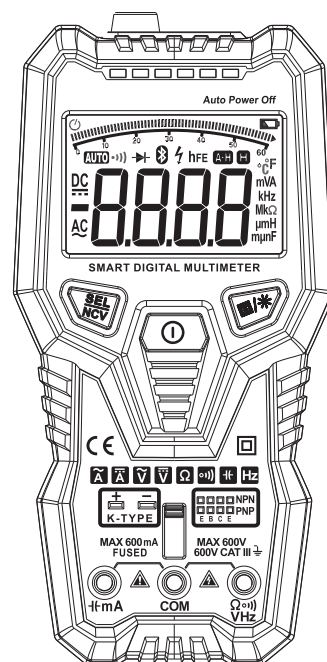


USERS MANUAL

SMART DIGITAL MULTIMETER



EMC&LVD



Y01-04-0147 A0



Before using the instrument, please read this manual carefully, and save it well for future using.

尺寸：142X100MM
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1. Announcement

According to the International Copyright Law, any part of this manual shall not be reproduced in any form without permission or written agreement. This manual is subject to change in later version without prior notice.

1.1 Safety Announcement



“Caution” symbol indicates any condition or operation which may cause damages to instruments or equipment. It requires taking cautions when executing this operation. Incorrect execution or incompliance with this operation may cause damages to instruments or equipment. If these conditions are not met or fully understood, please do not execute any operation indicated by the caution symbol.



“Warning” symbol indicates any condition or operation which may cause danger to users. It requires to be noted when executing this operation. Incorrect execution or incompliance with this operation may cause human injuries or demises. If these conditions are not met or fully understood, please do not execute any operation indicated by the warning symbol.

Before using this instrument, please read the manual carefully, and please note related safety warning information.

1.2 Safety Information

The instrument is designed according to international safety standard EN61010-1, EN61010-2-033, EN61326-1 about safety requirements on electronic testing instruments. Design and manufacture of the instrument shall comply with regulations in EN61010-1, EN61010-2-033, EN61326-1, CAT IV 600V overvoltage safety standards and pollution level 2.

1.3 Safety Work Specification



Warning : In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with the following specification:

- ⇒ Before using this instrument, please read the manual carefully, and pay special attention to safety warning information. Please operate this instrument by strictly complying with this manual, otherwise protective functions provided by the instrument may be damaged or weakened.
- ⇒ Before using this instrument, please check whether there' s any crack on instrument shell or damaged plastic part, check whether the insulation layer of the pen is damaged, whether exposed metal is worn, check the connectivity of the pen, if so, please do not use any more.
- ⇒ Before using the instrument, please use the instrument to measure a known voltage to verify whether it is normal.
- ⇒ Please use the instrument according to measure category, rated voltage or current specified on the instrument or manual.
- ⇒ Please comply with local or national safety specification. Wear individual protective articles (i.e. approved rubber

gloves, mask and flame retardant clothes etc.), to prevent any injury caused by electric shock and electric arc when any electrified conduct is exposed.

- ⇒ The voltage applied between input terminals or between any terminal and the grounding point shall not exceed the nominal value indicated on the instrument.
- ⇒ Please be very careful when the measured true valid value of 30V AC, 42V AC peak value or 60V DC is exceeded. Such voltages will cause the danger of electric shock.
- ⇒ When the indicator of low battery of the instrument appears, please change the battery timely, to avoid any measurement error.
- ⇒ Do not use the instrument in explosive gas, steam or humid environment.
- ⇒ When using the pen, please grasp back of the probe finger cap with your fingers.
- ⇒ During measurement, please connect the neutral wire or earth wire first, then connect the live wire; when disconnected, please disconnect the live wire first, then disconnect the neutral wire or earth wire.
- ⇒ Before opening the shell or battery cover, please remove the pen on the instrument. Do not use the instrument when the instrument is dismantled or the battery cover is opened.
- ⇒ Only using the instrument together with the pen it equips could comply with requirements of safety standards. Any damaged pen must be replaced with a new one of the same model and electrical specification.

