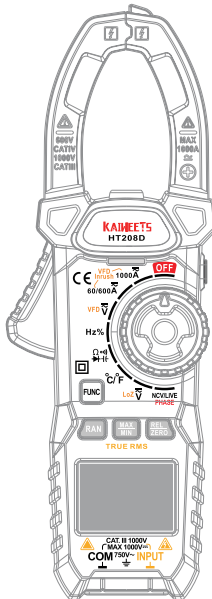


# KAIWEETS



## True-rms Digital Clamp Meter

### HT208D User Manual

CE RoHS



Contact us: [support@kaiweets.com](mailto:support@kaiweets.com)

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# Introduction

Thank you for selecting the KAIWEETS 208D Digital Clamp Meter. It is a True RMS 1000A AC/DC Clamp Meter with integrated VFD Mode, Inrush Current capture.

## Safety information

### **Warnings: Read First**

To avoid possible electric shock or personal injury, please obey the following instructions:

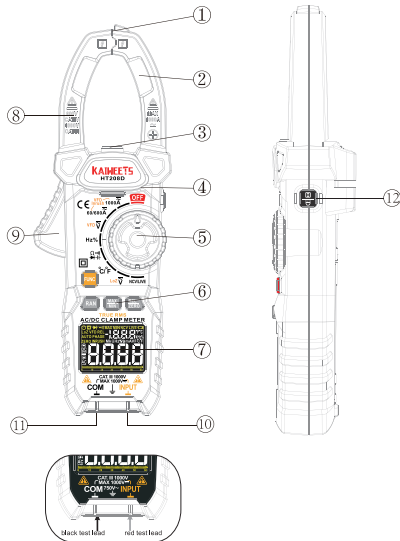
- Use the Meter only as specified in this manual or the protection provided by the Meter might be impaired.
- Avoid working alone so assistance can be rendered.
- Never measure AC current while the test leads are inserted into the input jacks.
- Do not use the Meter in wet or dirty environments.
- Inspect the test leads before use. Do not use them if insulation is damaged or metal is exposed.
- Check the test leads for continuity. Replace damaged test leads before using.
- Use extreme caution when working around bare conductors or bus bars. Contact with the conductor could result in electric shock.
- Do not hold the Meter anywhere beyond the tactile barrier.
- Do not apply more than the rated voltage, as marked on the Meter, between the

terminals or between any terminal and earth ground.

- Remove test leads from the Meter before opening the Meter case.
- Never operate the Meter with the back cover removed or the case open.
- Never remove the back cover or open the case of an instrument without first removing the test leads or the jaws from a live conductor.
- Use caution when working with voltages above 30 V ac RMS, 42 V ac peak, or 60 V dc. These voltages pose a shock hazard.
- Do not attempt to measure any voltage that might exceed the maximum range of the Meter- 1000 V RMS.
- Do not operate the Meter around explosive gas, vapor, or dust.
- When using probes, keep fingers behind the finger guards.
- When making electrical connections, connect the common test lead before connecting the live test lead; when disconnecting, disconnect the live test lead before disconnecting the common test lead.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, or diodes.
- Check the operation of the meter at a known source before and after use.

# Product Overview

- ① NCV Probe
- ② Current Sensing Jaw
- ③ Flashlight
- ④ Tactile Barrier
- ⑤ Rotary Function Switch
- ⑥ Function Buttons
- ⑦ Display
- ⑧ Alignment Marks
- ⑨ Jaw Release
- ⑩ INPUT Terminal  
(red test lead)
- ⑪ COM Terminal  
(black test lead)
- ⑫ Data Hold / Flashlight Switch



