DIGITALMULTIMETER OPERATION MANUAL

I. SUMMARY

It is an intelligent multi-purpose meters that can automatically identify functions and ranges according to the input measurement signals, making the operation simpler, more convenient and faster. The product is designed to meet the requirements of safety regulations CAT III 600V, with full functional design overload protection, safe and reliable operation, and innovative patent appearance design and functional configuration logo.

It can be used to measure DCV, ACV, DCA, ACA, resistance, capacitance, diode and continuity test, NCV (non-contact ACV induction measurement), Live (live line judgment) and torch functions. It is the ideal entry level tools of the electronic hobbyists and home users.

II. UNPACKING INSPECTION

Open the package to check if all parts and accessories are all right in the box

1. User's manual 1pc
2. Test leads 1pair
3. Battery (1.5V AAA) 2pc

III. SAFETY OPERATION RULE

This series of device is designed according to IEC61010 standard (safety standard issued by International Electrotechnical Commission or equivalent standard GB4793.1). Please read these safety notices before using it.

1. Input over range is prohibited in each range during the test.
2. The voltage which is less than 36V is a safety voltage. When measuring voltage higher than DC 36V, AC 25V, check the connection and insulation of test leads to avoid electric shock. When the input ACV/DCV is more than 24V, the high voltage warning symbol " " will be displayed.
3. When changing function and range, test leads should be removed away from testing point.
4. Select correct function and range, beware of wrong operation. Please still be careful although the meter got a function of full range protection.
5. Do not operate the meter if the battery and back cover is not fixed.
6. Do not input voltage when measuring capacitance, diode or doing the continuity test.
7. Remove test leads from test point and turn off the power before replacing battery and fuse.
8. Please comply with local and national safety regulations. Wear personal protective equipment (such as approved rubber gloves, face masks, and flame-retardant clothing etc.) to prevent the injury from electric shock and arc when charged conductors are exposed.
9. Please measure according to the correct standard measurement category (CAT), voltage probe, testing wire and adaptor.
10. Safety symbols

"⚠" exists high voltage，"⏚ "GND，" ▣ " dual insulation，"⚠" must refer to manual，" " low battery

IV. SAFETY SYMBOLS

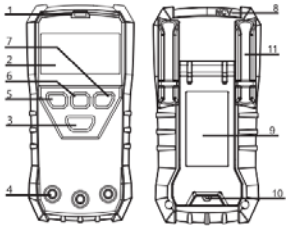
⚠	Warning	⎓	DC
⚠	High Voltage danger	~	AC
⏚	Ground	≂	AC and DC
▣	Dual insulation	CE	Accord with order of the European Union
	Low battery Voltage		Fuse

V. CHARACTERISTIC

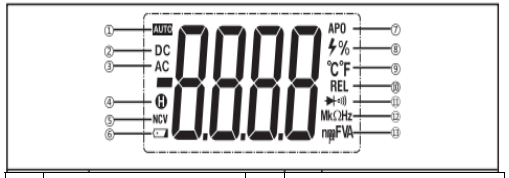
1. Display method: LCD displaying;
2. Max display: 5999 (3 5/6) digits automatic polarity display;
3. Measurement method: A/D conversion;
4. Sampling rate: about 3 times/seconds
5. Over-range display: the highest digit displays "OL"
6. Low voltage display：" "appears;
7. Working environment: (0～40)℃, relative humidity: <75%;
8. Storage environment: (-20～60)℃, relative humidity < 85%
9. Power supply: Two batteries 1.5V AAA
10. Dimension: (146 * 72 * 50) mm (length*width*height);
11. Weight: about 210g (including battery);

VI.EXTERNAL STRUCTURE

1. Sound alarm indicator light
2. LCD display
3. Turn on/off key/ live line judgment and auto range conversion
4. Measurement input terminal
5. Function selection
6. NCV measurement/Turn on/off torch
7. Data hold / turn on/off the backlight
8. NCV sensing position
9. Bracket
10. Screws for fixing the battery box
11. Bracket for fixing the test leads



