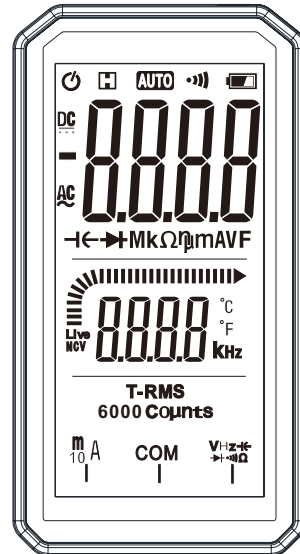


USERS MANUAL

Intelligent digital multimeter



Designed and Conforms to
IEC61010-1
CAT. III 600V



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

Table of content

1. Safety Information	1
1.1 Preparation.....	1
1.2 Symbol.....	2
1.3 Maintenance.....	2
2. Description	3
2.1 Part name	3
2.2 LCD display.....	4
3. Specification	5
3.1 Overview	5
3.2 Technical indexes	6
4. Operation guide	9
4.1 Reading hold	9
4.2 Backlight/Light.....	9
4.3 Automatic shutdown.....	10
4.4 To measure.....	10
4.5 NCV (Non-contact voltage detection)	11
4.6 AC & DC current measurement	12
4.7 DC voltage measurement	12
4.8 AC voltage measurement	13
4.9 Resistance on off measurement	13
4.10 Single watch pen wire test	14
4.11 Capacitor measurement	14
4.12 Temperature measurement.....	14
5. Maintenance	15
5.1 Change battery.....	15
5.2 Change pens.....	15
6. Accessories	15

1. Safety Information



Pay special attention to use of this instrument, for improper use may cause electric shock or damage to instrument. During use, observe usual safety regulations and observe safety measures regulated in use manual.

In order to make full use of instrument functions and guarantee safe operation, please carefully read and observe use methods in this manual.

Instrument complies with safety requirements on electronic measuring instrument of EN-61010-1, EN-61010-2-030 and EN-61010-2-032, level II pollution, and over-voltage standard is CAT III 600V.

Please observe safety operation guide, and guarantee to use instrument in a safe manner.

1.1 Preparation

1.1.1 When using this instrument, users must observe standard safety rules:


- General electric shock prevention.
- Prevention of misuse of instrument.


1.1.2 After receiving the instrument, check whether it is damaged during transportation.


1.1.3 After storing and shipping under adverse conditions, check whether the instrument has been damaged.

1.1.4 Pens of the instrument must be in good condition. Before use, check whether insulation of pens is damaged, and whether metal wire is exposed.


1.2 Symbol

 Note (refer to use manual for important safety information)

 Able to be used on dangerous electrified conductors.

 Dual-insulation protection (Category II)

CAT III Over-voltage according to IEC-61010-1 standard (installation), level III, pollution degree 2 refers to protection level of pulse withstand voltage provided.


 Comply with EU standard.

 Grounded

1.3 Maintenance

1.3.1 Do not try to open bottom case to adjust or repair instrument, for such operation could only be conducted by technicians fully understanding the instrument and electric shock danger.

1.3.2 Before opening instrument bottom case or battery cover, remove the pens from the wire being measured.

1.3.3 In order to avoid electric shock possibly caused by error reading, when symbol " " displays on instrument, replace battery immediately.

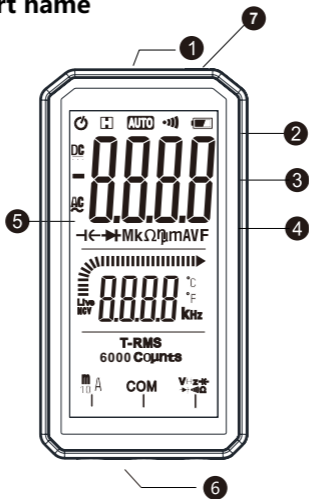
1.3.4 Use wet cloth and gentle detergent to clean the instrument, and do not use any abrasive or solvent.

