

Zico

ZI-9400

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EARTH RESISTANCE TESTER

Instruction Manual



Electronic Digital Earth Resistance Tester is direct replacement of the conventional hand generator type tester. It is designed for measurement of the resistance of earthing used in the electrical equipment as well as for measurement of ground resistivity. It can be used for measurements of the other low regular and liquid resistances. It can also be used for measurement of voltage AC, voltage DC and resistance. This instrument finds wide application for testing earthing installation in power based industries, telecommunication networks and electrical traction systems etc.

I. SAFETY INFORMATION

- Read the following safety information carefully before attempting to operate or service the meter.
- To avoid damages to the instrument do not apply the signals which exceed the maximum limits shown in the technical specifications tables.
- Do not use the meter or test leads if they look damaged. Use extreme caution when working around bare conductors or bus bars.
- Accidental contact with the conductor could result in electric shock.
- Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
- Read the operating instructions before use and follow all safety Information.

- Caution when working with voltages above 60V DC or 30V AC RMS. Such voltages pose a shock hazard.
- Before taking resistance measurements or testing acoustic continuity, disconnect circuit from main power supply and all loads from the circuit.

Safety symbols:



Caution refer to this manual before using the meter.



Dangerous voltages.



Meter is protected throughout by double insulation or reinforced insulation.

When servicing, use only specified replacement parts.

CE Comply with EN-61010-1

II. FEATURES

Earth resistance range: 20 Ω , 200 Ω , 2000 Ω

Display: Large LCD with dual display

Multimeter function Range: 200k Ω , 750VAC, 1000VDC.

Sampling Rate: 2.5 times per second.

Zero Adjustment: Automatic adjustment.

Over Range Indicator: Number 1 of highest digit is displayed.

Low Battery Indication: The  is displayed when the battery Voltage drop below the operating voltage.

Auto Power Off:

To conserve battery life, the meter will automatically turn off after approx. 15 minutes of non-use. To turn the meter back on, turn the rotary switch to OFF, then to the desired function.

Operating Temperature: 0°C to 40°C (32°F to 104°F)

and Humidity below 80% RH

Storage Temperature: -10°C to 60°C (14°F to 140°F)

and Humidity below 70% RH

Power source: 6x1.5V Size “AA” battery or Equivalent (DC9V)

Dimensions: 200(L) x 92(W) x 50(H) mm

Weight: Approx 700g include battery

Accessories: 4 sets Test kits, 4pcs iron rods, 6pcs battery, Carrying case, manual.

IV. Electrical Specifications

Accuracies are specified in the way:

$\pm(\dots\%$ of reading $+\dots$ digits) at 23°C \pm 5°C, below 80% RH.

Earth resistance

Range	Resolution	Accuracy
20 Ω	0.01 Ω	$\pm(2\%+10d)$
200 Ω	0.1 Ω	$\pm(2\%+3d)$
2000 Ω	1 Ω	$\pm(2\%+3d)$

Earth voltage

Range	Resolution	Accuracy
200V	0.1V	$\pm(3\%+3d)$

Ohm

Range	Resolution	Accuracy	Overload Protection
200k Ω	0.1k Ω	$\pm(1\%+2d)$	250Vrms

DC Voltage

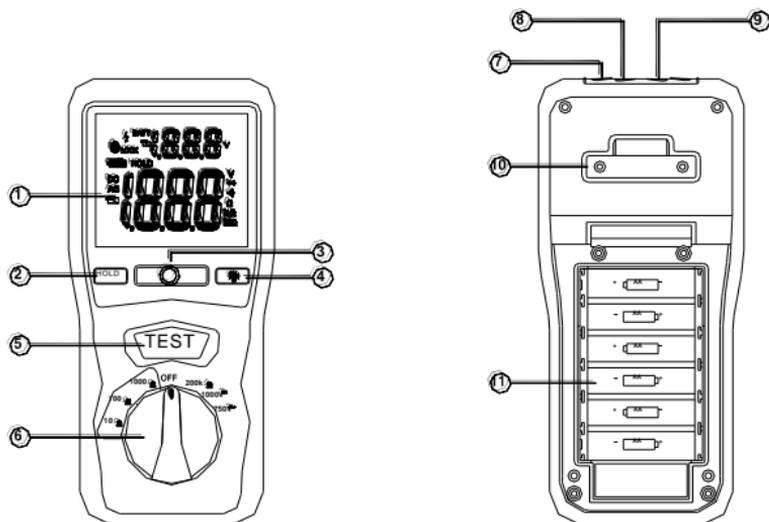
Range	Resolution	Accuracy	Input Impedance	Overload Protection
1000V	1V	$\pm(0.8\%+3d)$	10M Ω	1000Vrms

AC Voltage (40Hz~400Hz)

Range	Resolution	Accuracy	Input Impedance	Overload Protection
750V	1V	$\pm(1.2\%+10d)$	10M Ω	750Vrms

V. PARTS & CONTROLS

- ① Digital Display
- ② Data Hold Button
- ③ ADJ (ZERO) Turncap
- ④ Backlight Button
- ⑤ Test Button
- ⑥ Rotary Function switch
- ⑦ V Ω C Jack
- ⑧ P Jack
- ⑨ COM E jack
- ⑩ Pothook
- ⑪ 12, Battery Cover



Button Function Operation

Hold Function

The hold function freezes the reading in the display. Press the HOLD key momentarily to activate or to exit the hold function

Backlight

Press the  key for to turn on the display backlight function. The backlight will automatically turn off after 15 seconds.

