AC/DC CLAMP METER

M-271+

INSTRUCTION MANUAL

Ver1.00

Thank you very much for selecting our AC/DC Clamp Meter M-271+.

This model is complex instrument and employ a very reliable mechanical/ electronic design.

Before you use your new instrument, read this Instruction.

Manual completely and familiarize yourself thoroughly with all functions.

Keep this manual carefully to take out whenever you need.

MULTI
Let's Create
New Concepts of
Instruments

MULTI MEASURING INSTRUMENTS CO.,LTD.
Akihabara Murai Bldg. 7F, 1-26 Kanda Sakuma-cho,
Chiyoda-ku, Tokyo, Japan, 101-0025
TEL : +81-3-3251-7016　FAX : +81-3-3253-4278
Home Page : http://www.multimic.com/
E-mail : multi@multimic.com

SAFETY SUMMARY

observe by all means

● To use this instrument safely, read this “SAFETY SUMMARY” carefully and apply the instrument correctly.

● The CAUTIONs and WARNINGs which appear on the following pages are stated to prevent the operator & other people from the dangers and their properties from the damages beforehand.

⚠ WARNING : This symbol indicates the contents "Possibilities of the death or the serious wound can be supposed" caused from mis-operations.

⚠ CAUTION : This symbol indicates the contents "Possibilities of the injury or only the material damage can be supposed" caused from mis-operations.

IEC directive: Do not install or remove around uninsulated, hazardous live conductors that may cause electric shock, electrical burns, or arc flash.

⚠WARNING

- Do not make measurements of power lines outside the specification range. IN SOME CASES, POWER LINES MAY CARRY VOLTAGE SPIKES OF SEVERAL TIMES OF THE NORMAL SUPPLY VOLTAGE. THIS INSTRUMENT SHOULD NOT BE USED TO MEASURE POWER LINES.
  *The term of “POWER LINE” means the electrical circuit providing the power to factories, buildings, and etc.
- Before operating this instrument, familiarize yourself with all instructions outlined in this manual.
- Always check to make sure that the function switch is set to the proper position.
- When making measurements, use CAUTION as dangerous voltages may be present in normally safe areas.
- To avoid electrical shock, use CAUTION when working outside the specification range (Within the scope of work described in the category, 1000V). Such voltages pose a shock hazard.
- Never make measurements with the case opened.
- Never fail to keep the maximum tolerable input.
- Never operate this instrument if it becomes wet, damp or has any liquid condensation build-up on any part of the instrument.
- Apply only the covered cables and do not clamp the bare cables. When measuring bare wires, use insulating gloves and be careful to avoid electric shock. To prevent electric shock accidents, users should ensure a safe work area and avoid contact with live parts when opening and closing the CT before using it.

1. GENERAL

- Low cost high performance and True RMS reading AC/DC2000A clamp-on tester.
- 4000 count full scale display.
- Additional AC1000V/DC1500V voltage, resistance, frequency test, diode test and continuity check.
- Data hold and auto power off function.
- Convenient push switch for auto zero adjustment for DC current measurement.

2. CAUTION BEFORE USE

After open the box, check the appearance of instrument and confirm whether standard accessories are contained. Once if you found an damage or shortage, contact the sales agent or directly to us.

3. SPECIFICATIONS

AC conversion& Measuring method	:	AC coupled true rms reading, Dual integration mode
Sampling	:	3 times/sec.
Display	:	Reading of ±3999 display with unit and symbols
Over range indication	:	Blanking of most significant digit "4" (except for AC1000V/DC1500V, AC/DC 2000A ranges)
Data Hold	:	"D·H" mark on LCD readout, holds the measuring displayed value
Low battery indication	:	"+ -" mark on LCD readout
Input polarity indicator	:	Displayed "-" when the DC current/voltage will be only input with reverse polarity.
Auto power off	:	The power is automatically turned off when the tester has not been used for approx. 10 min.
Other functions	:	Zero adjustment
Buzzer	:	The buzzer sounds in the following situations *Power switch on, power switch off, range switch, data hold switch on, overrange indicated, continuity check below 40Ω.
Overvoltage Category	:	CAT-IV 600V or CAT-III 1000V For safety use, when clamping on the insulated wire when measures current and voltage max AC1000V and DC1500V (for PV).
Standard	:	(Safety) IEC 61010-1, EN 61010,IEC61010-2-32 (EMC) IEC 61326-1, (Environment) RoHS Directive
Withstanding voltage	:	AC 5500V, 1 min (between outer case and core of CT)
Operating & storage temp & RH	:	0°C to 40°C(-10°C to 60°C), <80% RH (non-condensing)
Battery	:	AAA 1.5V x3, Consumption:36mW, Life:60 hours continuous.
Jaw opening capability	:	Φ55mm
Size and weight	:	85(W)x240(H)x34(D)mm, Approx. 400g (w/o batteries)

