



# Digital Multimeter

## AM-1009

### USER'S MANUAL








**1. GENERAL**

The instrument is a stable and high performance digital multimeter driven by battery. It uses the LCD with 42mm high make the reading is clearly. And the function of 20sec. back light and overload protection make operation is convenient.

The instrument has the function of measuring DCV, ACV, DCA, ACA, resistance, capacitance, and diode, triode and continuity test. The instrument takes dual-integral A/D converter as key point, is an excellent tools.


**2. SAFETY NOTES**

This series meter meets the standard of IEC1010. Read it before operation.

1. Do not input the limited voltage of 1000V DC or 750V AC RMS when measuring voltage.
2. Voltage less than 36V is safety voltage. When measuring voltage higher than 36V DC, 25V AC, check the connection, insulation of test leads to avoid electric shock.
3. When changing function and range, test leads should be removed from testing point.
4. Select correct function and range.
5. When measuring current, do not input current over 20A.
6. Safety symbols  
 “” exists high voltage, “”GND, “” dual insulation, “” must refer to manual, “”low battery

**3. SPECIFICATION**

**1. GENERAL**

- 1-1. Displaying : LCD displaying
- 1-2. Max. indication: 1999 (3 1/2) , auto polarity indication
- 1-3. Measuring method: dual slope A/D transfer
- 1-4. Sampling rate: approx. 3 times/sec
- 1-5. Over range indication: MSD displays “1” or“-1”
- 1-6. Low battery indication: “” symbol displays
- 1-7. Operation: 0~40℃, relative humidity <80%
- 1-8. Power: one 9V battery (NEDA1604/6F22 or equivalent)
- 1-9. Meas.:190×93.5×37 mm
- 1-10. Weight: approx. 426g (including battery)
- 1-11. Accessories: test leads, instruction manual, holster, gift box and battery
- 1-12. Test accessories: alligator, triode test accessory

**2. TECHNICAL DATA**

- 2-1. Accuracy: ± (RDG% + the lowest digit) at (23±5)℃, <75%RH one year guarantee from production date
- 2-2. TECHNICAL DATA

2-2-1.DCV

| RANGE | ACCURACY   | RESOLUTION |
|-------|------------|------------|
| 200mV | ±(0.5%+3)  | 100uV      |
| 2V    |            | 1mV        |
| 20V   |            | 10mV       |
| 200V  |            | 100mV      |
| 1000V | ±(0.8%+10) | 1V         |

Input resistance: all ranges: 10MΩ

Overload protection: 200mV range: 250V DC or AC peak value, other range: 1000V DC or AC peak value

2-2-2.AC

| RANGE | ACCURACY   | RESOLUTION |
|-------|------------|------------|
| 2V    | ±(0.8%+5)  | 1mV        |
| 20V   |            | 10mV       |
| 200V  |            | 100mV      |
| 750V  | ±(1.2%+10) | 1V         |

Input resistance: 10MΩ Max

Overload protection: 1000V DC or AC peak value

Frequency response: lower than 200V range: 40~400Hz, 750V range: 40~200Hz

Displaying: rms of sine wave(mean value response)

2-2-3. DCA

| RANGE | ACCURACY   | RESOLUTION |
|-------|------------|------------|
| 20mA  | ±(0.8%+10) | 10uA       |
| 200mA | ±(1.2%+8)  | 100uA      |
| 20A   | ±(2.0%+5)  | 10mA       |

Max. measuring voltage drop: 200mV;

Max. input current: 20A (within 10 sec.)

Overload protection: 0.2A / 250V self-resume fuse, 20A infused

2-2-4. ACA

| RANGE | ACCURACY   | RESOLUTION |
|-------|------------|------------|
| 20mA  | ±(1.0%+5)  | 10uA       |
| 200mA | ±(2.0%+5)  | 100uA      |
| 20A   | ±(3.0%+10) | 10mA       |

Max. measuring voltage drop:200mV

Max. input current: 20A (less than 10sec.)