1.3.5 Power off when the instrument is not used, and rotate range switch to OFF position.

1.3.6 If the instrument is not used for a long time, take out the battery to avoid any damage to the instrument.

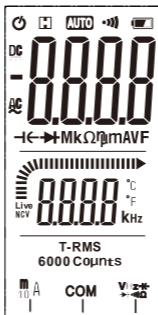
2. Description

2.1 Part name



- 1 Non-contact voltage detecting & inducing area
- 2 Data hold and backlight buttons
- 3 Flashlight and NCV button
- 4 Function switch button
- 5 Liquid crystal display (LCD)
- 6 Trigger
- 7 On/off key

2.2 LCD display




~	≡	AC & DC
·)		Connection/Disconnection indication
AUTO		Automatic range mode
⏻		Automatic shutdown indication
🔋		Low battery
⏻		Reading hold state
V, A		Volt (voltage), ampere (current)
Ω, kΩ, MΩ		Ohm kilohm and megohm (resistance)
Hz		Hertz
▶		DIODE
nF uF mF		Microfarad
°C °F		Centigrade and Fahrenheit
NCV		Non-contact voltage detection
Live		The line of fire test

3. Specification

The instrument specifies one year as a cycle, and shall be re-calibrated under $18^{\circ}\text{C} \sim 28^{\circ}\text{C}$, with relative humidity less than 75%.

3.1 Overview

- Select measurement function and range automatically.
- Overload protection throughout the range.
- Max. voltage between measurement terminal and ground: 600V DC or 600V AC
- Operating height: Max. 2000m
- Display: LCD
- Max. display value: 6000 digit.
- Polarity indication: Automatic indication, and '–' indicates negative.
- Over range display: '0L' or '-0L' .
- Sampling time: About 3 times/second., bargraph 10 times/second
- Unit display: Function and electricity quantity unit display.
 - Automatic shutdown time: 15 minutes
 - Power supply: 1.5V AAA battery $\times 2$
 - Battery under-voltage indication: LCD display  symbol
- Temperature coefficient: Less than $0.1 \times \text{accuracy} / ^{\circ}\text{C}$.
- Operating temperature: $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$.
- Storage temperature: $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$.

3.2 Technical indexes

3.2.1 AC current

Range	Resolution	Accuracy
6000mA	1mA	± (1.0% reading + 8 digits)
10 A	0.01A	

- Min. input current: 20mA AC current.
- Max. input current: 10A AC current.
- Frequency range: 40 ~ 1000Hz;

3.2.2 DC current

Range	Resolution	Accuracy
6000mA	1mA	± (1.0% reading + 5 digits)
10 A	0.01A	

- Min. input current: 20mA DC current
- Max. input current: 10 A DC current

3.2.3 DC voltage

Range	Resolution	Accuracy
6V	0.001V	± (0.5% reading + 3 digits)
60V	0.01V	
600V	0.1V	

- Min. input voltage 0.5 V DC
- Max. input voltage: 600V DC

3.2.4 AC voltage

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

- Min. input voltage: 0.5 V AC
- Max. input voltage: 600V AC (valid value)
- Frequency range: 40 ~ 1000Hz

3.2.5 Line on-off test

Range	Resolution	Function
•))	1Ω	If resistance of the line being measured is less than 50Ω, buzzer in instrument will make continuous alarming sounds.


- Overload protection: 600V DC or AC (valid value)

3.2.6 Resistance

Range	Resolution	Accuracy
600Ω	0.1Ω	± (0.8% reading + 3 digits)
6kΩ	0.001kΩ	
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	
60MΩ	0.01MΩ	

- Overload protection: 600V DC or AC (valid value)

3.2.7 DIODE

Range	Resolution	Accuracy	Testing environment
Diode test 	1 V	0.001V	Testing current: about 1mA; Open circuit voltage : about 2.8V。 The display shows an approximation of the diode forward pressure drop

- Overload protection: 600V DC or AC (valid value)

