MILLIOHM METER

Model : MO-2001

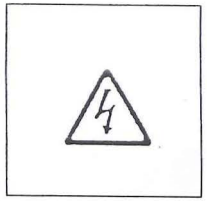


Your purchase of this MILLIOHM METER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

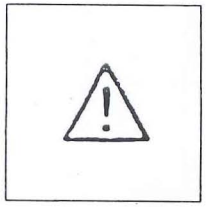
https://tecpel.com.tw/ Email: sales@tecpel.com Tel: 886-2-2218-3111

Caution Symbol



Caution :

* Do not touch the power source outlet & the power cord plug. Risk of electric shock !



Caution :

* Do not apply any voltage to the input terminal !
* Please check the right power supply voltage (110 Vac or 230 Vac)before operating the meter.
* Cleaning – Only use the dry cloth to clean the plastic case !

Environment Conditions

* Installation categories II .
* Pollution Degree 2.
* Altitude up to 2000 meters.
* Indoor use.
* Relative humidity 80% max.
* Operation ambient 0 to 40 °C.

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1. FEATURES

* 4 terminal devices for accurate measurement of very low resistance.
* Ideal for measuring the resistance of the motor coil, transformer, PCB layout.
* Ideal for testing protective conductors, lightning conductors and welded points.
* Wide measuring range, 0.1 m ohm – 2000 ohm, 5 ranges.
* 18 mm, large size LCD display, easy to read–out.
* LSI circuit provides high accuracy, reliability and durability.
* Built–in over input.
* Durable & portable housing plastic case with the front protective cover.

2. SPECIFICATIONS

2–1 General Specifications

Display	18 mm (0.7") LCD, Max. indication 1999.
Range	200 m ohm, 2,000 m ohm, 20 ohm, 200 ohm, 2000 ohm.
Zero Adjustment	External adjustment for zero value of the display. Adjusting range approx. ± 50 counts.
Input Terminal	4 terminal input, accurate for low ohms measuring.
Over input Indication	Indication of "1".
Sampling Time	Approx. 0.4 sec.
Operating Temp.	0° to 40° C (32° to 104° F).
Operating Humidity	Less than 80 % R.H..

Fuse	500 mA, 250 V, size : 5 x 20 mm.
Power Supply	AC 110V ± 10%, 50/60 Hz or AC 230V ± 10%, 50/60 Hz.
Power Consumption	Less than 2 VA.
Dimension	160 x 120 x 85 mm, with housing front cover.
Weight	Approx. 680 g (1.5 LB).
Standard Accessories	Power Cable.....1 PC. 4 wire with 2 kelvin clips.....1 pair. Instruction Manual.....1 PC.

2–2 Electrical Specifications (23 ± 5 °C)

Range	Resolution	Test current	Accuracy
200 m ohm	0.1 m ohm	100 mA	±(0.75% + 4d)
2000 m ohm	1 m ohm	10 mA	±(0.75% + 2d)
20 ohm	10 m ohm	10 mA	
200 ohm	0.1 ohm	1 mA	
2000 ohm	1 ohm	1 mA	

Range	Open circuit voltage
200 m ohm	Approx. 3.8 V DC
2000 m ohm	Approx. 3.4 V DC
20 ohm	Approx. 3.4 V DC
200 ohm	Approx. 3.2 V DC
2000 ohm	Approx. 3.2 V DC

Remark :

Spec. tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.

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3. FRONT PANEL DESCRIPTION

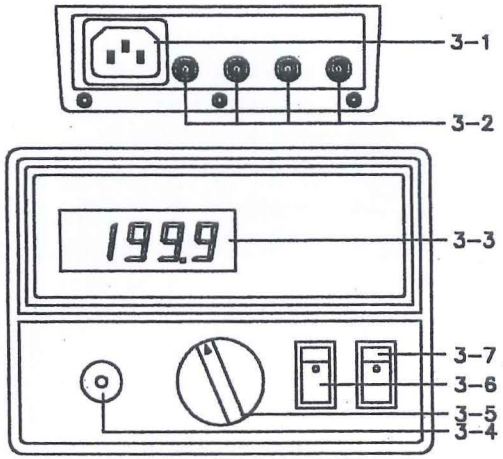

Fig. 1

3-1 AC Power Input Socket
3-2 4 Wires Input Terminal
3-3 Display
3-4 Zero Adjust Knob
3-5 Range Rotary Switch
3-6 200 m ohm/2000 m ohm, 20 ohm, 200 ohm, 2000 ohm Select Switch
3-7 Power On/Off Switch

4. BASIC 4 WIRES MEASURING PRINCIPLE

The DIGITAL MILLIOHM METER is the precision, wide range & small resistance with high resolution measuring instrument. As for preventing any measuring errors, especial to avoid the influence of "LEAD STRAY RESISTANCE" or "TEST WIRE'S RESISTANCE". The meter is designed according the following "4 WIRES MEASURING PRINCIPAL" to let the meter within high accuracy.

