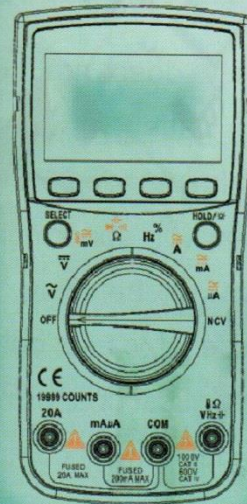


# User Manual



## 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 19999 counts auto-ranging digital multimeter. It is battery-powered with true-rms, a LCD display and a backlight.

## Safety Information

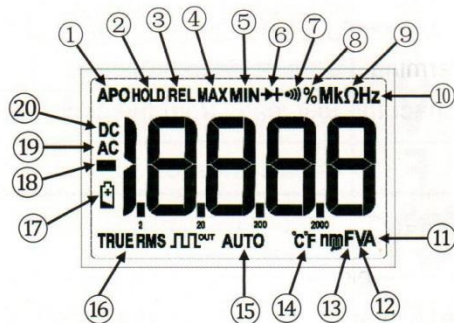
To avoid possible electrical shock, fire, or personal injury, please read all safety information before you use the product. Please use the product only as specified, or the protection supplied by the product can be compromised.

- 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

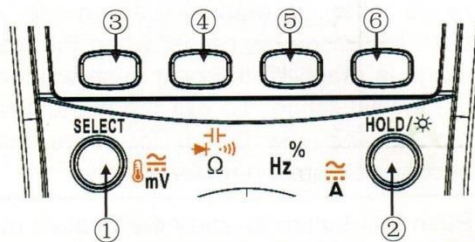
### LCD Display



①	<b>APO</b>	Auto power off.
②	<b>HOLD</b>	Display freezes present reading.
③	<b>REL</b>	Relative mode.
④	<b>MAX</b>	Display shows maximum reading.
⑤	<b>MIN</b>	Display shows minimum reading.
⑥	▶	Diode test.
⑦	•)))	Continuity test.

⑧	%	Duty cycle test.
⑨	$\Omega$	Resistance test. (Ohm)
⑩	Hz	Frequency test. (Hertz)
⑪	A	Current test. (Ampere)
⑫	V	Voltage test. (Volt)
⑬	F	Capacitance test. (Farad)
⑭	$^{\circ}\text{C}/^{\circ}\text{F}$	Temperature test. (Fahrenheit or Celsius)
⑮	<b>AUTO</b>	Auto range. The product selects the range with the best resolution.
⑯	<b>TRUERMS</b>	The product measures both sinusoidal and nonsinusoidal ac waveforms accurately.
⑰		Low battery. Replace batteries.
⑱		Negative readings.
⑲	<b>AC</b>	Alternating current.
⑳	<b>DC</b>	Direct current.
<b>nkM<math>\mu</math>m</b>		Measurement units.

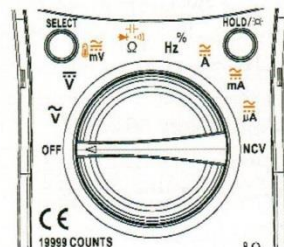
### Function Buttons



①	<p>Selects alternate measurement modes on a rotary switch setting, including:</p> <ol style="list-style-type: none"> <li>1. DC mV/AC mV/Temperature</li> <li>2. Resistance/Continuity/Diode/Capacitance</li> <li>3. Frequency/Duty Cycle</li> <li>4. DC A/AC A</li> <li>5. DC mA/AC mA</li> <li>6. DC <math>\mu\text{A}</math>/AC <math>\mu\text{A}</math></li> </ol>
②	<p>Push once to hold the current reading on the display; push again to continue normal operation.</p> <p>Push for more than 2 seconds to turn on the backlight; long-push again to turn off or the backlight automatically turns off after 2 minutes.</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, push the button for more than 2 seconds or turn the rotary switch.
④	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.
⑤	Push to toggle between the MAX and the MIN mode. To exit MAX/MIN mode, push the button for more than 2 seconds.
⑥	Push this button when the rotary switch is at the position of $\tilde{V}$ , the product will enter Frequency/Duty Cycle (only applies to low frequency with low voltage) measuring mode.

## Rotary Switch

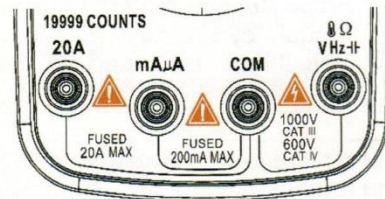


# OFF

- 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 SEL 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 SEL button when turning on the product, you will hear five beeps if you have successfully disabled the function.

	AC voltage $\leq 750V$ Press RANGE button: Frequency with high voltage Duty Cycle from 1%~99%
	DC voltage $\leq 1000V$
	DC voltage $\leq 199.99mV$ AC voltage $\leq 199.99mV$ Celsius: -20~1000 Fahrenheit: -4~1832
	Ohms $\leq 60M\Omega$ Continuity. Beeper turns on at $< 50\Omega$ Diode test. Displays  above 3V Farads $\leq 9.999mF$
	Frequency with low voltage Duty Cycle from 1%~99%
	DC A from $\leq 19.999A$ AC A from $\leq 19.999A$
	DC A from $\leq 199.99mA$ AC A from $\leq 199.99mA$
	DC A from $\leq 1999.9\mu A$ AC A from $\leq 1999.9\mu A$
<b>NCV</b>	Non-contact voltage test.

