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ИНТЕРПАВК

## LIMITED WARRANTY AND LIMITATION OF LIABILITY

Customers enjoy one-year warranty from the date of purchase.

This warranty does not cover fuses, disposable batteries, damage from misuse accident, neglect, alteration, contamination, or abnormal conditions of operation or handling, including failures caused by use outside of the product's specifications, or normal wear and tear of mechanical components.

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## Introduction

This product is a battery-powered, true-rms, auto-ranging digital multimeter with a 6000 counts LCD display and a backlight.

## Safety Information

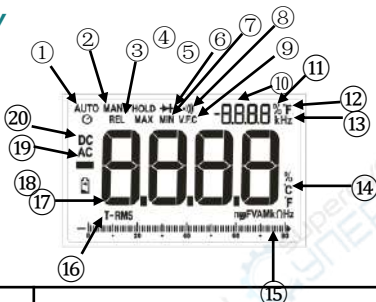
To avoid possible electrical shock, fire, or personal injury, please read all safety information before you use the product. Please use the product only as specified, or the protection supplied by the product can be compromised.

- Examine the case before you use the product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.
- The measurement must be made with correct input terminals and functions and within the allowable measuring range.













- Do not use the product around explosive gas, vapor, or in damp or wet environments.
- Keep fingers behind the finger guards on the probes.
- When the product has already been connected to the line being measured, do NOT touch the input terminal that is not in service.
- Disconnect the test leads from the circuit before changing the mode.
- When the voltage to be measured exceeds 36V DC or 25V AC, the operator shall be careful enough to avoid electric shock.
- Misuse of mode or range can lead to hazards, be cautious. “OL” will be shown on the display when the input is out of range.
- Low level of a battery will result in incorrect readings. Change the batteries when battery level is low. Do not make measurements when the battery door is not properly placed.

# Instrument Overview

## LCD Display

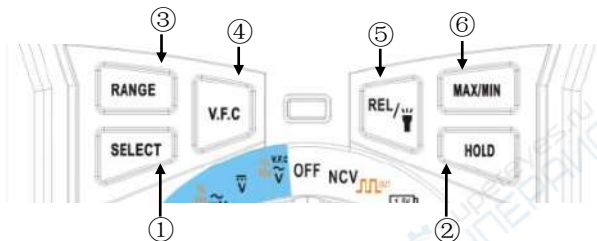


|   |               |   |
|---|---------------|---|
| ① | <b>AUTO</b>   | Auto range. The product selects the range with the best resolution              |
| ② | <b>MANUAL</b> | Manual range. The user selects the range.                                       |
| ③ | REL           | The product measures both sinusoidal and nonsinusoidal ac waveforms accurately. |
| ④ | <b>HOLD</b>   | Display freezes present reading   |
| ⑤ | <b>MAX</b>    | Display shows maximum reading.  |
| ⑥ | ▶             | Diode test.   |
| ⑦ | <b>MIN</b>    | Display shows minimum reading.  |
| ⑧ | )))           | Continuity test.  |

|  |   |   |
|--|---|---|
| ⑨  | V.F.C   | Voltage Frequency Converter   |
| ⑩  |    | Secondary measurements display  |
| ⑪  |    | Duty cycle test.  |
| ⑫  |    | Temperature test.<br>(Fahrenheit or Celsius)                                    |
| ⑬  |    | Frequency test. (Hertz)   |
| ⑭  |    | Temperature test.<br>(Fahrenheit or Celsius)                                    |
| ⑮  |    | Analog bar graph.   |
| ⑯  |    | The product measures both sinusoidal and nonsinusoidal ac waveforms accurately. |
| ⑰  |    | Primary measurement display.  |
| ⑱  |   | Low battery. Replace batteries.   |
| ⑲  |  | Alternating current.  |
| ⑳  |  | Direct current.   |
|  |   | Measurement units.  |