## Symbol-Explanation

|                                                                                   |                                                                                                                                                                                                                                           |                                                                                   |                          |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------|
|  | Hazardous Voltage. Danger!                                                                                                                                                                                                                |  | Alternating Current (AC) |
|  | AC and DC                                                                                                                                                                                                                                 |  | Direct current (DC)      |
|  | Important Information                                                                                                                                                                                                                     |  | Earth                    |
|  | Fuse                                                                                                                                                                                                                                      |  | Low Battery Indication   |
|  | Double Insulated                                                                                                                                                                                                                          |                                                                                   |                          |
|  | Conforms to European Union directives.                                                                                                                                                                                                    |                                                                                   |                          |
|  | Do not dispose of this product as unsorted municipal waste.                                                                                                                                                                               |                                                                                   |                          |
| <b>CAT. III</b>                                                                   | IEC Measurement Category III: CAT.III equipment has protection against transients in equipment in fixed-equipment installations, such as distribution panels, feeders and short branch circuits, and lighting systems in large buildings. |                                                                                   |                          |
| <b>CAT. IV</b>                                                                    | IEC Measurement Category IV: CAT.IV equipment has protection against transients from the primary supply level, such as an electricity Meter or an overhead or underground utility service.                                                |                                                                                   |                          |

## Function Buttons



Press the "FUNC." key to switch the respective secondary function between the different measurements for the applications accessible via the function switch such as between AC and DC.



Auto-Ranging by default. Switches to manual mode and cycles through all ranges. Auto-Ranging restored when pressed for two seconds.



Press this key to switch between the maximum and minimum values; Press this key for more than 2 seconds to exit this mode. Before entering the "MAX/MIN" mode, press the range key to switch to the most suitable range. After entering this mode, the meter will automatically enter to manual range mode.



**NOTE:** In DC current measurement mode, this key is the “ZERO”key. However, in other functions, this key is the “REL” key.

“REL” Function: Relative (REL) mode: Stores existing reading (a delta) and resets display to zero. Sets a relative reference point to measure against the next reading.

“ZERO” Function: This function allows the user to set the magnetization effects to zero when measuring DC. It must be performed after each high amplitude current measurement. With no conductor inserted into the clamp, press and hold this key (approx. 3 seconds) until a beep sounds and the “ZERO” symbol appears on the display.



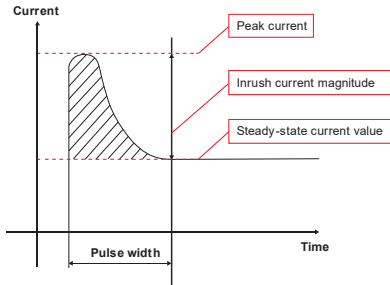
**HOLD:** Captures and holds a stable measurement. Make sure that the function is deactivated at the start of the test. Otherwise an incorrect measurement result will be simulated!

**Work Light:** Press and hold this button for more than 2 seconds to switch the work light on or off.

# Advanced Functions

## AC current measurement with “Inrush” function

Inrush current is the instantaneous high input current drawn by a power supply or electrical equipment at turn-on. This arises due to the high initial currents required to charge the capacitors and inductors or transformers.



1. With the device to be tested turned off, turn the meter's dial to proper range(60/600  $\tilde{A}$  or 1000  $\tilde{A}$  ).
2. Center the jaw around the device's live wire.
3. Push the **FUNC** button 3 times until the “INRUSH” symbol is displayed.
4. Switch on the device. The inrush current (spike) is displayed in the meter's display.

**Note:** The measuring time of inrush current is about 100ms.

When an electrical device is first powered on, inrush current is the surge or momentary burst of current that flows into it.

## AC current measurement with “VFD” function (Variable Frequency Drive Filtering)

The VFD mode eliminates high frequency noise in voltage measurements by means of a low-pass filter. The VFD mode is designed for variable frequency drive (VFD) measurements. This mode is always active for AC measurements.

Turn the knob and select proper range(60/600  $\bar{A}$  or 1000  $\bar{A}$  ), press the  key until the “VFD” symbol is displayed.

