

# ELECTRICIANS DIGITAL MULTIMETER

## 3. CHARACTERISTIC

### 1. GENERAL

- 1-1. Displaying: LCD displaying.
- 1-2. Max. displaying: 1999 (3 1/2 digit) auto polarity indication.
- 1-3. Measuring method: dual slope A/D conversion.
- 1-4. Sampling rate: approx. 3 times/second.
- 1-5. Overrange indication: the MSD displays "OL".
- 1-6. Low battery indication: "BAT" appears.
- 1-7. Operation environment: (0~40) °C, R.H.<80%.
- 1-8. Power: 9V×1 (NEDA1604/6F22 or equivalent model).
- 1-9. Size: (190×88.5×27.5)mm
- 1-10. Weight: approx. 320g (including battery).
- 1-11. Accessory: operation manual, holster, gift box, test leads, and battery.

### 2. TECHNICAL CHARACTERISTIC

**2-1. Accuracy: ±(a%×rdg+d) at (23±5)°C, R.H.<75%, one year guaranteed from the production date.**

#### 2-2. TECHNICAL DATA

##### 2-2-1.DC VOLT (DCV)

Range	Accuracy	Resolution
200mV	±(0.5%+5)	100uV
2V	±(0.5%+3)	1mV
20V		10mV
200V		100mV
1000V	±(1.0%+10)	1V

Input resistance: 10MΩ.

Overload protection: 200mV range: 250V DC or AC peak value.

Other range: 1000V DC or AC peak value.

## 1. SUMMARIZE

The meter is a stable multimeter with 30mm LCD display, driven by battery. It's widely used on measuring DCV, ACV, DCA, ACA, resistance, capacitance, diode and continuity test. It's an ideal tool for lab, factory and family.

## 2. SAFETY NOTE

The meter meets the standards of IEC1010. Read the operation manual carefully before operation.

1. Do not input limit over-ranged.
2. The voltage below 36V is safety. To avoid electric shock, check whether the test leads are connected correctly, whether the insulation is good when measuring over 36DCV or 25ACV.
3. Remove the test leads when changing function and range.
4. To select correct function and range, beware of error operation.
5. Do not operate the meter if battery case and back cover is not fixed.
6. Do not input voltage when measuring resistance.
7. Remove test leads from test point and turn off the power before replacing battery and fuse.
8. safety symbols  
 "⚠" exists dangerous voltage, "⏚" gnd, "⏚" dual insulation "⚠" the operator must refer to the manual, "BAT" low battery

##### 2-2-2. AC VOLT (ACV)

Range	Accuracy	Resolution
2V	±(0.8%+5)	1mV
20V		10mV
200V		100mV
750V	±(1.2%+10)	1V

Input resistance: 10MΩ. Display: True RMS

Overload protection: 250V DC or AC peak value (200mV range) 1000V DC or AC peak value. (Other range)

Frequency response: Sine wave and triangular wave:(40-1000)Hz other wave:(40-200)Hz

##### 2-2-3.DC CURRENT(DCA)

Range	Accuracy	Resolution
2mA	±(1.2%+8)	1uA
20mA		10uA
200mA		100uA
20A	±(2.0%+5)	10mA

Max. input volt drop: 200mV

Max. input current: 20A (the test time should be in 10 seconds)

Overload protection: 0.2A/250V fast-melt fuse, 20A/250V fast-melt ceramic fuse

##### 2-2-4. AC CURRENT(ACA)

Range	Accuracy	Resolution
20mA	±(1.5%+15)	10uA
200mA		100uA
20A	±(3.0%+10)	10mA

Max. measuring volt drop: 200mV

Max. input current: 20A (the test time should be in 10 seconds)

Overload protection: 0.2A/250V fast-melt fuse, 20A/250V fast-melt ceramic fuse

Frequency response: (40~200)Hz Display: True RMS

### 2-2-5. RESISTANCE( $\Omega$ )

Range	Accuracy	Resolution
200 $\Omega$	$\pm(0.8\%+5)$	0.1 $\Omega$
2k $\Omega$	$\pm(0.8\%+3)$	1 $\Omega$
20k $\Omega$		10 $\Omega$
200k $\Omega$		100 $\Omega$
2 M $\Omega$		1 k $\Omega$
200M $\Omega$	$\pm[5.0\%+30]$	100 k $\Omega$

Open voltage: less than 3V

Overload protection: 250V DC and AC peak value



**NOTE:** A. at 200  $\Omega$  range, should make the test leads short, and measure the wire resistance, then, subtract from the actual measuring.

### 2-2-6. CAPACITANCE(C)

Range	Accuracy	Resolution
20nF	$\pm(3.5\%+20)$	10pF
200nF		100pF
2uF		1nF
20uF		10nF
200uF	$\pm(5.0\%+10)$	100nF
2000uF		1 $\mu$ F

Overload protection: 250V DC or AC peak value.

### 2-2-7. DIODE AND CONTINUITY TEST

Range	Displaying	Test condition
	Positive voltage drop of diode	The positive DC current is approx. 1mA, negative voltage is approx. 3.2V
	Buzzer sounds, the resistance is less than $(50 \pm 20) \Omega$	open voltage is approx. 3.2V

Overload protection: 250V DC or AC peak value

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

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3. Do not input voltage over DC 1000V or AC 750V. When change the function or range, keep the testlead away from the test point.

4. Do not touch it when test a high voltage.

### 4.3 CURRENT MEASUREMENT

1. Insert the black test lead to "COM" jack and the red one to "mA" jack (max. 200mA), or insert the red one to "20A" jack (max. 20A).