1.4 Safety Symbols

	High voltage warning
	AC (Alternating current)
	DC (Direct current)
	Alternative current or direct current
	Warning, important safety symbol
	Grounding
	The equipment is protected with dual insulation and enhanced insulation.
	Battery undervoltage
	It indicates the product complies with all concerned European laws and regulations.
	This additional product label indicates it is not allowed to abandon this electrical/electronic product in household garbage.
CAT. III 600V	Category III 600V overvoltage protection
CAT. III 1000V	Category III 1000V overvoltage protection
CAT. IV 600V	Category IV 600V overvoltage protection

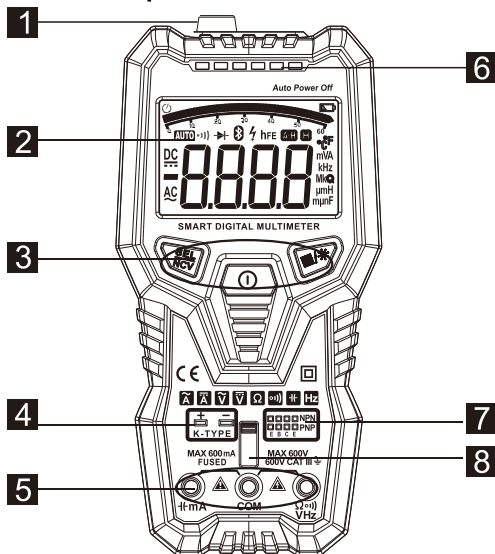
2. Overview

This instrument is a kind of intelligent digital multi-meter with simulation bar. It could measure DC voltage, AC voltage, DC current, AC current, frequency, resistance, capacitor, temperature, transistor and on-off test, and could recognize measured signals automatically, without needing to select measurement functions.

Measurement features of the types of this series, the green spot represents that the product you purchased.

Features		
AC Voltage Measurement $V_{\sim}$	●	●
DC Voltage Measurement $V_{\equiv}$	●	●
AC Current Measurement $A_{\sim}$	●	●
DC Current Measurement $A_{\equiv}$		●
Temperature Measurement $^{\circ}\text{C}$		●
Transistor Measurement		●
Capacitor Measurement $\text{ }\text{--}\text{ }$	●	●
Resistance Measurement Ω	●	●
Continuity Measurement diode symbol	●	●

2.1 Panel Description



- 1 NCV inductive probe
- 2 Display screen
- 3 Functional key
- 4 K-type thermocouple temperature probe insertion hole
- 5 Measurement input insertion hole
- 6 LED indicator
- 7 Transistor testing insertion hole
- 8 Dial button

3. Instrument Usage

This instrument is a kind of intelligent digital multi-meter, so the operation is very simple, and it is not required to carry out function selection during measurement; the instrument will recognize measured signals automatically, then measure and display measurement results.

Note:

- ◆ The instrument could not carry out measurement on two or more functions.
- ◆ Instrument' s automatic detection sequence on measurement instrument:

AC Voltage → DC Voltage → AC Current → DC Current
 → Temperature Measurement → Transistor Measurement
 → Capacitor Measurement → Resistance & On-off

3.1 Startup / Shutdown

Startup: When the instrument is shut down, press the  key and hold, till the buzzer sends a "Di" sound, then release.

Shutdown: When the instrument is started, press the  key and hold, till the buzzer sends a "Di" sound, then release.

3.2 Automatic Shutdown Function

If no pressing operation within 10 minutes, while no signal is input, the instrument will shut down automatically.

3.3 Backlight and Lighting Function

Press the  key for more than 2 seconds to turn on the backlight and the light; then press this key for more than 2 seconds to turn off the backlight and the light; or turn off automatically within about 10 seconds after startup.

