

**AC CURRENT/LEAKAGE
DIGITAL CLAMP-ON TESTER**

MODEL MCL-500DFN

INSTRUCTION MANUAL

Thank you very much for selecting our model MCL-500DFN
AC current/leakage digital clamp-on tester.

This model is complex instrument and employs 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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- 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.

△ **WARNING**

- This instrument is for the use of low voltage circuit.
- Do not make measurements in the circuit more than AC 500V.
Before use, check and confirm the circuit voltage to be measured.
- Apply only the coated cables and do not clamp the bare cables.
- Do not handle the instrument in the rain, at humid place, with a drop of water and or with wet hands.
- Do not use the instrument if the CT or CT case are damaged and if the battery cover is off, do not operate this instrument.
- Do not disassemble this instrument.

1. FEATURES

This instrument is a high precision clamp-on leakage current tester, concentrating the newest CT technologies and raising CT utilities very widely.

- Hardly having influence from outer magnetic fields and can measure small leakage current accurately even nearby motors, other power lines, etc.
- Applying rustless special alloy to the core and less aging degradation enables to keep an ever stable accuracy.
- Filter function for cutting high frequency signals.

2. SPECIFICATION

Measuring Function: Load Current (I), Leakage Current (Io), AC Voltage (V), Resistance (kΩ)

Measuring Method: CT Clamp-on Method

Measuring Range: Line/Leakage Current 40mA/400mA

Load Current 4A/40A/500A

AC Voltage 0~500V

Resistance 2kΩ/20kΩ/200kΩ

Input Frequency: 50/60Hz (can change the frequency by power on with pushing filter switch)

AC Current Detection: RMS conversion through average rectification

A/D Conversion: Successive approximation mode

Display: Max. 4000 count on LCD with annunciator

Change of Measuring Range: by rotary switch

Sampling Rate: 2 times/sec.

Over Range Indication: "OL" mark on LCD

Low Battery Indication: "B" mark on LCD

Auto Power Off: Automatically power off, approx. 10 minutes after the final key operation.

Data Hold Indication: "DH" mark on LCD by pressing data hold switch and press the switch again to release this function.

Filter Switch: By pressing filter switch in measurement of I & Io current, high frequency more than 150Hz will be cut off and "FL" mark on LCD.

By pressing the switch again, this function will be released.

Power Supply: AAA size alkaline battery (LR03 x 3)

Consumption Current: less than 7.5mA

Applicable Circuit Voltage: Less than AC 500V (insulated conductors)

Operating Temperature: 0 ~ 40°C, less than 85%RH without condensation

Storage Temperature: -10 ~ 60°C, less than 70%RH without condensation

Dimension & Weight: 70(W)x223(H)x34(D)mm, approx. 440g

Accessories: Batteries (LR03 x 3), Instruction Manual, Test Leads, Carrying Case

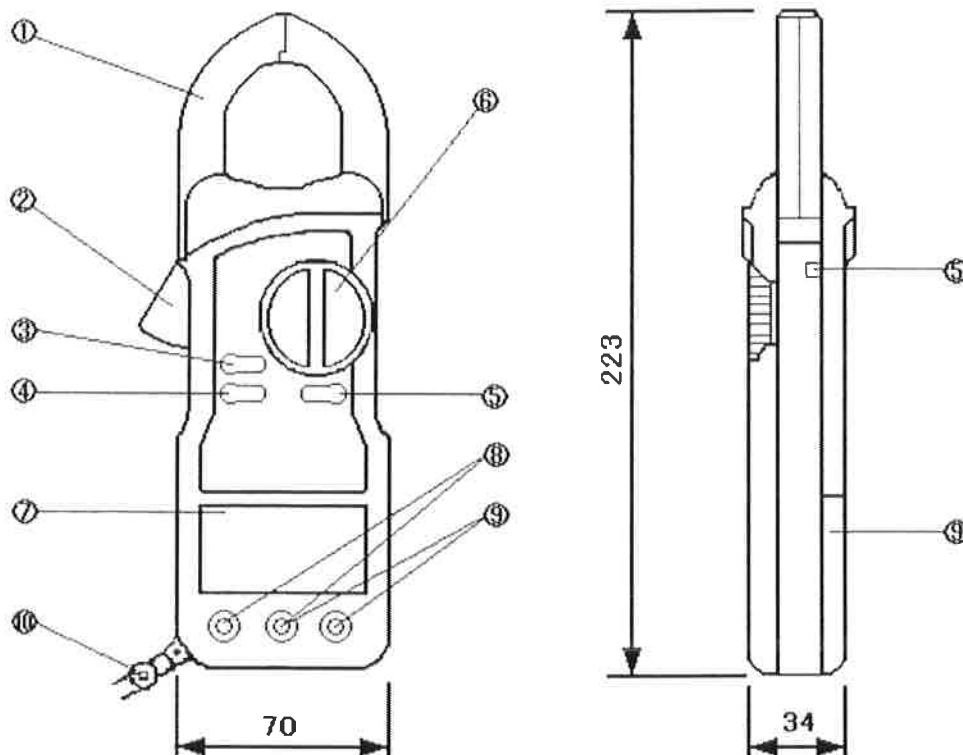
Accuracy (23°C ± 5°C, less than 85%RH)