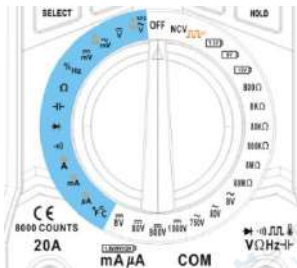
## Function Buttons



|   |  |
|---|--|
| ① | <p>Selects alternate measurement modes on a rotary switch setting, including:</p> <ol style="list-style-type: none"><li>1. Frequency/AC V</li><li>2. Frequency/AC mV</li><li>3. DC A/AC A</li><li>4. DC mA/AC mA</li><li>5. DC <math>\mu</math>A/AC <math>\mu</math>A</li><li>6. Square waves output</li></ol> |
| ② | <p>Push once to hold the current reading on the display; push again to continue normal operation.</p>  |

|   |  |
|---|--|
| ③ | Push this button once to enter the manual range mode. In manual range mode, each push increases the range; when the highest range is reached, the next push will lead to the lowest range. To exit the manual range mode, Long push for exit.  |
| ④ | Push this button once to enter the V.F.C model. Push once more to exit the model.  |
| ⑤ | <p>Push this button to enter the relative mode. The product will store the present reading as a reference for subsequent readings. The display is zeroed, and the stored reading is subtracted from all subsequent readings. Push again to exit the relative mode.</p> <p>Push this button over 2 seconds, it will open the flashlight, long push again to turn off the flashlight</p> |
| ⑥ | Push to toggle between the MAX and the MIN mode. To exit MAX/MIN mode, push the button for more than 2 seconds   |


















## Rotary Switch




# OFF

Turn off the product at this position.

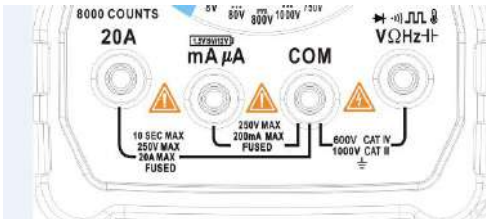
- The product automatically powers off after 15 minutes of inactivity.
- The built-in beeper beeps 5 times 1 minute before auto power off.
- To restart the product from auto power off, press the HOLD button or turn the rotary switch back to the OFF position and then to a needed position.
- To disable the Auto Power Off function, hold down the SELECT button when turning on the product, you will hear five beeps if you have successfully disabled the function.



|   |   |
|---|---|
|      | AC V $\leq 750V$ ,<br>Frequency<br>V. F. C  |
|    | DC V $\leq 1000V$   |
|    | AC V (mV) $\leq 800.0mV$<br>Frequency (Equal to  ) |
|    | DC V (mV) $\leq 800.0mV$  |
|    | Frequency, Duty cycle: 1%~99%。  |
|    | Resistance: $\leq 80M \Omega$ 。   |
|    | Capacitance: $\leq 100mF$ 。   |
|    | Diode   |
|    | Continuity  |
|    | DC A: $\leq 20A$ 。  |
|  | AC A: $\leq 20A$ 。  |
|  | DC A: $\leq 800.0mA$ 。  |
|  | AC A: $\leq 800.0mA$ 。  |
|  | DC A: $\leq 800.0 \mu A$ 。  |
|  | AC A: $\leq 800.0 \mu A$ 。  |
|  | Celsius:-20~1000, Fahrenheit:-<br>4~1832  |

|  |                               |
|--|-------------------------------|
| $\overline{\overline{8V}}$   | DC V: $\leq 8V$               |
| $\overline{\overline{80V}}$  | DC V: $\leq 80V$              |
| $\overline{\overline{800V}}$   | DC V: $\leq 800V$             |
| $\overline{\overline{1000V}}$  | DC V: $\leq 1000V$            |
| $\sim 750V$  | AC V: $\leq 750V$             |
| $\sim 80V$   | AC V: $\leq 80V$              |
| $\sim 8V$  | AC V: $\leq 8V$               |
| $80M\Omega$  | Resistance: $\leq 80M\Omega$  |
| $8M\Omega$   | Resistance: $\leq 8M\Omega$   |
| $800K\Omega$   | Resistance: $\leq 800K\Omega$ |
| $80K\Omega$  | Resistance: $\leq 80K\Omega$  |
| $8K\Omega$   | Resistance: $\leq 8K\Omega$   |
| $800\Omega$  | Resistance: $\leq 800\Omega$  |
| $12V$   | 12V Battery test              |
| $9V$    | 9V Battery test               |
| $1.5V$  | 1.5V Battery test             |

|   |                               |
|---|-------------------------------|
|  | Square waves output 50-5000Hz |
| <b>NCV</b>  | Non-contact Voltage           |