Overload protection: 0.2A / 250V self-resume fused, 20A range infused

Frequency response: 40~200Hz;

Displaying: rms of sine wave(mean value response)

2-2-5. RESISTANCE (Ω)

| RANGE | ACCURACY | RESOLUTION |
|-------|----------|------------|
|-------|----------|------------|

|       |                    |       |
|-------|--------------------|-------|
| 200Ω  | ±(0.8%+5)          | 0.1Ω  |
| 2kΩ   | ±(0.8%+3)          | 1Ω    |
| 20kΩ  |                    | 10Ω   |
| 200kΩ |                    | 100Ω  |
| 2MΩ   |                    | 1kΩ   |
| 20MΩ  |                    | 10kΩ  |
| 200MΩ | ±[5%(rdg -10 )+30] | 100kΩ |

Open voltage: less than 3V

Overload protection: 250V DC or AC peak value

NOTE: a: At 200Ω range, it should make the test leads short to measure the wire resistance, then, subtracts from the real measurement.


b: At 200 MΩ range, make the test leads short, LCD displays 1.0MΩ, it's normal and has no effect on the accuracy and should be subtracted from real measurement.

2-2-6. CAPACITANCE

| RANGE | ACCURACY   | RESOLUTION |
|-------|------------|------------|
| 20nF  | ±(2.5%+20) | 10pF       |
| 200nF |            | 100pF      |
| 2uF   |            | 1nF        |
| 200uF | ±(5.0%+10) | 100nF      |

Overload protection: 36V DC or AC peak value

2-2-7. DIODE AND CONTINUITY TEST

| RANGE   | DISPLAYING VALUE                                      | TEST CONDITION   |
|---|---|--|
|  | Forward voltage drop of diode                         | Forward DCA is approx. 1mA, backward voltage is approx. 3V |
|   | If the resistance is less than 70Ω±20Ω, buzzer sounds | Open voltage is approx. 3V                                 |

Overload protection: 250V DC or AC peak value.

Warning: do not input voltage at this range!

2-2-8. TRANSISTOR hFE DATA TEST

| RANGE          | DISPLAYING RANGE | TESTING CONDITION                                 |
|----------------|------------------|---|
| hFE NPN or PNP | 0 ~ 1000         | Basic current is approx. 10uA , Vce is approx. 3V |

2-2-9. Live wire identifying

| RANGE | DISPLAYING | ALARM        | TEST CONDITION               |
|-------|------------|--------------|------------------------------|
| TEST  | 000 or 1   | Sound, light | AC standard live wire verify |

Overload protection: 500V DC or AC peak value.

Warning: for your safety, please operate according to the safety rule.

2-2-10 Logic TTL

| RANGE | TEST CONDITION                                  | RESOLUTION |
|-------|---|------------|
| TTL   | When Test voltage >2.4V, display “▲”            | 0.1V       |
|       | When Test voltage >0.7V, <2.4V, No display “▼▲” |            |
|       | When Input voltage <0.7, display “▼”            |            |


when the open test at the end, display “▲”

NOTE:

A: in the stalls measurement, the MSD always display “1”

Over load protection: 12V self-resume fuse

2-2-11. square-wave output

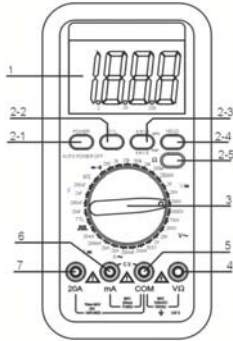
| RANGE   | OUTPUT FORM   | OUTPUT RANGE  |
|---|---|---------------|
|  | DC square wave output, the frequency about 50Hz, about 50% duty cycle | About 4V fuse |

