

# DIGITAL CLAMP-ON METER

## OPERATION MANUAL



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# 1. FEATURES

Thank you for purchasing this instrument. Please read this instruction manual carefully and completely before using your digital clamp meter, correct operation will insure the best performance and decrease the possibility of damages.

- \* Jaws may open up to 30mm.
- \* The maximum conductor size is  $\phi 30\text{mm}$ .
- \* Safety sockets designed.
- \* Data Hold.
- \* Impedance in circuit  $< 40\Omega$ , buzzer will sound.

# 2. SPECIFICATIONS

- a). **Display:** 3 3/4 digits LCD with max. reading 3999.
- b). **Polarity Indication:** Automatic polarity, "-" display for negative input.
- c). **Overload Indication:** LCD shows "OL".
- d). **Low Battery Indication:** LCD shows "BAT" when batter voltage is low.
- e). **Battery Life:** 50 hrs app. (alkaline bat. recommended)
- f). **Sampling Rate:** 2 times per second for digital display.  
20 times per second for analog display.
- g). **Power Supply:** R03/AAA 1.5V/UM4 battery x 2.
- h). **Operation Altitude:** up to 2000m.
- i). **Operating Environment:** Indoor use. This instrument has been designed for use in an environment of pollution degree 2.
- j). **Auto Power Off:** The power will be automatically turned off of non-use in 30 minutes.
- k). **Disable Auto Off:** Set the range selector OFF position to any range and also press down ZERO or RANGE button.

- l). **Operating Temperature & Humidity:** 5°C ~ 40°C, below 80%RH.
- m). **Storage Temperature & Humidity:** -10°C ~ 60°C, below 70%RH.
- n). **Safety:** IEC61010 and EN61010 (IEC61010-1, IEC61010-2-031, IEC61010-2-032) CAT III 600V.
- o). **EMC:** This apparatus is designed in accordance with EMC standards in force and its compatibility has been tested in accordance EN61326 (1997) + A1 (1998) + A2 (2001).
- p). **Dimension:** 195mm(L)x64mm(W)x30mm(H).
- q). **Weight:** About 240g.(including batteries)
- r). **Accessories:** Test leads, manual, batteries and carrying pouch.

**Electrical Specifications:**

Accuracy is indicated as [% of reading + digit number]. It is referred to the environment condition at 23°C ± 5°C with RH <75%.

**DCA (Auto/Manual)(CM2)**

Range	Resolution	Accuracy	Overload Protection
40A	0.01A	±(2.0%+10)	600A rms(60 Second)
400A	0.1°		

**ACA (Auto/Manual)(CM1)**

Range	Resolution	Accuracy 50Hz~60 Hz	Overload Protection
40A	0.01A	± (2.0%+10)	600A rms (60 second)
400A	0.1A		

**ACA (Auto/Manual) True RMS: From 10% to 100% of the range(CM2)**

Range	Resolution	Accuracy 50Hz~60 Hz	Accuracy 65Hz~500 Hz	Overload Protection

40A	0.01A	$\pm (2.0\%+5)$	$\pm$ (3.0%+8)	600A rms (60 second)
400A	0.1A			

### ACV (Auto/Manual)(CM1)

Range	Resolution	Accuracy 50Hz~500 Hz	Input Impedance	Overload Protection
400V	0.1V	$\pm(1.5\%+5)$	10M $\Omega$	660V rms
600V	1V			

### ACV True RMS:From 10% to 100% of the range (CM2)

Range	Resolution	Accuracy	Input Impedance	Overload Protection
400mV	0.1mV	$\pm(1.2\%+40)$ 50Hz~60Hz	100M $\Omega$	DC/AC 660V rms
4V	1mV	$\pm(1.2\%+20)$ 40Hz~499 Hz $\pm(2.0\%+20)$ 500Hz~1KHz	11M $\Omega$	
40V	10mV	$\pm(1.2\%+5)$ 40Hz~499 Hz $\pm(2.0\%+5)$ 500Hz~1KHz	10M $\Omega$	
400V	100mV			
600V	1V			

