

MM-UA9999

Smart Digital Multimeter

Manual

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The instrument performance is stable, the quality of reliability is Smart Key 3 5/6 digital multimeter, using LCD display, clear reading, intuitive display, easy to operate, can be used to measure the DC voltage, AC voltage sine wave RMS, DC current, AC current sine wave True RMS, resistance, capacitance, frequency, duty cycle, diode, Data hold, Auto power off. As well as unit symbol display, data retention, automatic power and other functions. The machine uses a high-performance MCU processor; the instrument is fully functional, high accuracy, easy to use, is the laboratory, factories, radio enthusiasts and the ideal home tools.

1. Security Information

Warning

Use this instrument with special attention, improper use may cause electric shock or damage to the instrument. In accordance with the usual safety procedures and full compliance with the safety regulations specified in the manual.

In order to make full use of the functions of the instrument and to ensure safe operation, please carefully read and follow the instructions of this manual.

Instrument in line with GB / T 13978-92 digital multimeter general technical conditions, in line with GB4793.1-1995 (IEC-61010-1, IEC-61010-2-032) electronic measuring instruments safety requirements CAT III 600V

Follow the safe operating instructions to ensure safe use of the instrument.

Appropriate use and protection, the instrument will give you a satisfactory service.

1.1 Preparation

1.1.1 When using the instrument, the user must comply with the standard safety rules:

- Universal anti-shock protection
- Prevent misuse of instruments

1.1.2 After receiving the instrument, check if it is damaged during transport.

1.1.3 In the rough conditions of preservation, shipment, check and confirm whether the

instrument is damaged.

1.1.4 The pen must be in good condition. Before use, check whether the insulation of the test leads is damaged and the wires of the wires are exposed.

1.1.5 Use the table provided with the table to ensure safety, if necessary, must use the same or the same level of the pen to replace.

1.2 Use

1.2.1 When using, you must use the correct function and range.

1.2.2 Do not exceed the protection range of each range to measure the value.

1.2.3 Do not touch the top of the test leads (metal parts) when the meter is connected to the measuring circuit.

1.2.4 In the measurement, if the measured voltage is higher than 60V DC or 30V AC (RMS), should pay attention to keep the fingers always in the table after the finger care device.

1.2.5 Do not measure the voltage when the voltage between the measuring end and the earth exceeds AC 500V.

1.2.6 Before turning the change switch to change the measuring function, remove the test leads from the circuit under test.

1.2.7 Do not live measurement resistance, capacitance, diode and test circuit off.

1.2.8 In the current, resistance, capacitance, diode and line continuity test range, care should be taken to avoid connecting the meter to the voltage source.

1.2.9 Do not measure the capacitance until the capacitor is fully discharged.

1.2.10 Do not use this instrument near explosive gas, steam or dust.

1.2.11 If you notice any abnormality or malfunction of the instrument, stop using it.

1.2.12 Do not use the instrument unless the instrument case and battery cover are fully fastened in place.

1.2.13 Do not store or use the instrument in direct sunlight, high temperature, high humidity.

1.3 Symbol



Note (important safety information, see instruction manual)



Can be used on dangerous live conductors.

 Double Insulation Protection (Class II)

CAT III In accordance with IEC-61010-1 standard over-voltage (installation) level III, pollution level 2 refers to the level of pulse withstand voltage protection provided.

 Meet the European Community (EU) standards

 Grounded

1.4 Maintenance

1.4.1 Do not attempt to open the bottom case to adjust or repair the instrument. This operation can only be performed by a technician who is fully aware of the instrument and the risk of electric shock.

1.4.2 Before opening the instrument case or battery cover, remove the test leads from the circuit under test.

1.4.3 In order to avoid false alarms that may cause errors, when the meter displays the  symbol, Replace the battery immediately.

1.4.4 Use a damp cloth and mild detergent to clean the meter, do not use abrasives or solvents.

1.4.5 When the instrument is not in use, turn off the power and turn the range switch to the OFF position.

1.4.6 If the instrument is not used for a long time, remove the battery to prevent damage to the instrument.

2. Description

- Instrument for the portable, professional measuring instruments, with LCD digital display, and a backlight,

Users are easy to read. The range switch is easy to measure with one hand operation, with overload protection and low battery indication. Whether professional, factory, school, enthusiast or family use, are an ideal

Multi-function instrument.