4. OPERATION

4-1. PANEL DESCRIPTION

- LCD: display the measuring value and unit.
- POWER switch: turn on/off the power.
- B/L key: turn on/off back light, will be auto off after 2 sec.
- HOLD key: press it, the present value is held on LCD and “**HOLD**” symbol displays. Press it again, “**HOLD**” symbol disappears, and the meter exists the hold mode.
- Live wire verify light
- Range knob: to select measuring function and range.
- VOLTAGE, RESISTANCE AND FREQUENCY COM

5. GND, ANODE SOCKET OF TEST ACCESSORY
6. LESS THAN 200mA CURRENT COM, CATHODE SOCKET OF TEST ACCESSORY
7. 20A CURRENT COM



SEE THE FIG:

#### 4-2. DCV MEASUREMENT

1. Apply the black test lead to “COM” terminal and the red one to V/ $\Omega$ /Hz terminal.
2. Set the knob to a proper DCV range, connect the black test lead crossly to the circuit under tested, the voltage and polarity of the point which the red lead connect to will display on LCD.

NOTE:

1. If the voltage range is unknown beforehand, set the knob to the highest range, then, select a proper range according to the displaying value.
2. There is a remained value at small voltage range before measuring, it is normal and have no effect on measurement. If MSD displays “1”, it means over range, should set the knob to a higher range.
3. Do not input a voltage over 1000V, or, the circuit might be damaged.
4. Be careful when measuring high voltage circuit.

#### 4-3. ACV MEASUREMENT

1. Apply the black test lead to “COM” terminal and the red one to V/ $\Omega$ /Hz terminal.
2. Set the knob to proper ACV range, connect the test leads crossly to the circuit under tested.

NOTE:

1. If the voltage under tested is unknown beforehand, set the knob to the highest range, then, select a proper range according to the displaying value.
2. There is a remained value at small voltage range before measuring, it is normal and have no effect on measurement. If MSD displays “1”, it means over range, should set the knob to a higher range.
3. Do not input voltage over 750Vrms, or, the circuit might be damaged.
4. Be careful when measuring high volt circuit.

#### 4-4. DCA MEASUREMENT

1. Apply the black test lead to “COM” terminal, and the red one to mA terminal (max. 200mA), or red test lead to “20A” terminal (max. 20A) .
2. Set the knob to proper DCA range, connect the meter to the circuit under tested, the current value and polarity of red test lead connect to will display on LCD.

NOTE:

1. If the current under tested is unknown beforehand, set the knob to the highest range, then, select proper range according to the displaying value.
2. If LCD displays “1”, it means over range, should set the knob to a higher range.
3. Max. input current is 200mA or 20A (subject to where the rd test lead apply to), too large current will blow the fuse. Be careful at 20A, because 20A is infused, continuously measuring will make the circuit heat and effect on the accuracy even damaged the meter.

#### 4-5. ACA MEASUREMENT

1. Apply the black test lead to “COM” terminal and the red one to “mA” terminal (max. 200mA), or apply the red one to “20A” terminal (max. 20A) .
2. Set the knob to proper ACA range, connect the meter to the circuit under tested.

NOTE:

1. I f the current under tested is unknown beforehand, set the knob to the highest range, then, select proper range according to the displaying value.
2. If LCD displays “1”, it means over range, should set the knob to a higher range.
3. Max. input current is 200mA or 20A (subject to where the red test lead apply to), too large current will blow the fuse. Be careful at 20A, because 20A is infused, continuously measuring will make the circuit heat and effect on the accuracy even damaged the meter.

#### 4-6. RESISTANCE MEASUREMENT

1. Apply the black test lead to “COM” terminal and the red one to V/ $\Omega$ /Hz terminal.
2. Set the knob to proper resistance range; connect test leads crossly to the resistor under tested.

NOTE:

1. If resistance is over selected range value, “1” displays, should set the knob to a higher range. When measuring value is over 1M $\Omega$ , the reading will take a few seconds to be stable, it’s normal for high resistance measuring.
2. When input terminal is in open circuit, overload displays.
3. When measuring in line resistor, be sure that power is turned off and all capacitors are released completely.