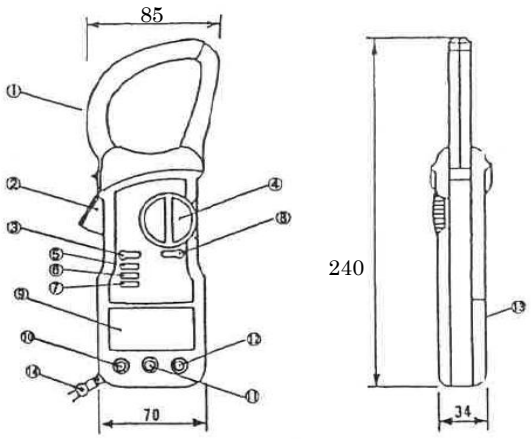
Measuring range and accuracy

Accuracy-guaranteed temperature and humidity: 23° C ± 5° C, < 80% RH , non-condensing, Crest factor: <2

Range		Resolution	Accuracy	Max input
AC (50/60Hz) A DC A	40A	0.01	±2% rdg±8 dgt	AC/DC 2000A (within 3s)
	400A	0.1	±1.5% rdg±8 dgt	
	2000A	1		
AC (50/60Hz)V DC V	400mV	0.1	±1.2%rdg±8dgt	AC 1000V rms DC 1500V
	4V	0.001		
	40V	0.01		
	400V	0.1		
	1500V	1		
Insulation Resistance Ω	400Ω	0.1	±1.5% rdg±8 dgt	AC/DC 250V rms (within 10s)
	4kΩ	0.001		
	40kΩ	0.01		
	400kΩ	0.1		
	4000kΩ	1		
	40MΩ	0.01	±3% rdg±10 dgt	
Continuity check ·))	400Ω	0.1	<Approx. 40Ω	250V rms
Diode test →|	3V	0.001	±10% rdg±3 dgt	250V rms
Hz	100Hz	0.01	±0.5% rdg±3 dgt	AC 1000V rms
	1kHz	0.1		
	10kHz	0.001		
	100kHz	0.01		
	1000kHz	0.1		

4. NAME OF PART & EXPLANATION

①Current transducer(Jaw)
②Jaw opening lever
③Power switch
④Function switch
⑤Range switch
⑥Sub-function switch (⎓/~, Ω/•))
⑦Zero adjustment switch
⑧Data hold switch
⑨LCD display
⑩Input terminal(V)(Hz)
⑪COM terminal
⑫Input terminal(Ω)(→|–)
⑬Battery cover
⑭Wrist strap



5. OPERATION

5-1. Measurement of Current

5-1-1 Measurement of DC Current

① Set the power switch to "ON" position.
② Set the function switch to a range appropriate to the current to be measured.
③ Press the zero adjustment switch once, the zero display will be observed.

Note: When pressing the zero adjustment switch in DC 40A range, even if the zero display is not obtained for high sensitivity, however, this is not abnormal and the accuracy is kept in the tolerance.

Fig.1

④ Clamp the conductor of the circuit at the center of CT.
⑤ Read the current value in the display.
⑥ If you make measurements in a dark place or in a place where it is difficult to see the readings, use the data hold switch.

Note : Clamp around only one conductor of the circuit to be measured. (See Fig.1)
Over range value is moved due to the zero adjustment, however, this is not abnormal.
To release the zero adjustment mode, press the zero adjustment switch at least 1 second.

5-1-2 Measurement of AC Current

① Set the power switch to "ON" position.
② Set the function switch to a range appropriate to the current to be measured.
③ Press the sub-function switch for AC measurement, "~" mark is displayed.
④ Clamp the conductor of the circuit at the center of CT.
⑤ Read the current value in the display.
⑥ If you make measurements in a dark place or in a place where it is difficult to see the readings, use the data hold switch.

Note : Clamp around only one conductor of the circuit to be measured. (See Fig.1)
When making the clamp measurements for high AC current, the noise sound of CT may be caused, however, this is not abnormal.

