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1. Safety Information **⚠**Warning

To fully understand the function of the meter and ensure safe operation, please read and follow it carefully Follow the use method of this manual. Special care should be taken when using this meter, improper use may cause electric shock or damage to the meter. In use, it should follow the usual safety regulations and take effective safety precautions.

The instrument meets the safety requirements of,IEC-61010-1, IEC-61010-2-030, IEC-61010-2-032) electronic measuring instrument, belongs to secondary pollution, and the overvoltage standard is CAT III 600V. Please follow the safety operation guide and use the meter safely. 1.1 Preparation

1.1.1 When using this instrument, users must observe standard safety rules: - Universal protection against electric shock. - Prevent misuse of meter

 $1.1.3\,A fter\,storing\,and\,shipping\,under\,adverse\,conditions, check\,whether\,the\,instrument\,has\,been\,damaged.$  $1.1.4\,\mbox{The pen}$  must be in good condition. Before use, check whether the insulation of the pen is damaged and whether the metal wire of the wire is exposed. 1.2 Electrical symbols  $\underline{\Lambda}$  Note (For important safety information, please refer to the instruction 1 Can be used on dangerous charged objects.

1.1.2 After receiving the meter, check for damage in transit.

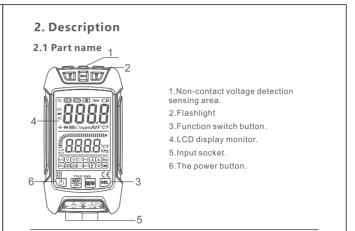
 $\hfill\square$  Dual-insulation protection (Category  $\hfill{\mathbb{I}}$  ). CAT III In accordance with iec-61010-1 overvoltage (installation) Class II, contamination level 2 refers to the level of voltage protection provided to withstand pulses. **(€** Comply with European Community (EU) standards. 

— Grounded

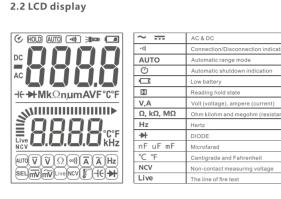
1.3 Maintenance

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.  $1.3.2\,\mbox{The pen}\,\mbox{should}$  be removed from the line under test before opening the instrument backing.

1.3.3 To avoid electric shocks that may be caused by incorrect readings, charge the meter immediately when it shows the "  $\ \blacksquare$  "symbol.  $1.3.4\ \mbox{Clean}$  the meter with a damp cloth and mild detergent. Do not use abrasives or solvents. 1.3.5 Turn off the power when the meter is not in use.



2.2 LCD display



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Gauges shall be specified for a period of one year, between 18  $^{\circ}$  C and 28  $^{\circ}$  C, with relative humidity less than Recalibration in 75% condition. 3.1 Comprehensive Indicators 1. Automatic selection of measuring function and range. 2. Full range overload protection. 3.The maximum voltage between the measuring end and the ground is 600V DC or 600V AC(2201)/1000V DC or 750V AC(2202).

3. Technical indicators

3.2.2 DC current(2201)

4. Working height: maximum 2000m 5.Display: LCD 6. The maximum display value is 6000 digits(2201)/9999 digits(2202). 7. Polarity indication: automatic indication, '-' indicates negative polarity. 8. Superview display: 'OL' or '-OL'. 9. Sampling time: about 3 times/second. 10. Unit display: with function, electric quantity unit display.

11. Automatic shutdown time: 15 minutes. 12. Power supply: Two 1.5V AAA 7 batteries. 15. Operating temperature: 0° C-40 °C.

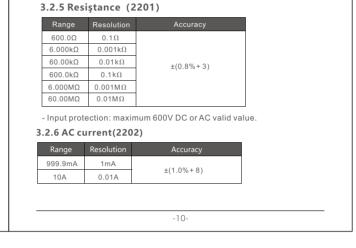
13.Battery undervoltage indicator: LCD 🖼 symbol. 14. Temperature coefficient: less than 0.1X accuracy /°C. 16.Storage temperature: -10°C- 50°C. 3.2 Technical indexes 3.2.1 AC current (2201) Range Resolution ±(1.0%+8) 10A 0.01A - Min. input current: 20mAAC current. - Max. input current: 10AAC current. - Frequency range: 40 ~ 1000 Hz.

Range Resolution 6000mA 1mA ±(1.0% + 5) - Min. input current: 20mA DC current. - Max. input current: 10A DC current. 3.2.3 DC voltage(2201) Range Resolution 600.0mV 0.1mV 0.001V ±(0.5%+3) 0.01V 60.00V 600.0V - In AUTO mode, the input voltage ranges from 0.5V to 1000V DC. - The input voltage ranges from 0.0mV to 600.0mV DC in mV mode.

