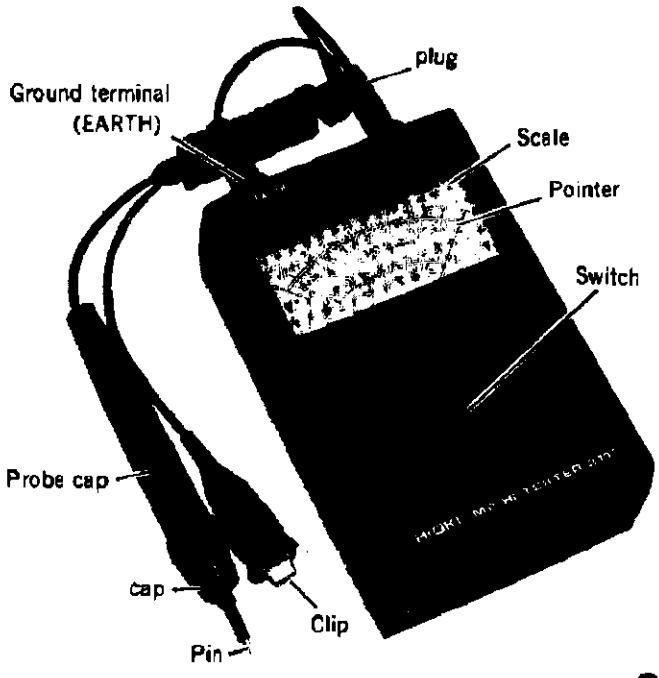
WARNING

This instrument is designed to prevent accidental shock to the operator when properly used. However no engineering design can render sate an instrument which is used carelessly. There-fore, this manual must be read carefully and completely befour making any measurement. Failure to follow directions can result in a serious or fatal accident.

Instrument Nomenclature



Specifications

	3111		3111-02	
Reting/ Measurement range	250 V-50 MΩ	500 V-100 MΩ	500 V-200 MΩ	1000 V/2000 MΩ
Accuracy	0.05 M~20 MΩ ± 5 % of rdg. 20 MΩ~50 MΩ ……±10% of rdg.	0.1 M~50 MΩ ± 5 % of rdg. 50MΩ~100MΩ ……±10% of rdg.	0.1 M~50 MΩ…… ± 5 % of rdg. 50 MΩ~200 MΩ …… ±10% of rdg.	2 M~500 MΩ…… ± 5 % of rdg. 500MΩ~2000 MΩ …… ±10% of rdg.
	Scale values other than above (including ∞): ±0.7% of scale length			
Other	Measurement terminal voltage : Over 90% rated voltage for 1 MΩ test resistance. At infinity, rated voltage. 0 ~+10 %.			Over 90% rated voltage for 50MΩ test resistance.
Resistance	0~100Ω ± 3 % of scale length 1A/250V protection fuse			
AC voltage	0~600 V ±7%f.s.			
Discharge	250V Range		500V Range	
Case	ABS plastic			
Batteries	Eight size AA batteries			
Low battery check	By band on meter scale			
Dimensions	170H×109W×53Dmm. Weight, 650g (approx.)			
Dielectric strength	AC 2000V, 1 min. (between meter circuit and case)			
Accessories	Size AA batteries, 8; Probe type test lead, 1; Clip type test lead; Spare fuse 1A/250V non-arcing (5.2×30mm, MF51NR-S), 1			
Optional accessories	Neckstrap type carrying case (3111: 9089, 3111-02: 9089-02)			

General Precautions

1. Do not apply voltage across the measurement terminals when the instrument is in the ohms range. This can damage or destroy the instrument, and also presents a shock hazard. Note also the fuse protection does not extend above 250V.
2. A fuse is installed in the meter to protect the ohms circuit. To check for a blown fuse, short the test leads together : an open fuse is indicated by an infinity (∞) reading.
3. Do not switch ranges with the power switch ON. This shortens the life of the switch contacts.
4. Always make sure that the range switch is positioned at a detent. (Using the meter between ranges will produce an erroneous reading.)
5. Always turn the power switch OFF when you are through. (Failure to do so will run the battery down.)

Operating Procedure

1. As illustrated in Fig. 1, plug the black test lead into the EARTH terminal, and the red lead into the LINE terminal. Twist the lead plugs to the right to lock them in place.
2. To check batteries, position the range switch to B. CH (as shown in Fig. 2), and without pressing the power switch, touch the LINE test probe to the B. CH terminal. If the pointer deflects into the B band, the batteries are good. If the pointer is to the right of the band, the batteries require replacement.

Insulation Resistance Measurements

1. **3111**

   To measure insulation resistance of a material with 500V across it, position the range switch to 500V (position to 250V for 250V, shown as switch position ① in Fig. 3).

   When using 500V, the readings will be taken from the upper

scale (0~100MΩ). For 250V, read from the lower scale (0 ~50MΩ).

3111-02

To measure insulation resistance of a material with 1000V across it, position the range switch to 1000V (position to 500V for 500V, shown as switch position ①in Fig. 3).

When using 1000V, the readings will be taken from the upper scale (0~2000MΩ). For 500V, read from the lower scale (0 ~200MΩ).

2. When one side of the test object is connected to ground, take the measurement with the EARTH lead (positive side) connected to the ground side. This will result in a lower reading, but this is the recommended method from the standpoint of safety. Note also that in this condition, the LINE lead must not touch ground or another object.
3. When the test object is not grounded, the test leads can be connected on either side. (There is no polarity.)
4. Press the center switch. The reading will indicate the insulation resistance of the test object.
5. If it is difficult to use the tip of the pin lead, screw back the pin cap and place the device lead in the gap thus created. Screw the cap up against the device lead to secure it. (See Fig. 4.)
6. If continuous measurements are to be made, swinging the center switch place up as shown in Fig. 5 lock the meter ON.
7. Always turn the power switch OFF after the measurement is completed.
8. **Discharge function**
   - When measuring insulation resistance of an object having a capacitance component, the object will charge to a value equivalent to rated measurement voltage (and will hold that value for a considerable length of time).
   - When using the 500 (3111-02 : 1000V) range, turning the

power switch OFF, and moving the range switch to 250V- (3111-02 : 500V) will automatically discharge the capacitance.

