时，应检查表笔是否有松脱或其它异常。
- * 如果被测电阻开路或阻值超过仪表量程时，显示屏将显示“OL”。
- * 在低阻测量时，测量表笔会引起引线会带有0.1 Ω ~0.2 Ω 的电阻测量误差，为了获取精确的数值，为此测量请使用相对测量功能（在400 Ω 档）测量，仪表将自动减去表笔电阻。
- * 测量高阻时，可能需要数秒时间后方能稳定读数，这属正常现象。
- * 不要输入高于直流60V或交流30V

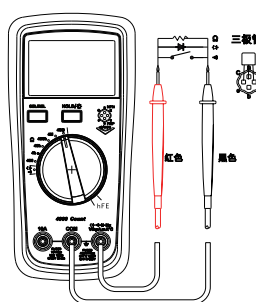


图3

3. 电路通断测量(见图3)

- 1) 将功能量程开关拨到电路通断测量档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触被测量的两个端点进行测量；
- 3) 如果被测两个端点之间电阻 $>51\Omega$ ，认为电路断路，蜂鸣器无声；被测两个端点之间电阻 $\leq 10\Omega$ ，则认为电路导通性良好，蜂鸣器连续蜂鸣，发声的同时，并伴有红色LED发光指示。

▲注意：

- * 当在线测量电路通断时，为避免仪器损坏和危及用户，在测量前必须先将被测电路内所有的电源关断，并将所有电容器上的残余电荷放尽，才能进行测量。

4. 二极管测量(见图3)

- 1) 将功能量程开关拨到二极管测量档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”插孔，并将两只表笔笔尖分别接触PN结的两个端点；
- 3) 如果被测二极管开路或极性反接时，将会显示“OL”。对硅PN结而言，一般约为500~800mV（0.5~0.8V）确认为正常值。

▲注意：

- * 当在线测量PN结时，为避免仪器损坏和危及用户，在测量前必须先将被测电路内所有的电源关断，并将所有电容器上的残余电荷放尽，才能进行测量。
- * 二极管测试电压范围约为4.0V/1.4mA

5. 晶体管放大倍数测量(hFE)(见附图3)

- 1) 将功能/量程开关置于“hFE”。
- 2) 将待测晶体管（PNP或NPN型）的基极（B）、发射极（E）、集电极（C）对应插入四脚测试座，显示器上即显示被测晶体管的hFE近似值

6. 电容测量(见图4)

- 1) 将功能量程开关拨到电容测量档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”插孔，将两只表笔笔尖分别接触测电容的两个端点；
- 3) 从显示屏上读取测试结果。在无输入时仪表会显示一个固定读数，此数为仪表内部固有的电容值。对于小容量电容的测量，被测值一定要减去此值，才能确保测量精度。为此小容量电容的测量请使用相对测量功能（REL）测量（仪表将自动减去内部固定值，方便测量读数）。

▲注意：

- * 如果被测电容短路或容值超过仪表的最大量程，显示屏将显示“OL”。
- * 对于大容量电容的测量，可能需要数秒时间后方能稳定读数，这属正常现象。
- * 测试前必须电容上的残余电荷放尽，才能进行测量；对带有高压的电容尤为重要，避免损坏仪表和造成人身伤害。

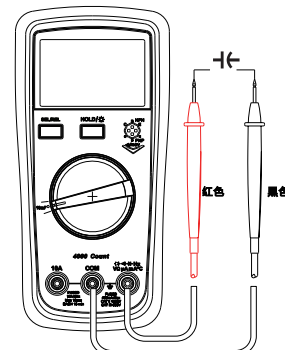


图4

7. 频率测量(见图5)

- 1) 将功能量程开关拨到频率Hz测量档位上；
- 2) 将红表笔插入“VQmA”插孔，黑表笔插入“COM”孔，将两只表笔笔尖分别接触被测信号源的两个端点；
- 3) 从显示屏上读取测试结果。