⚠WARNING

- To avoid electrical shock or damage, the measurement is limited to the circuit under 1000V AC(or DC1500V for PV facilities).
  Such voltages pose a shock hazard.
- Never fail to keep the maximum 2000A input to avoid electrical shock or damage.
- Apply only the covered cables and do not clamp the bare cables.When measuring bare wires, use insulating gloves and be careful to avoid electric shock.To prevent electric shock accidents, users should ensure a safe work area and avoid contact with live parts when opening and closing the CT before using it.

5-2. Measurement of Voltage

5-2-1. Measurement of AC Voltage

① Set the power switch to "ON" position.
② Connect the plug of red test lead into the “V” terminal and the plug of black test lead into the “COM” terminal.
③ Set the function switch to “~V” range. The auto ranging mode is selected.
④ Contact the tips of the test leads to the circuit under test.
⑤ Read the voltage value in the display.

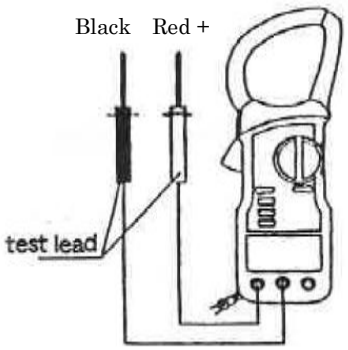


Fig. 2

Manual range mode:
Press the range switch to the manual range mode.
the instrument changes from the auto range to the manual ranging mode and the range is held. Subsequent pressing of switch causes the up-and down-ranging as below.

4V → 40V → 400V → 1000V → 400mV

To return to the auto ranging mode, press the range switch at least one second.

5-2-2. Measurement of DC Voltage

① Set the power switch to "ON" position.
② Connect the plug of red test lead into the “V” terminal and the plug of black test lead into the “COM” terminal.
③ Set the range selector switch to “ ⎓ V” range. The auto ranging mode is selected.
④ Contact the tips of the test leads to the circuit under test.
⑤ Read the voltage value in the display.

Manual range mode:
Press the range switch to select the manual range mode. The instruments changes from the auto ranging to the manual ranging mode and the range is held.
Subsequent pressing of the switch caused the up- and down-ranging as below.

4V → 40V → 400V → 1500V → 400mV

To return to the auto ranging mode, press the range switch at least one second.

⚠WARNING

●Do not make measurements of power lines carrying more than 250V. IN SOME CASES, POWER LINES MAY CARRY VOLTAGE SPIKES OF SEVERAL TIMES OF THE NORMAL SUPPLY VOLTAGE. THIS INSTRUMENT SHOULD NOT BE USED TO MEASURE POWER LINES.
* The term of "POWER LINE" means the electrical circuit providing the power to factories, buildings and etc.

●POSSIBLE ELECTRICAL SHOCK. Do not make measurements if the case is damaged or the rear case is removed. Remove all electrical inputs before removing the rear case.

●POSSIBLE ELECTRICAL SHOCK or FIRE HAZARD. Do not expose this tester to rain or moisture. Do not operate the tester in the presence of flammable gases or fumes.

⚠CAUTION

To avoid damage to the tester, disconnect test leads before changing functions. Do not exceed the maximum input limits.

5-3. Measurement of Resistance and Continuity Check

① Set the power switch to "ON" position.
② Connect the plug of red test lead into the "Ω" terminal and the plug of black test lead into the "COM" terminal.
③ Set the function switch to "Ω" range. The auto ranging mode is selected
⑤ Contact the tips of the teat leads to the circuit under test.
⑥ Read the resistance value in the display.

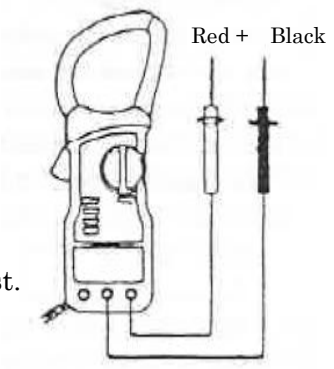


Fig.3

To select the continuity check, press the sub-function switch and "•))" mark is displayed. In the continuity check mode, if the circuit under test has a resistance of less than approximately 40Ω, the continuity beeper will sound.

Manual range mode:

Press the range switch to select the manual range mode. The instruments changes from the auto ranging to the manual ranging mode and the range is held. Subsequent pressing of the switch caused the up- and down-ranging as below.

40MΩ → 400Ω → 4KΩ → 40KΩ → 400KΩ → 4000KΩ

To return to the auto ranging mode, press the range switch at least one second.