## Input Terminals



|  |   |
|--|---|
| 20A  | Input terminal for AC/DC current measurements to 20A.   |
|    | Input terminal for AC/DC current measurements to 800mA.<br>Input terminal for battery testing.  |
| COM  | Common (return) terminal for all measurements.  |
|  | Input terminal for the measurements of: <ol style="list-style-type: none"> <li>1. AC/DC voltage</li> <li>2. Resistance</li> <li>3. Capacitance</li> <li>4. Frequency</li> <li>5. Temperature</li> <li>6. Continuity</li> <li>7. Diode</li> <li>8. Duty cycle</li> <li>9. Square waves output</li> </ol> |

## Measurements Instruction

### Measure AC/DC Voltage

1. Connect the black test lead to the COM Terminal and the red lead to the  Terminal.
2. Turn the rotary switch to each manual range from 8V~1000V according to the voltage you want to test. Or you can choose the auto-range for testing the voltage.
3. Touch the probes to the correct test points of the circuit to measure the voltage.
4. Read the measured voltage on the display.

**\*Do not measure voltage that exceeds the extremes as indicated in the Specifications.**

**\*Do not touch high voltage circuit during measurements.**

### Measure AC/DC Current

1. Connect the black test lead to the COM Terminal and the red lead to the mA  $\mu$ A (MAX current is 800mA) Terminal or the 20A (MAX current is 20A) Terminal (choose based on the value of the current to be measured).



- Turn the rotary switch to **A** , **mA** , **μA** , according to the signal you want to test.
- Press SELECT to toggle between AC/DC.
- Break the circuit path to be measured, connect the test leads across the break and apply power.
- Read the measured current on the display.

**\*Do not measure current that exceeds the extremes as indicated in the Specification  $\overline{\text{A}}$ .**

**\*Use the 20A Terminal and the  $\overline{\text{A}}$  Mode when you are measuring an unknown current  $\overline{\text{mA}}$ . Then switch  $\overline{\text{μA}}$  the mA  $\overline{\text{μA}}$  Terminal and the  $\overline{\text{A}}$  Mode or the  $\overline{\text{μA}}$  Mode if necessary.**


**\*Do not input voltage at this setting.**

### Measure Resistance

- Connect the black test lead to the COM Terminal and the test lead to the  $\overline{\text{V}\Omega\text{Hz}}$  Terminal.
- Turn the rotary switch to each range from  $800\ \Omega \sim 80\text{M}\ \Omega$  , Or you can turn the rotary switch to  **$\Omega$**  model.
- Touch the probes to the desired test points of the circuit to measure the resistance.
- Read the measured resistance on the display.

- \*Disconnect circuit power and discharge all capacitors before you test resistance.**
- \*Do not input voltage at this setting.**


### *Test for Continuity*

1. Connect the black test lead to the COM Terminal and the red lead to the  $\rightarrow \cdot \Omega \cdot \leftarrow$  Terminal.
2. Turn the rotary switch to .
3. Touch the probes to the desired test points of the circuit.
4. The built-in beeper will beep when the resistance is lower than  $50\Omega$ , which indicates a short circuit.

- \*Do not input voltage at this setting.**

### *Test Diodes*



1. Connect the black test lead to the COM Terminal and the red lead to the  $\rightarrow \cdot \Omega \cdot \leftarrow$  Terminal.

2. Turn the rotary switch to  ,
3. Connect the red probe to the anode side and the black probe to the cathode side of the diode being tested.
4. Read the forward bias voltage value on the display.
5. If the polarity of the test leads is reversed with diode polarity or the diode is broken, the display reading shows “OL”.

**\*Do not input voltage at this setting.**

**\*Disconnect circuit power and discharge all capacitors before you test diode.**

### *Measure Capacitance*




1. Connect the black test lead to the COM Terminal and the red lead to the  Terminal.
2. Turn the rotary switch to  .
3. Connect the red probe to the anode side and

the black probe to the cathode side of the capacitor being tested.

4. Read the measured capacitance value on the display once the reading is stabilized.

**\*Disconnect circuit power and discharge all capacitors before you test capacitance.**

### *Measure Frequency*

1. Connect the black test lead to the COM Terminal and the red lead to the  Terminal.
2. Turn the rotary switch to  (applies to high frequency with low voltage); or turn the rotary switch to , press SELECT once to toggle to the Frequency Mode (applies to low frequency with high voltage).
3. Touch the probes to the desired test points.
4. Read the measured frequency value on the display.

