

# GAZELLE<sup>®</sup>

## G9202



**400A Digital  
Clamp Meters  
Operating Manual**



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## I. Overview

G9202 is a handheld automatic-range clamp meter in 4,000 counts 3 3/4 digit true virtual value. The circuit design of the complete machine takes the large scale integrated circuit  $\Sigma/\Delta$  analogdigital converter as core, and the full-range over-load protection circuit and a unique appearance design make it a dedicated electro-technical instrument. It is applicable to measure AC/DC voltage, AC current, resistance, diode, circuit on-off, capacitance, frequency and duty ratio, and it is also equipped with such functions as data-hold, relative value measurement, flashlight, NCV, undervoltage display and auto OFF. The Instructions includes relevant safety information, warning, etc. Please read relevant contents carefully and strictly observe all warnings and cautions.

### Warning:

Before using the clamp meter, please read relevant "SafeOperation Criterion".

## II. OOBA (Out-of-Box Audit)

Open the packing box and take out the instrument. Please carefully check whether or not the following accessories are missing or damaged.

1. Instructions----- one copy
2. Probe----- one pair
3. Cloth bag-----one piece

Please contact your supplier in case of any missing or damage.

## III. Safety Operation Criterion

Please pay attention to the "Warning Signs and Words". Warnings mean the situations and behaviors that endanger the user or cause losses to the instrument or the equipment to be measured.

The instrument is designed and produced in strict accordance with IEC/EN 61010-1,IEC/EN 61010-2-032 and IEC/EN 61010-2-033, safety standards, and complies with the safety standard of double insulation, over-voltage CAT III 600V and pollution level 2. Please observe the following operation instruction, otherwise, the instrument provided protection is likely to be damaged.


Conforms to UL STD. 61010-1, 61010-2-032, 61010-2-033; Certified to CSA STD. C22.2 NO. 61010-1, IEC STD. 61010-2-032, IEC STD. 61010-2-033

CAT III: Applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation, before use and follow all safety instructions.

1. Before using, please check the clamp meter and probe so as to prevent any damage or abnormal phenomenon. If you find that the probe and insulating layer of the shell are damaged obviously, the display screen cannot work, etc., or you consider the clamp meter cannot work well, please don't use the clamp meter any more.
2. It is strictly prohibited to use the clamp meter without the rear cover or battery cover, otherwise, shock hazard may occur.
3. When carrying out the measurement, please be sure that your finger should not exceed the shield and not touch the bare wire and connector, unused input terminal or circuit under measurement, to prevent the electric shock.













4. Before measuring, the function switch must be placed at the correct location and gears of range switch are not permitted to change during measuring, so as to prevent the clamp meter damage.
5. Do not apply DC600V/AC600V or above voltage between the clamp meter terminal and grounding, so as to prevent electric shock and clamp meter damage.
6. When use the instrument to measure DC voltage of higher than 42V or AC RMS voltage of higher than 30V, it is necessary to operate it carefully, for there may be danger of an electric shock.
7. Do not measure the voltage or current higher than the allowable input, and the function range switch must be placed at the maximum range position when the range of the value to be measured is not determined.

Before measuring the resistance, diode or circuit on-off, it is a must to cut off all the power supplies in the circuit and discharge all capacitors, otherwise, it may lead to incorrect measurement results.

8. When the symbol of “” is displayed on the LCD, it is necessary to timely replace the battery, so as to assure the measuring precision. Battery must be removed when the clamp meter was not used for a long time.
9. Please do not change the internal wiring of the clamp meter at random, to prevent instrument damage and insecurity.
10. Do not keep or use the clamp meter in an inflammable and explosive environment with high-temperature, high-humidity, or strong electromagnetic field.
11. During maintenance, please clean the shell of the clamp meter with the soft cloth soaked with neutral detergent, and do not use the abradant and solvent, so as to prevent the shell corrosion, instrument damage and insecurity.

12. the documentation shall indicate that probe assemblies to be used for MAINS measurements shall be RATED as appropriate for MEASUREMENT CATEGORY III or IV according to IEC 61010-031 and shall have a voltage RATING of at least the voltage of the circuit to be measured.