3.4 Data Hold Function

Press the  key to start data hold, the character **H** will show on the display; then press the  key to close data hold.

3.5 AC & DC Voltage / Resistance Measurement / Continuity Test

- 1 Press the power key , to start the power of the instrument.
- 2 Insert the red pen into the V insertion hole, and the black pen into the COM insertion hole.
- 3 Parallel connect the pen to the circuit, power supply or resistance to be measured. The instrument will judge AC voltage, DC voltage and resistance automatically.
- 4 During measuring the resistance, when the resistance is less than about 30Ω , the built-in buzzer will sound, while the green LED indicator will light up; when the resistance is more than about 30Ω and less than about 50Ω , the red LED indicator will light up, and the buzzer will not sound.
- 5 Read measurement results from the display screen. When measuring DC voltage, the voltage polarity of the testing points of the red pen will show synchronously on the display.
- 6 When measuring AC voltage, press the  key to display frequency, and then press the  key to shift back to AC voltage display.
- 7 When the measurement is completed, press the power key , to shut down the instrument power supply.



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms:

3.6 AC/DC Current/Capacitor Measurement

- 1 Press the power key , to start the power of the instrument.
- 2 Insert the red pen into the mA insertion hole, and the black pen into the COM insertion hole.
- 3 During measuring the capacitor, parallel connect the pen to both ends of the capacitor to be measured; during measuring the current, connect the pen in series to the circuit to be measured. The instrument will recognize and measure automatically.
- 4 Read measurement results from the display screen. When measuring DC voltage, the current polarity of the testing ends of the red pen will show synchronously on the display.
- 5 When measuring AC current, press the  key to display frequency, and then press the  key to shift back to AC current display.
- 6 When the measurement is completed, press the power key , to shut down the instrument power supply.

Note

- ◆ **Max. measurement current of the instrument is 600mA, and the min. measurement current is 5mA.**
- ◆ **During measuring the maximum capacitor, it requires about 10 seconds to display the measurement result.**



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms:

3.7 Temperature Measurement

- ① Press the power key , to start the power of the instrument.
- ② Take off the pen, and push down the dial button on the instrument panel lightly, till the dial button is locked.
- ③ Insert the temperature probe of the K-type thermocouple into the insertion hole of the temperature probe of the K-type thermocouple.
- ④ Bring the thermocouple' s temperature probe inductive end close to the object to be measured.
- ⑤ Read measurement results from the display screen.
- ⑥ Press the  key to shift between degrees Celsius and Fahrenheit.
- ⑦ When the measurement is completed, press the power key , to shut down the instrument power supply.



- ◆ **It is not allowed to carry out measurement on electrified objects, or input measurement voltage of the insertion hole from this.**
- ◆ **Pay attention to the polarity of the thermocouple, and do not reverse.**



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms

3.8 Transistor Measurement

- 1 Press the power key , to start the power of the instrument.
- 2 Take off the pen, and push down the dial button on the instrument panel lightly, till the dial button is locked.
- 3 Insert the transistor into the transistor testing insertion hole.
- 4 Read measurement results from the display screen.
- 5 When the measurement is completed, press the power key , to shut down the instrument power supply.



- ◆ **It is not allowed to input measurement voltage of the insertion hole from this.**
- ◆ **Pay attention to the transistor type and pole B, C and E shall be inserted into corresponding insertion holes, do not make a mistake.**



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms.

3.9 NCV Detection

- ① Press the power key , to start the power of the instrument.
- ② Press the  key and hold, the instrument will display "NCV" .
- ③ Then bring the instrument' s NCV inductive probe close to the point being detected gradually.
- ④ When the AC voltage sensed by the instrument is larger than about 12V, 2 green LED indicators will light up, meanwhile, the buzzer will send a slow "Di, Di" sound.
- ⑤ When the AC voltage sensed by the instrument is larger than about 40V, 4 green LED indicators will light up, meanwhile, the buzzer will send a "Di, Di" sound at moderate speed.
- ⑥ When the AC voltage sensed by the instrument is larger than about 80V, 4 green LED indicators and 2 red LED indicators will light up, meanwhile, the buzzer will send a "Di, Di" sound quickly.
- ⑦ When the measurement is completed, press the power key , to shut down the instrument power supply.



