

## 1. Introduction

Welcome to choose this product!




This is a kind of 3 1/2 bit portable digital Clamp-Shape meter, which may measure AC current and AC & DC voltage, resistance, test for connection and disconnection, positive voltage on diode, temperature, frequency, phase sequence etc.. The meter is the ideal tool of the industries of electricity, electronics and refrigeration due to wonderful structure, easily operated, more portable.

## 2. Safety

The meter is designed in accordance with the safety requirements of the standard IEC1010-1. Please

Carefully read this manual before operate it.

### 2.1 Note for safety symbols:

-  Warning hint, Caution!
-  Danger by high-voltage shock!
-  Double insulation protection

2.2 During measuring, any range may not exceed its input value in Max

2.3 At resistance range, not allowed to impose voltage on input

2.4 During measuring, to prevent the meter from damage, do not turn its round switch to change its range.

2.5 Over DC60V or AC30V may be shock danger, carefully operating during measuring.

2.6 During clamping non-insulation wire, must specially be careful to avoid

2.7 During measuring current, fingers must be placed on the back of the armguard of the meter.

2.8 The meter shall avoid straight sunlight, high temperature and humidity.

2.9 After measuring end, the turning switch shall be at OFF.

2.10 Idling for long term, its batteries shall be taken out to prevent the batteries from leaking liquid to damage parts.

## 3. Features

3.1 Displaying mode: LCD displayer

3.2 Maximum display: 1999

3.3 Maximum open: 30mm

3.4 Automatic negative indication: Displaying “-”

3.5 Low battery indication: Displaying “”

3.6 Operating environment: 0°C~40°C, 70%RH(Max.)

3.7 Storage environment: -10°C~60°C, 85%RH(Max.)

3.8 Power supply: 9V battery (IEC6F22, NEDA1604, JIS006P or equivalent types),



3.11 Size 221 (Length) × 75 (Width) × 31 (Height) mm

3.12 Weight: about 240gram (with batteries)

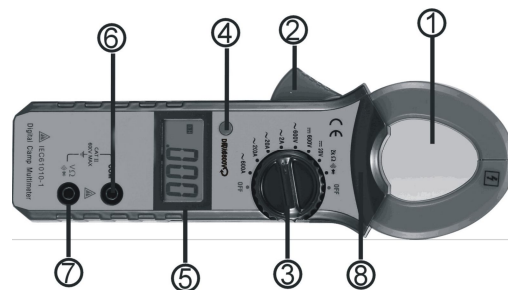
## 4. Usage of Clamp-Shape Meter with Manual Range

### 4.1 Instruction on operating panel (see figure)

- (1) Clamp mouth
- (2) Trigger
- (3) Range switch: choosing current, voltage, resistance, frequency, forward voltage on diode, test for connection and disconnection and range.
- (4) DH reading holding button: pressing the button may lock the current reading, and displaying “DH” symbol, repressing the button to cancel the holding function, “DH” symbol disappears.

Phase sequence: At range AC600V, “DH” button is the switch to measure phase sequence, pressing the button to display “” symbol for measuring phase sequence, repressing the button to cancel the function, “” symbol disappears.

- (5) LCD
- (6) “COM” for common input (input ground)
- (7) “V/Ω” voltage-resistance-frequency-temperature input jack
- (8) Armguard



### 4.2 Measurement of AC voltage


Turn the range switch into the range “A600V”, Plug the black pen into the jack“COM”, the red pen into the jack“V/Ω”, in parallel connect the pens with the measured circuit, read the displaying number.

### 4.3 Measurement of DC voltage

Turn the range switch into the range “D600V”, Plug the black pen into the jack“COM”, the red pen into the jack“V/Ω”, in parallel connect the pens with the measured circuit, read the displaying number. When the reading is less than 20V, turn the range switch at range “DC20V” to measure again.

### 4.4 Measurement of AC current

Turn the range switch into the range “AC600A”, clamp the wire of the measured current, shall put the wire into the canter of the completely closing clamp mouth as soon as possible, directly get the reading. When the reading is less, turn the range switch at lower range to measure again.


 Cautions: If two or more than two different wires are clamped, the measuring can't be done.

### 4.5 Measurement of resistor and connection & disconnection

- (1) Turn the range switch into the range 2kΩ
- (2) plug the black pen into the jack“COM”, the red pen into the jack“V/Ω”
- (3) In parallel connect the pens into the two terminators of the measured circuit or component, get the reading.

(4) when the two pens open or input overload, the displayer shows “1”

### 4.7 Measurement of forward voltage of diode


(1) Turn the range switch into the range , when the input opens, the meter shows over range (show“1”).

(2) Plug the black pen into the jack“COM”, the red pen into the jack“V/Ω”, (the red pen's polarity is“+”)

(3) In parallel connect the pens into the two terminators of the measured diode, get the reading for approximation of the forward voltage.


(4) when the diode is connected in reverse or the input open, the displayer shall show “1”.

### 4.8 Test of connection and disconnection


(1) Turn the range switch into the range , when the input opens, the meter shall show over range (show“1”).

(2) Plug the black pen into the jack“COM”, the red into the jack“V/Ω”.

(3) In parallel connect the two pens into the two terminators of the measured circuit, if the resistance between the tested two points is less than approximate 50Ω, the buzzer shall make a sound.


 Cautions: resistor, diode and connection and disconnection sharing the same range, when measuring, the measured component or circuit cannot be electrified, otherwise, shall misjudge.