## IV. Electrical Symbols

	Double insulation
	Grounding
	Warning
	AC (alternating current)
	DC (direct current)
	Buzzer on/off
	Diode
	Capacitance
	AC or DC (alternating current or direct current)
	Danger: high voltage
	Meet EU (European Union) standards
	This symbol signify the product comply with both USA and Canada requirement



## V. External Structure (See Figure 1)

### 1.Clamp head

It is the sensing device for AC/DC measurement, which convert the current into voltage.

### 2.Clamp body

It is a kind of safety design to protect the operators' hands from dangerous zone.

### 3.Clamp head trip handle

Press the trigger to open the clamp head and release the trigger to allow automatic closing of it.

### 4.Knob switch

For selection of measurement function tap positions.

### 5.Function keys

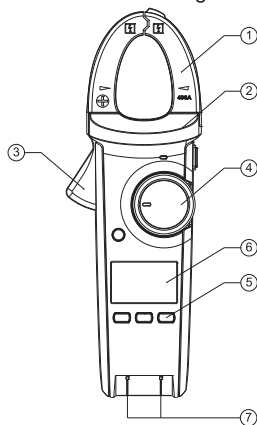
For selection of basic functions.

### 6.LCD display area

For display of measurement data and functional symbols.

### 7.Measurement input terminal

For input of measurement signal.



## VI. Description of LCD Symbols

S/N	Symbol	Description
1	$\Delta$	Prompt of relative value measurement/reset status
2	AC DC	Prompts of alternating current and direct current
3	—	Negative readings
4	$\rightarrow$	Prompt of diode measurement
5	••)	Prompt of circuit on-off measurement
6	H	Prompt of data-hold
7	$\Omega$ k $\Omega$ M $\Omega$	Units of resistance: ohm, kilohm and megaohm
8	Hz kHz MHz	Units of frequency: hertz, kilohertz and megahertz
9	mV V	Units of voltage: millivolt and volt
10	mA A	Units of current: milliampere and ampere
11	nF $\mu$ F mF	Units of capacitance: nanofarad, microfarad and millifarad
12	(EF)NCV	Prompt of non-contact AC voltage sensing
13	Auto	Prompt of automatic range
14		Prompt of under-voltage of built-in battery
15	OL	Prompt of over-range and instrument overflow
16	%	Prompt of duty ratio measurement

## VII. Functions of Keys

### 1. SELECT

Click once to select the tap positions.

### 2. HOLD

Click once to enter reading-hold measuring mode; click once again to exit.

Hold the key to open backlight. For G9202, hold again within 15s to close backlight or wait for 15s for automatic closing.

### 3. Hz%

Click at voltage gear position for voltage-frequency switching; Click at frequency gear position for frequency-duty ratio switching.

### 4. REL

Click once to enter relative value measuring mode, with measured value-basic value displayed (applicable to measurement of AC/DC voltage, AC current, resistance). Click again to exit.

### 5. FLIGHT

click to turn the flashlight on or off.

## VIII. Technical Indexes


### 1. General Specification

#### 1. General Specification

Liquid crystal display: Maximum display up to 4000;

Polarity display: Automatic positive and negative polarity display;

Over-load display: Display in "OL" or "-OL";

Battery voltage display: When the battery voltage is lower than the working voltage, "  " symbol will be displayed and new battery will be required;

Sampling rate: Approximately 3 times/second;

Sensor type: Coil induction;

Measured position error: When measuring the current,  $\pm 1.0\%$  additional error may occur if it fails to put the source to be measured into the central position of the probe;

Impact-resistant strength: 1m height impact can be borne;

Maximum opening dimension of clamp head: Diameter of 30mm;

Predicted maximum dimension of the current wire: Diameter of 30mm;

Electromagnetic field effect: When the electromagnetic field interference exists, it probably displays unstable or incorrect readings;

Power requirements: Three AAA 1.5V batteries;

Auto OFF function: 30min for automatic switch off;

This function can be closed as necessary.