- When using the 250 (3111-02 : 500V) range, turning the power switch OFF will automatically discharge the capacitance.
- Note that discharge time will vary depending on the discharge constant and capacitance value. After the power switch has been turned OFF, leave the test leads in contact with the object until discharge is complete.

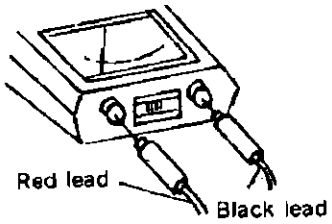


Fig. 1

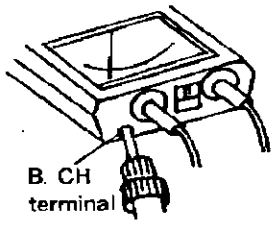


Fig. 2

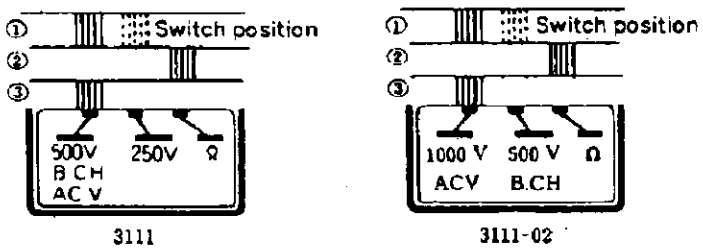


Fig. 3

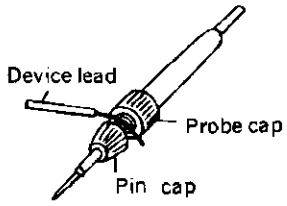


Fig. 4

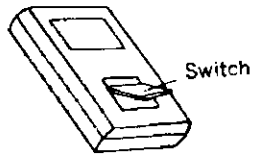


Fig. 5

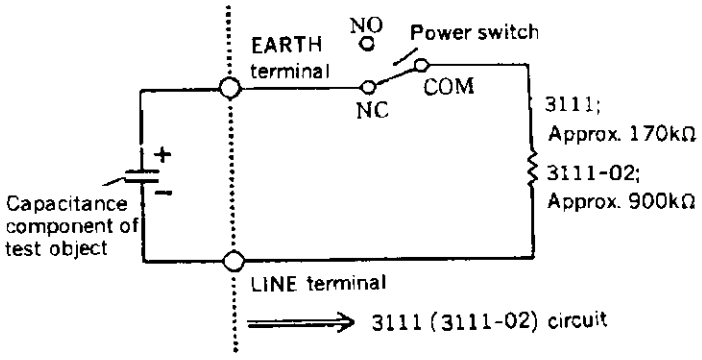


Fig. 6

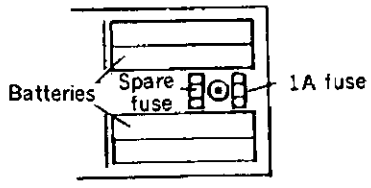


Fig. 7

Resistande Measurements

1. Position the range switch to Ω. (Switch position ②in Fig. 3.)
2. Press the power switch. Use the LINE probe and EARTH lead to measure resistance.
3. Take the reading from the Ω scale (green).
4. In some cases, the pointer will not indicate zero when the LINE probe and EARTH lead are shorted together. This is due to the contact resistance between the measurement terminal and the LINE probe and EARTH lead, along with the resistance of the fuse. In this case, take the reading when shorted, and subtract this value from the measurement value.

AC Voltage Measurements

1. Position the range switch to AC V. (Switch position ③in Fig. 3.)
2. Do not press the power switch. Measure voltage with the LINE probe and EARTH lead.
3. Take the reading from the AC V scale (red).

Battery and Fuse Replacement (Fig. 7)

1. Loosen the thumb screw holding the battery cover, and take the cover off. Pull the battery holder out of the case, and replace the batteries.
2. If the fuse blows, replace it with the spare provieed in the instrument.
3. The fuse used by this instrument is a 1A,250V non-arcing type, (3111; 1A: 250V) with dimensions of 5.2× 20mm.

Storage

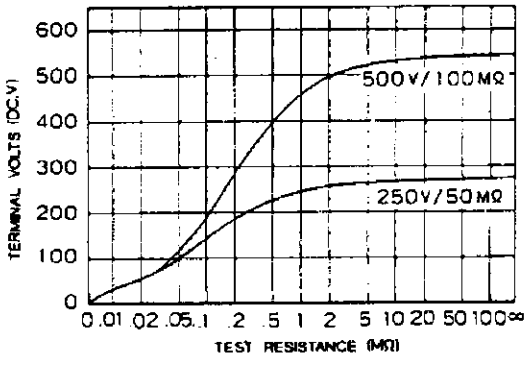
When storing the instrument, avoid the following conditions.

1. High humidity.
2. Direct sunlight, and extreme heat (inside a car, etc.)
3. Near heat sources (stoves, etc.)
4. Areas where strong vibrations are present.

Optional Accessories

The 9089 (3111), 9089-02 (3111-02) neckstrap type carring case is convenient for use in on-site jobs. Inquire at your Hioki dealer.

TYPICAL TERMINAL VOLTAGE CHARACTERISTICS



TYPICAL TERMINAL VOLTAGE CHARACTERISTICS