**Note:** Please do not use VFD function to verify the presence of dangerous voltage or current, which may exceed the indicated value.

## AC voltage measurement with “VFD” function

Turn the knob to  $V_{FD} \bar{V}$  or  $LoZ \bar{V}$  , press  key until the “VFD” symbol is displayed.

**Note:** Please do not use VFD function to verify the presence of dangerous voltage or

current, which may exceed the indicated value.

## High-Impedance voltage measurement

High Impedance means high electrical Impedance. This is used to denote the input Impedance or output Impedance of electrical circuits and devices in particular. When measuring in the circuit, this has only a minor impact on the performance of the circuit, particularly in the case of sensitive electronic circuits or control circuits.

## Low-Impedance voltage measurement ( $\text{LoZ} \overline{\text{V}}$ )

$\text{LoZ} \overline{\text{V}}$  mode allows you to measure AC/DC voltages with a low impedance in this mode, the Meter lowers the internal resistance to prevent 'phantom' voltage readings. As a result, the circuit is more heavily loaded than in the standard measuring mode.

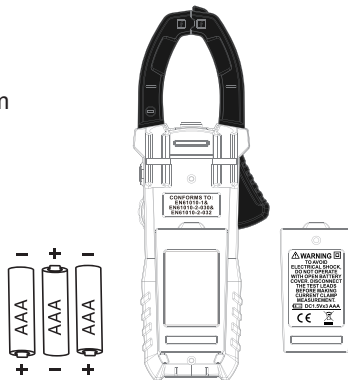
### Attention

- ▶ When using  $\text{LoZ} \overline{\text{V}}$  (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.
- ▶ Do not use LoZ mode to measure the voltage in the circuit that may be damaged due to the low impedance of this mode.

# Operating Instructions

## Insert and replace the batteries

Replace the batteries immediately when the symbol  appears in the display. Disconnect the meter from the power source. Remove the test leads from the measuring device, loosen the screws on the back and remove the lower half of the housing, replace the old batteries and screw the cover back on.



## Turn on/off the meter

The device is switched on when the rotary switch (5) is set to a measuring function. When the rotary switch is set to OFF, the measuring device is switched off.

## Automatic shutdown

No operation in 15 minutes, the clamp meter beeps 3 times. Without further operation,

the clamp meter beeps again and switches off automatically. Press any key to restore the clamp meter to operating status. The symbol  appears on the display. To deactivate the automatic switch-off, hold down the “FUNC.” key for more than 2 seconds and switch on the clamp meter at the same time. The symbol  disappears. Restart after switching off the meter, the automatic switch-off can be restored.

## **Auto-ranging**

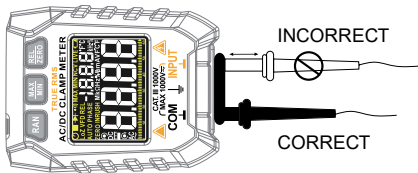
The meter automatically selects the measuring range that is best suited for the measurement performed. The measuring unit and resolution are adjusted at the same time.

## **AC zero input behavior of True-rms meters**

Unlike averaging meters, which can accurately measure only pure sinewaves, True-rms meters accurately measure distorted waveforms. Calculating True-rms converters require a certain level of input voltage to make a measurement. This is why ac voltage and current ranges are specified from 5 % of range to 100 % of range. Non-zero digits that are displayed on a True-rms meter when the test leads are open or are shorted are normal. They do not affect the specified ac accuracy above 5 % of range.

## Connecting test leads

Do not test if leads are improperly seated. Results could cause intermittent display readings. To ensure proper connection, firmly press leads into the jack completely.