Dimension: 228mm×77mm×41mm;

Weight: Approximately 265g (battery included);

## 2. Environmental Limitation

Working environment: Indoor use;

Maximum altitude: 2,000m;

Safety regulations: IEC/EN 61010-1;

IEC/EN 61010-2-032;

IEC/EN 61010-2-033

CAT III 600V; Pollution grade: 2;

Operating temperature and humidity: 0°C-30°C (not larger than 80%RH), 30°C-40°C (not larger than 75%RH), 40°C-50°C (not larger than 45% RH);

Storage temperature and humidity : -20°C-+60°C (not larger than 80%RH);

## 3. Electrical Specification

Accuracy:  $\pm$  (% reading + word count), calibration period is a year

Ambient temperature: 23°C $\pm$ 5°C;

Ambient humidity:  $\leq$ 75%RH;

Temperature coefficient: 0.1 $\times$ (accuracy)/°C;

### 1. AC current ( $\tilde{A}$ )

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
4.000A	0.001A	$\pm(2.5\%+30)$	400A
40.00A	0.01A	$\pm(2.5\%+5)$	
400.0A	0.1A	$\pm(1.8\%+9)$	

Display: G9202-average value; applicable to 10% to 100% of the measurement range.

G9202 frequency response: 50Hz-60Hz;

### 2. AC voltage ( $\tilde{V}$ )

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
4.000V	0.001V	$\pm(1.2\%+5)$	600V DC/AC
40.00V	0.01V		
400.0V	0.1V		
600V	1V	$\pm(1.5\%+5)$	

value; applicable to 10% to 100% of the measurement range.

Voltage input impedance  $\geq$  10M $\Omega$ ;

Frequency response: 40Hz-400Hz;

### 3. DC voltage ( $\bar{V}$ )

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
400.0mV	0.1mV	$\pm(1.0\%+8)$	600V DC/AC
4.000V	0.001V	$\pm(0.8\%+1)$	
40.00V	0.01V	$\pm(0.8\%+3)$	
400.0V	0.1V		
600V	1V	$\pm(1.0\%+3)$	

Voltage input impedance  $\geq$  10M $\Omega$

**4. Resistance (  $\Omega$  )**

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
400.0 $\Omega$	0.1 $\Omega$	$\pm(1.2\%+2)$	600V DC/AC
4.000k $\Omega$	0.001k $\Omega$	$\pm(1.0\%+2)$	
40.00k $\Omega$	0.01k $\Omega$		
400.0k $\Omega$	0.1k $\Omega$		
4.000M $\Omega$	0.001M $\Omega$	$\pm(1.2\%+3)$	
40.00M $\Omega$	0.01M $\Omega$	$\pm(2\%+5)$	

**5. Conductivity test (  $\cdot$  )**

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
400.0 $\Omega$	0.1 $\Omega$	(ON) $\leq 30\Omega$ , the buzzer will ring (OFF) $\geq 70\Omega$ , the buzzer will not ring  Open-circuit voltage is about 1.2 V	600V DC/AC

**6. Diode test (  $\blacktriangleright$  )**

Measurement Range:	4.000V
Resolution Ratio:	0.001V
Overload Protection:	600V DC/AC
Accuracy:	open-circuit voltage is about 1.5V, and measurable PN junction $\leq$ forward voltage drop value of 1.5V. Normal voltage value of silicon PN junction is about 0.5-0.8V.

**7. Capacitance (  $\text{--}$  )**

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
50.00nF	0.01nF	$\pm(4.0\%+25)$	600Vrms
500.0nF	0.1nF	$\pm(4.0\%+5)$	
5.000 $\mu$ F	0.001 $\mu$ F		
50.00 $\mu$ F	0.01 $\mu$ F		
100.0 $\mu$ F	0.1 $\mu$ F		

## 8. Frequency Hz

Measurement Range	Resolution Ratio	Accuracy	Overload Protection
10Hz ~ 1 MHz	0.01Hz ~ 1K Hz	$\pm(0.1\%+4)$	600V DC/AC

10Hz-1MHz

200mVrms  $\leq$  input amplitude  $\leq$  20Vrms

## 9. NCV

Measurement range	Accuracy
NCV	$\geq 100$ Vrms, < 10mm audio and visual alarm

# IX. Measuring Operation Instructions

## 1. Measuring of AC Current (See Figure 2)

1) Switch to the AC current gear position, press the trigger to open the clamp head, use the clamp head to pick up the conductor to be tested, and release the trigger slowly until the clamp head is fully closed. Please ensure that the conductor to be tested shall be placed at the center of clamp head, or error may occur; only one current conductor can be measured during one test with clamp meter, or false readings may be displayed.