In the mV range, with the input open, the meter may have a pulsating reading. This is normal because of the high sensitivity, of the meter when connected to the pen When you measure the circuit, you get a true measurement. 3.2.4 AC voltage(2201) Range Resolutio 600.0mV 0.1mV

6.000V 0.001V  $\pm (0.8\% + 5)$ 0.01V 600.0V 0.1V - In AUTO mode, the input voltage ranges from 0.5V to 1000V AC. - In mV mode, the input voltage ranges from 0.0mV to 600.0mV AC. - Frequency range: 40 ~ 1000Hz. -9-

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- Min. input current: 20mAAC current. - Max. input current: 10AAC current - Frequency range: 40  $\sim$  1000 Hz. 3.2.7 DC current(2202) 999.9mA 1mA 10A 0.01A - Min. input current: 20mA DC current. - Max. input current: 10A DC current. 3.2.8 DC voltage(2202) 0.1mV 9.999V 0.01V  $\pm (0.5\% + 3)$ 0.1V 99.99V 999.9 V 0.1V

- In AUTO mode, the input voltage ranges from 0.5V to 1000V DC. The input voltage ranges from 0.0mV to 600.0mV DC in mV mode. Note: In the mV range, with the input open, the meter may have a pulsating reading. This is normal because of the high sensitivity, of the meter when connected to the pen When you measure the circuit, you get a true 3.2.9 AC voltage(2202) 0.1mV 600.0mV 0.001V ±(0.8% +5) 99.99V 0.01V 999.9V 0.01V - In AUTO mode, the input voltage ranges from 0.5V to 1000V AC. - In mV mode, the input voltage ranges from 0.0mV to 600.0mV AC. - Frequency range: 40 ~ 1000Hz.

3.2.10 Resistance(2202) 99.99kΩ 0.01kΩ ±(0.8%+3) 999.9k $\Omega$  0.1k $\Omega$ 9.999ΜΩ 0.001ΜΩ 99.99ΜΩ 0.01ΜΩ - Input protection: maximum 600V DC or AC valid value.

3.2.11 Capacitor(2202) 9.999nF 0.001nF ±(10% reading + 40 digits) 999.9nF 0.1nF 9. 999 μ F 0.001 μ F 99. 99 µ F 0.01 µ F ±(2.5%+20) 999. 9μF 0.1 μ F 0.01mF 99.99mF - Input protection: the maximum value is 600V DC or AC. 3.2.12 Temperature(2202) ±(1% +3) 1°C °F 1°F ±(1%+3) -14-

-Accuracy does not include error of thermocouple probe. - Overload protection: 250V DC or AC (valid value). 3.2.13 DIODE(2202) Diode test 0.001V **>** - Input protection: the maximum value is 600V DC or AC. 3.2.14 Line on-off test(Have both) 1 $\Omega$ 

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3.2.15 Frequency(Have both) 3.2.15.1 Pass grade A: 100.0Hz 0.1Hz ±(1% +5) 1Hz - Measurement range: 40Hz ~ 1000Hz. - Input signal pattern: > 3A AC current (Effective Value). -16-

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

3.2.15.2 Via gear V: Range Resolution 0.1Hz ±(1%+5)

4. Operation guide 4.1 Reading hold In the process of measurement, if you need to hold the reading, touch the  $\blacksquare$  key, the display value will be locked, touch the  $\blacksquare$  key again, can remove the reading hold. - Measurement range: 40Hz ~ 1000Hz. 4.2 Flashlight Touch the 300 button to turn on the lighting function of the flashlight barrel, which will be automatically turned off after about 15 minute. - Input signal range: >0.8 AC voltage (valid value). 4.3 Automatic shutdown 4.3.1If there is no operation within 15 minutes after startup, the meter will enter hibernation state and automatically shut down to save electric energy. The buzzer has one sound one minute before the shutdown.  $4.3.2\,\mbox{After}$  automatic shutdown, press the power button to wake up the instrument to work. -17--18-

4.4 Preparation before measurement 4.4.1 Long press the power source button to power on. If the battery voltage is low (about 2.8V), the monitor will display "  $\square$ " symbol, then should charge. Press the power button againto turn it off.  $4.4.2\,\mbox{When}$  the instrument is not measured, the instrument enters the automatic scanning state and the instrument displays.

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 $4.5.1 \mbox{Touch}$  the NCV key to enable the NCV function, and the instrument 4.5.2The NCV sensor is placed close to the measured wire, and the instrument can detect whether the measured wire is gt. 90V ac voltage. When the meter detects the ac power, the meter buzzer alarms and the LCD analog bar displays the induction intensity.  $$\tt L$ (1) Voltage may still exist even if there is no alarm indication. Do not rely on contactless voltage detectors To see if there's a voltage on the wire. Probe operation may depend on socket design, insulation thickness Different types of factors such as the impact. such as the impact. (2) In NCV mode, the meter does not measure voltage, resistance, and current at the same tim

4.5 NCV (Non -contact voltage detection)

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-20-4.7 DC voltage measurements Insert the black stylus into the COM jack and the red stylus into the V jack. Connect the markers together The voltage source or load ends are measured and read on the LCD. AUTO automatic measurement mode:

terminal is inserted into the stylus automatic identification function on on Automatically enters the default DC current gear of the current gear system. Remove the 10A current input hole and the stylus automatically jumps out of the current gear and enters the AUTO measurement mode.