VII. LCD DISPLAY



1	Auto range	2	DC measurement
3	AC measurement	4	Data hold
5	NCV	6	Low battery
7	Auto power off	8	High voltage/Duty cycle
9	Temperature	10	Relative value measurement
11	Diode/continuity test	12	Resistance/Frequency
13	Capacitance/DCV/ACV/DCA/ACA		

VIII. KEY DESCRIPTION

1. POWER KEY

Long press this key (＞2 seconds) to turn on/off the power, short press it to switch auto range / fire line judgment

2. FUNC KEY

2-1.Short press this key to cycle switch DCV/ACV、resistance、continuity、diode、capacitance and auto range test function

2-2.Short press this key to switch ACA、DCA when current measurement function(insert the red test lead to "mA/A" jack.

3. NCV/

Short press this key to turn on/off NCV function measurement, long press (＞2 seconds)to turn on/off the torch.

4. HOLD B/L

Short press this key to turn on/off date hold function, " " will display on the screen when it's turn on. Long press it (＞2 seconds) to turn on/off backlight (backlight will turn off after 15 seconds)

⚠⚠Warning: to prevent possible electric shock, fire or personal injury, do not use the data hold function to measure the unknown voltage. When open the HOLD function, the LCD will keep original data when measuring a different voltage.

IX. MEASUREMENT INSTRUCTIONS

First of all, please check the battery, and turn the knob to the proper range that you need. If the battery is out of power, the "" symbol will appear on the LCD. Pay attention to the ⚠ symbol next to the jack for test leads. This is a warning that the voltage and current should not exceed the indicated value.

AUTO auto mode can measure resistance、continuity、DCV、ACV、DCA 、ACA function.

FUNC manual mode can measure DCV、ACV、continuity (600Ω)、diode、capacitance function.

1. DCV and ACV measurement

1-1. Under auto / manual mode switch to DCV/ACV range, and connect the test leads across to the tested circuit, The voltage and polarity from the red test lead are displayed on the screen.

1-2. Insert the black test lead to "COM" jack, the red one to " VΩHz Live " jack.

1-3. You can get the result from display.

Note:

(1) The LCD will display "OL" symbol if it is out of the range.

(2)When measuring high voltage (above 220V), it's necessary to wear personal protective equipment (such as approved rubber gloves, face masks, and flame-retardant clothing etc.) to prevent the injury from electric shock and arc.

2. DCA and ACA measurement

2-1. Insert the red test lead to "**mA/A**" jack，auto identification DCA function.

2-2. Short press "FUNC" key to switch DCA/ACA function.

2-3. Insert the black test lead to "COM" jack, the red one to "**mA/A**" jack, and then connect the test leads to the power or circuit under test in series.

2-4. Read the result on the LCD.

Note:

(1) Before connect the test leads to the power or circuit, you should turn off the power of the circuit first, and then check the input terminal and function range is normal. Don't measure voltage with the current jack.

(2) The max measure current is 10A, it alarms when the measuring range is exceeded. Overload input or wrong operation will blow the fuse.

(3) When measuring large current (more than 5A), continuous measurement will make the circuit heating, affect the measurement accuracy and even damage the instrument. It should be measured each time less than 10 seconds. The interval recovery time is more than 10 minutes.

3. Resistance measurement

3-1. At the auto mode, connect the two test leads to the resistor under test.

3-2. Insert the black test lead to "COM" jack, the red one to " VΩHz Live "jack.

3-3. You can get the result from display.

Note:

(1) At the manual mode, the LCD displays "OL" while the resistance is over range. When the measuring resistance is over 1MΩ, the meter may take a few seconds to stabilize. This is normal for testing high resistance.

(2) When measuring on-line resistance, be sure the circuit under tested has been switched off and all capacitors are fully discharged.

4. Capacitance measurement

4-1. At the manual mode convert to capacitance function, connect the teat leads to the two side of the tested capacitor. (The polarity of red lead is "+")

4-2. Insert the black test lead to "COM" jack, the red one to " VΩHz Live "jack.