3.2.8 Capacitor

Range	Resolution	Accuracy
6nF	0.001nF	$\pm (10\% \text{ reading} + 40 \text{ digits})$
600nF	0.1nF	$\pm (2.5\% \text{ reading} + 20 \text{ digits})$
6uF	0.001 uF	
60uF	0.01 uF	
600uF	0.1 uF	
6mF	1 uF	
60mF	0.01mF	

- Overload protection: 600V DC or AC (valid value)

3.2.9 Temperature

Range	Resolution	Accuracy
-40~1000 °C	1°C	$\pm (1\% \text{ reading} + 3^\circ\text{C})$
-40~1832 °F	1°F	$\pm (1\% \text{ reading} + 3^\circ\text{F})$

The precision does not include the error of the thermocouple probe

- Overload protection: 250V DC or AC (valid value)

3.2.10 Frequency

3.2.10.1 (viagear A):

Range	Resolution	Accuracy
100.0 Hz	0.1Hz	± (1.0%reading+ 5digits)
1000Hz	1Hz	

- Measurement range: 40Hz ~ 1000Hz
- Input signal range: ≥ 3A Effective value of AC current



3.2.10.2 Via gear V:

Range	Resolution	Accuracy
100.0 Hz	0.1Hz	± (1.0%reading+ 5digits)
1000Hz	1Hz	


- Measurement range: 40Hz ~ 1000Hz
- Input signal range: ≥ 0.8 AC voltage (valid value)

4. Operation guide

4.1 Reading hold

During measurement, if it is required to hold reading, touch  button, value on display will be locked, touch  button again, to cancel reading hold.

4.2 Backlight/Light

- 1) In the process of measurement, if the ambient light is too dark, which makes the reading difficult, you can press the  button and turn on the backlight for more than 2 seconds. Then the backlight will automatically close after about 1 minute.

- 2) Hold down the flashlight button for more than 2 seconds to turn on the flashlight lighting function, and turn it off automatically about 1 minute later

4.3 Automatic shutdown

- 1) If there's no operation within 15 minutes after start, instrument will enter standby state, and shut down to save energy.
- 2) After automatic shutdown, Press the "⊙" button, to wake the instrument enter work state.
- 3) Holding NVC to turn on the power will cancel the automatic shutdown function.

After shutdown, restart to restore the automatic shutdown function.

4.4 To measure

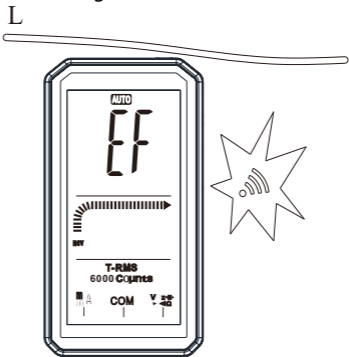
- 1) Touch the electric source button to start the machine. If the battery voltage is insufficient, the display will display a low voltage symbol, at which point the battery should be replaced. Press the power button again to shut down the machine.
- 2) When the instrument is not measured, it will enter the automatic scanning state. The instrument is shown as follows:



Auto

4.5 NCV (Non -contact voltage detection)

Switch the rotation switch to any gear, hold down the "NCV" key to display EF, and bring the NCV sensor close to the conductor under test, instrument could detect whether the lead being measured is >90V AC voltage. When instrument detects AC voltage, instrument buzzer will alarm and NCV alarm light will flash.



Note:

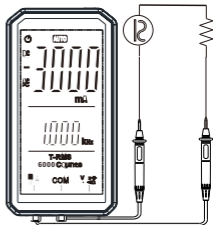
- 1) Even if there' s no alarm indication, voltage may still exist. Do not depend on non-contact voltage detector to judge whether there's voltage in the lead. Detection operation may be impacted by factors like different socket designs and insulation thickness types etc.

4.6 AC/DC current measurement

- 1) Insert the pen into the 10A current input hole, the automatic identification function is on, and the current test automatically enters. The system measures dc current by default. Pull out the pen in the 10A current input hole, and the system automatically jumps out of current mode and enters AUTO measurement mode.

Note: when the meter is in diode gear, the pen is inserted into the 10A input hole and the meter cannot enter current gear.