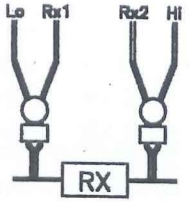

Fig. 2

* Please refer to 2.2 Electrical Specification (page 3), each range exist the exciting test current (from Hi to Lo terminal).
* The standard current is dropped to the unknown resistor Rx.
* From the terminal Rx1, Rx2 can measure a voltage : Vx = Is x Rx.
* According the Vx value, then meter can get the unknown resistance (Rx) values from following formula :

$$Rx = \frac{Vx}{Is}$$

* The measured resistance between Rx 1 and Rx 2 is not affected by any stray resistance of test wire.

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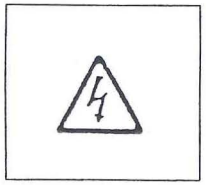
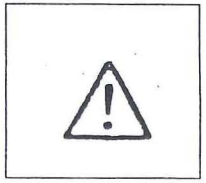
5. MEASURING PROCEDURES

1) * ***Please check carefully if the meter's power supply is AC 110 V or AC 230 V before operating the meter. There is a label at the rear of the meter to show the proper power source outlet AC 110 V or AC 230 V.***
   * ***Please don't input voltage to input terminal (Lo, Rx1, Rx2, Hi) to prevent any internal circuit damage.***



Caution :

* **Do not touch the power source outlet & the power cord plug. Risk of electric shock !**



Caution :

* **Do not apply any voltage to the input terminal !**
* **Please check the right power supply voltage (110 Vac or 230 Vac)before operating the meter.**

2) a. Engae the " Power On/Off Switch (3−7, Fig. 1) to the " On " position (" 1 " position).
   b. Rotate the " Range Rotary Switch " (3−5, Fig. 1) to the convenient & right range 200 m ohm, 2000 m ohm, 20 ohm, 200 ohm, 2000 ohm.
   c. Engage the " 200 m ohm/2000 m ohm, 20 ohm, 200 ohm, 2000 ohm Select Switch " (3−6, Fig. 1) to the " 200 ohm " position for the 200 m ohm range measurement.

d. Engage the " 200 m ohm/2000 m ohm, 20 ohm, 200 ohm, 2000 ohm Select Switch " (3−6, Fig. 1) to the " 2000 m ohm, 20 ohm, 200 ohm, 2000 ohm " position except the 200 m ohm range measurement.

3) After select the above right range, then should make the following " ZERO ADJ. PROCEDURE " :
   a. Short the 2 clips.
   b. Rotate the " Zero Adjust Knob " (3−4, Fig. 1) until the display reading values show the zero values.

Consideration :

* ***Zero adjustment is necessary for range 200 m ohm, 2000 m ohm, 20 ohm only.***
* ***Recommend user select 200 m ohm range to make "ZERO ADJ. PROCEDURE"***

4) Connect the 2 clips as following Fig. 3 to measure the unknown resistance.

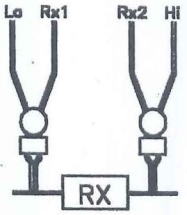


Fig. 3

5) Connect the 2 Kelvin clips as following Fig. 4 to measure the unknown resistance between two test points, such as PCB layout.

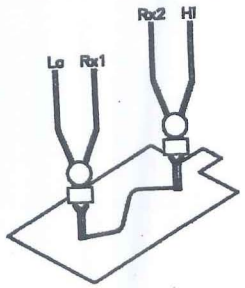


Fig. 4

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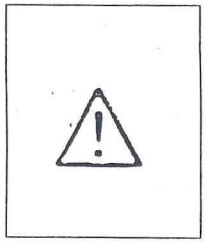
6. CLEAN & MAINTENANCE



* This instrument contains no operator servicable parts, service by qualified persons only.

* Cleaning – Only use the dry cloth to clean the plastic case !

7. THE ADDRESS OF AFTER SERVICE CENTER

0205–MO–2001–IEC1010

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