

DIGITAL INSULATION
INSULATION RESISTANCE TESTER

Model MIS-2D/3D/4D

INSTRUCTION MANUAL

Thank you very much for selecting our digital insulation resistance tester.

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

Before use the instrument, read this instruction manual completely and
familiarize yourself thoroughly with all functions.

Keep this instruction manual carefully to take out whenever you need.

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1. FEATURES

- MIS series are 3 ranges insulation resistance tester designed for testing of electrical installations and equipment in accordance with IEC international standard.
- Battery operation and heavy duty rugged case is used for high performance insulation testing.
- The big digital and bar graph LCD display with back light enabled easy observation. Especially, useful when working in dark place.
- Hand free and continuous measurements with custom made MΩ test switch.
- The voltage in the circuit or capacitor can be checked by warning lamp for safe insulation measurements.
- Data hold and auto power off function.
- Ultra compact, light weight.

2. SAFETY SUMMARY

- The CAUTIONs and WARNINGs which appear on the following pages must be followed to ensure operator safety and to retain the operating conditions of the instrument.

Safety Symbols:



indicates the operator must refer to an explanation in this manual.



indicates terminals at which dangerous voltages may exist.

WARNING

- To avoid electrical shock, use CAUTION when working with more than 60V DC or 25V rms.AC since the danger of electric shock exist. In addition, check that the test leads are normal condition.
- POSSIBLE ELECTRICALSHOCK:
Do not make measurements if the case is damaged.
Make sure that the terminals and the connecting cables are in a good condition and that the proper measuring function has been selected.
- POSSIBLE ELECTRICAL SHOCK or FIRE HAZARD:
Do not expose this instrument to rain or moisture.
Do not operate the instrument in the presence of flammable gasses or fumes.
- This instrument must be used only by professionals. Any adjustment, maintenance and repair of the opened apparatus under voltage shall be carried out only by a skilled person who is aware of the hazard involved.

CAUTION

Where it is likely that the protection has been impaired, the instrument shall be made inoperative and be secured against any unintended operation.

The protection is likely to be impaired if the instrument:

- shows visible damage.
- fails to perform the intended measurements.
- has been subjected to prolonged storage under unfavourable conditions.
- has been subjected to severe transport stresses.

3. SPECIFICATIONS

Function: Insulation resistance, AC voltage

Display: 3 1/2 digit LCD with bar graph, max. reading of 3200 count and annunciators

Response time: Less than 5 sec. (auto ranging)

Data hold indication: "DH" mark on LCD readout

Infinity indication: "OL (∞)" mark on LCD readout (over 3200 count)

Safety standard: IEC 61010-1, CAT. II 600V phase to earth

EMC standard: EN 61326

Constructional standard: IEC 61557-2

Insulation resistance: DC 500V-50M Ω or more (MIS-2D)

DC 1000V-50M Ω or more (MIS-3D, MIS-4D)

Withstanding voltage: AC 3700V/1minute, between input terminal and outer case

Low battery indication: "B" mark on LCD readout

Temperature characteristics (0~40 $^{\circ}$ C): $\pm 5\%$ rdg of specified accuracy

Operation temperature: 0 $^{\circ}$ C to 40 $^{\circ}$ C, less than 80% RH without condensation

Storage temperature: -10 $^{\circ}$ C to 60 $^{\circ}$ C, less than 80% RH without condensation

Power supply: 1.5V alkaline batteries (AA size, LR-6) x 6

Dimension: 170(W) x 105(H) x 54(D)mm, approx. 365g (excluding batteries)

Accessories: Line test lead 1

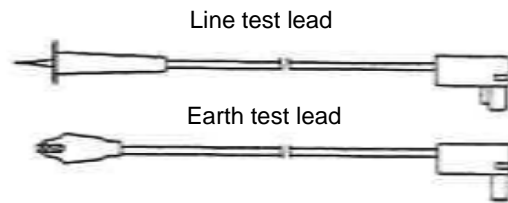
Earth test lead 1

Batteries 6

Test leads case 1

Belt 1

Instruction manual .. 1



Optional accessory: Test lead with remote switch

4. MEASURING RANGES AND TECHNICAL DATA

● Insulation resistance measurement

Model	MIS-2D	MIS-3D	MIS-4D
Rated voltage & effective measuring range	125V-20M Ω 250V-50M Ω 500V-100M Ω	250V-50M Ω 500V-100M Ω 1000V-2000M Ω	125V-20M Ω 250V-50M Ω 1000V-2000M Ω
Min. measurable resistance at rated voltage	0.125M Ω 0.25M Ω 0.5M Ω	0.25M Ω 0.5M Ω 1M Ω	0.125M Ω 0.25M Ω 1M Ω
Rated current	1mA +20% -0%		
Max. no-load voltage	Rated voltage +30% -0%		
Short circuit current	<2mA		

