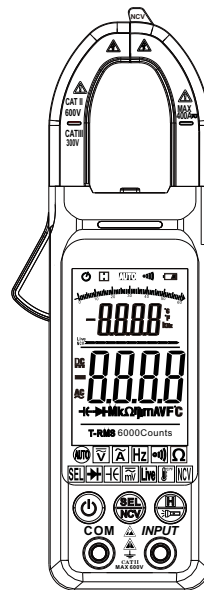


# USERS MANUAL

## Intelligent digital clamp multimeter



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



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



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

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# 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 II 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.

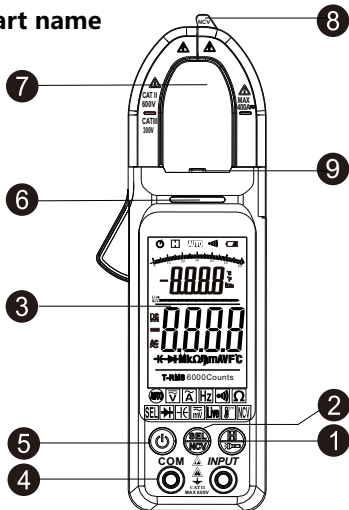
1.3.5 Power off when the instrument is not used, and rotate range switch to OFF position.

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



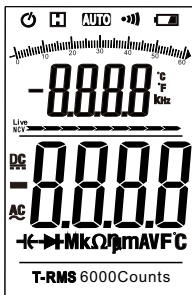
## 2. Description

### 2.1 Part name



- ① Data hold and flashlight button
- ② SEL and NCV buttons
- ③ LCD display
- ④ Input socket
- ⑤ On/off key
- ⑥ Caution light
- ⑦ Current measuring clamp
- ⑧ Contactless induction zone
- ⑨ Electric torch

## 2.2 LCD display



|                  |                                     |
|------------------|-------------------------------------|
| ~                | AC & DC                             |
| •  )             | Connection/Disconnection indication |
| <b>AUTO</b>      | Automatic range mode                |
| ⏻                | Automatic shutdown indication       |
| 🔋                | Low battery                         |
| ⏻                | Reading hold state                  |
| <b>V, A</b>      | Volt (voltage), ampere (current)    |
| <b>Ω, kΩ, MΩ</b> | Ohm kilohm and megohm (resistance)  |
| <b>Hz</b>        | hertz                               |
| ➡                | DIODE                               |
| <b>nF uF mF</b>  | icrofarad                           |
| <b>°C °F</b>     | Centigrade and Fahrenheit           |
| <b>NCV</b>       | Non-contact measuring voltage       |
| <b>Live</b>      | Live line voltage identification    |

### 3. Specification

The instrument specifies one year as a cycle, and shall be re-calibrated under 18°C ~ 28°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: 'OL' or '-OL' .
- 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 × 2
  - Battery under-voltage indication: LCD display  symbol
  - Temperature coefficient: Less than 0.1×accuracy/°C.
  - Operating temperature: 18°C ~ 28°C.
  - Storage temperature: -10°C ~ 50°C.



## 3.2 Technical indexes

### 3.2.1 AC current

| Range | Resolution | Accuracy                    |
|-------|------------|-----------------------------|
| 60A   | 0.01A      | ± (2.5% reading + 8 digits) |
| 400A  | 0.1A       |                             |

- Min. input current: 0.2A AC current.
- Max. input current: 400A AC current.
- Frequency range: 40 ~ 1000Hz;

### 3.2.2 DC current(Optional features)

| Range | Resolution | Accuracy                   |
|-------|------------|----------------------------|
| 60A   | 0.01A      | ± (2.5% reading +8 digits) |
| 400A  | 0.1A       |                            |

- Min. input current: 0.2A DC current
- Max. input current: 400A DC current

### 3.2.3 DC voltage

#### 3.2.3.1 Dc voltage V

| Range | Resolution | Accuracy                    |
|-------|------------|-----------------------------|
| 600V  | 0.1V       | ± (0.5% reading + 5 digits) |

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

#### 3.2.3 2 Dc voltage mV

| Range  | Resolution | Accuracy                   |
|--------|------------|----------------------------|
| 600 mV | 0.1 mV     | ± (0.5% reading +3 digits) |