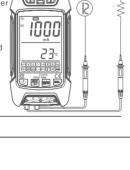
4.6 AC/DC current measurement

When the meter is in diode gear, the pen is inserted into the 10A input hole and the meter will not enter current gear. 1000 .4.6.2 Connect the pen into the measured

 $4.6.1\,lnsert$  the stylus into the 10A current input hole, and the current input

signal, when the measured signal; The meter will display the current measured value at 20mA. When measured ac signal; At 3000rnA, the instrument pair displays the AC current frequency. -21-

4.8 AC voltage measurement



when the measured signal > At 0.5V, the meter will display the current measured DC voltage value. When the signal being measured. At 0.5V, the meter will default to the resistance value and display the internal resistance value of the measured signal. Touch the "mV\mathfrak{\text{m}}" key to switch to the DC mV voltage level. Connect the pen to both ends of the voltage source or load for measurement, reading on the LCD. 1500 DC mV measurement mode: when the measured signal; At 600.0mV, the meter will display the current measured DC voltage value. When the measured signal; The meter will display "OL" at 600.0mV. TRUE PARS

Insert the black stylus into the COM jack and the red stylus into the V jack. Connect the pen to both ends of the voltage source or load for measurement, reading on the LCD. AUTO automatic measurement mode: when the measured signal; At 0.5V, the meter will display the current measured AC voltage value. When the signal beingmeasured. 0.5 VInstrument will default to the resistance value, display the measured signal interest value of the control of the internalresistance value. WHD/ Touch the mV≈ key to switch to ac mV voltage

Connect the pen to both ends of the voltage source or load for measurement, reading on the LCD. AC mV measurement mode: when the measured signal At 600.0mV, the meter will display the current measured AC voltage value. When the signal is measured;The meter will display "OL" at 600.0mV." -23-

 $4.9.1\,\mbox{lnsert}$  the black stylus into the COM jack and the red stylus into  $4.9.2\,\mbox{AUTO}$  AUTO range tap. At this time, the meter is in automatic scanning state. 4.9.3 Connect the pen to the measured resistance or both ends of the line for measurement, reading in the LCD display. 1000 Notice: (1) When the input is open, the LCD will display the "OL" overrange status. (2) If the resistance being measured is higher than  $10M\Omega$ , the meter may take several seconds to stabilize the reading, which is normal for high resistance readings. -24-

When measuring the impedance on the line, make sure that the circuit is disconnected and the capacitor on the circuit discharges completely.

4.9 Resistance measurement

4. 12 Temperature measurement

4.14 Line connection test

Note:

4.10 The line of fire test  $4.10.1\,\mbox{Press}$  "SEL" key to switch to LIVE gear, the instrument shows LIVE. 4.10.2 Connect the red test pen to the Live input socket. Insert the single pen into the power socket L jack or close to the live wire. If the instrument detects ac voltage, it will display voltage signal strength according to the detected signal strength, and the buzzer will give alarm sound of different

4.13.4 Read on the LCD.

Note:

intensity. 4.11 Capacitance measurement 4.11.1 Press the "SEL" key to switch to capacitor gear. 4.11.2 Use the other end of the test pen to measure the capacitance value of the capacitor to be measured and read the measured value from the LCD.

(1)When measuring large capacitors, a fixed time is required to stabilize readings. (2)When measuring polar capacitors, pay attention to the corresponding polarity to avoid damaging the instrument.

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The maximum temperature of the randomly packaged K-type thermocouple 4.13 Diode test 4.13.1 Insert the black stylus into the COM jack and the red stylus into the "  $\clubsuit$  "jack. 4.13.2 Touch SEL key to switch to diode position.  $4.13.3\,\mbox{Connect}$  the red stylus to the diode anode and the black stylus to the diode cathode for testing.

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

The meter displays an approximation of the forward voltage drop of the diode. If the pen is connected inversely or the pen is open, the LCD displays "OL". -27-

discharged.  $4.14.1 \ \text{Insert}$  the black marker into the COM jack and the red marker into the •ı) jack. 4.14.2 Touch the "SEL" key to switch to the line connection test state. 4.14.3 Connect the pen to both ends of the line for measurement. If the resistance of the measuredline is less than  $50~\Omega,$  the buzzer inside the meter will sound. If the meter is open or the resistance of the measured line is greater than 999.9  $\Omega, \, \text{"OL"}$ is displayed. -28-

Danger of electric shock. When testing the circuit on and off, make sure

the circuit is disconnected and the capacitor on the circuit is completely

5. Maintenance 5.1 Replace Battery When replacing the battery, remove the pen from the measuring circuit to 5.1.1 the "a" symbol indicates that charging is needed. 5.2 Replace the test pen When replacing the stylus, you must replace the same or the same grade of the table. Pen meter must be in good condition, pen grade: 1000V 10A. If the insulation layer of the pen is damaged, such as "exposed wire of the wire, the pen must be replaced. 6.The attachment (1) Pens Level: 1000V 10A One pair (2) Directions for use One copy (3) Thermocouple 1PCS -29-

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