2) Read the AC current value directly from the display.

### Caution:

- The current measurement shall be operated within the range of 0°C-40°C.
- In order to ensure accurate measuring data, the conductor to be tested must be placed at the center of clamp head, or additional error of  $\pm 1.0\%$  may occur.
- AC conversion is a true virtual value response mode through AC coupling, which is corrected through sine wave input. Therefore, the accuracy of non-sine wave must be adjusted in accordance with the following:  
If wave crest factor is 1.4-2.0, the accuracy is +1.0%;  
If wave crest factor is 2.0-2.5, the accuracy is +2.5%;  
If wave crest factor is 2.5-3.0, the accuracy is +4.0%.

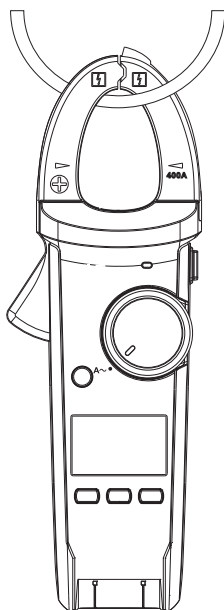


Figure 2

## 2. Measuring of AC Voltage (See Figure 3)

- 1) Insert the red probe into “V” jack, and black one into “COM” jack.
- 2) Switch to AC voltage gear position, press SELECT key to select AC voltage measurement, and connect in parallel the probe to the power supply or load to be tested.
- 3) Read the AC voltage value directly from the display.

### ⚠ Caution:

- Do not input voltage of higher than AC 600V. It is possible to measure higher voltage, but at the risk of meter damage.
- It is especially necessary to be cautious about electric shock when measuring high voltage.
- The probe shall be disconnected from the tested circuit after all measuring operations.
- when the input voltage is higher than AC 1000V, the meter will directly display OL!
- AC conversion is a true virtual value response mode through AC coupling, which is corrected through sine wave input.

Therefore, the accuracy of non-sine wave must be adjusted in accordance with the following:

If wave crest factor is 1.4-2.0, the accuracy is +1.0%;

If wave crest factor is 2.0-2.5, the accuracy is +2.5%.

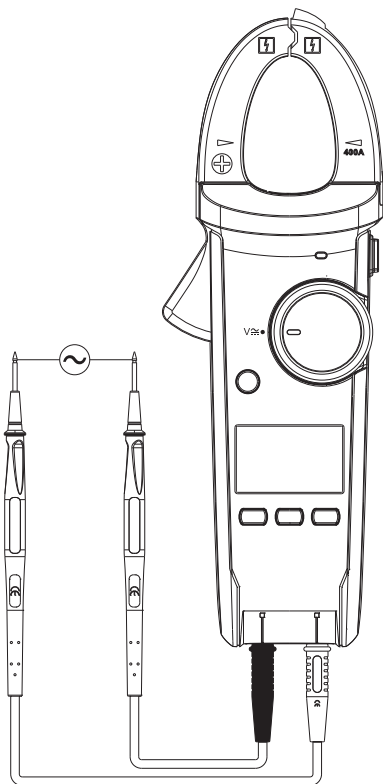


Figure 3

### 3. Measuring of DC Voltage (See Figure 4)

- 1) Insert the red probe into "V" jack, and black one into "COM" jack.
- 2) Switch to DC voltage gear position  $\bar{V}$ , press SELECT key to select DC voltage measurement, and connect the probe to the power supply or load to be tested in parallel.
- 3) Read the DC voltage value directly from the display.

#### ⚠ Caution:

- Do not input voltage of higher than DC 600V. It is possible to measure higher voltage, but at the risk of meter damage.
- During measurement of the range of 400mV tap position, relative measurement function can be used to obtain more accurate readings. First, short-circuit the probe and press REL key, and then read the tested voltage value after the meter automatically deduct the short circuit displaying value of the probe.
- It is especially necessary to be cautious about electric shock when measuring high voltage.
- The probe shall be disconnected from the tested circuit after all measuring operations.
- when the input voltage is higher than DC 1,000V, the meter will directly display OL!

