DIGITAL EARTH RESISTANCE TESTER
INSTRUCTION MANUAL

CE

Description by:

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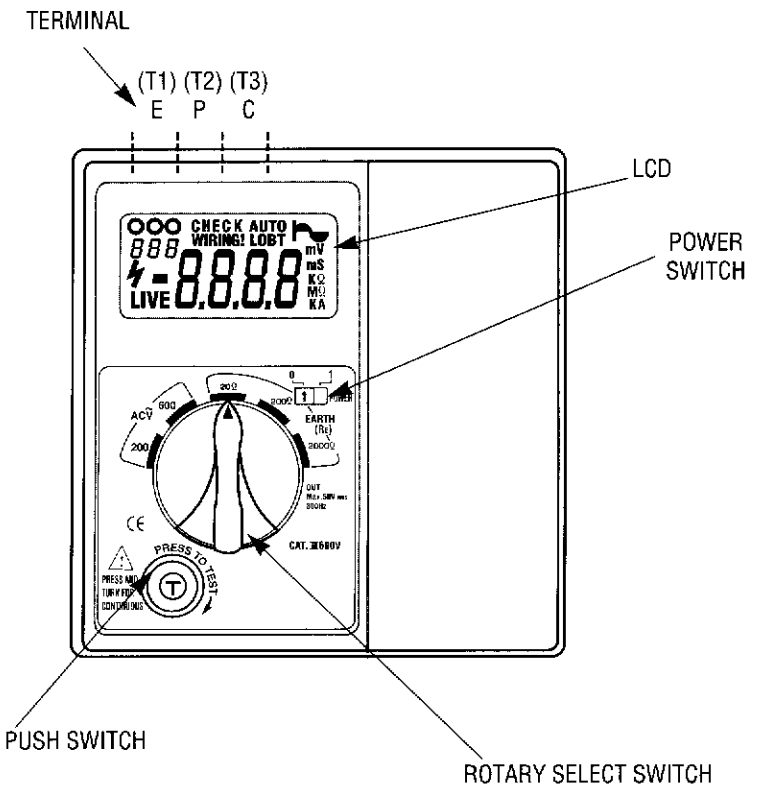
A. FRONT LINE DRAWING.



B. INSTRUCTION

1. Safety Warnings

This instruction manual contains information and warnings which have to be followed by the user to ensure safe operation and to retain the instrument in safe condition.
Read these operating instructions before using the instrument.
Pay particular attention to all **WARNINGS** and **CAUTIONS** in this instruction manual.

⚠ **WARNING** is for the user to avoid electric shock hazard.
CAUTION is for the user to avoid damage to the instrument.

1. Do not open the battery compartment cover when making measurement.
2. Before opening the battery compartment to replace the battery, make sure to set the TEST button to OFF position and remove test leads from the instrument.
3. To avoid electric shock hazard, do not use the instrument if it is in the following conditions ;
   a) Shows visible damage.
   b) Fails to perform intended operation.
   c) Remember to always inspect your instrument before use for any sign of abnormality or damage. If any abnormal conditions exist (e.g. damaged leads, cracked case, display faulty, etc.) do not attempt to make measurements.Return it to your nearest distributor for rectification.
   d) Always check the continuity of yours leads prior to setting the unit for measurement by following the instruction given in the sections bellow ;
   e) Do not make measurement if the instrument, test leads or your hands are wet.
   f) Do not make measurement in an explosive atmosphere (i.e. in the presence of flammable gasses or fumes, vapor or dust).
   g) Never exceed the maximum allowable of any function.
   h) Always set the TEST button to OFF position after use. When you do not use the instrument for a long period of time, place it in storage after removing the battery.

2.Safety Symbols

ϟ	DANGEROUS VOLTAGE	⚠	SEE EXPLANATION IN MANUAL
~	AC -ALTERNATING CURRENT	⏚	GROUND
⎓	DC-DIRECT CURRENT	▬	FUSE

3.EC Declaration of Conformity

This is to certify that model Earth Resistance Tester conforms to the protection requirements of the council directive 89/336/EEC, in the approximation of laws of the member states relating to Electromagnetic compatibility and 73/23/EEC, The Low Voltage Directive by application of the following standards:

EN 50081-1 1992 Emissions Standard
EN 50082-1 1992 Immunity Standard
EN61010-1 1993 Safety Standard
EN61010-2-031 1995 Safety Standard
EN61557-5 1997 Safety Standard

To ensure conformity with these standards, this instrument must be operated in accordance with the instructions and specifications given in this manual.