- Min. input voltage 0.1mV DC
- Max. input voltage: 600V DC

## 3.2.4 AC voltage

### 3.2.4.1 AC voltage V

| Range | Resolution | Accuracy                                        |
|-------|------------|-------------------------------------------------|
| 600V  | 0.1V       | $\pm(0.8\% \text{ reading} + 5 \text{ digits})$ |

- Min. input voltage: 0.5 V AC
- Max. input voltage: 600V AC (valid value)
- Frequency range: 45 ~ 1000Hz

### 3.2.4.2 AC voltage mV

| Range  | Resolution | Accuracy                                        |
|--------|------------|-------------------------------------------------|
| 600 mV | 0.1 mV     | $\pm(0.8\% \text{ reading} + 5 \text{ digits})$ |

- Min. input voltage: 0.1 mV AC
- Max. input voltage: 600V AC (valid value)

## 3.2.5 Line on-off test

| Range | Resolution | Function                                                                                      |
|-------|------------|-----------------------------------------------------------------------------------------------|
| •)))  | 1 $\Omega$ | If the measured line resistance is less than 50 $\Omega$ , the buzzer in the meter will sound |

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

## 3.2.6 Resistance

| Range         | Resolution      | Accuracy                                        |
|---------------|-----------------|-------------------------------------------------|
| 600 $\Omega$  | 0.1 $\Omega$    | $\pm(0.8\% \text{ reading} + 3 \text{ digits})$ |
| 6k $\Omega$   | 0.001k $\Omega$ |                                                 |
| 60k $\Omega$  | 0.01k $\Omega$  |                                                 |
| 600k $\Omega$ | 0.1k $\Omega$   |                                                 |
| 6M $\Omega$   | 0.001M $\Omega$ |                                                 |
| 60M $\Omega$  | 0.01M $\Omega$  |                                                 |

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

### 3.2.7 DIODE

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

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

### 3.2.8 Capacitor

| Range   | Resolution | Accuracy                                                                                                |
|---------|------------|---------------------------------------------------------------------------------------------------------|
| 60.00nF | 0.01nF     | $\pm(10\% \text{ reading} + 40 \text{ digits})$<br><br>$\pm(2.5\% \text{ reading} + 20 \text{ digits})$ |
| 600.0nF | 0.1nF      |                                                                                                         |
| 6.000uF | 1nF        |                                                                                                         |
| 60.00uF | 10nF       |                                                                                                         |
| 600.0uF | 100nF      |                                                                                                         |
| 6.000mF | 1μF        |                                                                                                         |
| 60.00mF | 10μF       |                                                                                                         |

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

### 3.2.9 Temperature

| Range        | Resolution | Accuracy                                     |
|--------------|------------|----------------------------------------------|
| -40°C~1000°C | 1°C        | $\pm(1\% \text{ reading} + 3^\circ\text{C})$ |
| -40°F~1832°F | 2°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 Clamp frequency measurement (viagear A):

| Range  | Resolution | Accuracy                                      |
|--------|------------|-----------------------------------------------|
| 60.0Hz | 0.1Hz      | $\pm(1\% \text{ reading} + 5 \text{ digits})$ |
| 1000Hz | 1Hz        |                                               |

- Measurement range: 40Hz ~ 1000Hz
- Input signal range:  $\geq 1/4$  Full- scale Value

### 3.2.10.2 Via gear V:

| Range  | Resolution | Accuracy                                      |
|--------|------------|-----------------------------------------------|
| 60.0Hz | 0.1Hz      | $\pm(1\% \text{ reading} + 5 \text{ digits})$ |
| 1000Hz | 1Hz        |                                               |

- Measurement range: 40Hz ~ 1000Hz
- Input signal range:  $\geq 0.5 \sim 600\text{V AC voltage (valid value)}$

## 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 Torch

- 1) Long press the flashlight button for 2 seconds, turn on the flashlight, and turn it off after about 1 minute.

### 4.3 Auto Power -Off

- 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.

