TENMA®

Digital Clamp Meter

Model: 72-7224 & 72-7226

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

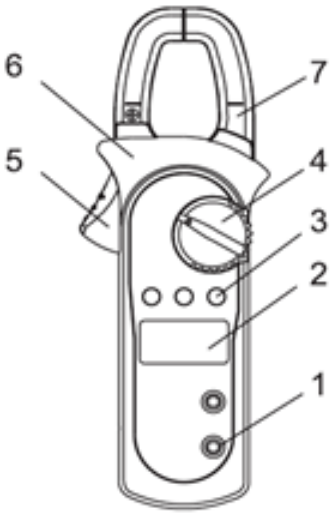
- Digital multimeter
- User manual
- Test lead
- One 9V battery
- Carrying bag

SYMBOL GUIDE

~	AC (Alternating Current)
⎓	DC (Direct Current)
≂	AC or DC
⏚	Grounding
⧈	Double insulated
⚠	Warning
⊟	Low battery
•))	Continuity Buzzer
⏩	Diode
▭	Fuse
⚡	Application around and removal from UNINSULATED HAZARDOUS LIVE conductors is permitted.
CE	Conforms to European Union directives
ETL Intertek 4007682	This symbol signifies the product complies with both USA and Canada requirements.

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 and DC current flowing through the conductor. It transfers current to voltage. The tested conductor must pass centrally through the jaw.



OPERATING PARAMETERS

- Operating temperature: 23°C± 5°C
- Relative Humidity: ≤85%.
- Temperature Coefficient: 0.1× (specified accuracy)/1°C

DC VOLTAGE

Range	Resolution	Accuracy	Overload Protection
400.0mV	0.1mV	±(0.8%+3)	600V DC/AC
4.000V	1mV	±(0.8%+1)	
40.00V	10mV		
400.0V	100mV		
600V	1V	±(1%+3)	

Note: The input impedance is 10MΩ.

AC VOLTAGE

Range	Resolution	Accuracy	Overload Protection
4.000V	1mV	±(1%+5)	600V DC/AC
40.00V	10mV		
400.0V	100mV		
600V	1V	±(1.2%+5)	

Notes:

- Input Impedance: 10MΩ
- Frequency Response: 40Hz~400Hz
- AC conversion type: Average-responded, calibrates the reading to be RMS by sine wave input.

RESISTANCE

Range	Resolution	Accuracy	Overload Protection
400.0Ω	100mΩ	±(1.2%+2)	600Vp
4.000kΩ	1Ω	±(1%+2)	
40.00kΩ	10Ω		
400.0kΩ	100Ω		
4.000MΩ	1kΩ	±(1.2%+2)	
40.00MΩ	10kΩ	±(1.5%+2)	

DIODE AND CONTINUITY

Range	Resolution	Accuracy	Overload Protection
	1mV	Displays approximate forward voltage drop	600Vp

Note: The open circuit voltage is about 1.48V.

Range	Resolution	Accuracy	Overload Protection
	100mΩ	When ≤10Ω, the buzzer beeps.	600Vp

Notes:
- The open circuit voltage is about 0.45V.
- The buzzer may beep when the resistance of a circuit under test is 10Ω~100Ω.
- The buzzer does not beep when the resistance of a circuit under test is higher than 100Ω.

FREQUENCY

Range	Resolution	Accuracy	Overload Protection
10Hz	0.001Hz	±(0.1%+3)	600Vp
100Hz	0.01Hz		
1kHz	0.1Hz		
10kHz	1Hz		
100kHz	10Hz		
1MHz	100Hz		
10MHz	1kHz	For reference only	

Notes:
- Input Sensitivity:
- ≤100kHz, ≥300mVrms
- >100kHz, ≥600mVrms
- >1MHz, ≥800mVrms

- Input Amplitude at:
- 10Hz~100kHz: 30Vrms ≥ a ≥ 300mVrms
- 100kHz~10MHz: 30Vrms ≥ a ≥ 600mVrms

DUTY CYCLE

Range	Resolution	Accuracy	Overload protection
0.1%~99.9%	0.1%	For reference only	600Vp

DC CURRENT

Range	Resolution	Accuracy	Overload Protection
40.00A	0.01A	±(2%+5)	400A DC/AC
400.0A	0.1A	±(2%+3)	

Notes

- If the reading is positive, the current direction is from down to up (See Figure 10, with the front panel facing up, and rear panel facing down).
- Do not release the jaw suddenly as the built-in Hall components are very sensitive to magnetic force, heat and mechanical stress, any shock will cause read errors.
- To measure DC current and obtain a more precise reading, perform the following steps:
  1. Hold the meter, and press the trigger to open the detector jaw. Center the conductor within the detector jaw, then release the trigger gently until the detector jaw is completely closed. Make sure the conductor to be measured is placed at the center of the detector jaw, otherwise it will produce ±1.0% measuring deviation based on the stated accuracy.
  2. Open the jaw and remove the detector from the current conductor.
  3. Press REL Δ to display zero.
  4. Repeat Step 1.