## Making Measurements

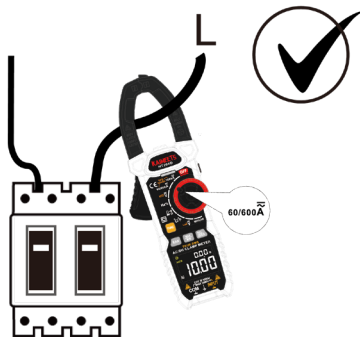
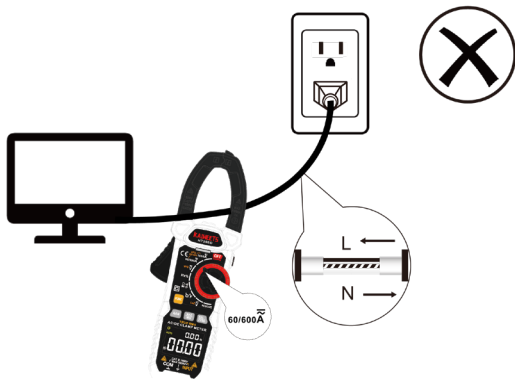
### AC/ DC current measurement

- ⚠ • When making current measurements, disconnect the test leads from the Meter.
- Keep fingers behind Tactile Barrier(4).
- When measuring current, center the conductor in the Jaw using the alignment marks on the Jaw.
- Before taking dc measurements, please push  key to ensure correct readings. Zeroing the Meter removes dc offset from the reading. The Zero function works only in the dc current measurement.
- Before zeroing the Meter, make sure the Jaws are closed and there is no conductor

inside the Jaw.

1. Turn the rotary switch to the correct current setting (60/600 $\bar{A}$ , 1000 $\bar{A}$ ). “DC” appears on the display. Press the “FUNC.” button, AC is shown on the display.
2. If measuring DC current, wait for the display to stabilize and then push  to zero the Meter.
3. Open the Jaw by pressing the Jaw Release and insert the conductor into the Jaw.
4. Close the Jaw and center the conductor using the alignment marks.
5. View the reading on the display.

- Do not use the current clamp to surround more than one conductor.
- If the supply and return conductors (e.g. L and N) are measured, the currents will cancel each other out and no measurement will be displayed. The cables of household appliances usually contain L and N conductors. A cable separator is required to measure with the current probe.
- If several supply conductors are measured, the currents add up.



## AC/DC voltage measurement

⚠ Voltage above 750 V (AC) / 1000V (DC) cannot be measured! When measuring high voltage, pay special attention to safety to avoid electric shock or injury.

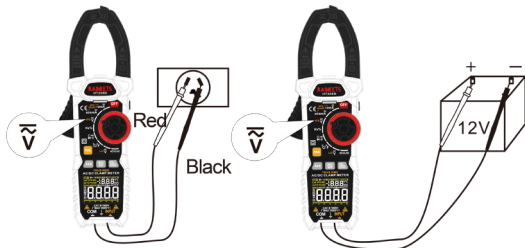
1. Set the rotary switch to  $V_{FD}$   $\tilde{V}$  or  $V_{oZ}$   $\tilde{V}$ , press the “FUNC.” key to change the AC or DC

voltage measurement.

2. Plug the black test lead into the COM socket and the red test lead into the INPUT socket.
3. Then bring the test probes into contact with the points to be measured.
4. Read the measurement results on the display.

### **Attention**

- When using  $\text{LoZ} \overline{\text{V}}$  (low input impedance) measurement, the continuous measurement time cannot exceed 1 minute.
- Do not use LoZ mode to measure the voltage in the circuit that may be damaged due to the low impedance of this mode.



High impedance voltage measurement: 10 M $\Omega$

Low impedance voltage measurement: 300 k $\Omega$

## Frequency or duty cycle measurements (Hz%)

1. Turn the rotary function switch to Hz%.
2. Plug the black test lead into the COM socket and the red test lead into the INPUT socket.
3. Connect the probes to the measuring points (connect to the measured power supply or to the parallel connection).
4. Read the result on the display.