- instrument for AC current, DC current, AC voltage sine wave true RMS, DC voltage, resistance, capacitance measurement and line off measurement.

- The instrument has an automatic range function.
- The meter has a reading hold function.
- The instrument has an automatic shutdown function.

2.1 Part Name

(1) Torch

(2) LCD display

(3) NCV and Torch indicator

(4) Frequency/Duty cycle

Voltage and Temperature

(5) 10A current input Jack

(6) Resistance, capacity, voltage, frequency, Temperature, on-off test, Diode test button

(7) Common jack

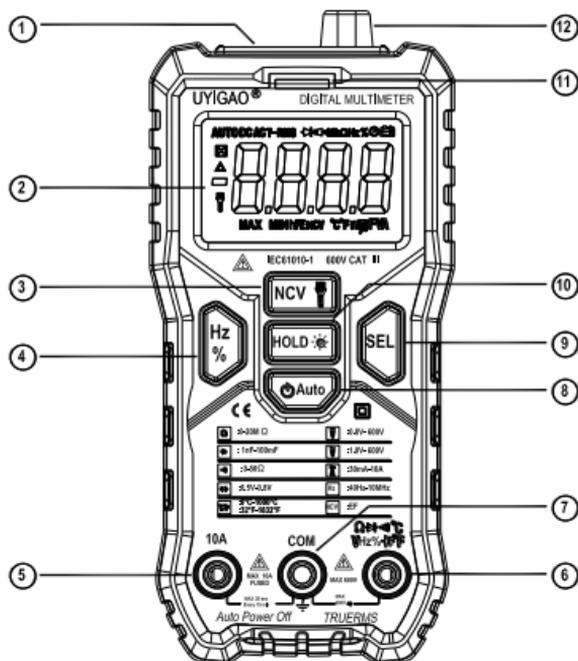
(8) Auto function and Power on/off

(9) Function select button

(10) Reading /Data hold button

(11) NCV tester and Buzzer indication

(12) NCV function zone



2.2 Switch and button and input jacks

 Button: Data hold when short time press, back light on/off when long time press.

Back light will be off about 15 minutes when no signal input

 Button: Frequency and duty cycle switch

 Button: NCV when short time press, Torch functions when long time press.

 Button: Power on/off when long time press. Auto test function when short time press.

 Input Jack; Resistance, capacity, voltage, frequency, Temperature, on-off test, Diode test

COM: Common jack

10A: Current input jack

2.3 LCD Display



AC、DC	AC , DC
	Diode test, On-off test
AUTO	Auto mode
NCV	Non-contact AC voltage test
hFE	Transistor test status
°C °F	Temperature measurement status
	Battery week
H	Data hold
	Auto power off
%	duty ratio
mV, V	Millivolt, volt (voltage)
A	Ampere (current)
nF, μF, mF	NaFala, micro-Farah, millifara
Ω, kΩ, MΩ	Ohm,kilo-ohm,megaohm(resistance)
Hz, kHz, MHz	Hertz, kilohertz, megahertz (frequency)

3. Specification

The meter shall be designated for one year and recalibrated at 18 ° C to 28 ° C and a relative humidity of less than 75%.

3.1 Summary

Automatic range and Manual range

Full ranges overload protection.

The maximum voltage allowed between the measuring end and the ground: 600V DC or AC 600V RMS

Fuse protection: FF10A/250V on A

Working height: max 2000m

- Maximum display value: 6000 counts

Polarity indication: automatic indication, '-' indicates negative polarity.

- Overrange display: 'OL' or '-OL'.

- Sampling time: about 3 times / sec

- Unit display: with function, power unit display.

- Automatic shutdown time: no letter when about 15 minutes

Power supply: DC power supply 4.5V

Battery Type: AAA1.5Vx3 Battery

- Battery under voltage indication: LCD display - symbol .