## Measure Duty Cycle



1. Connect the black test lead to the COM Terminal and the red lead to the  $\frac{V}{\Omega} \text{Hz}$  Terminal.
2. Turn the rotary switch to **% Hz** , press the Hz % button once to toggle to the Duty Cycle Mode .
3. Touch the probes to the desired test points.
4. Read the measured duty cycle value on the display.

## Measure Temperature

1. Connect the black thermocouple probe to the COM Terminal and the red probe to the  $\frac{V}{\Omega} \text{Hz}$  Terminal.
2. Turn the rotary switch to **°F °C** , and the display will show the room temperature, to toggle between °C/°F , press SELECT button.
3. Touch the probes to the desired test points.
4. Read the measured temperature on the display.


**\*Do not input voltage at this setting.**

## Square Wave Output

1. Connect the black test lead to the COM Terminal and the red lead to the  Terminal.
2. Turn the rotary switch to  OUT , and the default output frequency is 50Hz. To change the output frequency, press the SEL button.
3. Touch the probes to the desired test points.

**\*Do not input voltage at this setting.**

## Battery Measurement

1. Connect the red lead into the  terminal, and the black lead into the COM terminal.
2. When you test the batteries, You can change the range between 1.5v, 9v, and 12v.



|              |      |      |      |
|--------------|------|------|------|
| Battery test | 1.5V | 9V   | 12V  |
| load Current | 10mA | 10mA | 10mA |

3. Connect the probes to the positive and negative poles of the battery, then you can read the voltage on the screen. Or you can judge the voltage according to the color of central lighting

### **Test NCV**

1. Keep pushing the NCV button .
2. Hold the product and move it around, the built-in beeper will beep when the inner sensor detects AC voltage nearby. The stronger the voltage is, the quicker the beeper beeps.

### **Test V.F.C**

- 1, Connect the black test lead to the COM Terminal and the red lead to the  Terminal
- 2, Turn the rotary switch to  , push once to enter the V.F.C mode. Touch the probes to the desired test points, read the voltage on display.

## Maintenance


Beyond replacing batteries and fuses, do not attempt to repair or service the product unless you are qualified to do so and have the relevant calibration, performance test, and service instructions.

### *Clean the Product*

Wipe the product with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.

\*Remove the input signals before you clean the product.

### *Replace the Batteries*

When “” is shown on the display, batteries shall be replaced as below:

1. Remove the test leads and turn off the product before replacing the batteries.



2. Loosen the screw on the battery door and remove the battery door.
3. Replace the used batteries with new batteries of the same type.
4. Place the battery door back and fasten the screw.

### ***Replace the Fuses***

When a fuse is blown or do not work properly, it shall be replaced as below:

1. Remove the test leads and turn off the product before replacing the fuse.
2. Loosen the four screws on the back cover and the screw on the battery door, then remove the battery door and the back cover.
3. Replace the fuse with a new fuse of the same type.
4. Place the back cover and the battery door back and fasten the screws.

# Specifications

| <b>General Specifications</b>       |                     |          |
|-------------------------------------|---------------------|----------|
| Display (LCD)                       | 8000 counts         |          |
| Ranging                             | Auto/Manual         |          |
| Material                            | ABS/PVC             |          |
| Update Rate                         | 3 times/second      |          |
| Ture RMS                            | √                   |          |
| Data Hold                           | √                   |          |
| Backlight                           | √                   |          |
| Low Battery Indication              | √                   |          |
| Auto Power Off                      | √                   |          |
| <b>Mechanical Specifications</b>    |                     |          |
| Dimension                           | 176*91*47mm         |          |
| Weight                              | 330g                |          |
| Battery Type                        | 1.5V AA Battery * 3 |          |
| Warranty                            | One year            |          |
| <b>Environmental Specifications</b> |                     |          |
| Operating                           | Temperature         | 0~40°C   |
|                                     | Humidity            | <75%     |
| Storage                             | Temperature         | -20~60°C |
|                                     | Humidity            | <80%     |