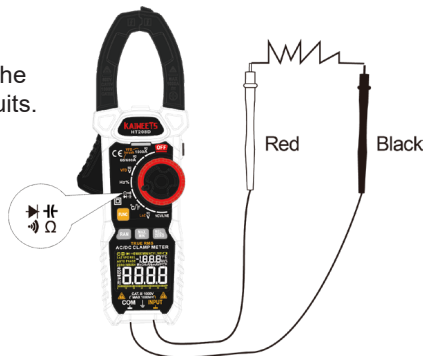
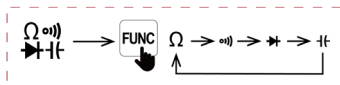
- In Hz% mode, Range: 0~10MHz Voltage sensitivity: 0.5~10V AC (as the frequency increases, the voltage should increase accordingly).
- In V mode, Range: 10Hz~10 kHz Voltage sensitivity: > 0.5V AC (as the frequency increases, the voltage should increase accordingly).
- In A mode, Range: 10Hz~1 kHz Current sensitivity:> 20A (as the frequency increases, the current should increase accordingly).

## Resistance measurement $\Omega$

1. Turn the rotary function switch to  $\Omega$  for resistance measurement. It displays “M $\Omega$ ” on screen.
2. Turn off the circuit under test.
3. Plug the black test lead into the COM socket and the red test lead into the INPUT socket.
4. Then place the test probes in contact with the points at which the resistance must be measured.
5. Read the result on the display.

**Note:** When measuring resistance on a circuit, the measured value can be influenced by other circuits.

Overload protection: 250V



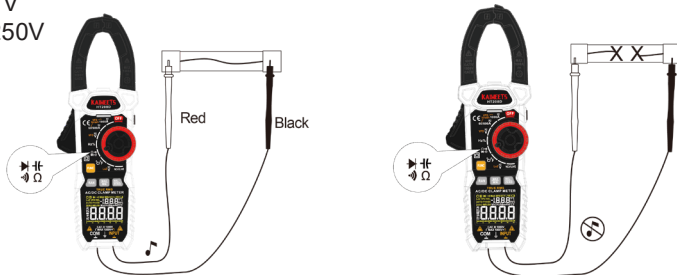
## Continuity test

1. Turn the rotary switch to  and press the “FUNC.” key until  appears on the display. The continuity test is now active.
2. Plug the black test lead into the COM socket and the red test lead into the INPUT socket.
3. Connect the probes to the circuit or component under test.
4. If the resistance is  $<30\ \Omega$ , an acoustic signal sounds continuously and the orange backlight lights up.

**Note:** When measuring resistance on a circuit, the measured value can be influenced by other circuits.

Test Voltage Approx. 1V

Overload protection: 250V



## Diode test

1. Turn the rotary function switch to  $\Omega$   $\rightarrow$   $\rightarrow$ , press the "FUNC." key 2 times until  $\rightarrow$  appears on the display.
2. Remove power from the circuit being tested.
3. Connect the black test lead to the COM terminal and the red test lead to the INPUT terminal.
4. Connect the black test lead to the cathode side and the red test lead to the anode side of the diode being tested.
5. Read forward bias voltage value on the LCD.
6. If the polarity of the test leads is the reverse of the diode polarity, the LCD reading shows "OL". This can be used for distinguishing the anode side and cathode side of a diode.



### **Warning**

To avoid electrical shock when testing diodes in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

Forward DC current is about 1.5mA,

Reverse DC voltage is about 3V

Overload protection: 250V

## Capacitance measurement

1. Remove power from the circuit being tested. Turn the rotary function switch to , press the “FUNC.” key 3 times until “nf” appears on the display.
2. Connect the black test lead to the COM terminal and the red test lead to the INPUT terminal.
3. Connect the probes across the circuit or (capacitance) component to be tested.
4. View the reading on the display.