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms.

3.10 Live Wire Detection

- ① Press the power key  , to start the power of the instrument.
- ② Insert the red pen into the V insertion hole.
- ③ Then press the  key and hold, the instrument will display "NCV" .
- ④ Then contact the other end of the red pen with the point being detected.
- ⑤ When the AC voltage sensed by the instrument is larger than about 50V, 4 green LED indicators and 2 red LED indicators will light up, the display will show "LIVE" , meanwhile, the buzzer will send a "Di, Di" sound quickly.
- ⑥ When the measurement is completed, release the  key; then press the power key  , to shut down the instrument power supply.



In order to avoid safety accidents such as potential electric shock or human injury etc., please comply with safety work norms.

4. General Technical Specifications

4.1 Overall Specifications

Use environmental conditions:

EN61010-1, EN61010-2-033, EN61326-1, CAT IV 600V, pollution level 2.

Altitude < 2000 m

Working temperature and humidity: 0~40°C (<80% RH , <10°C is not considered)

Storage temperature and humidity: -10~60°C (<70% RH, with the battery taken off)

- Temperature coefficient: 0.1×Accuracy/°C
- Allowable max. voltage between measurement end and the ground: DC 600V or AC valid value.
- Sampling rate: About 3 times/second.
- Display: Liquid crystal display
- Outrange indication: Display “OL” .
- Battery low voltage indication: When the battery voltage is lower than normal working voltage,  will show on the display screen.
- Input polarity indication: It will display “-” automatically.
- Power supply: 3x1.5V AAA battery
- Dimension: 169mm x 83mm x 53mm

4.2. Accuracy Specification

The accuracy shall be applicable within one year after calibration.

Reference conditions: Ambient temperature 18°C to 28°C, and relative humidity no more than 80%.

4.2.1 DC Voltage

Range	Resolution	Accuracy
6V	0.001V	$\pm(0.8\% \text{ reading} + 3 \text{ characters})$
60V	0.01V	
600V	0.1V	

Input impedance: 10M Ω

Min. measurement voltage: 0.2V DC voltage

Max. measurement voltage: 600V DC or AC valid value.

4.2.2 AC Voltage

Range	Resolution	Accuracy (45~65Hz)
6V	0.001V	$\pm(1.2\% \text{ reading} + 3 \text{ characters})$
60V	0.01V	
600V	0.1V	

Input impedance: 10M Ω

Min. measurement voltage: 0.5V DC voltage

Max. measurement voltage: 600V DC or AC valid value.

Frequency range: 45Hz~65Hz, true valid value response.

4.2.3 DC Current

Range	Resolution	Accuracy
600mA	0.1mA	$\pm(1.0\% \text{ reading} + 3 \text{ characters})$

Min. measurement current: 5mA

Max. measurement current: 600mA DC or AC valid value.

Input protection: 600mA/600V protective tube.

4.2.4 AC Current

Range	Resolution	Accuracy (45~65Hz)
600mA	0.1mA	$\pm(1.5\% \text{ reading} + 3 \text{ characters})$

Min. measurement current: 5mA

Max. measurement current: 600mA DC or AC valid value.

Input protection: 600mA/600V protective tube.

Frequency range: 45Hz~65Hz, true valid value response.

4.2.5 Frequency

Range	Resolution	Accuracy
30~1000Hz	0.1Hz	$\pm(0.5\% \text{ reading} + 2 \text{ characters})$

Current channel: Sensitivity 5mA, measurement range 30~1000Hz

Voltage channel: Sensitivity 0.5V, measurement range 30~1000Hz

Input protection: Max. 600V DC or AC valid value.