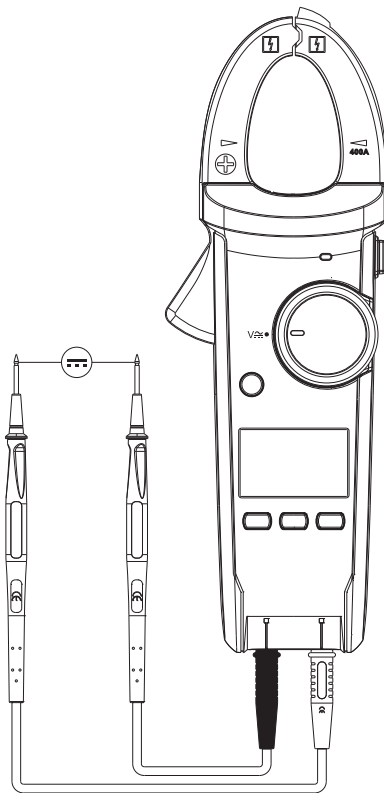


Figure 4

#### 4. Measuring of Resistance (See Figure 5)

- 1) Insert the red probe into “Ω” jack, and black one into “COM” jack.
- 2) Switch to “Ω” gear position, press SELECT key to select “Ω” measurement, and connect in parallel the probe to both ends of resistance to be tested.
- 3) Read the resistance value directly from the display.

#### ⚠ Caution:

- If the tested resistance open circuit or the resistance value exceeds the maximum measurement range, it will display “OL”.
- Before measurement of on-line resistance, all power supply in the tested circuit must be switched off, and residual charges in all capacitors may be discharged, in order to ensure correct measuring readings.
- During low-resistance measurement, the probe will have a measuring error of about 0.1Ω-0.2Ω. Relative measurement function can be used to obtain more accurate readings. First, short-circuit the probe and press REL key, and then read the tested voltage value after the meter automatically deduct the short circuit displaying value of the probe.
- Where the resistance value is not lower than 0.5Ω in case of probe short circuit, it is necessary to check whether the probe is loosened or there is any cause.
- When measuring the resistance of higher than 1MΩ, the readings may get stable after a few seconds, which is normal for high-resistance measurement. Testing stub may be adopted for measurement to obtain stable readings.
- Do not input voltage of higher than DC or AC 30V, in order to ensure personal safety.
- The probe shall be disconnected from the tested circuit after all measuring operations.



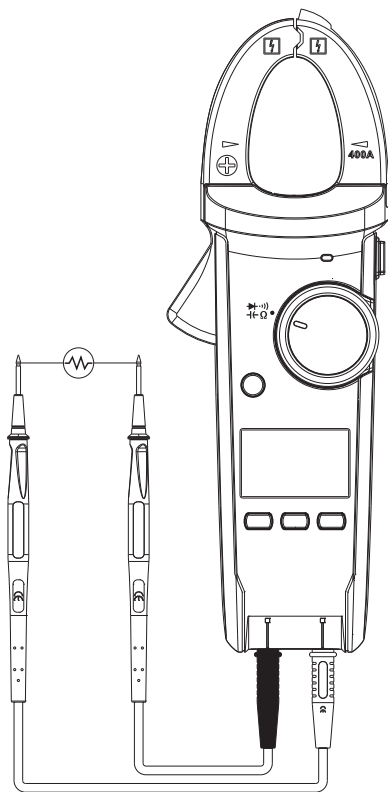


Figure 5

### 5. Measuring of Conductivity (See Figure 6)

- 1) Insert the red probe into “Ω” jack, and black one into “COM” jack.
- 2) Switch to “•••” gear position, press SELECT key to select circuit on-off measurement, and connect in parallel the probe to the load to be tested. If the resistance between the tested terminals is  $< 30\Omega$ , it will be deemed as circuit conducting state, when the buzzer will ring continuously; if it is  $30\Omega$ - $70\Omega$  (including  $30\Omega$  and  $70\Omega$ ), the buzzer will either ring or not ring; if it is  $> 70\Omega$ , the buzzer will not ring.
- 3) Read the resistance value of the tested circuit load directly from the display.