▲注意：

- * 在无输入时，因工频电场强的响，仪表可能会显示一个固定的50Hz或60Hz读数，但对实际测量精度无影响的。
- * 不要输入高于直流60V或交流30V

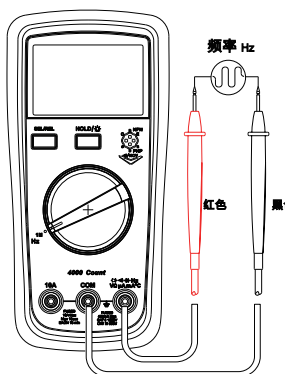


图5

8. 直流电流测量(见附图6)

- 1) 将功能量程开关拨到直流(交流)电流档位上;
- 2) 将红表笔插入"VΩmA"或者10A插孔, 黑表笔插入"COM"插孔, 并将表笔串联到待测量的电源或者电路中;
- 3) 从显示屏上读取测试结果。

▲注意:

- * 在仪表串联到待测回路之前, 必须先将回路中的电源关闭, 并认真检查输入端子及其量程开关位置是否正确, 确认无误后方可通电测量。
- * 在未知被测电流的范围大小的情况下, 应将量程开关置于最大档位测量, 然后再根据实际读数需要逐步调低档位测量。
- * "VΩmA"、"10A"输入孔输入过载时, 会将内置保险丝熔断, 须予更换:
 - a. VΩmA 插孔保险丝电气规格: Fuse 0.5A/250V Φ5×20mm
 - b. 10A插孔保险丝电气规格: Fuse 10A/250V Φ5×20mm
- * 电流档测试时, 切勿把表笔并联到电压电路上, 避免损坏仪表和危及人身安全!
- * 当测量电流接近10A时, 每次测量时间应小于10秒, 时间间隔应大于15分钟!

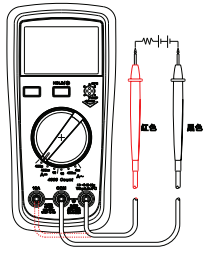


图6

9. 交流电流测量(见附图6)

交流电流测量及操作与直流电流测量类似, 请参照直流电流测量测试方法及步骤。

10. 温度测量(摄氏/华氏测温, 见附图7)

- 1) 将功能量程开关拨到温度测量档位上;
- 2) 将K型热电偶的插头插到仪表上, 探头感温端固定到待测物体上; 待数值稳定后读取显示屏上的温度值。

▲注意:

产品开机显示"OL", K型(镍铬~镍硅)热电偶即温度传感器, 产品仅适用K型(镍铬~镍硅)热电偶, 适用于250°C/482°F以下温度的测量! 摄氏换算华氏°F测温公式(°F=°C*1.8+32)

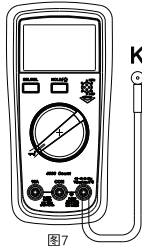


图7

11. 非接触交流电场感测(见附图8)

- 1) 如要感测空间是否存在交流电压或电磁场, 请将功能量程开关拨到(NCV)档位上;
- 2) 将仪表的前端靠近被测物体进行感应探测。当电场电压>100Vac时, LCD以笔段指示电场感测的强度, 分5个等级显示横段"一", 横段越多(最多4段), 电场强度越大; 同时蜂鸣器发出滴滴声, 红色LED也闪烁, 随着测量电场的强弱, 蜂鸣器、红色LED会同步改变发声与发光闪烁的频率。电场强度越大, 蜂鸣的频率和LED闪烁的频率越高, 反之亦然。
- 3) 笔段指示电场感测的强度示意图
 - * 当电场强度在0~50mV时, LCD显示"EF"
 - * 电场强度在50~100mV时, LCD显示"一"
 - * 电场强度在100~150mV时, LCD显示"一一"

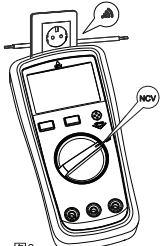


图8

- * 电场强度在150~200mV时, LCD显示"一一一"
- * 电场强度在>200mV时, LCD显示"一一一一"