	Range	Resolution	Accuracy
AC current (50/60Hz)	40mA	0.01mA	± 1.0% rdg ± 10 dgt
	400mA	0.1mA	
	4A	0.001A	
	40A	0.01A	
	500A	0.1A	± 1.0% rdg ± 3% FS
AC voltage	500V	0.1V	± 1.0% rdg ± 10 dgt
Resistance	2kΩ	0.001kΩ	± 1.0% rdg ± 10 dgt
	20kΩ	0.01kΩ	
	200kΩ	0.1kΩ	

* The accuracy when the conductor to be measured is located in the center of CT.

* Specifications/Dimensions subject to change without notice for modification, etc.

3. DIMENSIONS AND PANEL FUNCTION

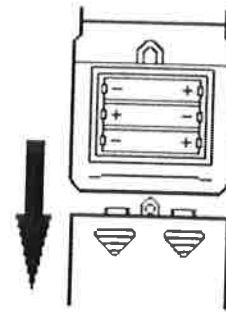


- ①Clamp type ZCT: Current detection sensor, clamp-on method.
- ②Jaw opening lever: By pressing to the inside, clamp part opens.
- ③POWER (power supply switch): By pressing this switch, power on of the instrument.
By pressing again, power will be off. By auto power off function, power supply will be off automatically approx. 10 minutes after the final key operation.
- ④FILTER (filter switch): When measuring current & voltage, "FL" mark on LCD by pressing this switch to cut off high frequency. By pressing again, this function will be released. Also, the frequency (50Hz/60Hz) can be changed by power on with pressing this switch.
- ⑤D-HOLD (data hold switch): By pressing this switch, "DH" appears on LCD and the displayed value will be hold. By pressing again, this function will be released. There are two D-HOLD switches on the front & side case as per drawing.
- ⑥Range selector switch: For changing measuring ranges.
- ⑦Display (LCD): Display for measured value, measuring and battery conditions.
- ⑧Voltage input terminal (red, black):Connection terminals for test leads when measuring AC voltage.
- ⑨Resistance measuring terminal (black, white): Connection terminals for test leads when measuring resistance.
- ⑩Battery cover: When replace the batteries (AAA size x 3), remove this cover.
- ⑪Hand strap: During measurement, prevent the instrument from dropping by wearing this strap around wrist.

4. METHOD OF MEASUREMENT

4-1. REPLACEMENT OF BATTERIES

- 1) Remove the fixing screw of battery cover by + driver on rear case and slide the battery cover to the direction of arrow mark to open battery case.
- 2) Take out 3 exhausted batteries.
- 3) Install new batteries (UM-4 or type AAA), observing polarity.
- 4) Put back the battery cover to the original position and tighten the fixing screw firmly.



Δ WARNING

POSSIBLE ELECTRICAL SHOCK or FIRE HAZARD

- Do not replace the batteries under the conditions of clamping CT to the conductor and or inputting voltage to the terminals.
- Do not use the instrument leaving battery cover off.

Δ CAUTION

- In case of not using the instrument for a long time, remove the batteries and storage. Leakage of batteries may cause damage of instrument.

- * When the batteries are exhausted less than operation voltage, "B" mark will appear on the display. Replace the batteries to new ones immediately.
- * Do not use the mixed batteries of new & old ones and or different kinds.

4-2. Measurement

Δ WARNING

POSSIBLE ELECTRICAL SHOCK

- For safety, use the instrument in the circuit less than AC 500V.
Before use, confirm the circuit voltage to be measured.

POSSIBLE ELECTRICAL SHOCK or ACCIDENT

- Avoid to operate the instrument in the rain, moist condition, with water drops and or wet hands.
- Do not use the instrument in case that body case and or CT are damaged.
- Do not use the instrument leaving battery cover off.

POSSIBLE ELECTRICAL SHOCK, FIRE HAZARD or COMBUSTION

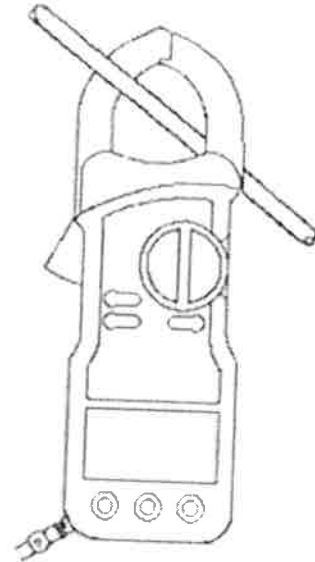
- If applying large current in excess to CT part, it may have heat.
- Do not apply the current more than AC 500A to CT part.
- Do not apply the voltage more than AC 500V to voltage input terminals.