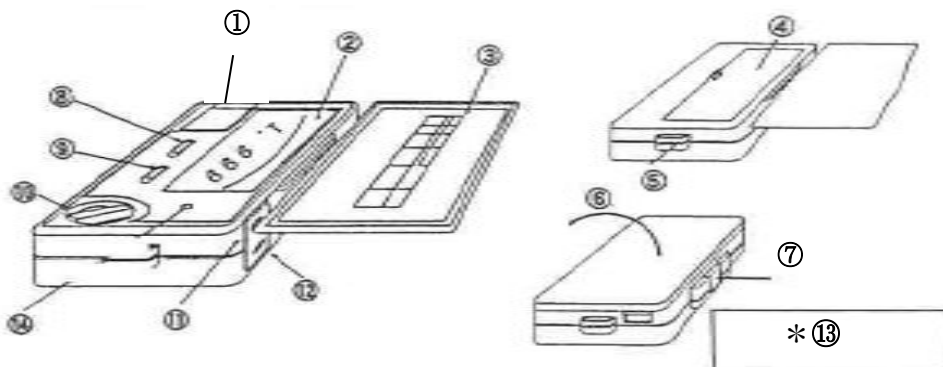
● Accuracy

Rated voltage	DC125V	DC250V	DC500V	DC1000V
Measuring range	0~20MΩ ~OL(∞)	0~50MΩ ~OL(∞)	0~100MΩ ~OL(∞)	0~2000MΩ ~OL(∞)
First effective range	0.02~10MΩ <±5%rdg	0.05~20MΩ <±5%rdg	0.1~50MΩ <±5%rdg	2~1000MΩ <±5%rdg
Second effective range	0.01~0.02MΩ 10~100MΩ <±10%rdg	0.02~0.05MΩ 20~100MΩ <±10%rdg	0.05~0.1MΩ 50~100MΩ <±10%rdg	1~2MΩ 1000~2000MΩ <±10%rdg
Other range		100MΩ ~OL(∞) Not specified		2000MΩ ~OL(∞) Not specified

● AC voltage measurement (50Hz/60Hz)

Range	Accuracy	Input impedance	Max. input voltage
AC 600V	±2.5% of full scale	approx. 20MΩ	AC 600V rms

5. PANEL FUNCTION



- ① **MEASURE** MΩ test switch (*1)
- ② LCD display
- ③ Unit cover
- ④ Battery compartment cover
- ⑤ Belt connecting hole
- ⑥ Opening direction
- ⑦ To open the unit cover, depress the yellow button of the front
- ⑧ Data hold switch (*2)
- ⑨ Backlight switch (*3)
- ⑩ Range selector switch
- ⑪ Line terminal
- ⑫ Earth terminal
- ⑬ The unit cover can be settled on the bottom of the unit
- ⑭ HV lamp

Note: *1 The custom made $M\Omega$ test switch is used for hand free and continuous measurements. When the switch knob is pulled up, the switch is locked at continuous "ON" position. Thus, the continuous measurements are enabled without any switch operation.

*2 This switch is used to hold the displayed data during measurement. When pressed, the displayed value is held and "DH" mark appears in the display in this condition.

*3 This switch is used to turn on the LED back light. When pressed, the LED back light is lit for 10 minutes. By pressing this switch once again, the LED back light will be off.

6. METHOD OF MEASUREMENT

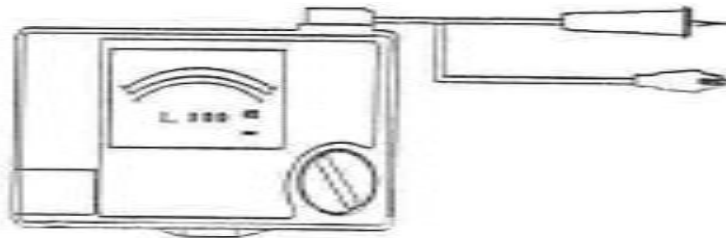
6-1. Precautions for Use

- Always check to make sure that the range selector switch is set to the proper position.
- Before making measurements, make sure that the terminals and test leads are in a good condition.
- Before making any measurement, make sure that the pointer of the instrument correspond to exactly to the zero at the beginning of the scale.
- When **MEASURE** $M\Omega$ test switch is set to "ON" position, a high voltage is being generated between line and earth terminals.
Do not touch any live parts in the circuit during the measurements.
- When making $M\Omega$ test, make sure all power is disconnected in the circuit to be measured.

6-2. Battery Check

When the battery voltage falls below a specified voltage value, "B" mark will appear on the display. If this occurs during the measurement, replace all batteries to new ones as soon as possible.

- ① To verify the battery charge, set the range selector switch to the highest insulation resistance test range.
- ② Connect the tip of line test lead to the alligator clip of earth test lead and press **MEASURE** $M\Omega$ test switch. If the batteries become exhausted, "B" mark will appear on the display.



⚠ WARNING

- When **MEASURE** $M\Omega$ test switch is pressed during the battery check, a high voltage is being generated between line and earth test lead.
Do not touch any live parts of the test leads.