- Temperature coefficient: less than $0.1 \times \text{accuracy} / ^\circ\text{C}$

- Operating temperature: 18 °C ~ 28 °C

Storage temperature: -10 °C ~ 50 °C

Size: 140 (L)×68(W)×49(H)mm

Weight: About 226g (including battery) □

3.2 Technical indicators

Ambient temperature: 23 ± 5 °C Relative humidity: <75%

3.2.1 True RMS zero input

3.2.1.1 The measurement of sine wave signal, the use of true RMS measurement method than

the traditional average response method error is small.

3.2.1.2 True RMS The instrument can accurately measure the sine wave signal, but if it is on the AC function, the instrument may display 1 to 50 if the measured signal is not input (shorted at the AC voltage range and the input terminal) Word between a reading. These deviations are normal. Within the specified measuring range, they do not affect the accuracy of the multimeter to measure alternating current.

3.2.1.3 True RMS requires that the input signal reach a certain level for measurement. Therefore, the AC voltage and current range is specified between 2% and 100% of full scale.

3.2.2 DC voltage

Range	Resolution	Accuracy
6V	0.001V	± (0.5% of reading + 5 words)
60V	0.01V	
600V	0.1V	± (0.8% of reading + 5 words)

- Input impedance: 10MW

- Maximum input voltage: 600V DC or 600V AC (rms)

Note:

In the small voltage range, the test leads not connected measured circuit; the meter may be beating the readings,

This is normal because of the high sensitivity of the meter, which does not affect the actual measurement results..

3.2.3 AC voltage

Range	Resolution	Accuracy
6V	0.001V	± (0.8% of reading + 3 words)
60V	0.01V	
600V	0.1V	± (1.0% of reading + 10 words)

AC voltage(mV)

- Input resistance: 10MW
- Maximum input voltage: 600V AC (RMS) or 600V DC
- Frequency range: 40 ~ 1000Hz True RMS

Note:

In the small voltage range, the test leads not connected measured circuit, the meter may be beating the readings,

This is normal because of the high sensitivity of the meter. which does not affect the actual measurement results..

3.2.4 AC current

Range	Resolution	Accuracy
6A	0.01A	± (2.5% of reading +10words)
10A	0.01A	

- Overload protection:10A mode ;Fuse (10A/250V)
- Minimum input current: 30mA DC or AC(rms)
- Maximum input current: 10A DC or AC(rms)

When the measured current is greater than 5A, the continuous measurement time is not longer than 15 seconds, after the measurement to stop the current measurement for more than 1 minute.

- Frequency response: 40Hz ~ 1000Hz True RMS.

3.2.5 DC Current

Range	Resolution	Accuracy
6A	0.01A	± (2.0% of reading +10words)
10A	0.01A	

- Overload protection:10A mode ;Fuse (10A/250V)

- Minimum input current: 30mA DC or AC(rms)
- Maximum input current: 10A DC or AC(rms)

When the measured current is greater than 5A, the continuous measurement time is not longer than 15 seconds, after the measurement to stop the current measurement for more than 1 minute.

- Frequency response: 40Hz ~ 1000Hz True RMS.

3.2.6 Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	± (0.8% readings + 3 digits)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	± (1.2% readings + 3 digits)
20MΩ	0.01MΩ	± (2.0% readings + 5 digits)

- Overload protection: AC/DC 250V

3.2.7 Line off test

Range	Resolution	Function
ⓘ)	0.1W	If the measured resistance is less than 50W, the buzzer inside the instrument may sound or may not sound. Less than 10W will be pronounced

- Open circuit voltage: approx. 1.0V
- Overload protection: 250V DC or AC (rms)

3.2.8 Diode Test

Measuring Range	Resolution	Function
	0.001V	Display approximate diode forward voltage value

- Forward DC current is about 1mA
- Reverse DC voltage about 3.0V
- Overload protection: 250V DC or AC (RMS)

3.2.9 Capacitance

Range	Resolution	Accuracy
9.999nF	0.001nF	± (4.0% readings + 3 digits)
99.99nF	0.01nF	
999.9nF	0.1nF	
9.999MF	0.001mF	
99.99MF	0.01mF	
999.9MF	0.1mF	
9.999mF	0.001mF	± (5.0% readings + 3 digits)
99.99mF	0.01mF	未标定

