

AC CURRENT DIGITAL CLAMP-ON TESTER

MODEL M-2010+

INSTRUCTION MANUAL

Thank you very much for selecting our digital AC clamp-on tester.

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. With proper use and care, your tester will give you years of satisfactory service.

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1. FEATURES

- Multi functional clamp-on tester.
- Additional AC/DC voltage, resistance, diode test and continuity check.
- Data hold and auto power off function.

2. ⚠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.
- 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 above 60V DC or 25V AC rms.
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.
- Never make measurements for uninsulated conductors or bus bars.

3. SPECIFICATIONS

Safety standard : Meets the requirements for double insulation to IEC 1010-2-032, IEC 1010-1(1995), EN 61010-1(1995) installation Category IV 600V phase to earth.

E.M.C. standard : The instrument meets EN 50081-1 and EN 50082-1(1992)

Withstanding voltage : AC 5500V, 1 minute (between outer case and core of CT)

Measuring method : Dual integration mode

Jaw opening capability : 40mm ϕ

Display : 3 1/2 digit LCD max. reading of 1999 and annunciators

Over range indication : Blanking of all digits except MSD1 (Except AC/DC 1000V and AC 1000A range)

Low battery indication : "B" mark on LCD readout

Sampling : 2 times/s

Data hold indication : "D·H" mark on LCD readout

Auto power off : The meter is set to power off mode approx. 10 minutes after the power switch on.

Operating temperature : 0°C to 40°C, <80%RH (non-condensing)

Storage temperature : - 10°C to 60°C, <70%RH (non-condensing)

Power supply : 1.5V ("AAA" size, R03) x2

Power consumption and battery life : Approx. 3.5mW, 500 hours continuous.

Size : 70(W)x223(H)x34(D)mm

Weight : Approx. 425g

Accessories : Carrying case.....1

Instruction manual.....1

Batteries.....2

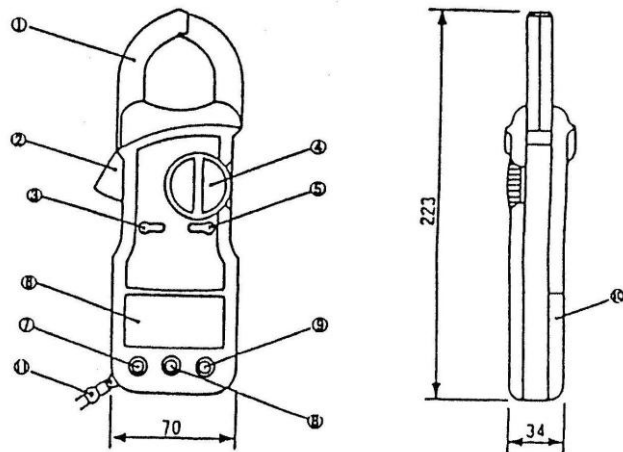
Test lead.....1set

Measuring range (23°C \pm 5°C, <80% RH) :

Range		Accuracy	Max. input
\sim A (50/60Hz) Manual range	20A	$\pm 1.5\%$ rdg ± 10 dgt	AC 1000A
	200A	"	
	1000A	$\pm 1.0\%$ rdg ± 8 dgt	
\sim V (50/60Hz) $\overline{\sim}$ V Auto range	2V	$\pm 0.7\%$ rdg ± 5 dgt	AC/DC 1000V rms
	20V	$\pm 1.2\%$ rdg ± 5 dgt	
	200V	"	
	1000V	"	
Ω (OHM) Auto range	200 Ω	$\pm 1.2\%$ rdg ± 5 dgt	Input protection
	2K Ω	"	250V rms
	20K Ω	"	
	200K Ω	"	
	2000K Ω	"	
	20M Ω	$\pm 3\%$ rdg ± 10 dgt	
\rightarrow) Continuity check	2K Ω	Continuity beeper < Approx. 300 Ω	250V rms
\rightarrow Diode test	2V	$\pm 10\%$ rdg ± 3 dgt	250V rms

4. DIMENSIONS AND PANEL FUNCTION

- ① Current transducer(Jaw)
- ② Jaw opening lever
- ③ Power switch
- ④ Range selector switch
- ⑤ Data hold switch
- ⑥ LCD display
- ⑦ Input terminal(V)
- ⑧ COM terminal
- ⑨ Input terminal(Ω)(\rightarrow |)
- ⑩ Battery cover
- ⑪ Wrist strap



5. METHOD OF MEASUREMENT

5-1. Measurement of AC Line Current

- ① Set the power switch to "ON" position.
- ② Set the range selector switch to a range appropriate to the current to be measured. Start the measurement at top range and then work down to lower range.
- ③ Clamp the conductor of the circuit at the center of CT.
- ④ Read the current value in the display.
- ⑤ 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.