## Electrical Specifications

| <i>Function</i>           | <i>Range</i> | <i>Resolution</i> | <i>Accuracy</i> |
|---------------------------|--------------|-------------------|-----------------|
| DC Voltage<br>(V)<br>(mV) | 800.0mV      | 0.1mV             | $\pm(0.5\%+3)$  |
|                           | 8.000V       | 0.001V            |                 |
|                           | 80.00V       | 0.01V             |                 |
|                           | 800.0V       | 0.1V              |                 |
|                           | 1000V        | 1V                |                 |
| AC Voltage<br>(V)<br>(mV) | 800.0mV      | 0.1mV             | $\pm(1.0\%+3)$  |
|                           | 8.000V       | 0.001V            |                 |
|                           | 80.00V       | 0.01V             |                 |
|                           | 750V         | 1V                |                 |
| DC Current<br>(A)         | 8.000A       | 0.001A            | $\pm(1.2\%+3)$  |
|                           | 20.00A       | 0.01A             |                 |

| <i>Function</i>          | <i>Range</i>    | <i>Resolution</i> | <i>Accuracy</i> |
|--------------------------|-----------------|-------------------|-----------------|
| DC Current<br>(mA)       | 8.000mA         | 0.001mA           | $\pm(1.2\%+3)$  |
|                          | 80.00mA         | 0.01mA            |                 |
|                          | 800.0mA         | 0.1mA             |                 |
| DC Current<br>( $\mu$ A) | 800.0 $\mu$ A   | 0.1 $\mu$ A       |                 |
|                          | 8000 $\mu$ A    | 1 $\mu$ A         |                 |
| AC Current<br>(A)        | 8.000A          | 0.001A            |                 |
|                          | 20.00A          | 0.01A             |                 |
| AC Current<br>(mA)       | 8.000mA         | 0.001mA           |                 |
|                          | 80.00mA         | 0.01mA            |                 |
|                          | 800.0mA         | 0.1mA             |                 |
| AC Current<br>( $\mu$ A) | 800.0 $\mu$ A   | 0.1 $\mu$ A       |                 |
|                          | 8000 $\mu$ A    | 1 $\mu$ A         |                 |
| Resistance               | 800.0 $\Omega$  | 0.1 $\Omega$      | $\pm(0.5\%+3)$  |
|                          | 8.000k $\Omega$ | 0.001k $\Omega$   |                 |
|                          | 80.00k $\Omega$ | 0.01k $\Omega$    |                 |
|                          | 800.0k $\Omega$ | 0.1k $\Omega$     |                 |
|                          | 8.000M $\Omega$ | 0.001M $\Omega$   |                 |
|                          | 80.00M $\Omega$ | 0.01M $\Omega$    | $\pm(1.5\%+3)$  |

| <i>Function</i> | <i>Range</i>  | <i>Resolution</i> | <i>Accuracy</i> |
|-----------------|---------------|-------------------|-----------------|
| Capacitance     | 9.999nF       | 0.001nF           | $\pm(5.0\%+20)$ |
|                 | 99.99nF       | 0.01nF            | $\pm(2.0\%+5)$  |
|                 | 999.9nF       | 0.1nF             |                 |
|                 | 9.999 $\mu$ F | 0.001 $\mu$ F     |                 |
|                 | 99.99 $\mu$ F | 0.01 $\mu$ F      |                 |
|                 | 999.9 $\mu$ F | 0.1 $\mu$ F       | $\pm(5.0\%+5)$  |
|                 | 9.999mF       | 0.001mF           |                 |
|                 | 99.99mF       | 0.01mF            |                 |
| Frequency       | 9.999Hz       | 0.001Hz           | $\pm(0.1\%+2)$  |
|                 | 99.99Hz       | 0.01Hz            |                 |
|                 | 999.9Hz       | 0.1Hz             |                 |
|                 | 9.999kHz      | 0.001kHz          |                 |
|                 | 99.99kHz      | 0.01kHz           |                 |
|                 | 999.9kHz      | 0.1kHz            |                 |
|                 | 9.999MHz      | 0.001MHz          |                 |
| Duty Cycle      | 1%~99%        | 0.1%              | $\pm(0.1\%+2)$  |

| <i>Function</i>    | <i>Range</i> | <i>Resolution</i> | <i>Accuracy</i> |
|--------------------|--------------|-------------------|-----------------|
| Temperature        | (-20~1000)°C | 1°C               | ±(2.5%+5 )      |
|                    | (-4~1832)°F  | 1°F               |                 |
| Diode              | √            |                   |                 |
| Continuity         | √            |                   |                 |
| Square wave output | 50Hz~5000Hz  |                   |                 |