- Overload protection: 250V DC or AC (rms)

3.2.10 Frequency

Range	Resolution	Accuracy
99.99Hz	0.01Hz	± (0.1% readings + 2 digits)
999.9Hz	0.1Hz	
9.999kHz	0.001kHz	
99.99KHZ	0.01KHZ	
999.9KHZ	0.1KHZ	
10.00MHZ	0.001MHZ	

- Overload protection: 250V DC or AC (RMS)
- Input voltage range: 1.0V~10V ac (As the measured frequency increases, the input voltage should also increase)

3.2.11 Duty Ratio

Measuring Range	Resolution	Accuracy
0.1 – 99.9%	0.1%	± (0.1% readings + 2 digits)

- Frequency response: 10 ~ 10MHz
- Input voltage range: 200mV ~ 10V AC (with the measured frequency increases, the input voltage should also increase)
- Maximum input voltage: 250V DC and AC (RMS)

3.2.12 Temperature test

Range	Resolution	Resolution
-20°C – 300°C	±(2.5%+5d)	1°C
301°C – 1000°C	±(2.5%+5d)	1°C
-4°F – 600°F	±(2.5%+5d)	1°F
601°F – 1832°F	±(2.5%+5d)	1°F

- Overload protection: 250V DC or AC (rms)

4. Operation guide

4.1 Readings remain

In the course of the measurement, if you want to keep the reading, press the "  " key, the display value of the monitor will be locked, and then press the key to release the reading.

4.2 Function selection

- 1) In capacitance ,Diode, Buzzer ,Temperature mode, Press  "to switch the function.
- 2) Press " " Button ,move meter to the relate location
- 3) Short time press " " change to frequency and duty ratio

4.3 Torch and Backlight

- 1) If need use Torch, Press " " button 2 second then open the Torch. Around 15 seconds can closed automatically. If you need re-open the Torch, please press the button 2 second
- 2) The Torch flashlight is LED, and its working current is large. Although the meter is equipped with timing circuit (timing time is about 15 seconds), frequent use of the Torch will shorten the battery life, so it is necessary to use the Torch as little as possible.

Note:

When battery voltage $\leq 7.5V$, LCD display "-" (Under-voltage) symbol. But under the condition of backlight and flashlight, when battery voltage $\geq 7.5V$, the high working current will decrease the battery voltage, "-" symbol may appears (when "-" appears, the measuring result may not be accurate). It is no necessary to replace batteries. Please turn off the Torch and use the meter in normal condition until "-" appears again.

4.4 Automatic Power off

- 1) If there is no operation for any 15 minutes after power on, the instrument will go to sleep automatically to save power. 1 minute before the shutdown, the buzzer has 5 prompts, shut down before a long sound into the dormant state. (Note: automatic shutdown is still 3 ~ 5uA of the working current, a long time do not use the best to go to OFF or unplug the battery)
- 2) Automatically shut down, press the key " " position, the instrument to resume working status. Or turn the knob switch to OFF, and then rotate to the desired range.

4.5 Buzzer

When the key is pressed or the function switch is on, the buzzer will sound "Beep" (about 0.25 seconds). If the measured voltage or current is greater than the set alarm value, for example, the AC voltage is greater than 600V, AC and DC current greater than 10A, the buzzer will continue to pronounce, as over-range warning; automatically shut down about 1 minute before the buzzer will be issued five consecutive warning, before the shutdown buzzer will send a long warning; When the automatic shutdown function is canceled, every 15 minutes will be issued 5 consecutive warning.

4.6 Preparation for measurement

- 1) Turn on the power. If the battery voltage is low (about $\leq 7.5V$), the display Display "-" symbol, then you should replace the battery.

2) "  sign indicates that the input voltage or current should not exceed the indicated value, which is to protect the internal wiring from damage.

3) Place the changeover switch in the desired measurement function and range.