AC CURRENT

Range	Resolution	Accuracy	Frequency Response	Overload Protection
40.00A	0.01A	±(2.5%+8)	50Hz~60Hz	400A DC/AC
400.0A	0.1A	±(2.5%+5)		

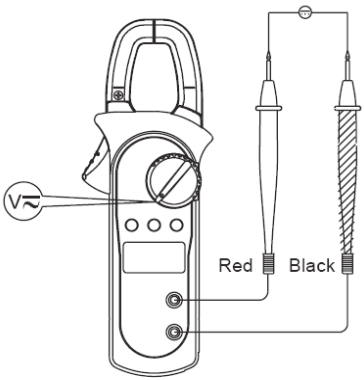
Note:

- To measure AC current and obtain a more precise reading, perform the following steps:
  1. Hold the meter, and press the trigger to open the detector jaw. Center the conductor within the detector jaw, then release the trigger gently until the detector jaw is completely closed. Make sure the conductor to be measured is placed at the center of the detector jaw, otherwise it will produce ±1.0% measuring deviation based on the stated accuracy.
  2. Open the jaw and remove the detector from the current conductor.
  3. Press REL Δ to display zero.
  4. Repeat Step 1.

OPERATION

Measuring DC/AC Voltage

- The DC voltage ranges are 400mV, 4V, 40V, 400V and 600V.
- The AC voltage ranges are 4V, 40V, 400V and 600V.
- To measure DC/AC voltage, perform the following steps:
  1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the **COM** terminal.
  2. Turn the range selector to V≂ and DC measurement mode and auto range are set as default. To measure AC voltage press **SELECT** switch to AC measurement mode, and press **REL** △ to switch to manual range measurement mode.
  3. Connect the test probes with the object being measured. The measured value shows on the display.

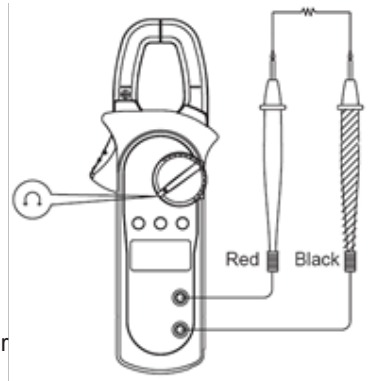


Note:

- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

Measuring Resistance

- The resistance ranges are 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ and 40MΩ.
- To measure the resistance, perform the following steps:
  1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the COM terminal.
  2. Turn the range selector to Ω. Press REL △ to switch from auto range as default to manual range during the measurement if required.
  3. Connect the test probes with the object being measured. The measured value shows on the display.

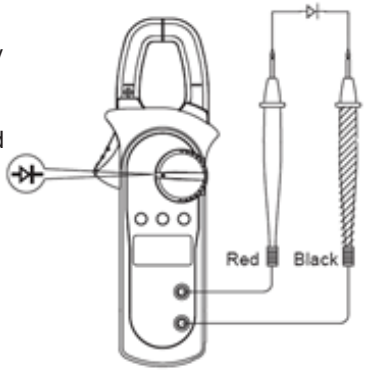


Notes:

- To obtain a more precise reading, you could remove the object being measured from the circuit when measuring.
- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

DIODE CHECK

- 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.
- A good silicon junction drop is between 0.5V and 0.8V.
- To test a diode out of a circuit, perform the following steps,
  1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the COM terminal.
  2. Turn the rotary switch to . Press SELECT to switch from diode measurement mode as default to continuity measurement mode if needed.
  3. 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.

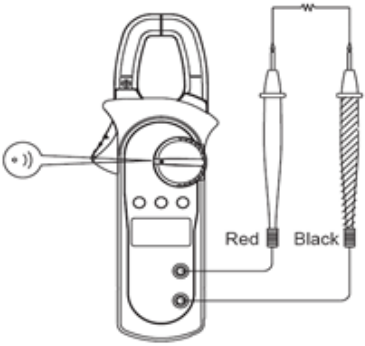


Notes:

- To obtain a more precise reading, you could remove the object being measured from the circuit when measuring.
- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

CONTINUITY CHECK

- To test continuity, perform the following steps:
  1. Insert the red test lead into the Hz Duty% terminal and the black test lead into the COM terminal.
  2. Turn the rotary switch to 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 100Ω.
- The buzzer does not sound if the resistance of a circuit under test is higher than 100Ω.