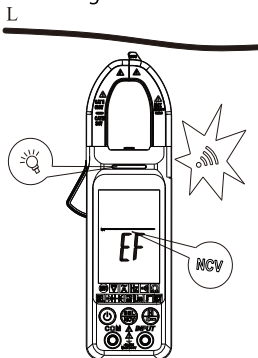
### 4.4 To measure

- 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:

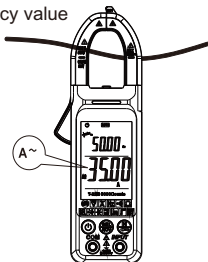
- 1) Even if there is no alarm indication, the voltage may still be present. Do not rely on the non-contact voltage to determine whether a wire has a voltage. Probe operation may be influenced by socket design, type of insulation thickness, etc. In NCV detection mode, the meter does not measure voltage, resistance, and current simultaneously.

## 4.6 electric current measurement

### 4.6.1 Ac current and AC current frequency measurement

- 1) Press the clamp, open the clamp mouth and clamp one of the wires under test.
- 2) When the measured signal is greater than 0.2A, the meter display displays the current value and frequency value of the measured conductor.

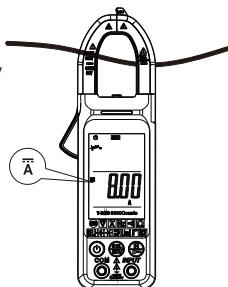
(Note: The meter can display the frequency value only when the current value is greater than 35A)



### 4.6.2 Dc current measurement

#### (Test instrument with dc current function)

- 1) Press the clamp, open the clamp mouth and clamp one of the wires under test.
- 2) When the measured signal is greater than 0.2A, the meter display displays the current value and frequency value of the measured conductor.



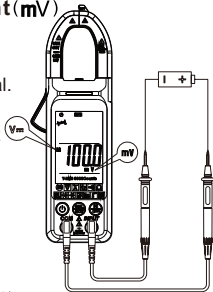
## 4.7 DC voltage measurements

### 4.7.1 DC voltage measurements (V)

Connect the test pen to the signal being tested. When the measured DC signal is greater than 0.5V, the display voltage value. When the measured DC signal is  $<0.5V$ , the instrument uses the default resistance value and displays the resistance value of the measured signal.

### 4.7.2 Dc voltage measurement (mV)

- 1) Press SEL button to dc voltage mV, the instrument shows mV
- 2) Connect the test pen to the test signal. When the test signal is  $<600mV$ , the instrument will display the current dc voltage value under test; when the test signal is  $>600mV$ , the instrument will display "OL".



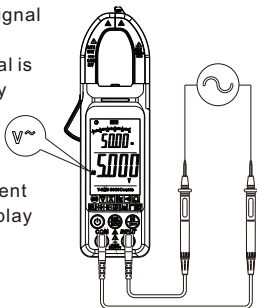
## 4.8 AC voltage measurement

### 4.8.1 AC voltage measurement (V)

Connect the test pen to the signal being tested.

When the measured AC signal is greater than 0.5V, the display displays the voltage and frequency values.

When the measured AC signal  $<0.5V$ , the instrument default resistance value, display the measured signal internal resistance value.

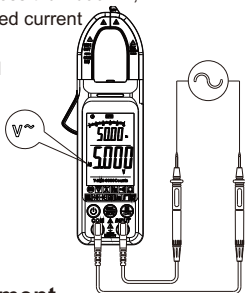


## 4.8.2 Ac voltage measurement (mV)

- 1) Press SEL to enable the mV function. Instrument display mV
- 2) Connect the meter and meter pen to the signal under test.

When the measured signal is less than 600mV, the meter displays the measured current dc voltage value.

When the measurement signal is  $> 600\text{mV}$ , the instrument displays "OL".

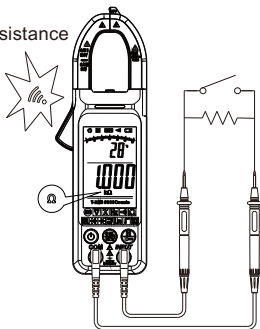


## 4.9 resistance measurement

- 1) Connect the test pen to the resistance to be measured.

The main display of the instrument will display the measured resistance value.

When the measurement resistance is less than  $50\ \Omega$ , the instrument buzzer sound alarm, indicator light on.



## 4.10 Single watch pen wire test

1. Press "**SEL**  
**NCV**" 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**  
**NCV**" 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) | K-Type     | Optional function accessories | 1PCS     |