4) When wiring, connect the common test leads and connect the live test leads. Remove the live test line when removing the wiring.

4.7 AC & DC voltage /Resistance / Line off test measurements

Warning

Risk of electric shock

Pay special attention to avoid electric shock when measuring high voltage.

Do not enter voltages above 600 V DC rms to prevent electric shock or damage to the meter.

Do not apply voltages in excess of 600V AC between the common terminal and earth ground in case of electric shock or damage to the meter.

1) Press  button power on the meter,

2) Connect the red and black test leads separately to COM and  input jack.

3) Measure the other two ends of the test pen and connect it to the voltage source or both ends of the load.

4) Read by the LCD monitor the measured voltage, resistance, buzzer value. When measuring DC voltage, the display will be simultaneous

4.8 AC and DC current measurement

Warning

Risk of electric shock

Do not attempt to perform current measurement on the circuit when the voltage between the live circuit and ground exceeds 250V. If the fuse is blown during measurement, it may damage the instrument

In order to avoid damage to the instrument or equipment under test, before the current measurement, please check the instrument fuse. When measuring, use the correct input socket, function and range. Do not connect the other end of the test leads in parallel to any circuit when the test leads are inserted in the current input receptacle

Test current:

- 1) Press  button power on the meter
- 2) Connect Red /black test leads to COM and 10A input jack
- 3) Disconnect the circuit to be tested. Connect the black test pen to one end of the disconnected circuit (the lower voltage) and connect the red test lead to the other end of the circuit that is broken (its voltage is high).
- 4) Read by the LCD monitor the measured current value. When measuring DC current , The display will also show the polarity of the current connected by the red pen

4.9 Frequency /On/Off Test



Warning

Risk of electric shock.

To avoid damage to the meter or the device under test, all power to the circuit under test should be cut off and all high voltage capacitors should be fully discharged before the beep on-off test.

- 1) Insert the black test lead into the COM jack, and the red test lead into the  Jack and Press  button enter On –off mode.
- 2) Connect the other end of the red and black test leads to the resistance of the circuit under test.
- 3) The LCD display the Frequency value
- 4) Press the  button again then to on-off test mode

4.10 Diode Test



Warning

Risk of electric shock.

To avoid damage to the meter or the device under test, all power to the circuit under test should be cut off and all high voltage capacitors fully discharged before measuring the resistance.

Test a diode outside the circuit

- 1) Insert the black test lead into the COM jack, and the red test lead into the  Jack and Press  button enter Diode mode
- 2) Connect the other end of the red test lead to the diode anode and the other end of the black test lead to the diode cathode for testing.
- 3) The meter shows the approximate forward voltage drop of the diode under test. If the polarity of the test leads is reversed, the meter will display "OL."

In the circuit, the normal diode should produce a forward voltage drop of 0.5V to 0.8V; however, the reverse bias reading will depend on the change in resistance of the other

4.11 Buzzer On/Off Test



Warning

Risk of electric shock.

To avoid damage to the meter or the device under test, all power to the circuit under test should be cut off and all high voltage capacitors should be fully discharged before the beep on-off test.

On-off test:

- 1) Press  button, enter to the  test status.
- 2) Insert the black test lead into the COM jack, and the red test lead into the  Jack.
- 3) Connect the other end of the red and black test leads to the resistance of the circuit under test. If the resistance of the circuit under test is less than 50Ω the buzzer inside the meter may sound. When the built-in buzzer sounds and the indicator lights, when the measured resistance is about 40Ω~60Ω, only the rightmost two indicator lights; when the measured resistance is less than 10 Ω, the buzzer will beep, and all lights will be lit.

Note:

If the test leads are open or the measured line resistance is greater than 600Ω, the display shows "0L".

4.12 Capacitance measurement



Risk of electric shock.

To avoid damage to the instrument or equipment under test, all power supplies of the circuit under test and all high voltage capacitors should be fully discharged before measuring the capacitance. Use the DC voltage file to determine that the capacitors have been discharged.