### **Warning**

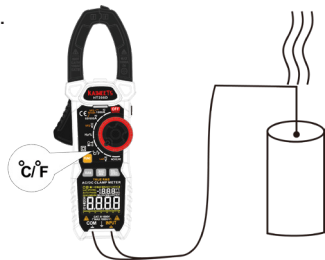
To avoid electrical shock when testing capacitance in a circuit, make sure the power to the circuit is turned off and all capacitors are discharged.

When measuring small capacitors, turn on the relative value (REL) to subtract the residual capacitance value of the meter and the conductor when the test probe is open. When measuring a capacitance greater than 100uF, it will take a long time to measure correctly.

Overload protection: 250V

## Temperature measurement

1. Turn the rotary function switch to  $^{\circ}\text{C}$  /  $^{\circ}\text{F}$  position.
2. Insert the K-type thermocouple into the meter, the positive pole (red) of the thermocouple into the INPUT input and the negative pole (black) into the COM input.
3. Contact the thermocouple probe with the measurement object, then the reading appears on the display.
4. Connect the temperature probe with the testing point.



### **Warning**

To avoid possible electric shock DO NOT apply the probe tip to any conductor that is greater than 30 V ac, 42 V peak or 60 V dc to earth.

**Note:** It takes a long time for the cold end of thermocouple to be restored in the instrument to achieve thermal balance with the environment.

## Non-contact AC voltage detection (NCV)

⚠ When using NCV function, please remove the probe, otherwise the detection sensitivity will be affected.

1. Turn the knob to **NCV/LIVE**, the “” symbol is displayed.
2. Then the NCV probe will be approached the detected point gradually.
3. When the signal of weak electromagnetic field is sensed, the character “- - L” is displayed, the buzzer emits a slow beep sound and the green LED indicator light is on.
4. When the signal of strong electromagnetic field is sensed, the character “- - H” is displayed, the buzzer emits a quick beep sound and the red LED indicator light is on.

## Live detection

⚠ Remove black test lead otherwise the detection sensitivity will be affected.

1. Turn the knob to **NCV/LIVE** , press  key until the “” symbol is displayed.
2. Insert the red test lead to INPUT terminal.
3. Connect the red test lead to the conductor to be for measurement.

4. When the signal of weak electromagnetic field is sensed, the character “- - L” is displayed, the buzzer emits a slow beep sound and the green LED indicator light is on.
5. When the signal of strong electromagnetic field is sensed, the character “- - H” is displayed, the buzzer emits a quick beep sound and the red LED indicator light is on. In general, it means the tested wire is live wire.

## Specification

|                                |                                              |
|--------------------------------|----------------------------------------------|
| Display .....                  | 6000 counters, True RMS                      |
| Display update frequency ..... | approx. 3 Hz                                 |
| Measuring impedance .....      | 10 M $\Omega$ (V range)                      |
| Operating voltage .....        | 3 $\times$ AAA (1.5V)                        |
| Weight:.....                   | approx. 700g                                 |
| Dimension:.....                | 285mm $\times$ 135mm $\times$ 60mm           |
| Security standard: .....       | IEC 61010-1                                  |
|                                | IEC 61010-2-032: CAT III 1000V / CAT IV 600V |
|                                | IEC 61010-2-033: CAT III 1000V / CAT IV 600V |
| Pollution level.....           | 2                                            |
| Operating temperature.....     | 0 to +40 $^{\circ}$ C                        |
| Operating humidity .....       | <80%                                         |
| Operating height .....         | 0 to max. 2000 m                             |
| Storage temperature .....      | - 10 to +60 $^{\circ}$ C                     |
| Air humidity in storage .....  | <70%                                         |