## Input Terminals



20A	Input terminal for AC/DC current measurements to 19.999A.
mAμA	Input terminal for AC/DC current measurements to 199.99mA.
COM	Common (return) terminal for all measurements.
VΩHz	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> </ol>

## Measurements Instruction

### Measure AC/DC Voltage

1. Connect the black test lead to the COM Terminal and the red lead to the VΩHz Terminal.
2. Turn the rotary switch to  $\tilde{V}$ ,  $\bar{V}$ , or  $\frac{mV}{\Omega}$ .
3. Press SELECT to toggle between AC/DC.
4. Touch the probes to the correct test points of the circuit to measure the voltage.
5. 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 Terminal or the 20A Terminal (choose based on the value of the current to be measured).

2. Turn the rotary switch to  $\frac{mA}{A}$ ,  $\frac{\mu A}{mA}$  or  $\frac{\mu A}{\mu A}$ .
3. Press SELECT to toggle between AC/DC.
4. Break the circuit path to be measured, connect the test leads across the break and apply power.
5. Read the measured current on the display.

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

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

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

### Measure Resistance


1. Connect the black test lead to the COM Terminal and the test lead to the VΩHz Terminal.
2. Turn the rotary switch to  $\frac{\Omega}{\Omega}$ , and the display will show "OL".
3. Touch the probes to the desired test points of the circuit to measure the resistance.
4. 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 VΩHz Terminal.
2. Turn the rotary switch to  , press SELECT once to toggle to the Continuity Mode.
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 50Ω, 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 VΩHz Terminal.

2. Turn the rotary switch to  , press SELECT twice to toggle to the Diode Mode.
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 VΩHz Terminal.
2. Turn the rotary switch to  , press SELECT three times to toggle to the Capacitance Mode.

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 VΩHz Terminal.
2. Turn the rotary switch to  $\tilde{\nu}$  , press the Hz % button once to toggle to the Frequency Mode (applies to low frequency with high voltage); or turn the rotary switch to  $\text{Hz}^{\%}$  to enter the Frequency Mode (applies to high frequency with low 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 VΩHz Terminal.
2. Turn the rotary switch to  $\tilde{\nu}$  , press the Hz % button twice to toggle to the Duty Cycle Mode (applies to low frequency with high voltage); or turn the rotary switch to  $\text{Hz}^{\%}$  , press SELECT once times to toggle to the Frequency Mode (applies to high frequency with low voltage).
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 VΩHz Terminal.

2. Turn the rotary switch to  , press SELECT twice to toggle to the Temperature Mode 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.**

### ***Test NCV***

1. Turn the rotary switch to **NCV** .
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.

## **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.

- Loosen the screw on the battery door and remove the battery door.
- Replace the used batteries with new batteries of the same type.
- 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:

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

## Specifications

<b>General Specifications</b>	
Display (LCD)	19999 Counts
Ranging	Auto/Manual
Material	ABS
Update Rate	3 Times/Second
Ture RMS	√
Data Hold	√
Backlight	√
Low Battery Indication	√
Auto Power Off	√

<b>Mechanical Specifications</b>	
Dimension	180*90*45mm
Weight	319g
Battery Type	1.5V AA Battery * 2
Warranty	One year

<b>Environmental Specifications</b>		
Operating	Temperature	0~40°C
	Humidity	<75%
Storage	Temperature	-20~60°C
	Humidity	<80%

## Electrical Specifications

Function	Range	Resolution	Accuracy
DC Voltage (V)	1.9999V	0.0001V	$\pm(0.05\%+3)$
	19.999V	0.001V	
	199.99V	0.01V	
	1000.0V	0.1V	
DC Voltage (mV)	19.999mV	0.001mV	
	199.99mV	0.01mV	
AC Voltage (V)	1.9999V	0.0001V	$\pm(0.3\%+3)$
	19.999V	0.001V	
	199.99V	0.01V	
	750.0V	0.1V	
AC Voltage (mV)	19.999mV	0.001mV	
	199.99mV	0.01mV	
DC Current (A)	1.9999A	0.0001A	$\pm(0.5\%+3)$
	19.999A	0.001A	

Function	Range	Resolution	Accuracy
DC Current (mA)	19.999mA	0.001mA	$\pm(0.5\%+3)$
	199.99mA	0.01mA	
DC Current ( $\mu$ A)	199.99 $\mu$ A	0.01 $\mu$ A	
	1999.9 $\mu$ A	0.1 $\mu$ A	
AC Current (A)	1.9999A	0.0001A	$\pm(0.8\%+3)$
	19.999A	0.001A	
AC Current (mA)	19.999mA	0.001mA	
	199.99mA	0.01mA	
AC Current ( $\mu$ A)	199.99 $\mu$ A	0.01 $\mu$ A	
	1999.9 $\mu$ A	0.1 $\mu$ A	
Resistance	199.99 $\Omega$	0.01 $\Omega$	$\pm(0.5\%+3)$
	1.9999k $\Omega$	0.0001k $\Omega$	$\pm(0.2\%+3)$
	19.999k $\Omega$	0.001k $\Omega$	
	199.99k $\Omega$	0.01k $\Omega$	
	1.9999M $\Omega$	0.0001M $\Omega$	$\pm(1.0\%+3)$
	19.999M $\Omega$	0.001M $\Omega$	
	199.99M $\Omega$	0.01M $\Omega$	$\pm(5.0\%+5)$

<i>Function</i>	<i>Range</i>	<i>Resolution</i>	<i>Accuracy</i>
Capacitance	9.999nF	0.001nF	±(5.0%+20)
	99.99nF	0.01nF	±(2.0%+5)
	999.9nF	0.1nF	
	9.999μF	0.001μF	
	99.99μF	0.01μF	
	999.9μF	0.1μF	
	9.999mF	0.001mF	±(5.0%+5)
Frequency	99.99Hz	0.01Hz	±(0.1%+2)
	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%	±(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		√	
NCV		√	