4-3. You can get the result from display.

NOTE:

(1).The LCD displays “OL” while it is over range. The capacitance range is automatically converted; Maximum measurement: 60mF;

(2). When measuring the capacitance, due to the influence of the distributed capacitance of the lead wire and the instrument, there may be some residual readings when the capacitance is not connected to the test, it is more obvious when measuring the range of small capacitance. In order to obtain accurate results, the residual readings can be subtracted from the measurement results to obtain more accurate readings.

(3). when measuring serious leakage or breakdown of capacitance at large capacitance range, some values will be displayed and unstable; For large capacitance measurements, the reading takes a few seconds to stabilize, which is normal for large capacitance measurements; .

(4). Please discharge the capacitor sufficiently before testing the capacity of the capacitor to prevent damage to the meter.

(5). Unit: 1mF = 1000uF 1uF = 1000nF 1nF = 1000pF

5. Diode

5-1.At the manual mode convert to diode function, connect the teat leads to the tested diode.

5-2.Insert the black test lead into the “COM” jack, the red one to“ VΩ⊣⊢ Live ” jack. (The polarity of red lead is “+”）;The meter reading is an approximation of the diode forward voltage drop; If the test leads connected in reverse, it will display “OL”

6. Continuity test

6-1. At the auto/manual mode convert to continuity test function.

6-2. Insert the black test lead to “COM” jack, the red one to “ VΩ⊣⊢ Live ”jack.

6-3. Connect the test leads to two points of the tested circuit, if the resistance value between the two points is lower than about 50Ω, the LCD will display “))) ” and the built-in buzzer sounds.

7. Live line recognition

7-1. Short press “POWER/Live” key, convert to Live function.

7-2. Insert the red test lead to “ VΩ⊣⊢ Live ” jack, and contact the measured point with the red test lead

7-3. If there is a sound and light alarm, the measured line connected by the red test lead is live line. If nothing changes, the measured line connected by the red test lead isn’t live line.

Note:

(1) The range must be operated according to safety rules.

(2) The function only detects AC standard mains power lines (AC 110V~AC 380V).

8. NCV (non-contact ACV induction measurement)

8-1. Short press “ NCV convert to NCV function.

8-2. NCV induction voltage range is 48V~250V, the upper position of the meter close to the measured charged electric field(AC power line, socket, etc),the LCD display “ — ”or “ --- ”, the buzzer sounds, at the same time the red indicator flashing; As the intensity of the sensed electric field increases, the more horizontal line “----”displayed on the LCD, the faster the buzzer sounds and the more often the red light blinks.

Note:

When the measured electric field voltage is ≥AC100V,pay attention that whether the conductor of the measured electric field is insulated, in order to avoid electric shock.

9. Auto power off function

In order to save the battery energy, APO auto power off function already set by default when you turn on the meter, if you have no any operation in 14 minutes, the meter will beep for three times to hint, if there’s still no any operation, the meter will long sound and auto power off after one minute.

X. TECHNIACAL FEATURES

Accuracy: ±(a%×rdg＋d), ensuring the accuracy environment temperature: (23±5)℃, relative humidity <75%

1. DCV

Range	Accuracy	Resolution	Input impedance	Overload protection
6V	±(0.5%+3)	0.001V	≥300kΩ	600V DV/AC RMS
60V		0.01V		
600V	±(1.0%+10)	1V		

Min identification voltage: above 0.6V

2. ACV

Range	Accuracy	Resolution	Input impedance	Overload protection
6V	±(0.8%+5)	0.001V	≥300kΩ	600V DV/AC RMS
60V		0.01V		
600V	±(1.2%+10)	0.1V		

Min identification voltage: above 0.6V

Measuring range of accuracy: 10% - 100% of the range;

Frequency response: 40Hz - 400Hz

Measuring way (sine wave) True RMS

Crest factor: CF≤3, when CF≥2, add an additional error of 1% of the reading

3. DCA

Range	Accuracy	Resolution	Overload protection
600mA	±(1.0%+5)	0.1mA	Fuse 10A/250V
6A	±(1.5%+10)	0.001A	
10A	±(2.0%+5)	0.01A	