POSSIBLE CAUSE OF ACCIDENT

- Do not give a shock to the tip of clamp CT.

4-2-1 Measurement of Line Current

- 1) Press the power switch ③ once.
- 2) Select the appropriate range to be measured by rotary switch (set bigger range than expectation initially).
- 3) Open the CT and clamp it to the conductor to be measured.
- 4) Read the displayed value.
(In case of over range, "OL" mark appears on LCD).
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 ⑤.
If "DH" mark lightens on LCD, this function is still effective.
- 5) If you want to cut the high frequencies, press FILTER switch ④.



Note :

- Clamp around only one conductor of the circuit to be measured.
In case of clamping cable, parallel line, etc. en bloc, the line current cannot be measured.

4-2-2 Measurement of Leakage Current

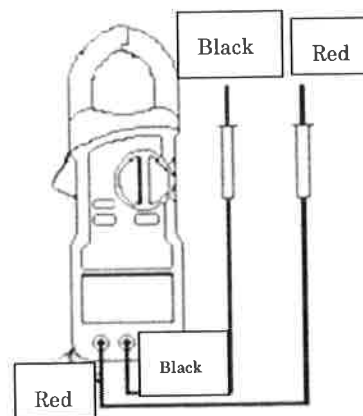
- 1) Leakage Current Measurement for Grounding Line
The operation is in the same manner as for line current measurement.
- 2) Leakage Current Measurement except for Grounding Line
The operation is the same as for line current but clamp CT to the circuit en bloc. (1 Phase/2 Wires = 2 Wires, 1 Phase/3 Wires = 3 Wires, 3 Phase/3 Wires = 3 Wires, 3 Phase/4 Wires = 4 Wires).

Note:

- Do not apply to the conductor with diameter thicker than CT inside diameter nor in the narrow place. It may cause CT breakage.

4-2-3 Measurement of Voltage (500V Range)

- 1) Press the power switch ③ once.
- 2) Set Range Switch ⑥ to 500V position.
- 3) Connect the test leads (standard accessory) to the voltage input terminals ⑧ (red, black).
- 4) Contact test leads to the circuit to be measured.
- 5) Read the displayed value on LCD.



Δ CAUTION

- Do not input the voltage more than AC 500V to the terminals. It may cause breakage.
POSSIBLE ELECTRICAL SHOCK

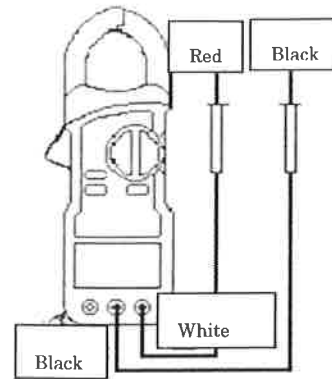
- Test leads are consumption articles. Before use, confirm if there is any damage. Suspend the use and repair or replace the test leads to new one, if you find any abnormality.

POSSIBLE INJURY or BURN

- Connect test leads certainly. By mis-connection, it may cause a spark.

4-2-4 Measurement of Resistance

- 1) Press the power switch ③ once.
- 2) Set Range switch ⑥ to $k\Omega$ position.
- 3) Connect the test leads to resistance measurement terminal ⑨.
- 4) Contact the tip of test leads to the object to be measured and read the displayed value.



Δ CAUTION

POSSIBLE DAMAGE OF INSTRUMENT

- When measuring resistance, the instrument prevents damage by working internal safety circuit even if the voltage is input by mistake.
- Do not make measurement, leaving battery cover off.
- In case of lightening "B" mark during measurement, the batteries become exhausted. Replace batteries to new ones immediately.

4-2-5 Change of Frequency

At the time of power on, the display will show the version of this instrument for 0.5 sec. At the same time, the numbers (50 or 60) will appear on the right upper side of LCD, which is the frequency of that time.

To change the frequency, keep pressing FILTER switch ④ under the condition of power off and press POWER switch ③ to get power supply.

After showed version, "F50" or "F60" appears on the display and the frequency will be changed.

*F50 means 50Hz setting and F60 is for 60Hz.

5. Repair Service

When requesting for repair service, please bring the instrument directly to the dealer where you bought.

When mailing the instrument, always pack it in its original or equivalent.

Packing materials to avoid any damage during the transportation and also put together with documents showing your name, address, phone number and defect point.

6. 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