## Accuracy

| Function | Range             | Resolution              | Accuracy                                                          |
|----------|-------------------|-------------------------|-------------------------------------------------------------------|
| DC Volts | 600mV/6V/60V/600V | 0.1mV/0.001V/0.01V/0.1V | $\pm(0.5\%+5)$                                                    |
|          | 1000V             | 1V                      | $\pm(0.8\%+5)$                                                    |
| AC Volts | 600mV/6V/60V/600V | 0.1mV/0.001V/0.01V/0.1V | $\pm(0.8\%+5)$                                                    |
|          | 750V              | 1V                      | $\pm(1.0\%+5)$                                                    |
|          | VFD(750V)         | 0.1V                    | $\pm(2.0\%+5)$                                                    |
| DC Amps  | 60A/600A/1000A    | 0.01A/0.1A/1A           | $\pm(2.5\%+8)$                                                    |
| AC Amps  | 60A/600A/1000A    | 00.01A/0.1A/1A          | $\pm(2.5\%+8)$<br>VFD: $\pm(5.0\%+10)$<br>INRUSH: $\pm(5.0\%+10)$ |

|                         |                                                     |                                                       |                                   |
|-------------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------|
| Resistance              | 600Ω/6kΩ/60kΩ/600kΩ/<br>6MΩ/60MΩ                    | 0.1Ω/0.001kΩ/0.01kΩ/0.1kΩ/<br>0.001MΩ/0.01MΩ          | ±(1.0%+5)                         |
| Capacitance             | 10nf/100nf/1000nf/10uf/<br>100uf/1000uf/10mf        | 0.001nf/0.01nf/0.1nf/0.001uf/<br>0.01uf/0.1uf/0.001mf | ±(4.0%+5)                         |
|                         | 100mf                                               | 0.01mf                                                | ±(5.0%+10)                        |
| Frequency               | 10Hz/100Hz/1000Hz/10<br>kHz/100kHz/1000kHz          | 0.001Hz/0.01Hz/0.1Hz/0.001kHz/<br>0.01kHz/0.1kHz      | ±(1.0%+3)                         |
|                         | 10MHz                                               | 0.001MHz                                              | ±(3.0%+3)                         |
| Duty Cycle              | 1%~99%                                              | 0.1%                                                  | ±(3.0%+3)                         |
| Temperature<br>(°C, °F) | -20°C ~ 0°C<br>0°C ~ 400°C<br>400°C ~ 1000°C        | 1°C                                                   | ±3°C<br>±1.0% or ± 2°C<br>±2.0%   |
|                         | -4 °F ~ 32 °F<br>32 °F ~ 752 °F<br>752 °F ~ 1832 °F | 1 °F                                                  | ±6 °F<br>±1.0% or ± 4 °F<br>±2.0% |

# Maintenance

## **Warning**

- To avoid electrical shock, disconnect test leads from the Meter before removing its back cover. Never use the Meter with the back cover removed.
- Repairs or servicing not covered in this manual should be performed only by qualified personnel.

## **Caution**

- To avoid contamination or static damage, do not touch the circuit board without proper static protection.
- If the Meter is not going to be used for a long time, remove the battery. Do not store the Meter in a high temperature or a high humidity environment.

## **Cleaning the Meter**

- To avoid damaging the meter, do not use abrasives or solvents on this instrument.
- Periodically clean the Meter by wiping it with a damp cloth and mild detergent.
- Do not get water inside the case. This may lead to electrical shock or damage to the instrument.
- Wipe the contacts in the socket with a clean cotton swab soaked in alcohol.

## Three Year Warranty

KAIWEETS will repair, without charge, any defects due to faulty materials or workmanship for three years from the date of purchase provided that:

- Proof of purchase is produced.
- Service/repairs have not been attempted by unauthorized persons;
- The product has been subject to fair wear and tear;
- The product has not been misused;

Defective products will be repaired or replaced, free of charge or at our discretion, if sent together with proof of purchase to our authorized distributor(s). For further detail of warranty coverage and warranty repair information, send email to [support@Kaiweets.com](mailto:support@Kaiweets.com).

Contact us on Facebook: [@kaiweetstools](https://www.facebook.com/kaiweetstools)