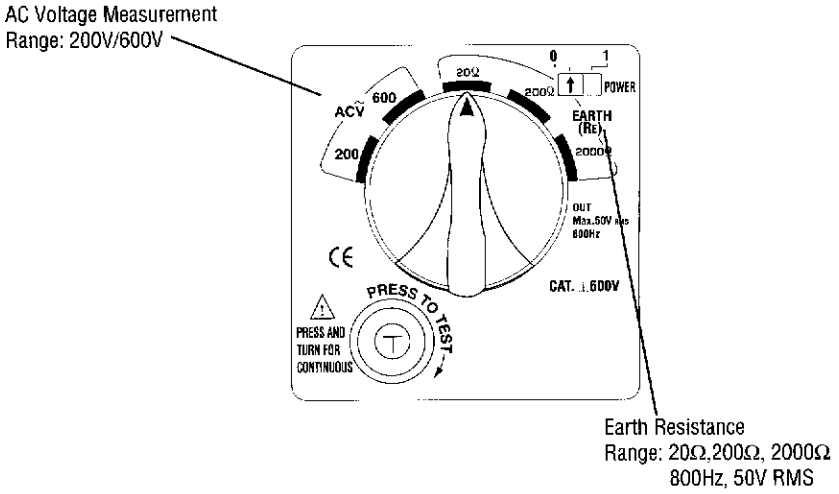
CAUTION:
Even though this instrument complies with the immunity standards, the accuracy can be affected by strong radio emissions not covered in the above standards. Sources such as hand held radio transceivers, radio and TV transmitters, vehicle radios and cellular phones generate electromagnetic radiation that could be induced into the test leads of this instrument. Care should be taken to avoid such situations or alternative and check to make sure that the instrument is not being influenced by these emissions.

C.INPUT TERMINAL APPLICATION & LIMIT

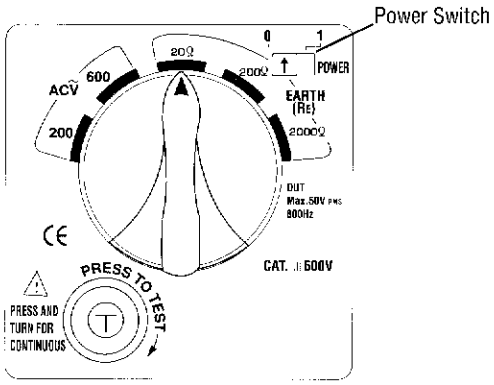
	T1	T2	T3	MAX INPUT
AC Voltage	E	-	L	600V
Earth Resistance	Earth	Potential	Current	250V

D.MEASUREMENT TECHNIQUES

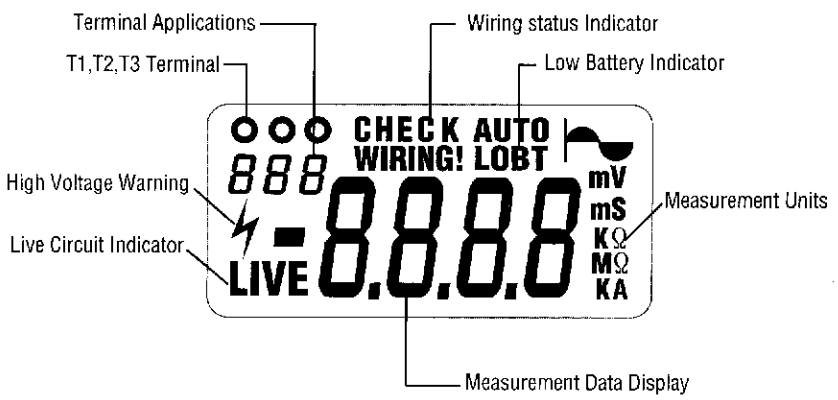
1. Rotary Switch



2. Slide Switch



3. Display



E. FEATURES

1. Earth resistance.

Available 3 or 2 pole measurement.

2. AC voltage.

F. TECHNICAL DATA

CE

IEC 1010 Over Voltage:
CAT III - 600V
Pollution Degree 2

※ INSTALLATION Ⅰ • Ⅱ • Ⅲ

INSTALLATION CATEGORY(OVERVOLTAGE CATEGORY)
: Signal level, special equipment or parts of equipment, telecommunication, electronic etc., with smaller transient overvoltages than INSTALLATION CATEGORY Ⅱ.

INSTALLATION CATEGORY(OVERVOLTAGE CATEGORY) Ⅱ
: Local level, appliances, PORTABLE EQUIPMENT etc., with smaller transient overvoltages than INSTALLATION CATEGORY Ⅲ.