### 4.8 Test of connection and disconnection

(1) Turn the range switch into the range , when the input opens, the meter shall show over range (show“1”).

(2) Plug the black pen into the jack“COM”, the red into the jack“V/Ω”.

(3) In parallel connect the two pens into the two terminators of the measured circuit, if the resistance between the tested two points is less than approximate 50Ω, the buzzer shall make a sound.

 Cautions: resistor, diode and connection and disconnection sharing the same range, when measuring, the measured component or circuit cannot be electrified, otherwise, shall misjudge.

### 4.9 Measurement of temperature

Turn the range switch into the range °C, put the black plug of K type thermoelectric couple attached with the meter into the jack“COM”, the red into the jack“V/Ω”, here the meter shall show environmental temperature, place the detector head on the measured object, get the reading when the detector head and the measured object are the same temperature.

**⚠ Cautions:**

When the temperature detector head not put into the meter, the displaying value is meaningless, attached with the meter, the limited temperature of the conjunction thermoelectric couple, which is the K type WRNM-010, bareness style, is 250°C ( may reach 300°C in short time).

**4.10 Measurement of frequency**

Turn the range switch into the range 2kHz, put the black pen into the jack "COM", the red into the jack "V/Ω", in parallel connect the two pens into the measured circuit, get the reading.

**4.11 Measurement of phase sequence**

Turn the range switch into the range AC600V, put the black pen into the jack "COM", the red into the jack "V/Ω", take a press on the button for measurement of phase sequence, LCD shall display symbol "↻", for measuring phase sequence, after a measure to phase sequence, if measuring again, it is necessary to press the button for phase sequence to cancel the function on measurement of phase sequence at first, then restart the function on measurement of phase sequence, the meter sets its phase sequence as A → B → C.

**4.11.1 Measurement of three-phase four-wire system:**

- (1) Confirm phase A: connect the black pen into the zero wire or the ground wire, the red pen into any hot wire, LCD shall show the symbol A, here the phase connected with the red pen is defined as phase A.
- (2) Find phase B or phase C: connect the black pen into the zero wire or the ground wire, the red into any hot wire of the other hot wires, when LCD shows the symbol B, the phase connected with the red pen is defined as phase B, when LCD shows the symbol C, the phase connected with the red pen is defined as phase C
- (3) During measuring, the meter may show the value of the line voltage of the measured phase:
  - (a) When the measured line voltage is less than 30% of the other phases, then the phase is lost;
  - (b) When either phase B or phase C cannot be found, then either phase B or phase C is lost.

**4.11.2 Measurement of three-phase three-wire system:**

- (1) Confirm phase A: connect the black pen into any wire, the red pen into any wire of the other, LCD shall show the symbol A, here the phase connected with the black pen is defined as phase A.
- (2) Find phase B or phase C:
  - (a) Keep the black on the original phase, connect the red into the third phase, when LCD showing B, here the phase connected with the red is phase B, may judge the phase connected with the red in step (1) is phase C.
  - (b) When LCD showing C, here the phase connected with the red is phase C, may judge the phase connected with the red in step (1) is phase B.
- (3) During measuring to step (1)、(2), the meter shall show line voltage (380V). If the voltage of a phase is less than 30% of the others, then the phase of the lower voltage is lost, after phase A is confirmed, either phase B or phase C cannot be found, then either phase B or phase C is lost.



**Cautions : please reset before each measurement (quit the function on the measurement of phase sequence, then restart the function) measuring period may not more than 10 seconds.**

**5. Technological Indices**

Accuracy guarantee: 1 year. Temperature of keeping accuracy: 23°C ± 5°C  
Relative humidity: < 75%。

Function	Range	Resolution	Accuracy
ACA	20A	10mA	±1.9%±5
	600A	1A	
ACV	600V	1V	±1.2%±5d
DCV	20V	0.01V	±0.8%±2d
	600V	1V	
Resistor	2kΩ	1Ω	±1.0%±2d
FREQ	2kHz	1Hz	±2.0%±5d

ACA frequency range : 50~60Hz( sine wave), ACV frequency range: 50~100Hz(sine wave)。

Function	Range	Resolution	Accuracy
Temperature	-30~400°C	1°C	±1.2%±4d
	400~1000°C	1°C	±1.9%±15d
Diode 	Show the value of the forward voltage. Test conditions: forward DC current is about 1mA, backward DC voltage is about 3V。		
Connection & disconnection 	When Conductive resistance is less than about 50Ω, the buzzer in the meter sounds, test conditions: open voltage is about 3V。		
Phase sequence	May measure the phase sequence of AC when phase tolerance is under ±25		

Resistor, Diode, Buzzer, FREQ Overload Protection : 250V

**6. Maintenance of the Meter**

**⚠ Cautions !** Before open the covers of the meter, or the batteries, shall switch off power and disconnect the pens and any input signal to prevent danger of shock.

- 6.1 when the meter shows symbol "⊖", shall change battery. Open the battery cover, change a fresh battery with 9V ( Automatic range meter: Two new batteries with AAA1.5V ), to make sure the meter normal work.
- 6.2 Keep the meter and the pens clean, dry and non-damage, may clean the meter surface with clean clothes or eradicator, abrasive or organic solvent is banned.
- 6.3 Avoid mechanical damage, shake, impact, keep the meter away from high temperature and strong magnet field.
- 6.4 The meter shall be calibrated once a year.

**7. Accessories**

- 7.1 A pair of pen
- 7.2 A manual
- 7.3 K type detector head for temperature