4.2.6 Temperature

Range	Resolution	Accuracy
-20~1300°C	1°C	±(1.0% reading + 3 characters)
-4°F~2372°F	1°F	±(0.5% reading + 2 characters)

4.2.7 Transistor

Range	Description	Test Conditions
hFE	Display approximate value of hFE, (0 -1000)	Basic current is about 10μA Vce is about 2.5V

4.2.8 Resistance

Range	Resolution	Accuracy
6kΩ	0.001kΩ	±(1.0% reading + 3 characters)
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	±(1.2% reading + 5 characters)
10MΩ	0.01MΩ	

Input protection: Max. 600V DC or AC valid value.

4.2.9 Capacitor

Range	Resolution	Accuracy
60nF	0.01nF	$\pm(4.0\% \text{ reading} + 5 \text{ characters})$
600nF	0.1nF	
6uF	0.001uF	
60uF	0.01uF	
600uF	0.1uF	
6mF	0.001mF	

Input protection: 600mA/600V protective tube or 600V/PTC.

Min. measurement capacitor: 1nF

4.2.10 Continuity Test

Function	Description	Test Environment
	When built-in buzzer sounds, the resistance being tested is less than about 30Ω.	Test current: About 0.6mA; Open circuit voltage: About 1.0V.

Input protection: Max. 600V DC or AC valid value.

Instruction: When the resistance is less than about 30Ω, the built-in buzzer will sound, while the green LED indicator will light up; when the resistance is more than about 30Ω and less than about 50Ω, the red LED indicator will light up, and the buzzer will not sound.

5. Instrument Maintenance

This section provides basic maintenance materials, unless you're an experienced repairman and possess related calibration, performance test and service materials, please do not try to repair this instrument.



In order to prevent possible electric shock, fire disaster or human injury:

- ◆ **When the battery cover or back cover is opened, please do not carry out any measurement using this instrument.**
- ◆ **Please remove the input pen before cleaning the instrument.**
- ◆ **It is required to use specified parts for replacement. Please ask approved technicians to repair this instrument.**

5.1 General Maintenance

Use wet cloth or a few detergents to clean the instrument shell, and please do not use any grinding additive or chemical solvent.

5.2 Battery replacement



- ◆ In order to avoid any electric shock or human injury caused by error readings, when the “” symbol shows on the instrument display, please replace the battery timely.
- ◆ In order to guarantee safe operation and maintenance of this product, when the instrument is not used for a long term, please take out the battery, to avoid any damage caused by battery leakage to the product.
- ◆ In order to avoid electric shock or human injury, before opening the battery cover or replacing the battery, please shut down and check to guarantee that the pen has disconnected from the measurement circuit.

Please replace the battery according to the following steps:

- ① Shut down the instrument power supply.
- ② Disconnect the pen from the circuit being measured, and remove it from the instrument.
- ③ Loosen the bolts fixing the battery cover with a screwdriver, and take off the battery cover.
- ④ Take off the old battery, and replace with a new one.
- ⑤ Install the battery cover, and tighten the bolts.

5.3 Fuse Replacement



- ◆ Only Fuse with specified ampere, fuse rated value, voltage rated value and fusing speed could be used.
- ◆ In order to avoid electric shock or human injury, before opening the back cover or replacing the Fuse, please shut down and check to guarantee that the pen has disconnected from the measurement circuit.

Please replace the Fuse according to the following steps:

- ① Shut down the instrument power supply.
- ② Disconnect the pen from the circuit being measured, and remove it from the instrument.
- ③ Loosen the bolts fixing the back cover with a screwdriver, and take off the back cover.
- ④ Take off the old protective tube, and replace with a new one of the same type or specification.
- ⑤ Install the back cover, and tighten the bolts.