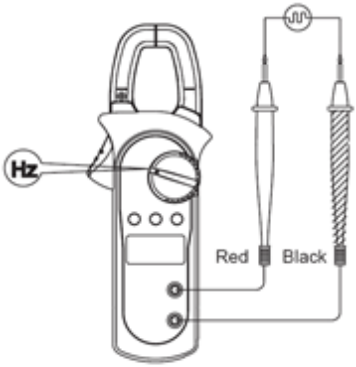


Note:

- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

FREQUENCY MEASUREMENT

- The frequency ranges are 10Hz, 100Hz, 1kHz, 10kHz, 100kHz, 1MHz and 10MHz.
- To measure frequency, perform the following steps:
  1. Insert the red test lead into the Hz Duty% •))+VΩ terminal and the black test lead into the COM terminal.
  2. Turn the rotary switch to **Hz**.
  3. Connect the test probes with the object being measured. The measured value shows on the display.

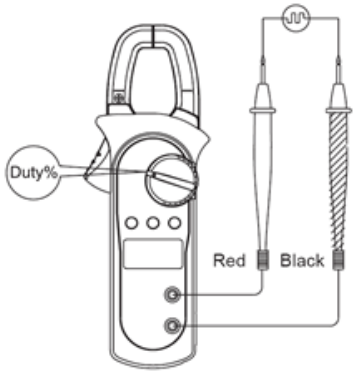


Note:

- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

DUTY CYCLE MEASUREMENT

- The duty cycle range is 0.1%~99.9%.
- To measure duty cycle, perform the following steps,
  1. Insert the red test lead into the Hz Duty% •))+VΩ terminal and the black test lead into the COM terminal.
  2. Turn the rotary switch to Hz and press REL Δ to select duty cycle measurement mode.
  3. Connect the test probes with the object being measured. The measured value shows on the display.

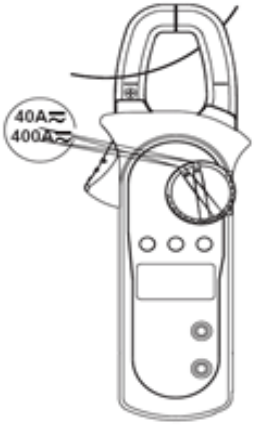


Note:

- When a measurement has been completed, disconnect the test probes from the circuit under test, and remove the test leads from the input terminals.

DC/AC CURRENT MEASUREMENT

- The current ranges are 40.00 **A** ≂ and 400.0 **A** ≂
- To measure current, perform the following steps,
  1. Turn the rotary switch to 40.00 **A** ≂ or 400.0 **A** ≂ and press SELECT to switch between DC (as default) and AC measurement mode.
  2. Press the trigger to open the detector jaw.
  3. Centre the conductor within the detector jaw, then release the trigger gently until the detector jaw is completely closed. Make sure the conductor to be measured is placed centrally otherwise it will produce an inaccurate measurement.
     The meter can only measure one conductor at a time. If more than one conductor is measured, incorrect readings will be displayed.
     To obtain a positive reading when measuring DC current, the current must flow in the direction from the rear of the meter to the front.



  4. Do not release the jaw suddenly as the built-in Hall components are very sensitive to magnetic force, heat and mechanical stress, any shock could cause damage and create read errors.

Notes:

- Press REL Δ to subtract a stored value from the present measurement value, then a differential measurement result is displayed.
- When a measurement has been completed, open the detector jaw and remove the meter from the conductor.
- The operating temperature must be 0ºC ~40ºC when measuring current.

Change to AC:
Model: 72-7224:

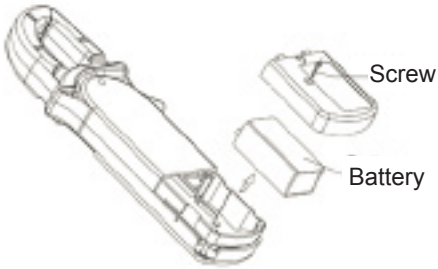
- Change to AC by using average response method.
- Input sine wave, then adjust the reading until it is same as the effective value.

Model: 72-7726:

- Combine AC and True RMS response method. Input sine wave to adjust.
- Non sine wave must follow the data below to adjust:
- Peak factor: 1.4~2.0, add 1.0% on the stated accuracy.
- Peak factor: 2.0~2.5, add 2.5% on the stated accuracy.
- Peak factor: 2.5~3.0, add 4.0% on the stated accuracy.

MAINTENANCE

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
- Remove the old battery and fit a new 9V
- Replace the battery cover.

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.

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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