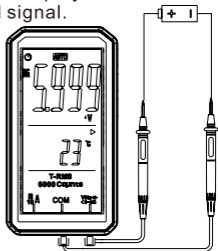
- 2) Connect the measuring pen into the measured signal. When the measured signal $>20\text{mA}$, the meter will display the current measured current value. When the measured ac signal $>3000\text{mA}$, the instrument pair displays the ac current frequency, and the measured current $b > 800\text{mA}$ is red backlight warning.



4.7 DC voltage measurements

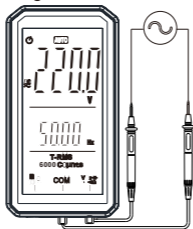
- 1) Connect the gauge pen to the measured signal. When the measured signal is greater than 0.5V, the meter will display the current DC voltage value. When the measured signal is less than 0.5V, the meter will default to the resistance value and display the internal resistance value of the measured signal.

When the measured signal voltage is greater than 42V, the red backlight will turn on the alarm.



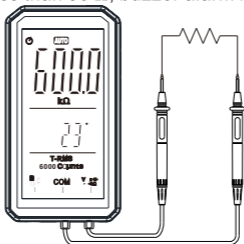
4.8 AC voltage measurement

1) Connect the meter pen to the measured signal. When the measured signal is greater than 0.5V, the meter will display the current AC voltage value and the frequency value of the voltage. When the measured signal is less than 0.5V, the meter will default to the resistance value and display the internal resistance value of the measured signal. When the measured signal voltage is greater than 42V, the red backlight will turn on the alarm.



4.9 Resistance, on off measurement

1) Pen connection resistance measurement, the instrument shows resistance, when measuring the resistance is greater than 60 M Ω instrument will show a "----". When measuring the resistance is less than 50 Ω , buzzer alarm lamp, instrument lights flashing.



4.10 Single watch pen wire test

1. Press "SEL" button to switch to LIVE mode, and the meter shows LIVE.
2. Insert the meter stylus into the power socket. If the instrument detects ac voltage, it will display the voltage signal strength based on the detected signal strength. The instrument induction LCD segment code will display the voltage signal strength. The red backlight is lit up and the buzzer emits an alarm of varying intensity.

4.11 Capacitance measure

1. Press "SEL" key to switch to capacitance
2. Measure the capacitance with both ends of the test pen and read the measurement from the LCD.

Notice:

- ① When measuring large capacitors, it takes time to stabilize the reading
- ② When measuring the capacitance with polarity, pay attention to the corresponding polarity to avoid damaging the instrument.

4.12 Temperature measurement

Press "SEL" key to switch TEMP, and the red plug of the thermocouple is inserted into the °C/°F end. The black plug can be inserted into the COM jack. When the reading is stable, the temperature value can be read directly from the display screen.

Notice:

- ① The maximum temperature of the randomly packaged K-type thermocouple is 250°C, and the instantaneous measurement can be up to 300°C.

5. Maintenance


5.1 Change battery

 Warnings

Warning



Before opening battery cover of the instrument, remove the pens from the circuit being measured, to avoid electric shock.

- 1) If symbol "  " appears, it indicates to change the battery.
- 2) Unfasten bolts on battery cover of instrument and remove the cover.
- 3) Change the old battery.
- 4) Place the battery cover.

 Note:

Do not reverse battery polarity.

5.2 Change pens

 Warnings

Warning



When changing the pen, it is required to replace with an identical pen or a pen of the same level. The pen must be in good condition, and level of the pens is: 1000V 10A.

If insulation layer of the pen is damaged, or metal wire of the lead exposes, it is required to change the pen.

6. Accessories

- | | | | |
|----|------------|-------------------------------|----------|
| 1) | Pens | Level: 1000V 10A | One pair |
| 2) | Use Manual | | One copy |
| 3) | Battery | 1.5V AAA battery | 2PCS |
| 4) | Cloth bag | | 1PCS |
| 5) | K-Type | Optional function accessories | 1PCS |