#### ⚠ Caution:

- Before checking the on-line circuit conductivity, all power supply in the tested circuit must be switched off, and residual charges in all capacitors may be discharged.
- Do not input voltage of higher than DC or AC 30V, in order to ensure personal safety.
- The probe shall be disconnected from the tested circuit after all measuring operations.

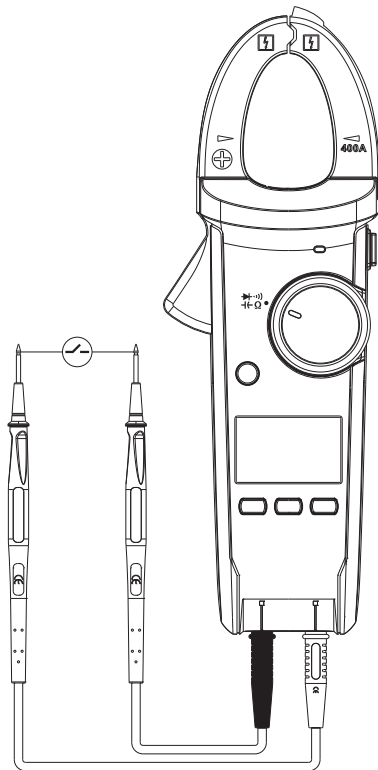


Figure 6

## 6. Measuring of Diode (See Figure 7)

- 1) Insert the red probe (polarity: "+") into "Ω" jack, and black one (polarity: "-") into "COM" jack.
- 2) Switch to "▶" gear position, press SELECT key to select diode measurement, and read the approximate forward PN junction voltage of the tested diode directly from the display. As for silicon PN junction, the normal range is generally considered as 500mV-800mV.

### ⚠ Caution:

- In case of open circuit or reverse polarity of the tested diode, it will display "OL".
- Before measurement of on-line diode, all power supply in the tested circuit must be switched off, and residual charges in all capacitors may be discharged.
- The open circuit voltage for diode test is about 1.5V.
- Do not input voltage of higher than DC or AC 30V, in order to ensure personal safety.
- The probe shall be disconnected from the tested circuit after all measuring operations.

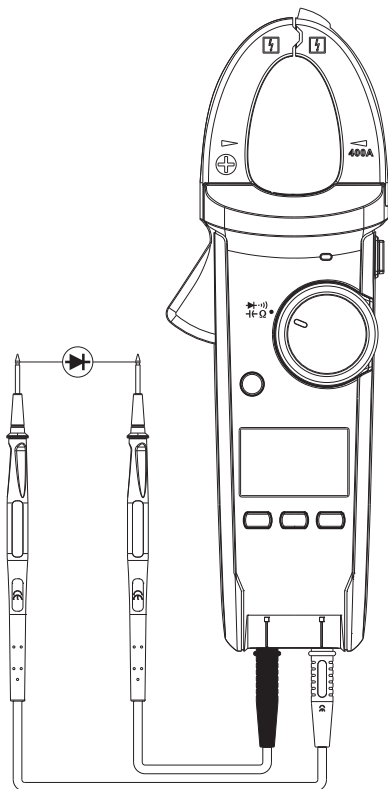


Figure 7

## 7. Measuring of Capacitance (See Figure 8)

- 1) Insert the red probe into “ $\Omega$ ” jack, and black one into “COM” jack.
- 2) Switch to “ $\frac{1}{f}$ ” gear position, and connect in parallel the probe to the two ends of capacitance to be tested.
- 3) Read the capacitance value of the tested circuit load directly from the display. It is suggested to use testing stub for capacitance measurement, which can reduce the influence of distributed capacitance.

### ⚠ Caution:

- In case of short circuit of the tested capacitance or the capacitance value exceeds the maximum measurement range of the meter, it will display “OL”.
- Under capacitance measuring mode, the simulation bar pointer is inhibited. It may take longer time for measurement of capacitance of greater than  $400\mu\text{F}$ , in order to obtain correct readings.
- In order to ensure measurement precision, it is suggested to discharge the residual charge in all capacitance before inputting the clamp meter, especially for measurement of HV capacitance, to avoid meter damage and personal injury.
- The probe shall be disconnected from the tested capacitance after all measuring operations.