12. 其它功能

- * 开机全显约2秒后, 进入正常测量状态。
- * 在测量过程中, 约15分钟内均无拨动功能量程开关时, 仪表进入"自动关机"状态以节省电能。在自动关机状态下点击任何按键或拨动功能量程开关, 仪表将会"自动唤醒"开机, 并伴随蜂鸣器蜂鸣一次。如需取消自动关机功能, 旋钮置OFF状态的同时按住SEL/REL键开机即取消自动关机功能。
- * 按下任何功能键或旋转功能量程开关时, 蜂鸣器会发"Beep"一声(约0.25秒)。

* 在测量过程提示蜂鸣警示:

- a. 当输入电压≥1000V(交流/直流)时, 蜂鸣器持续蜂鸣, 警示量程处于极限;
 - b. 当电流>10A(交流/直流)时, 蜂鸣器会持续蜂鸣, 警示量程处于极限。
- * 自动关机前约1分钟蜂鸣器会连续发出5声警示, 关机前蜂鸣器会发1长声警示。
 - * 低电压检测: 供电时检测内部电池供电电压, 当低于约2.5V时, 显示"⚡"电池欠压符号, 但仍可正常工作; 欠压情况下, "⚡"电池欠压显示符号每隔3秒会闪烁3秒。若低于2.2V, 则开机全显后只显示电池欠压符号, 不能工作。

十、技术指标

- 准确度: ±(a%读数+b字数), 保证期为1年
- 环境温度: 23°C±5°C (73.4°F±9°F) 相对湿度: ≤75%

▲注意:

- * 测量精确度的温度条件: 18°C至28°C, 环境温度波动范围稳定在±1°C内。当温度<18°C或>28°C时, 附加温度系数误差0.1 x (指定准确度)/°C。

1. 直流电压测量

量程	分辨率	准确度
400.0mV	0.1mV	±(0.5%+5)
4.000V	0.001V	
40.00V	0.01V	
400.0V	0.1V	
1000V	1V	±(0.7%+3)

▲输入阻抗:

- * 输入阻抗均约10MΩ。mV量程开路会有不稳定数字显示。接上负载后即可稳定≤±3个字
- * 最大输入电压: ±1000V, 当≥1010V时显示"OL"。
- * 过载保护: 1000Vrms(直流/交流)。

2. 交流电压测量

量程	分辨率	准确度
4.000V	0.001V	±(1.0%+2)
40.00V	0.01V	±(0.8%+3)
400.0V	0.1V	
750V	1V	

▲* 输入阻抗: 输入阻抗均约10MΩ。

- * 频率响应: 40Hz~400Hz, 正弦波有效值(平均值响应)
- * 最大输入电压: ±750V, 当≥760V时显示"OL"
- * 过载保护: 1000Vrms(直流/交流)
- * 输入阻抗: 输入阻抗均约10MΩ。
- * 频率响应: 40Hz~400Hz, 正弦波有效值(平均值响应)
- * 最大输入电压: ±750V, 当≥760V时显示"OL"
- * 过载保护: 1000Vrms(直流/交流)

3. 电阻测量

量程	分辨率	准确度
400.0Ω	0.1Ω	±(1.0%+2)
4.000kΩ	0.001kΩ	±(0.8%+2)
40.00kΩ	0.01kΩ	±(0.8%+2)
400.0kΩ	0.1kΩ	±(0.8%+2)
4.000MΩ	0.001MΩ	±(1.0%+2)
40.00MΩ	0.01MΩ	±(1.2%+3)

▲* 量程: 被测阻=测量显示值-表笔短路值。

- * 过载保护: 1000Vrms(直流/交流)。

4. 电路通断、二极管测量

量程	分辨率	备注
•••	0.1Ω	电路断开电阻值设定为: >50Ω, 蜂鸣器不发声; 电路良好导通阻值设定为: ≤10Ω, 蜂鸣器连续发声。
▶	0.001V	开路电压约: 4.0V 测试电流约1.4mA

▲过载保护: 1000Vrms(直流/交流)。

5. 电容测量

量程	分辨率	准确度
4.000nF	0.001nF	在REL模式下: ±(4%+10)
40.00nF	0.01nF	在REL模式下: ±(4%+10)
400.0nF	0.1nF	±(4%+10)
4.000μF	0.001μF	±(4%+5)
40.00μF	0.01μF	±(4%+5)
400.0μF	0.1μF	±(4%+5)
10.00mF	0.01mF	±10%