INSTALLATION CATEGORY(OVERVOLTAGE CATEGORY) Ⅲ
: Distribution level, fixed installation, with smaller transient overvoltages than INSTALLATION CATEGORY Ⅳ.

*** IEC 529 1989 Safety standard**
IP CODE: IP20B

G. SPECIFICATION

1. AC Voltage Ranges

Measuring Ranges	; 200V / 600V
Input Impedance	; Approx. 10MΩ
Input Frequency	; 45Hz ~ 450Hz
Accuracy	; ±3% rdg. ±5dgt.

2. Earth Resistance Ranges: EN61557-5

Measuring Ranges	; 20Ω / 200Ω / 2000Ω
Test Waveform	; Approx. 800Hz AC / Less Than 50V RMS.
Accuracy	; 20Ω ±3% of rdg. ±5dgt. ±0.1Ω
	; 200Ω /2000Ω ±3% rdg. ±5dgt.

3. General Specifications

Operating Temperature	; 0°C - 40°C
Storage Temperature	; -10°C - 50°C
Operating Humidity	; 70% max.
Storage Humidity	; 80% max.
Dimensions	; 170 X 210 X 90
Weight	; 2.5Kg
Power Supply	; 8 X 1.5V battery.(Type R-6 or AA)
Battery Life Times	; 100 hours
Altitude Up To 2000M	
Indoor Use	

H. OPERATING INSTRUCTIONS

1. Measuring AC Volts

⚠ **WARNING:**
▶ Do not attempt to make a voltage measurement of more than 600V AC or of a voltage level that is unknown.

a) Set the function switch to ACV 200V or 600V as required.
b) Press the TEST button and Turn for continuous .
c) Connect the test leads to the instrument. The red lead is connected to the T3 (right hand socket / marked "L" on the LCD) and black lead to the T1(left hand socket / marked "E" on the LCD).
d) Connect the test leads to the circuit under test.
e) Read the value of AC volt from the LCD.

2. Measuring Earth Resistance

⚠ WARNING:

▶The instrument will produce a maximum voltage of about 50VAC across terminal T1(E) and terminal T2(P) or terminal T1(E) and terminal T3(C) in Earth Resistance function. Do not touch the test leads during an earth rest stance test.

▶Do not use in agricultural equipment to prevent damages of the equipment.

CAUTION:

▶When connecting the lead wires, make sure that they are separated. If measurement is made with the lead wires twisted or in touch with each other, the reading of the instrument may be affected by induction voltage. If earth resistance of auxiliary earth spikes is too large, it may result in inaccurate measurement. Make sure to stick the auxiliary earth spikes into the moist parts of the earth. Also, ensure sufficient connections between the respective terminals and lead wires.

▶When supplied series interference voltages more than 3V to between terminal "E" and "P" it prevents to have accurate measurements. When the resistor value between terminal "P" and "C" is more than Max 5kΩ, it is impossible to measure.

NORMAL EARTH RESISTANCE MEASUREMENT

a) Connection of test leads

Stick the auxiliary earth spikes, P and C, into the ground as shown in Fig.1. They should be aligned at an interval of 5 to 10 meters from the earthed equipment under test. Connect the green lead wire to the terminal E(T1) of the instrument, the black wire to the terminal P(T2) and the red wire to terminal C(T3).

NOTE: Make sure to stick the auxiliary earth spikes in the moist part of the earth. Give enough water when the auxiliary earth spikes have to be stuck into the dry, stony or sandy part of the earth so that it may become moist.

b) Earth Resistance Measurement

Set the function switch to 2000Ω position and press test button to make measurement. Then, if necessary turn the function switch to 200Ω or 20Ω position and make another measurement.

NOTE: If the earth resistance of auxiliary earth spike C is too high to make measurement, the main digit reads "----". When this time, reduce the earth resistance, for example by adding moisture to the part of the earth where the spike is stuck, and check the test lead for loose connection.

