

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

DIGITAL EARTH TESTER

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1.0 SCOPE

1.01 This specification covers the design, engineering, manufacture, testing at manufacturer's works before dispatch, packing, supply and delivery of Hand held digital earth tester suitable for measurement of Resistance of earth.

1.02 The Digital Earth Tester is required for the measurement Resistance of Earth under the following conditions.

- a. Measurement of earth resistance in difficult situations, where noise is present in the earth.
- b. Measurement of Earth Resistance for large complex earthing systems.
- c. Accurate measurement of Earth Resistance in sub-station site where variation of soil resistivity values will be large.
- d. Measurement of soil resistivity.

2.0 CLIMATIC CONDITIONS

Maximum Ambient Air Temperature	55°C
Minimum Ambient Air Temperature	05°C.
Maximum Relative Humidity	Upto 95% (non-condensing)
Storage Temperature	-20°C to 70°C
Storage Humidity	Upto 95% (non condensing)
Max. Altitude	1000 meter

3.0 APPLICABLE STANDARDS

- a) IS 9223: Portable earth resistance meters
- b) EN 61010-1:2001, 61010-031 CAT III 600V for Safety requirement for electrical equipment for measurement, control & laboratory use
- c) EN 61326-1:2006 for EMC& EMI requirement for electrical equipment for measurement, control & laboratory use.
- d) IEC 60529 for Ingress Protection (IP 54 Required).
- e) CISPR 16-1 and 16-2 for Radiated emission for enclosure
- f) IEC 61000-4-2 for Electrostatic Discharge (ESD)
- g) IEC 61000-4-3 RF Electromagnetic Field
- h) IEC 60068-2-2/IS 9000 Part 3/Sec3 for Dry Heat Test
- i) IEC 60068-2-78/IS 9000 Part 4 for for Steady State Damp Test
- j) IEC 60068-2-14/IS 9000 Part 14/Sec 1 for Change of temperature
- k) IEC 60068-2-6/IS 9000 Part 8 for Vibration test
- l) IEC 60068-2-29/IS 9000 Part 7/Sec 2 for Bump Test
- m) IEC 60068-2-27/IS 9000 Part 7/Sec 1 for Mechanical Shock test

4.0 CONSTRUCTIONAL FEATURES

4.01 Digital Earth Tester shall be robust, compact instrument designed for measuring electrode resistance. The instrument should have facility to measure Ground Resistance by standard Fall of Potential method using 3 terminal method by Current and Potential spikes. The equipment must also enable to measure the 2 terminal measurement to measure soil resistivity

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- 4.02 The instrument also includes a voltmeter to allow you to measure the ground voltage.
- 4.03 To allow accurate testing in noisy environments the instrument should be capable of rejecting noise.
- 4.04 Instrument should automatically check and display the battery status Indication
- 4.05 The equipment must be compact and must come with carrying case for spike & wire and other measuring accessories.

5.0 GENERAL REQUIREMENTS

- i) The meter display should be 3½Digit, LCD, Max Reading 1999
- ii) The meter must measure Earth resistance by 3-wire method, Soil resistivity by 4-wire method and Earth voltage.
- iii) Earth Resistance range should be 20Ω, 200Ω and 2000Ω selectable respectively.
- iv) The power supplied to this meter should be through internal rechargeable battery
- v) Single charge battery life for the meter should be approximately 5–6hours of continuous operation on mid range.
- vi) The meter should be such that even at low battery indication the meter gives accurate readings.
- vii) It should be handy and light weight approx. 550grams
- viii) After sales support: The after – sales service support / warranty services has to be provided.
- ix) Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- x) Documentation: Sufficient no. of Operating/Service Manuals shall be provided along with supplied material

6.0 TECHNICAL SPECIFICATIONS:

Earth resistance ranges : 0.01 Ω to 19.99 Ω,
0.1Ωto199.9Ω,
1Ωto 1999Ω

Test current : 20Ωrange,10mA AC RMS approx.
200Ω ranges,1mA AC RMS approx.
2000 Ω range,100 μA AC RMS approx.

The test current should be constant throughout the range.

Accuracy: ±(1.5%of reading +5 digits) valid from 10 %to 95%of the range

Resolution: 0.01 Ω

Earth voltage: 0-200VAC ,Resolution-0.1V, Accuracy: 2%of Range

Test frequency:(128Hz \pm 0.5Hz)

Maximum open circuit output voltage: 36V approximately

Withstanding voltage: In the event of system fault, the instrument should withstand 240V AC, applied between any two terminals.

7.0 CALIBRATION CERTIFICATE

The calibration of equipment shall be carried out at approved laboratory by National Board of Accrediation of Laboratories (NABL).

The manufacturers calibration certificates for all other equipment under supply with report from NABL approved laboratory shall be submitted for approval of C.E. (Testing & QC) before commencement of supply. Validity of calibration certificate shall be one year.

The equipment shall be type tested for IP 54 degree of protection as per IS: 12063/ IEC 60529 against ingress of dust, moisture & vermin. The type test certificate shall be submitted along with the offer

8.0 PRE DESPATCH INSPECTION

The inspection shall be carried out at the place of manufacturer unless otherwise agreed upon by the manufacturer and purchaser at the time of purchases. For imported equipments the supplier/bidder shall offer the equipment at the authorized service centre /works of the original manufacturer in India or at the supplier's works/Testing centre. The manufacturer shall offer to the inspector representing.

9.0 NAME PLATE & MARKING

Equipment shall have name plate clearly visible, effectively secured against removal and indelibly and distinctly marked with all essential particulars as per relevant standards. Following details shall be marked on the Name Plate
Manufacturer's name & address:

Serial no.

Purchase Order No.

Month and Year of manufacture

Name of purchaser: MSEDCL

Guarantee: Five Years

ISI mark if applicable

10.0 GUARANTEE

The instrument shall be guaranteed for the period of **Five** years from the date of Dispatch.

11.0 PACKING

The instrument shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each instrument may be suitably packed in the first Instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case adequate strength with extra cushioning if considered necessary. The cases may then be properly sealed against accidental opening in transit. The packing cases may be marked to indicate the fragile nature of the contents.

The following information shall be furnished with the consignment:

- a. Name of consignee.
- b. Details of consignment
- c. Destination
- d. Total Weight of consignment.
- e. Sign showing upper / lower side of the crate.
- f. Sign showing fragility of the material.
- g. Handling and unpacking instructions

12.0 TRAINING OF ENGINEERS:

The successful supplier shall train Engineers of MSEDCL free of charge at their works for familiarization of design, operation and maintenance of testing equipments

GUARANTEED AND TECHNICAL PARTICULARS

ITEM NAME	DIGITAL EARTH TESTER		
SR. NO.	PARTICULARS	REQUIREMENT	GTP VALUES
1	Manufacturer name & country of manufacturer.		
2	Type/Model, details of equipment.		
3	Applicable standards for the instrument.	IS 9223:1989	
4	Measurement Earth Resistance range	20 Ω , 200 Ω and 2000 Ω selectable	
5	Accuracy	\pm (1.5% of reading + 5 digits)	
6	Resolution	0.01 Ω	
7	Earth voltage	0-200V AC	
8	Test frequency	128 Hz \pm 0.5 Hz	
9	Maximum open circuit output voltage	36 V	
10	Storage Temperature	-20°C to 70 °C	
11	Withstanding voltage	240 V AC	
12	Display	3 ½ Digit LCD, Max Reading 1999	
13	Weight	Approx 550 grams	
14	Calibration certificate is submitted	Yes	