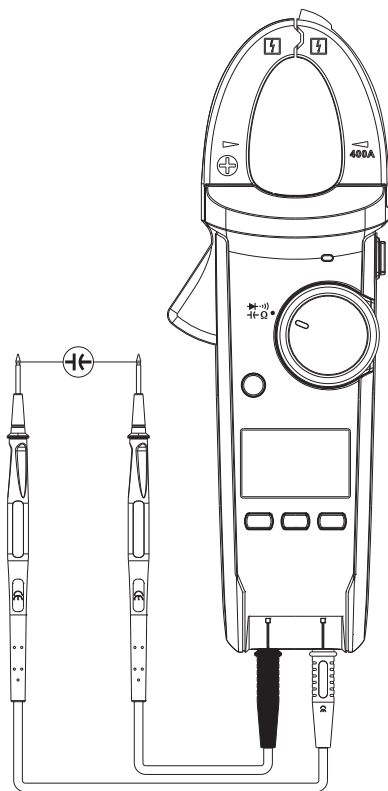


Figure 8

## 8. Measuring of Frequency (See Figure 9 )

- 1) Insert the red probe into “Hz” jack, and black one into “COM” jack.
- 2) Switch to “Hz” gear position, and connect in parallel the probe to the signal source to be tested.
- 3) Read the measured frequency value directly from the display.

### ⚠ Caution:

- The measurement shall meet the conditions of input amplitude a:  
 $10\text{Hz}-1\text{MHz}, 200\text{mVrms} \leq \text{input amplitude} \leq 20\text{Vrms}$ ;
- Do not input tested frequency voltage of higher than  $30\text{Vrms}$ , in order to ensure personal safety.
- The probe shall be disconnected from the tested circuit after all measuring operations.

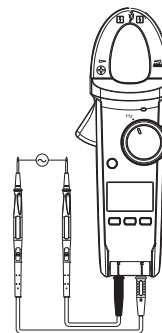


Figure 9

## 9. Non-contact AC Voltage Sensing NCV

The front end of clamp head can be used for sensing near the tested wire, in order to detect the existence of AC voltage or electromagnetic field. When the electric field voltage is higher than 100V AC and the distance is shorter than 10mm, the buzzer will ring and LED red light will flash or be constantly on for warning.

## 10. Power Supply Gear position(OFF)

It is for instrument switching-off.

## 11. Auto OFF Function

Where there is no operation to knob switch or keys within the set shutdown time (default as 30min), the LCD will fade and the instrument will enter micro-power consumption sleep state. Press SELECT key, and the instrument will be waken up. When pressing SELECT key to start the instrument, the Auto-OFF function will be inhibited.

## X. Maintenance and Repair (See Figure 10)



Warning:  
please pull out the test probe before opening the bottom cover, so as to avoid electric shock.

### 1. General Maintenance

A. The maintenance and other services of this clamp meter shall be accomplished by qualified professional maintenance staff or designated maintenance department.

B. The shell shall be regularly cleaned by dry cloth. Detergent which contains abrasant or solvent shall not be applied.

### 2. Battery Installation or Replacement

The power supply for this product is three AAA 1.5V batteries.

Please install or replace batteries according to the orders listed below:

- A. Turn off the product, and pull out the test probe at the input terminal.
- B. Face the product's panel adown, unscrew the screws for battery holder and remove the battery cover. Take out the batteries and install new batteries according to the polar indication.
- C. Please use batteries of the same model, and don't install inappropriate batteries.
- D. After installing new batteries and fitting the battery cover, lock the screws.

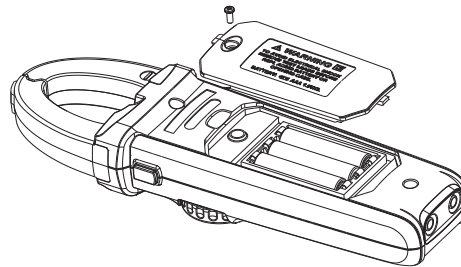


Figure 10

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Instructions are subject to change without prior notice.