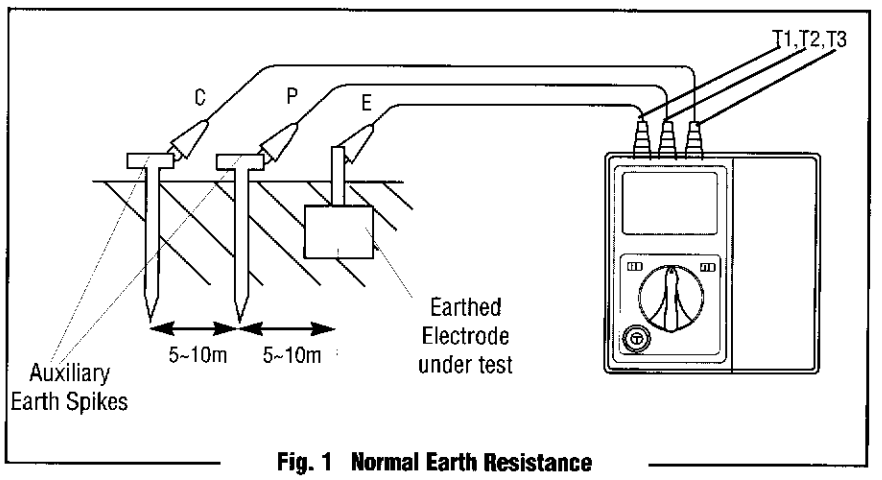


Fig. 1 Normal Earth Resistance

SIMPLIFIED EARTH RESISTANCE MEASUREMENT

Use this method when there is no space to stick auxiliary earth spikes. In this method, an existing earth electrode with a low earth resistance, such as metal water pipe, a common earth of a commercial power supply and an earth terminal of a building, can be used in place of C and P auxiliary earth spikes.

a) Connection of Test lead

Make connection as shown in Fig.2.

NOTE: Short P and C terminals with a shorting wire.

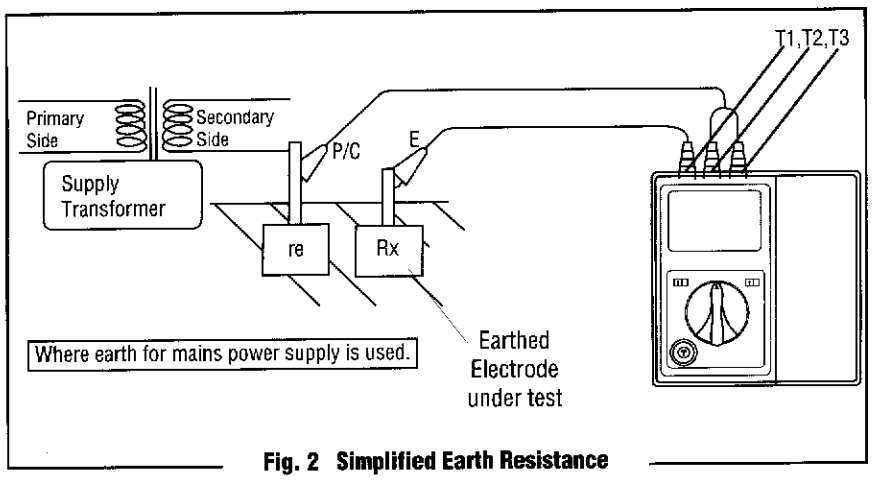


Fig. 2 Simplified Earth Resistance

⚠ WARNING:

▶Take caution to avoid electric shock hazard when making connection to an earth of a commercial power supply.

b) Earth Resistance Measurement

Set the function switch to 2000Ω position and press test button to make measurement. Then, if necessary turn the function switch to 200Ω or 20Ω position and make another measurement.

NOTE:

▶The instrument does not trip any residual current circuit breaker in a power distribution circuit since its measuring current is less than 2mA.

▶True earth resistance value Rx is calculated as follows.

RX= RE - re

re : Earth resistance of a common earth of commercial power supply, etc. Commercial power supply, etc.

RE : Reading of the instrument.

I. MAINTENANCE

⚠ **WARNING:**

▶ Always disconnect the test leads from the instrument before attempting battery or fuse replacement.

1. Battery Replacement

When the LCD shows the low battery indicator, the batteries need replacing Eight batteries (AA or equivalent) are required. Alkaline types are recommended.

a) Remove the two screws from back of the housing and battery cover.

b) Remove old batteries and replace with new ones observing the correct polarity as marked on the housing.

c) Close the battery cover and replace the meter screw.

2. Cleaning your Earth Resistance Tester.

Use a mild detergent and slightly damp cloth to clean the surfaces of the tester.

J. ACCESSORIES

1. HANGER BAND (SHOULDER STRAP) HS50
2. SPIKE SPK1000
3. GREEN CABLE (5M) GC5
   BLACK CABLE (10M) BC10
   RED CABLE (20M) RC20
4. CARRYING CASE CC5010

K. TROUBLE SHOOTING GUIDE

Problem	Probable Causes
Does not power up	• Dead or defective battery • Broken wire from battery terminal to PCB.
Won't display current readings	• Open test lead • Improperly connected to circuit under test

L. SERVICE

For any assistance or need repair parts contact your nearest distributors or SUMMIT Co., Ltd. SUMMIT's address can be found at the back of this manual.

Description by: