

TENMA[®]



Digital Clamp Meter

Model: 72-7222

SAFETY INFORMATION

Please read these instructions carefully before use and retain for future reference.













This meter is designed to meet IEC61010-1, 61010-2-032, and 61010-2-033 in Pollution Degree 2, Measurement Category (CAT II 600V, CAT III 300V) and double Insulation.

- Do not operate the meter or use test leads if they appear damaged, or if the meter is not operating properly.
- There are no user-serviceable parts in this product. Refer servicing to qualified personnel.
- Do not apply voltage between the COM and OHM terminals, while in the resistance measuring state.
- Do not measure current with the test leads inserted into the voltage or OHM terminals.
- To avoid electrical shock and personal injury, do not attempt to measure voltage higher than 600V AC/DC, although the readings may be obtained.
- Do not expose the instrument to direct sunlight, extreme temperature or humidity.
- Before measuring current, check the fuses and turn the power to the circuit off before connecting the meter to the circuit.
- Disconnect circuit power and discharge all high voltage capacitors before testing continuity, diode, resistance, capacitance or current.
- Do not use the meter around explosive gas or vapour.
- When using the test leads, keep your fingers behind the finger guards.
- Remove test leads from the meter before opening the meter case or battery door.
- Never operate the meter with the cover removed or the battery door open.
- Use only the test leads supplied or the protection may be impaired.
- Probe assemblies for mains measurements shall be rated as appropriate for measurement category III according to IEC 61010-031 and shall have a voltage RATING of at least the voltage of the circuit to be measured.
- Replace the batteries as soon as the low battery indicator appears on the display.
- Remove dead batteries from the meter or if it is not going to be used for a long time.
- Never mix old and new batteries together, or different types of batteries.
- Never dispose of batteries in a fire, or attempt to recharge ordinary batteries.
- Before replacing the battery, turn off the meter and disconnect all the test probes.
- To prolong battery life turn off the meter after use.

WHAT'S INCLUDED

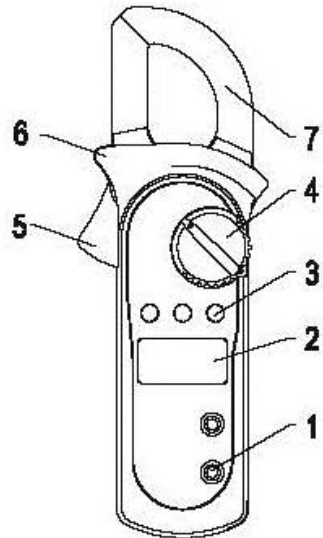
- Digital multimeter
- Zip case
- User manual
- Test leads
- Two 1.5V AAA batteries
- Point contact temperature probe

SYMBOL GUIDE

	AC (Alternating Current)
	DC (Direct Current)
	AC or DC
	Grounding
	Double insulated
	Warning
	Low battery
	Continuity buzzer
	Diode
	Fuse
	Capacitance test
	Conforms to European Union directives

FUNCTIONS

1. Input terminals
2. LCD Display
3. Function buttons x 3
4. Range selector
5. Trigger: press and release the trigger to open and close the detector jaw.
6. Hands guard: protects hands from touching the dangerous area.
7. Detector jaw: designed to pick up the AC current flowing through the conductor.



OPERATING PARAMETERS

- Operating temperature: $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- Relative Humidity: $\leq 75\%$.
- Temperature Coefficient: $0.1 \times$ (specified accuracy)/ 1°C

DC VOLTAGE AUTO RANGING

Range	Resolution	Accuracy	Overload Protection
200.0mV	0.1mV	$\pm(0.8\%+3)$	600V rms
2.000V	1mV	$\pm(0.8\%+1)$	
20.00V	10mV		
200.0V	100mV		
600V	1V	$\pm(1\%+3)$	

Note: The input impedance is $10\text{M}\Omega$.

AC VOLTAGE AUTO RANGING

Range	Resolution	Accuracy	Overload Protection
2.000V	1mV	$\pm(1.2\%+5)$	600V rms
20.00V	10mV		
200.0V	100mV		
600V	1V	$\pm(1.5\%+5)$	

Notes:


- Input Impedance: $10\text{M}\Omega // < 100\text{pF}$
- Frequency Response: $40\text{Hz} \sim 1\text{kHz}$
- Displays effective value of sine wave (mean value response)
- To adjust reading in accordance with effective value

RESISTANCE


Range	Resolution	Accuracy	Overload Protection
200.0 Ω	100m Ω	$\pm(1.2\%+2)$	600Vp
2.000k Ω	1 Ω	$\pm(1\%+2)$	
20.00k Ω	10 Ω		
200.0k Ω	100 Ω		
2.000M Ω	1k Ω	$\pm(1.2\%+2)$	
20.00M Ω	10k Ω	$\pm(1.5\%+2)$	

Note: The input impedance is $10\text{M}\Omega$.