▲过载保护: 1000Vrms(直流/交流)。

当被测电容量≤200nF时, 为确保测量准确度, 建议采用相对测量功能(REL)测量模式测量。

6. 温度测量

	量程	分辨率	准确度
°C	-40~1000°C	-40~40°C	±4°C
		>40~500°C	±(1.0%+3)
		>500~1000°C	±(2.0%+2.5)
°F	-40~1832°F	-40~104°F	±5°F
		>104~932°F	±(1.5%+5)
		>932~1832°F	±(2.5%+5)

▲过载保护: 1000Vrms(直流/交流)。

备注: 产品配置的点式K型(镍铬~镍硅)热电偶, 仅适用于250°C/482°F以下的温度测量!

7. 直流电流测量

档位	分辨率	准确度
400.0μA	0.1μA	±(0.8%+3)
400.0mA	0.1mA	±(0.8%+3)
10.00A	0.01A	±(1.2%+5)

- * 输入≥10A有报警声。输入>10.10A LCD显"OL"

▲过载保护: 250Vrms

μA mA量程: F1 Fuse 0.5A/250V Φ5×20mm
10 A量程: F2 Fuse 10A/250V Φ5×20mm

8. 交流电流测量

量程	分辨率	准确度
4.000 mA	0.001mA	±(1.0%+2)
40.00mA	0.01mA	±(1.0%+2)
400.0mA	0.1mA	±(1.0%+2)
10.00A	0.01A	±(1.5%+3)

▲* 频率响应: 频率响应: 40~400Hz。

- * 显示: 有效值, 准确度保证范围: 5~100%量程, 短路允许有<2字剩余读数。

▲* 输入≥10A有报警声。输入>10.10A LCD显"OL"

过载保护: 参考直流电流测量过载保护。

9. 频率测量

量程	分辨率	准确度	说明
10.00Hz~1.000MHz	0.01Hz~1kHz	±(0.1%+4)	测量灵敏度: 10Hz~1MHz ≤100kHz: 200mVrms ≤输入幅度≤30Vrms >100kHz~1MHz: 600mVrms ≤输入幅度≤30Vrms

▲过载保护: 1000Vrms(直流/交流)。

十一、保养和维修

▲警告:

在打开仪表后盖之前, 应确定电源已关闭(表笔已离开输入端口并与被测电路断开)。

1. 一般的保养和维修

- * 维护与保养请使用温和和的清洁剂清洁仪表外壳, 切勿使用研磨剂或溶剂。
- * 如发现仪表有任何异常, 请立即停止使用并送修。
- * 在有需要对仪表进行校验或维修时, 请由有资质的专业技术人员或指定的技术部门维修。

2. 更换电池或保险管(见图9a、图9b)

- 1) 当LCD显示欠压"⚡"提示符时, 应立即更换内置电池, 否则会影响测量精度。电池规格: AA 1.5V×2节
- * 把电源开关置于"OFF"位置, 并从输入插孔中移走表笔, 卸下保护套。
- * 电池更换: 用螺丝刀拧下电池盖固定的一颗螺丝(顶部), 卸下电池盖, 即可更换电池; 注意装入新电池时特别要看清正、负极性。
- 2) 仪表操作过程中当误测电压或过流烧坏保险管时, 产品某些功能则不能正常工作, 应立即更换保险管。
- * 把电源开关置于"OFF"位置, 并从输入插孔中移走表笔, 卸下保护套。
- * 用螺丝刀拧下后盖固定的二颗螺丝(仪表下部分), 卸下后盖, 即可更换已被烧断的保险丝:
- * 保险丝规格: F1 Fuse 0.5A/250V Φ5×20mm 陶瓷管
F2 Fuse 10A/250V Φ5×20mm 陶瓷管

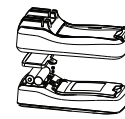


图9a

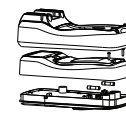


图9b