Min identification current: above 1mA

Measuring range of accuracy: 5% - 100% of the range

Max. Input current: 10A (less than 10 seconds); Interval time: 15 minutes

4. ACA

Range	Accuracy	Resolution	Overload protection
600mA	±(1.5%+10)	0.1mA	Fuse 10A/250V
6A	±(2.0%+5)	0.001A	
10A	±(3.0%+10)	0.01A	

Min identification current: above 2mA

Measuring range of accuracy: 5% - 100% of the range

Frequency response: 40Hz - 400Hz

Measuring way(sine wave)True RMS

Crest factor: CF≤3, when CF≥2, add an additional error of 1% of the reading

Max. Input current: 10A (less than 10 seconds); Interval time: 15 minutes

5. Resistance (Ω)

Range	Accuracy	Resolution	Overload protection
600Ω	±(1.3%+5)	0.1Ω	600V DV/AC RMS
6kΩ	±(0.8%+3)	0.001kΩ	
60kΩ		0.01kΩ	
600kΩ		0.1kΩ	
6MΩ	±(1.5%+3)	0.001MΩ	
60MΩ	±(2.0%+10)	0.01MΩ	

Measuring error does not include lead resistance

Measuring range of accuracy: 1% - 100% of the range

6. Capacitance test

Range	Accuracy	Resolution	Over-load protection
60nF	±(3.5%+20)	0.01nF	600V DV/AC RMS
600nF		0.1nF	
6uF		0.001uF	
60uF		0.01uF	
600uF		0.1uF	
6mF	±(5.0%+10)	0.001mF	
60mF		0.01mF	

Min identification capacitance: above 10nF

Accurate measurement range:10％ - 100％.

Large capacitance response time: ≧1mF About 8s;

The measured error doesn’t include lead capacitance

7. Continuity test

Range	Resolution	Test condition	Overload protection
600Ω	0.1Ω	When test resistance ≤ 50Ω, the buzzer makes a long sound, open-circuit voltage: ≤ 2V	600V DV/AC RMS

8. Diode test

Range	Resolution	Test condition	Overload protection
3V	0.001V	Open circuit voltage is approx 3V, Short circuit current less than 1.7mA	600V DV/AC RMS

XI. BATTERIES AND FUSE REPLACEMENT

1. Move away the test leads from the circuit under test, pull out the test lead from the input jack, turn the range knob to the “OFF” range to turn off the power.
2. Use a screwdriver to twist off the screws on the battery cover, and remove the battery cover and bracket.
3. Take out the old battery or the broken fuse, then replace with a new alkaline battery 9V or a new fuse.
4. Close the battery cover and use a screwdriver to tighten the screws on the battery cover.
5. Battery specifications: 2 * 1.5V AAA
6. Fuse specifications:
   10A input fuse: ϕ5 * 20mm 10A250V

Note: When the low voltage "[battery] nbol displays on the LCD, the battery should be replaced immediately, otherwise the measuring accuracy will be affected.

XII. MAINTENANCE AND CARE

It is an accurate meter. Do not try to modify the electric circuit.

1. Pay attention to the waterproof, dustproof and break proof of the meter;
2. Please do not store or use it in environment of high temperature, high humidity, high flammability or strong magnetic.
3. Please wipe the meter with a damp cloth and soft detergent, and abrasive and drastic solvent such as alcohol are forbidden.
4. If do not operate for a long time, should take out the battery to avoid leakage.
5. When replacing fuse, please use another same type and specification fuse.

XIII. Trouble shooting

If the meter cannot work normally, the methods below may help you to solve general problems. If these methods do not work, please contact service center or dealer.

Conditions	Way to solve
No reading on LCD	●Turn on the power ●Set the HOLD key to a correct mode ●Replace battery
[battery] ıl appears	●Replace battery
No current input	●Replace fuse
Big error value	●Replace battery
LCD displays dark	●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.