VI. Measurement of effective resistance of earth electrodes

BEFORE PROCEEDING MEASUREMENT,

Read safety notes on page 1.

1. In proceeding with measurement, if sym  appears on the display, replace with new batteries.
2. Short the tips of the leads and press the “TEST” button. Adjust the 0 Ω “ADJ” turncap control to set the reading of zero.
3. Rotary to function switch to “EARTH WOLTAGE” position and press to test. Earth voltage will displayed on the LCD. When earth voltage is more than 10V, it may result in errors in earth resistance measurement. Accurate earth resistance measurement may not be made.
4. Precision earth resistance measurement method :
 - (1) Connect green, yellow and red test leads to instrument terminals E, P and C with auxiliary earth spikes P1, C1 stuck into earth “IN A STRAIGHT LINE “. (Fig.1)
 - (2) Rotary the function switch to suitable range then press the pushbutton to test and take the reading.

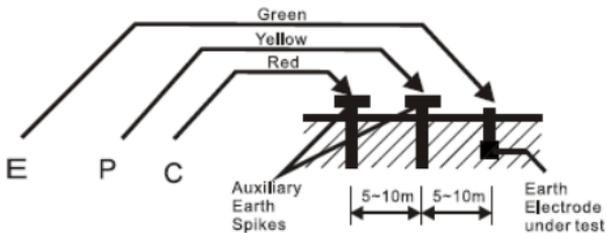


Fig.1

5. Simplified earth resistance measurement method :

- (1) This method is recommended where an earth resistance higher than $10\ \Omega$ is measured or where it is not possible to drive auxiliary earth spikes. An approximate value of earth resistance can be obtained by the two wire system where is shown in Fig. 2.
- (2) Rotary to function switch to “EARTH VOLTAGE” position and press to test. Make certain that earth voltage is less than 10V.
- (3) First rotary the function switch to “ $200\ \Omega$ ” position and press to test, read earth resistance. If the display shows “1”(MSD), switch to “ $2000\ \Omega$ ” position and read earth resistance.
- (4) The reading obtained (R_x) is an approximate earth resistance value. There is no need for external shorting as P and C terminals are shorted by using the test leads specified for the Simplified measurement.

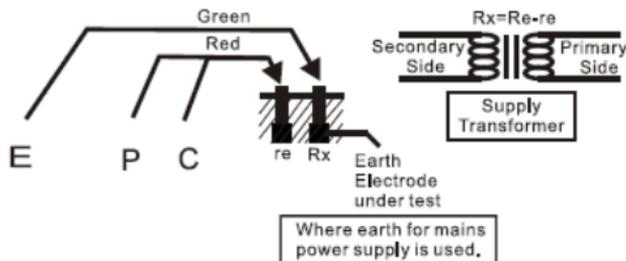


Fig.2

- (5) $R_x = R_e - r_e$
 R_x = True Earth Resistance
 R_e = Indicated Value r_e = Earth Resistance of Earth Electrode
- (6) Since measuring current is as low as 2 mA, the earth leakage breaker (ELCB) does not trip even if the earth side of the commercial power supply with an ELCB is used.

* Follow the proper connection such as Fig1.

VII. DC/AC VOLTAGE MEASUREMENTS

- 1, Set the function switch to the highest 1000V DC (---) or 750VAV (~) position.
- 2, Insert the black test lead banana plug into the negative COM jack.
- 3, Insert the red test lead banana plug into the positive V jack.
- 4, Touch the black test probe tip to the negative side of the circuit.
- 5, Touch the red test probe tip to the positive side of the circuit.
- 6, Read the voltage in the display.

DC/AC VOLTAGE MEASUREMENTS: If the polarity is reversed, the display will show (-) minus before the value

VIII. 200kΩ RESISTANCE MEASUREMENTS

- 1, Set the function switch to the highest **200kΩ** position.
- 2, Insert the black test lead banana plug into the negative COM jack
- 3, Insert the red test lead banana plug into the positive Ω jack.

4, Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.

5, Read the resistance in the display

X. Battery Replacement

1, When the low battery symbol  appears on the LCD, the six 1.5V 'AA' batteries must be replaced.

2, Turn the meter off and remove the test leads

3, Unsnap the tilt stand from the rear of the meter

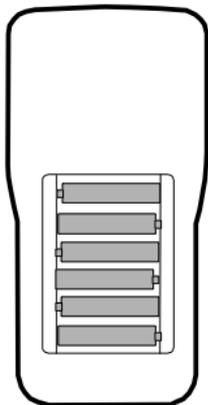
4, Remove the four Phillips head screws holding the battery cover

5, Remove the battery compartment cover

6, Replace the batteries observing polarity

7, Affix the rear cover and secure the screws.

8, Reattach the tilt stand



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