DIODE AND CONTINUITY

Range	Resolution	Accuracy	Overload Protection
	1mV	Displays approximate forward voltage drop 0.5V~0.8V	600Vp

Note: The open circuit voltage is about 1.48V.

Range	Resolution	Accuracy	Overload Protection
	100mΩ	When ≤50Ω, the buzzer beeps.	600Vp

Notes:

- The open circuit voltage is about 0.45V.
- The buzzer may sound when the resistance of a circuit under test is 50Ω~120Ω.
- The buzzer does not sound when the resistance of a circuit under test is higher than 120Ω.

TEMPERATURE

Range	Resolution	Accuracy	Overload Protection
-40°C~1000°C	1°C	-40~0°C ±(3%+9)	600VP
		0~400°C: ±(1%+7)	
		400~1000°C: (2%+10)	
-40°F~1832°F	1°F	-40~32°F: (3%+10)	
		32°F~752°F: (1%+8)	
		752°F~1832°F: (2%+18)	

AC CURRENT AUTO RANGING

Range	Resolution	Accuracy	Frequency Response	Overload Protection
2.000A	0.001A	±(4%+30) ≤1A ±(3%+12)	50Hz~60Hz	400A rms
20.00A	0.01A	±(3%+12) ≤4A ±(2%+8)		
200.0A	0.1A	±(1.5%+5)		
400A	1A	±(1%+9)		

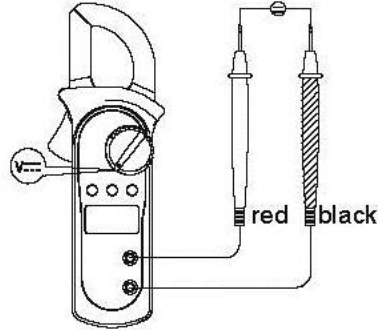
- Displays effective value of sine wave (mean value response).

OPERATION

Measuring DC Voltage

Warning

- To avoid damage to the meter, or risk of personal injury, do not attempt to measure higher than 600V.
- The DC voltage ranges are 200.0mV, 2.000V, 20.00V, 200.0V and 600V.
- To measure DC voltage, perform the following steps:
 1. Insert the red test lead into the Hz Duty% \rightarrow $V\Omega$ terminal and the black test lead into the **COM** terminal.
 2. Turn the range selector to $V\text{---}$
 3. Connect the test probes with the object being measured.
 4. The measured value shows on the display.



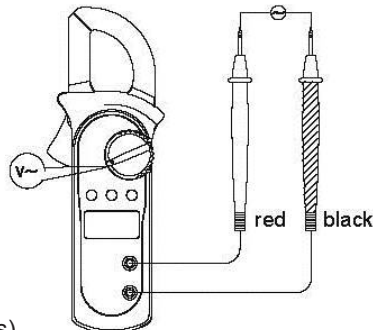
Note:

- In each range, the meter has an input impedance of 10MW. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10kW, the error is negligible (0.1 or less).
- When DC voltage measurement has been completed, disconnect the test leads from the circuit under test and remove them from the input terminals.

Measuring AC Voltage

Warning

- To avoid damage to the meter, or risk of personal injury, do not attempt to measure higher than 600V.
- The AC voltage ranges are 2.000V, 20.00V, 200.0V and 600V.
- To measure AC voltage, perform the following steps:
 1. Insert the red test lead into the Hz Duty% \rightarrow $V\Omega$ terminal and the black test lead into the **COM** terminal.
 2. Turn the range selector to $V\sim$
 3. Connect the test probes with the object being measured.
 4. The measured value shows on the display.



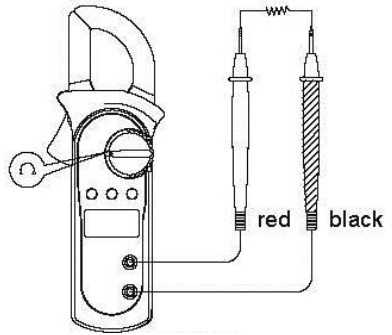
Note:

- In each range, the meter has an input impedance of 10mW. This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10kW, the error is negligible (0.1 or less).
- When AC voltage measurement has been completed, disconnect the test leads from the circuit under test, and remove them from the input terminals.