### DCV (Auto/Manual)(CM1)

Range	Resolution	Accuracy	Input Impedance	Overload Protection
400V	0.1V	$\pm (1.0\%+3)$	10M $\Omega$	660V rms
600V	1V			

### DCV (Auto/Manual)(CM2)

Range	Resolution	Accuracy	Input Impedance	Overload Protection
400mV	0.1mV	$\pm (0.8\%+2)$	100M $\Omega$	DC/AC

4V	1mV		11M $\Omega$	660V rms
40V	10mV		10M $\Omega$	
400V	100mV			
600V	1V		$\pm (1.0\%+2)$	

### Frequency (Auto-Ranging)(CM1)

Range	Resolution	Accuracy	Max. Sensitivity	Overload Protection
4KHz	1Hz	$\pm (0.8\%+3)$	3V rms	DC/AC 600V rms
40KHz	10Hz			
400KHz	100Hz			

### Continuity

Range	Buzzer	Max. Open Voltage	Overload Protection
·))	below 40 $\Omega$	About-1.5VDC	600V rms

### Resistance (CM1)

Range	Resolution	Accuracy	Max. Open Voltage	Overload Protection
$\Omega$ ·)) (400 $\Omega$ )	0.1 $\Omega$	$\pm(1\%+5)$	About-1.5V <sub>DC</sub>	600V rms

### Resistance :Auto/Manual(CM2)

Range	Resolution	Accuracy	Max. Sensitivity	Overload Protection
400 $\Omega$	0.1 $\Omega$	$\pm(1\%+5)$	about -1.5V <sub>DC</sub>	DC/AC 600V rms (60 Second)
4K $\Omega$	1 $\Omega$	$\pm(1\%+3)$	About-0.45V <sub>DC</sub>	
40K $\Omega$	10 $\Omega$			
400K $\Omega$	100 $\Omega$			
4M $\Omega$	1K $\Omega$			
40M $\Omega$	10 $\Omega$			

### 3. INSTRUMENT DESCRIPTION

- a. **Safety guard.**
- b. **Jaw trigger.**
- c. **Rotary range selector.**
- d. **LCD**
- e. **COM jack:** For the connection of negative signal input while measuring DCV, ACV,  $\Omega$  ( $\Omega$ ).
- f. **V/ $\Omega$  jack:** For the connection of positive signal input while measuring DCV, ACV,  $\Omega$  ( $\Omega$ ).
- g. **RANGE button:** Manual range mode is activated when the button is pressed, symbol MANU is shown on LCD. Auto range mode is activated by pressing the button more than 2 seconds, press button again, it turns to MANU range mode.
- h. **HOLD button:** The reading data is freezing when press the button.
- i. **ZERO button:** The reading data shown on LCD can be reset to 0 while the button is pressed once, and the symbol "ZERO" is also displayed on LCD. Press the button again, the data cleared can be shown on LCD, and the symbol "ZERO" begins to blink. To abort the zero mode, hold down the button more than 1 second. (CM2)

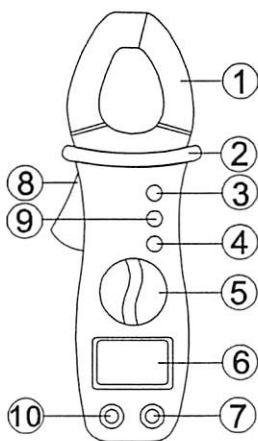
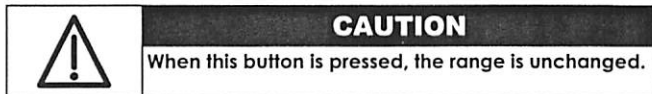


Fig.1


1. Inductive clamp Jaw
2. Safety guard
3. HOLD button(CM1)  
ZERO button(CM2)
4. RANGE button(CM2)
5. Rotary range selector
6. LCD
7. V/ΩJack
8. Jaw trigger
9. RANGE button(CM1)  
HOLD button(CM2)
10. COM Jack



## 4. MEASUREMENT




### 4.1. NOTES

1. Check if the batteries are installed properly.
2. Check the LCD and the range indicator show the same as the function desired.
3. When changing range, firstly remove the tested conductor or electrical circuit from the clamp jaw in order to avoid an accident.
4. Strong vibrations and impacts may cause damage to the instrument.
5. Do not test on or connect to any circuit with voltage or current which exceeds the specified overload protection.
6. When measuring resistor, do not add any voltage though there is a protection circuit, excessive voltage will still cause malfunction.
7. When measuring current, firstly remove the test leads of common and voltage / resistance.
8. When measuring current, any strong current nears or closes to the clamp jaw will affect the accuracy.
9. This instrument is not available for the non-sine wave AC signal, otherwise there will be a great error.
10. When measuring current, always put the tested conductor in the center of the clamp jaw so as to obtain more accurate reading.
11. During measurement, if the value of reading or indication of sign remain unchanged, check whether HOLD function is being activated or not or if the symbol  is displayed on the LCD.

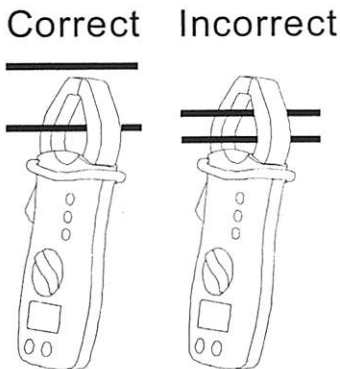
12. In order to avoid reading incorrect data, you have to replace the batteries immediately when the symbol BAT appears on the LCD.
13. Do not touch the circuit board before you take any adequate action, and thus prevent from any damage of contamination and static electricity.

#### 4.2. AC CURRENT (ACA) MEASUREMENT


	<b>WARNING</b> Make sure that all the test leads are disconnected from the meter's terminal for current measurement.
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1. Select “~A” range.
2. Open the clamp and put the tested conductor in the center of the clamp jaws (see Fig.2).(No gap is allowed between the connections of clamp jaws)
3. The current value will be indicated on the LCD.
4. Press HOLD button to freeze the obtained value.  
Press button again to exit this function.

Fig. 2




### 4.3. AC VOLTAGE (ACV) MEASUREMENT

	<b>WARNING</b>
	Maximum input for DCV or ACV is 600V. Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage the clamp meter.


1. Select "V~" range.
2. Plug red test lead into V/ $\Omega$  jack, and plug the black test lead into COM jack.
3. Connect two test leads to the desired circuit, and then reading will be displayed.
4. Press HOLD button to freeze the obtained value. To exit this function, press HOLD button again.

### 4.4. DC VOLTAGE (DCV) MEASUREMENT

	<b>WARNING</b>
	Maximum input for DCV or ACV is 600V. Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage the clamp meter.


1. Select "V=" range.
2. Plug the red test lead into V/ $\Omega$  jack and plug the black test lead into COM jack.
3. Connect the two test leads to the desired circuit.
4. Press HOLD button to freeze the obtained value. To exit this function, please press HOLD button again.

### 4.5. DC CURRENT (DCA) MEASUREMENT

	<b>WARNING</b>
	Make sure that all the test leads are disconnected from the meter's terminal for current measurement.

1. Select “ $\overline{\text{A}}$ ” range.
2. Check if the display shows zero first. If symbol “ZERO” isn’t appeared, press “ZERO” button.  
(If the current measurement is over 40A, press “RANGE” button to select 400A range before zeroing.)
3. Open the jaw and put the tested conductor in the center of the clamp jaws (See Fig.2). (No gap is allowed between the connections of clamp jaws).
4. The current value will be displayed on the LCD.
5. The excesses magnetic value should be deducted from the reading data, if auto zero is not activated.