2. Set the range knob to a proper DCA/ACmA/A range, connect the test leads across to the circuit under tested, the current value and polarity of the point which red lead connect will display on LCD.

#### NOTE:

1. If the measured current is unsure beforehand, should set the range knob to a higher range, then, switch to a proper range according to the displayed value.
2. If LCD displays "OL", it means over range, should set the range knob to a higher range.
3. Max. input current is 200mA or 20A (subject to where red lead insert), When change the function or range, keep the testlead away from the test point.

### 4.4 RESISTANCE MEASUREMENT

1. Insert the black test lead to "COM" jack and the red one to "V/ $\Omega$ /Hz" jack.

2. Set the range knob to a proper resistance range, connect the test leads across to the resistance under measured.

#### NOTE:

1. If the resistance value under measured exceeds the max value of the range selected, LCD displays "OL", thus, should set the range knob to a higher range. When the resistance is

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## 4. OPERATION

### 4.1 Front panel description

1. LCD display: Display measured value
2. HOLD, Backlight, Function
3. Range knob; to select measuring function and range
4. Voltage, resistance, diode, capacitance, temperature, "+" pole jack
5. Temperature, "-" pole jack
6. Current test pole jack for less than 200mA
7. Current test pole jack for 20A



### 4.2 VOLTAGE MEASUREMENT

1. Insert the black test lead to "COM" jack, the red one to "V/ $\Omega$ /Hz" jack.
2. Set the range knob to a proper DCV/ACV range, connect the test leads across to the circuit under tested, the polarity and voltage of the point which red lead connect will display on LCD.

#### NOTE:

1. If the measured voltage is unsure beforehand, should set the range knob to the highest range, then, switch to a proper range according to the displayed value.
2. If LCD displays "OL", it means overrange, should set the range knob to a higher range.

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over 1M  $\Omega$ , the meter may take a few seconds to stabilize. This is normal for high resistance measurement.

2. When input terminal is in open circuit, overload displays.
3. When measuring in-line resistance, be sure that power is off and all capacitors are released completely.
4. Do not input Voltage at this resistance range.

### 4.5 CAPACITANCE MEASUREMENT

1. Insert the red test lead to "COM" terminal and the black one to "V/ $\Omega$ /Hz" jack.

2. Set the range knob to a proper capacitance range, connect the test leads to the capacitor under measured (note: the polarity of red test lead is "+").

#### NOTE:

1. If the capacitance range under measured is unsure beforehand, should set the range knob to the highest range, then, set to a proper range according to the displayed value.
2. If LCD displays "OL", it means overrange, should set the range knob to a higher range.
3. Before measuring, LCD display might not be zero, the residual reading will be decreased gradually and could be disregarded.
4. When measuring large capacitance, if creeps seriously or break capacitance, LCD will display some instability value.
5. Discharge all capacitors completely before capacitance measurement to avoid damage.
6. Unit: 1uF = 1000nF 1nF = 1000pF
7. Do not input voltage at this range

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#### 4.6 DIODE AND CONTINUITY TEST

- 1.Insert the black test lead to “COM” terminal and the red one to “V/ $\Omega$ /Hz” jack ( Note: the polarity of red test lead is “+” ).
- 2.Set the range knob to “ $\rightarrow\rightarrow$ ” range, before setting, it is continuity test, press "HOLD/BL" can change to diode test. connect the test leads to the diode under measured, the red lead connects to the anode of diode and the black one connects to cathode of diode, Reading is the approximation of the diode positive volt drop.
- 3.Connect the test leads to two points of the measured circuit, if buzzer sounds, the resistance is lower than approx.( $50\pm 20$ ) $\Omega$ .

#### 4.7 DATA HOLD

Press “HOLD/BL” key, the present measuring value is hold on LCD and display "hold",press it again,will exit the fuction and "hold"disappear.

#### 4.8 AUTO POWER OFF

After stop operating for about 15 minutes, the meter is auto power -off to be in sleepy mode. Press "POWER APO"key twice to restart the power. Press "POWER APO" key for 2 seconds to cancel the fuction of auto power off and "APO" disappear;press it again for 2 seconds to restart the auto power off fuction and "APO" showing on LCD.

#### 4.9 POWER ON /OFF

Press "Power APO " key for 2 seconds, the meter is power on and enter into working mode; press it again for 2 seconds to turn off the power.

#### 4.10 BACKLIGHT

Press "HOLD/BL"key to turn on the backlight, press it again to turn it off. 15s auto off the backlight if there's no action.

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#### 5.MAINTENANCE

DO NOT try to verify the circuit for it's a precision meter.


1.Beware of waterproof, dustproof and shockproof.

2.Do not operate and store the meter in the circumstance of high temperature, high humidity, and flammability, explosive and

strong magnetic field.

3.Use the damp cloth and soft solvent to clean the meter, do not use abrasive and alcohol.

4. If do not operate it for a long time, should take out the battery.

4-1.When LCD displays “” symbol, should replace the battery as below:

4-1-1.Drop out the holster, take out the battery case.


4-1-2.Take out the battery and replace a new one. It's better to use alkalence battery for long time use.

4-1-3.Fix the battery case and take on the holster.

4-2.Fuse replacement

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#### 6. If the meter does not work properly, check the meter as following:

Conditions	Way to solve
no displaying	Power is off HOLD key Replace battery
 symbol displays	Replace battery
big error	Replace battery

- The specifications are subject to change without notice.
- The content of this manual is regarded as correct, error or omits Pls. 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.

601E-089A-002C

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