Measuring Resistance

Warning

- To avoid damage to the meter or to the devices under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance. The resistance ranges are 200.0 Ω , 2.000k Ω , 20.00k Ω ,200k Ω ,2.000M Ω and 20.00M Ω .
- To measure the resistance, perform the following steps:
 - Insert the red test lead into the Hz Duty% $\rightarrow V \Omega$ terminal and the black test lead into the COM terminal.
 - Turn the range selector to Ω . Press SELECT to select Ω mode.
 - Connect the test probes with the object being measured. The measured value shows on the display.

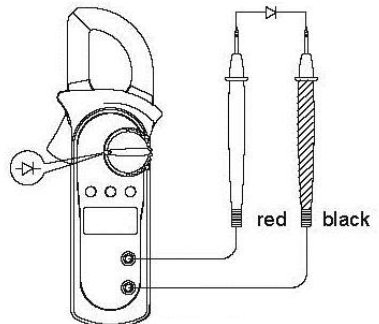


Notes:

- The test leads can add 0.1 Ω to 0.3 Ω of error to resistance measurement.
- For high-resistance measurement (>1M Ω), it normally requires several seconds to obtain a stable reading.
- If reading with shorted test leads is not 0.5 Ω , check for loose test leads, wrong function selected, or enabled data hold function.
- The LCD displays OL indicating open-circuit or the tested resistor value is higher than the maximum range of the meter.
- Removing the object under test from its circuit will allow more accurate measurement.
- When resistance measurement has been completed, disconnect the test leads from the circuit under test, and remove them from the input terminals.

Testing Diodes

- Use the diode test mode to check diodes, transistors and other semiconductor devices. In diode test mode, a current is sent through the semiconductor junction and the voltage drop across the junction is measured.
- To test a diode out of a circuit, perform the following steps,
 - Insert the red test lead into the Hz Duty% $\rightarrow V \Omega$ terminal and the black test lead into the COM terminal.
 - Turn the range selector to \rightarrow . Press SELECT to switch from diode measurement mode as default to continuity measurement mode if needed.
 - For forward voltage drop readings on any semiconductor component, connect the red test probe to the component's anode and the black test probe to the cathode.

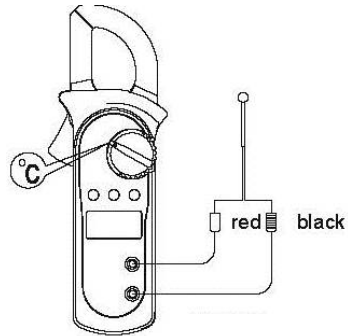


Notes:

- In a circuit, a good diode should still produce a forward voltage drop reading of 0.5V to 0.8; however, the reverse voltage drop reading can vary depending on the resistance of other pathways between the probe tips.
- The LCD will display OL indicating either open circuit or wrong polarity connection.
- The unit of diode is volt (V), displaying the forward voltage drop readings.
- To obtain a more precise reading, you could remove the object being measured from the circuit when measuring.
- When diode testing has been completed, disconnect the test leads from the circuit under test, and remove them from the input terminals.

Measuring Temperature

- The temperature measurement ranges are $-40^{\circ}\text{C}\sim 1000^{\circ}\text{C}$ and $-40^{\circ}\text{F}\sim 1832^{\circ}\text{F}$.
- To measure temperature, connect the meter as follows:
 1. Insert the red temperature probe into the $\text{V}\Omega$ terminal and the black temperature probe into the COM terminal.
 2. Turn the range selector to $^{\circ}\text{C}$ and press SELECT button to choose the measurement mode.

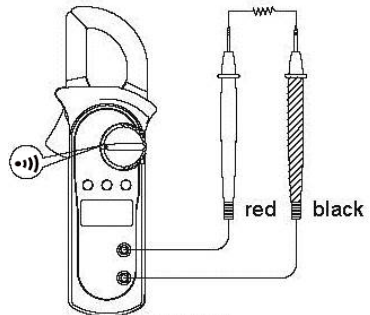


Note:

- The meter automatically displays the temperature value inside the meter when there is no temperature probe connection.

Measuring Continuity

- To test continuity, perform the following steps:
 1. Insert the red test lead into the Hz Duty% $\text{V}\Omega$ terminal and the black test lead into the COM terminal.
 2. Turn the range selector to $\text{V}\Omega$ and press SELECT button to choose the measurement mode.
- The buzzer will sound if the resistance of a circuit under test is less than 50Ω .
- The buzzer may sound if the resistance of a circuit under test is between 50Ω and 120Ω .
- The buzzer does not sound if the resistance of a circuit under test is higher than 120Ω .



Note:

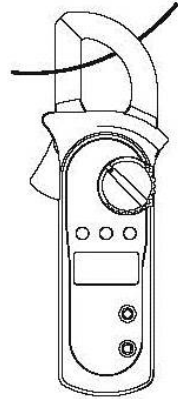
- The buzzer beeps once when pressing any buttons at any range selector positions except at 2/20A range selector position. If the button is not valid, it does not beep. At 2/20A range selector position, the buzzer is set not to beep.
- Approximately one minute before entering sleep mode, the buzzer will beep five times. Immediately before entering sleep mode, the buzzer will provide one long beep.

- The LCD displays OL indicating the circuit being tested is open.
- When continuity testing has been completed, disconnect the test leads from the circuit under test, and remove them from the input terminals.

Measuring AC Current

Warning

- To avoid electric shock, never measure current while the test leads are inserted into the input terminals. Never attempt an in-circuit current measurement where the open-circuit voltage between the circuit and the ground is greater than 600V.
- To measure current, do the following:
 1. Set the range selector to 2/20A or 200/400A
 2. Press the trigger to open the detector jaw.
 3. Center the conductor within the detector jaw.
- The measured value shows on the display, it is an effective value of sine wave (mean value response).



Note:

- To obtain accurate reading, measure only one conductor at each time.
- When current measurement has been completed, press the lever to open the transformer jaw again and remove the jaw from the conductor under test.


Sleep Mode

To preserve battery life, the meter automatically turns off after 15 minutes of inactivity. The meter can be activated by turning the range selector or pressing any button with the following conditions:

1. If the meter enters sleep mode while in the temperature function, the meter cannot be activated by turning the range selector to an AC current range.
 2. If using a Function Button to exit the sleep mode, only Function Buttons valid to the range selector position will be effective.
 3. The Hold function will be cancelled if the meter is activated by pressing the HOLD button.
- To disable the Sleep Mode function, press and hold HOLD button while turning on the meter.

Specifications

A. General Specifications:

Maximum voltage including transient overvoltage between any terminals and ground:	500V rms.
Auto Polarity Display:	3 1/2 digits LCD display, Maximum display 1999
Overload :	Display OL or -OL
Low battery :	Display 
Measurement Speed :	Updates 3 times/second.
Measurement Deviation :	When the conductor being measured is not placed centrally through the jaws during AC current measurement, it will cause 1% reading deviation.
Max. Jaw Size :	1.1" (28mm) diameter.
Projected Max.Current conductor size :	1.0" (26mm) diameter.
Power :	1.5V battery (AAA) x 2off
Battery Life :	typically 150hours (alkaline batteries)
Dimensions (H x W x L) :	1.2" x 3.0" x 8.2".
Weight :	Approximate 260g (battery included)

B. Environmental Restrictions:

Altitude :	Operating: 2000m Storage: 10000m
Temperature and humidity:	Operating: 0°C~30°C (75% R.H) 30°C~40°C (70%R.H) 40°C~50°C (45%R.H)
Storage:	-20°C~+60°C (75%R.H)

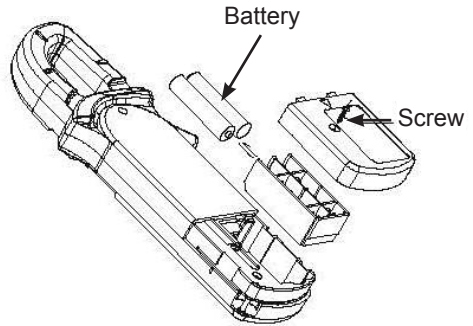
MAINTENANCE

Cleaning

- Clean the meter with a clean, soft cloth.
- Do not use any chemicals, abrasives or solvents that could damage the meter.
- Clean the terminals with a mild detergent, as dirt on the terminals can affect readings.

Replacing the battery

- When the meter displays the low battery symbol, replace the battery immediately in order to maintain normal operation.
- Disconnect and remove all test probes from any live source and the meter.
- Open the battery cover on the rear case with a screwdriver.
- Remove the old battery and fit a new 9V battery into the battery holder.
- Replace the battery cover.





INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT

These symbols indicate that separate collection of Waste Electrical and Electronic Equipment (WEEE) or waste batteries is required. Do not dispose of these items with general household waste. Separate for the treatment, recovery and recycling of the materials used. Waste batteries can be returned to any waste battery recycling point which are provided by most battery retailers. Contact your local authority for details of the battery and WEEE recycling schemes available in your area.



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Man Rev 1.0