⚠CAUTION

Be sure all voltage is turned OFF in the circuit before making resistance measurement.

5-4. Measurement of Frequency (Hz)

① Set the power switch to “ON” position.
② Connect the plug of red test lead into the “Hz” terminal and the plug of black test lead into the “COM” terminal.
③ Set the function switch to “Hz” range. The auto ranging mode is selected and the input sensitivity is set to 10mV.
④ Press the range switch to select the input sensitivity.
Subsequent pressing of the switch changes the sensitivity as below

10mV → 100mV → 1V

⑤ Contact the tips of the test leads to the circuit under test.
⑥ Read the frequency value in the display.

⚠ WARNING

Do not make measurements of power lines carrying more than 250V.
IN SOME CASES, POWER LINES MAY CARRY VOLTAGE SPIKES OF SEVERAL TIMES OF THE NORMAL SUPPLY VOLTAGE. THIS INSTRUMENT SHOULD NOT BE USED TO MEASURE POWER LINES.
* The term of “POWER LINE” means the electrical circuit providing the power to factories, buildings and etc.

5-5. Measurement of Diode

① Set the power switch to "ON" position.
② Connect the plug of red test lead into the “ →| ” terminal and the plug of black test lead into the “COM” terminal.
③ Set the range selector switch to “ →| ” range.
④ Contact the tips of the test leads to the diode under test.

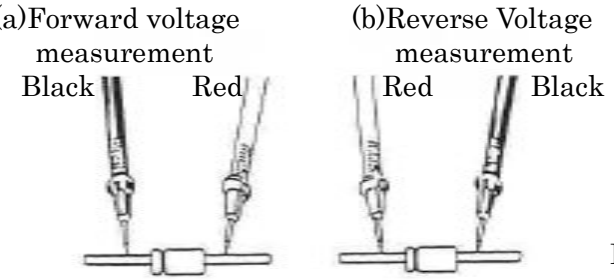


Fig. 4

As shown in Fig.4 (a), when measuring the forward voltage across the diode, a normal diode will indicate 0.4 to 0.7V and, as shown in Fig.4 (b) the reverse voltage will indicate a value near 3.000V. For a short-circuited diode, a value near 0mV will be displayed.

⚠CAUTION

Be sure all voltage is turned OFF in the circuit before making diode test.

6. REPLACEMENT OF BATTERIES

When the battery voltage falls below a specified voltage value, the "B" mark will appear in the display. If this occurs, replace the two batteries with new ones as quickly as possible.

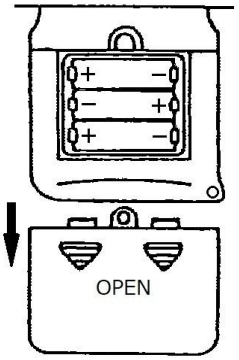
Turn the power switch to "OFF", prior to installing batteries.

To install the batteries, remove the battery cover located on the unit back.

Loosen the screw on the battery cover.

Replace the two batteries (UM-4 or type AAA) with new ones, observing polarity. Use high-quality batteries which are guaranteed against leakage.

If the instrument is to be left unused for long periods of time, to prevent damage from leakage, remove the batteries.



⚠WARNING

POSSIBLE ELECTRICAL SHOCK AND FIRE HAZARD

Do not replace the batteries, clamping CT to the conductor or during voltage measurement.

Do not use the instrument keeping battery cover off.

7.REPAIR SERVICE

When making requests for repair service, please bring the instrument directly to the dealer. If this is impossible, however, send the instrument directly to our sales office. When mailing this instrument, always pack it in its original or equivalent packing material and pack together with name, address, telephone number and the warranty documentation.

- To ensure speedy and reliable repair, always include information as the type of failure and cause.
- If required, always return accessories with the instrument.
- When contacting us, provide the model number and serial number of your instrument.

8. WARRANTY

This instrument is sent out from our factory after the sufficient internal inspections but if you find any defect due to the fault in our workmanship or the original parts, please contact the dealer where you bought the instrument.

The warranty period is 12 months from the date of purchase and the instrument shall be repaired at free of charge, provided that we judge the cause of defect is obviously resulted from our responsibility.

MULTI MEASURING INSTRUMENTS CO.,LTD.
Akihabara Murai Bldg. 7F, 1-26 Kanda Sakuma-cho,
Chiyoda-ku, Tokyo, Japan, 101-0025
TEL : +81-3-3251-7016　FAX : +81-3-3253-4278
Home Page : http://www.mutimic.com/e/
E-mail : multi@multimic.com