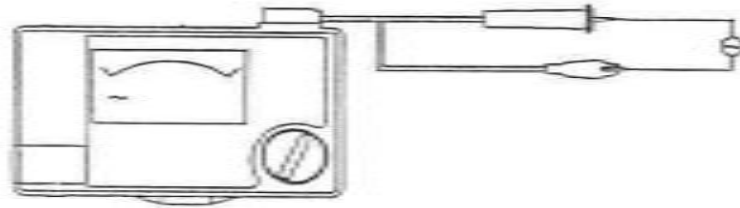
6-3. Auto Power Off Function

When a desired range is selected from “OFF” position, the power is turned on activating the display. If **MEASURE** MΩ test switch is not pressed within 10 minutes, the automatic power off function will operate to switch the power off automatically.

To release from this condition, reset the range selector switch again from “OFF” position or press **MEASURE** MΩ test switch.

6-4. Measurement of AC Voltage

- ① Verify the **MEASURE** MΩ test switch is set to “OFF” position.
- ② Set the range selector switch to “ACV” range. If the range selector switch is set to “ACV” position and even **MEASURE** MΩ test switch is pressed, this tester works as AC voltage measurement tester.
- ③ Connect the plugs of line test lead and earth test lead into the line and earth terminals respectively.
- ④ Connect the test leads to the circuit under test. If the voltage is applied to the unit, HV lamp is turned on.
- ⑤ Read the voltage value in the display after display stabilized.



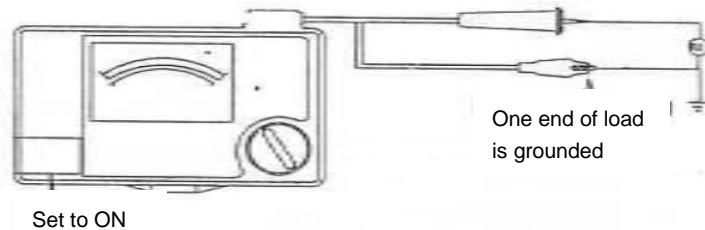
Set to OFF

⚠ WARNING

- POSSIBLE ELECTRICAL SHOCK or FIRE HAZARD.
Do not expose the instrument to rain or moisture. Do not operation the instrument in the presence of flammable gases or fumes.
- To avoid damage to the instrument, disconnect test leads before changing function.
- Never fail to keep the max. 600V AC input to avoid electrical shock or damage.
- To avoid electrical shock or damage, do not apply any voltage to the instrument when **MEASURE** MΩ test switch is set to “ON” position.

6-5. Insulation Resistance Test

- ① Set the range selector switch to a desired range appropriate to the circuit to be measured. (Refer to the section 4. "Insulation resistance measurement").
- ② Connect the test leads to line and earth terminals.
- ③ Connect the tip of line test lead to the alligator clip of earth test lead and press **MEASURE** MΩ test switch. Verify zero MΩ is indicated on the display.
- ④ Connect the test leads to the circuit under test and verify HV lamp is turned off.
- ⑤ Press **MEASURE** MΩ test switch and read the insulation resistance value on the display.



Note: "OL" mark indicate "over load" and "infinity (∞) of insulation resistance value".
When "OL" mark is displayed, " ∞ " mark also appears on the upper right side of LCD.

⚠WARNING

- When **MEASURE** MΩ test switch is set to "ON" position, a high voltage is being generated between line and earth terminals.
Do not touch any live parts in the circuit during the measurements.
- When making MΩ test, make sure all power is disconnected in the circuit to be measured.
- Always make sure HV lamp is turned off before pressing **MEASURE** MΩ test switch

6-6. Discharging of Capacitors in The Circuit

After the MΩ test has been done, keep to connect the test leads to the circuit under test and turn off the **MEASURE** MΩ test switch. The generation of voltage output is stopped and the discharging circuit is activated, thus, the charged electric power in the circuit will be discharged.

To verify the discharging condition, observe the HV lamp.

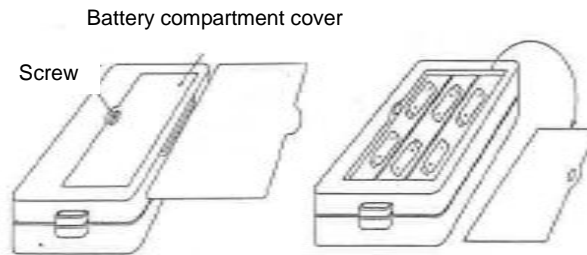
When discharged, HV lamp is turned off (no voltage condition).

7. REPLACEMENT OF BATTERIES

Before changing batteries, remove all electrical input and set the range selector switch to "OFF" position. To replace batteries, remove the battery cover located on the unit back. Loosen a screw on the battery cover by flat blade screw driver or coin. Then, slowly remove the battery cover.

Replace the six batteries (AA size or LR6) with new ones observing polarity.

Use high-quality batteries which are guaranteed against leakage. If the instrument is left unused for long periods of time, remove the batteries to prevent damage from leakage.



6. 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.

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.

GUARANTEE 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. Defects 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.