- 1) Insert the red and black test leads to COM and  the jack. Press 

Enter to capacitance mode

- 2) After the capacitor is completely discharged, the other end of the black test pen is connected to the measured capacitance. And the measured capacitance value is read by LCD

Note:

- 1) To improve the accuracy of measurements below 10nF, subtract the distribution capacitance of the meter and leads.
- 2) When measuring large capacitance, stable reading takes a certain amount of time.
- 3) When measuring polar capacitor, pay attention to the corresponding polarity to avoid

damaging the instrument

4.13 Temperature Measurement



Warning

Do not enter a temperature higher than 60V AC voltage 30V AC voltage to avoid damage or instrument damage

1) Connect the negative terminal (black) and the positive terminal (red) of the K type thermocouple to the COM input jack and  input jack separately.

2) Press  enter to temperature mode;

3) The other end of the thermocouple (test side) close to the surface of the measured object.

4) To be read by the liquid crystal display to read the measured temperature value.

Note:

K-type thermocouple distribution of the highest measurement temperature of 250

4.14 Non - contact voltage measurement (NCV)

Press  button, the instrument displays "NCV" or "EF" symbol, and the top of the instrument is close to the object to be tested such as mains, power switch, socket and so on. When the detected voltage is greater than 110V (AC RMS), the instrument NCV indicator will be lit and the buzzer will sound an alarm.

note:

1) The voltage may still be present even if there is no indication. Do not rely on non-contact voltage detectors to determine if there is voltage on the shielded wire. The detection operation may be affected by factors such as socket design, insulation thickness and type.

2) When the instrument input terminal input voltage, due to the presence of induced voltage, the voltage sensor indicator may also be bright.

3) External sources of interference (such as flash, motor, etc.) may be mistakenly triggered by non-contact voltage detection.

5 Maintenance

5.1 Replacement battery



In order to avoid the wrong reading caused by electric shock or personal injury, instrument display appears

“-” Symbol, you should replace the battery immediately.

To avoid electrical shock or personal injury, turn off the battery cover before replacing the battery, and check that the test leads have been disconnected from the measuring circuit.

Follow the steps below to replace the battery

- 1) Turn off the instrument power supply.
- 2) Remove all test leads from the input socket.
- 3) Unscrew the captive screws of the battery cover and remove it.
- 4) Remove the battery cover.
- 5) Replace the new 6F22 9V battery
- 6) Install the battery cover as it is, tighten the screws.

Note:

The polarity of the battery can not be installed.

5.2 Replace the probe



Warning

When changing the test leads, you must replace the same or the same grade of the test leads. Table pen must be intact, table pen level: 1000V 10A.

If the pen insulation is damaged, such as wire wire exposed, you must replace the test pen.

6. Attachment

- | | | | |
|----|-------------|------------------|-----|
| 1) | Table Probe | Grade: 1000V 10A | 1pc |
| 2) | Manual | | 1pc |
| 4) | Battery | 6F22 9V | 1pc |

* The contents of this manual are subject to change without notice *

* The contents of this manual are considered correct, if the user found errors, omissions, etc.,

please contact the manufacturer *

* The Company does not assume any accidents and hazards caused by incorrect operation of the user *

* The functions described in this manual do not serve as a reason for the use of the product for special purposes *

Product warranty instructions

Product certification is your instrument in the use of failure, seeking repair services must have, and then you purchase the invoice at the same time to be effective.

1) When your multimeter in use fails, please contact our maintenance department as soon as possible, consultation, so as not to delay your use and warranty period.

2) The product of the Company from the date of purchase from the warranty service. In the event of failure during the warranty period, the company professionals to confirm the reasons for the failure of non-users, the company free warranty service.

3) If the warranty period is exceeded, the cost will be charged (repair fee + component fee).

4) Even during the warranty period, maintenance fees are charged in the following cases.

(1) due to improper use of the user or accidental disaster events and damage to the components and burn the circuit board.

(2) non-professional staff of the company open shell, inspection, modification.

(3) failure to comply with the instructions specified in the operation.

(4) not the company's products do not maintain repair.

(5) due to maintenance caused by postage, transportation and other users themselves.

(6) multimeter battery, table pen, temperature probe and other functional accessories and supplies are not free warranty list.