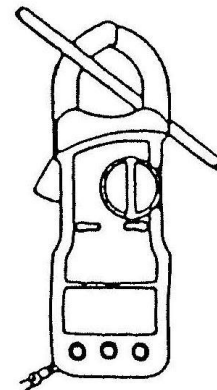


Fig.1

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.
Such voltages pose a shock hazard.
- Never fail to keep the maximum 1000A input to avoid electrical shock or damage.
- Never make measurements for uninsulated conductors or bus bars.

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 range selector switch to "ACV~" range.
- ④ Contact the tips of the test leads to the circuit under test.
- ⑤ Read the voltage value in the display.

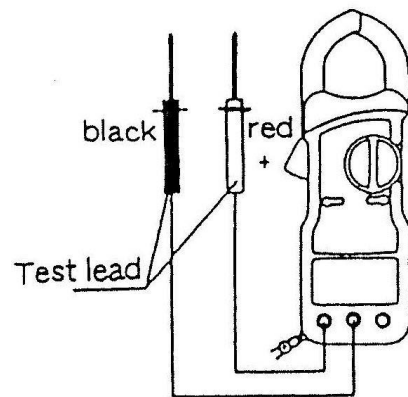


Fig.2

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 "DCV —" range.
- ④ Contact the tips of the test leads to the circuit under test.
- ⑤ Read the voltage value in the display.

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△WARNING

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.

△WARNING

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 range selector switch to “Ω” or “•••) 2K Ω” range.
- ④ Contact the tips of the test leads to the circuit under test.
- ⑤ Read the resistance value in the display.

In continuity check, if the circuit under test has a resistance of less than approximately 300Ω, the continuity beeper will sound.

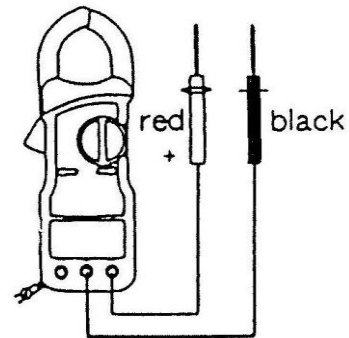


Fig.3

△CAUTION

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

5-4. Measurement of Diode

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

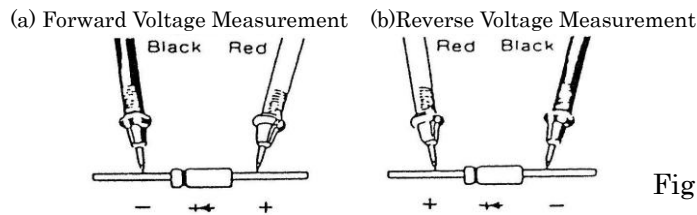


Fig.4

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 1.500. 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 AND FUSE

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.

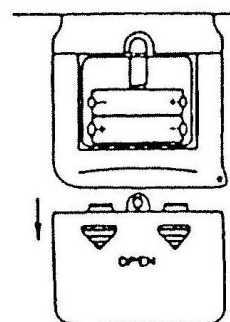
Turn the power switch to "OFF", prior to installing batteries.

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.



Battery Cover

△WARNING

Before changing batteries or fuse, removal all electrical input.



6. 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.

7. 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.

GURANTEE REGULATIONS

1. This instrument is warranted for the operation under normal use for 12 months from the date of purchase.
2. This warranty does not cover the following defects:
 - a. Defect caused from the improper use and operation.
 - b. Defect caused from the use, operation and storage beyond the original specifications, designs and conditions.
 - c. Defect caused from the renovations or repairs done by someone else than us or our representatives.
 - d. Defect not caused from our responsibilities.