#### 4.6. RESISTANCE MEASUREMENTS

	<p style="text-align: center;"><b>WARNING</b></p> <p>Before taking any circuit or resistance measurement, remove power from the circuit being tested and discharge all the capacitors. If a reading is over range, the message “OL” will be displayed.</p>
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1. Select “ $\Omega / \cdot \Omega$ ” range.
2. Plug the red test lead into “V/ $\Omega$ ” jack, and plug the black test lead into COM jack.
3. Connect the two test leads to the desired circuit, then reading will be displayed.
4. Press HOLD button to hold the value when take the resistance measurement if it’s necessary.

#### 4.7. CONTINUITY TEST

1. Select “V/ (•)” range.
2. Insert two test leads into the jacks. The red test lead is for V/ $\Omega$  jack, and the black test lead is for COM jack.

3. Then connect the two test leads to the desired circuit, now reading is displayed. The buzzer sounds when resistance value is lower than  $40\Omega$  approximately.

#### 4.8. FREQUENCY MEASUREMENT

1. Select "Hz" range.
2. Plug the red test lead into  $V/\Omega$  jack, and plug the black test lead into COM jack.
3. Connect the two test leads in parallel to the desired circuit, now reading is displayed.

### 5. SYMBOLS DESCRIPTION

 Ground

 Meter double insulated

 Caution

 Danger high voltage: risk of electric shock

 DC voltage or current

 AC voltage or current

 DC/AC voltage or current

 Application around and removal from hazardous live conductors is permitted

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Do not touch or close to the inductive clamp when measuring current.
- Individual protective equipment ( For example: Insulation gloves) must be used when measuring current.

- **CAT IV** - For measurements are performed with the source of the low-voltage installation.
- **CAT III** - For measurements are performed in the building installation.
- **CAT II** - For measurements are performed on circuits directly connected to the low-voltage installation.
- **CAT I** - For measurements are performed on circuits not directly connected to mains.

## 6. SAFETY PRECAUTION



1. Measuring voltage over 20V may cause human body electricity conduction.
2. Measure AC power.
3. Do not measure voltage, current under high humid or wet environment.
4. If any unusual condition of test leads' end (metal part), and attachment of the meter, such as breakage, deformation, fracture, foreign substance, no display, etc., do not conduct any measurement.
5. Do not contact any exposed metal (conductive) parts, such as end of test lead, jack, fixed object, circuit etc.,
6. Keep you insulated from the object waiting for measuring.
7. Do not operate the meter under the environment with explosive gas (material), combustible gas(material) steam or filled with dust.
8. In order to avoid get incorrect reading, you have to replace the batteries immediately when the symbol BAT appears on the LCD.

9. In order to avoid the damage caused by contamination and static electricity, do not touch the circuit board before you take any adequate action.

## **7. MAINTENANCE NOTES**

### **7.1. BATTERY REPLACEMENT**

1. If the symbol "BAT" is shown on the display, strongly recommend you to replace the batteries immediately.
2. Remove all test leads and the conductor under test before performing of battery replacement.
3. Set the range to OFF position.
4. Remove the screws from the battery cover with screwdriver, and detach the batteries cover from the bottom cover.
5. Replace with new batteries UM-4 or SIZE 1.5V x 2.
6. Attach the battery cover back to its right place, and tight it with screws.

### **7.2. MAINTENANCE AND CARE**

1. This meter is a precision digital instrument. Whether in use or in storage, please do not exceed the specification requirements to avoid any possible damage or danger during use.
2. Do not use strong or abrasive detergents, water, and wet cloth to clean the instrument. Do use a dry cloth to clean the instrument.
3. Do not place this meter in high temperature or humidity or expose to direct sunlight.
4. Once the measurement is completed, turn the rotary switch to off. Remove the batteries from battery holder if the instrument will not be used for a long period, so that may avoid the liquid leakage from the batteries.



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