

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

CONTACT RESISTANCE METER

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1.0 SCOPE

This specification covers the design, engineering, manufacture, testing at manufacturer's works before dispatch, packing, supply and delivery of portable low resistance testing meter suitable for contact resistance measurement.

2.0 CLIMATIC CONDITIONS

The Measuring Instrument should work in following climate.

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

3.0 GENERAL & CONSTRUCTIONAL REQUIREMENTS

Low resistance testing meter/ Contact resistance testing meter shall be designed and constructed in such a way so as to easy to operate, compact, rugged design, user safety. However, the following General features should be ensured.

4.0 GENERAL FEATURES

- 4.01 Instrument should be able to measure the resistance of circuit breaker contacts, bus-bar joints, Isolator joints, Welds & bonds and other high-current links.
- 4.02 Instrument should be lightweight and portable unit designed to deliver 100 Amps
- 4.03 The instrument uses classical Kelvin 4-wire method to measure contact resistance so that need of lead resistance compensation is eliminated
- 4.04 The instrument should be designed with safety feature, ease of use.
- 4.05 Instrument should be capable of being used anywhere to measure a low resistance value with high accuracy.
- 4.06 Instruments should be rugged and light weight to make it very suitable for field work, such as in substations.
- 4.07 Instrument should be capable of testing for a full day without recharge. It should store 100 test values and also able to transfer test data to a PC via USB communication port.
- 4.08 Instrument should be rechargeable battery operated and with charger & necessary accessory.
- 4.09 Instrument should supply with all necessary accessories for testing (test cable should be 20 mtr with suitable nut & bolt clamping arrangement having suitable current rating) and weight of the instrument should be less.
- 4.10 The protection shall be provided against wrong battery, high temperature.
- 4.11 The display parameters shall also include the battery and memory status.
- 4.12 Instrument should meet to standard EMC 2004/108/EC and LVD 2006/95/EC CE & EN61010 CAT-IV EN61326 for enhanced safety.
- 4.13 Compatible with IEC56 standards and Ingress protection IP54

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- 4.14 After sales support: The after – sales service support / warranty services has to be provided.
- 4.15 Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- 4.16 Documentation- Sufficient no. of Operating/Service Manuals shall be provided along with supplied material
- 4.17 Weight of complete kit including connecting leads shall not exceed 10 kg

5.0 APPLICABLE STANDARDS

- i) EN 61010-1:2001, 61010-031 CAT III 600V for Safety requirement for electrical equipment for measurement, control & laboratory use
- ii) EN 61326-1:2006 for EMI & EMC requirement for electrical equipment for measurement, control & laboratory use.
- iii) IEC 60529 for Ingress Protection (IP 54 Required).
- iv) CISPR 16-1 and 16-2 for Radiated emission for enclosure
- v) IEC 61000-4-2 for Electrostatic Discharge (ESD)
- vi) IEC 61000-4-3 RF Electromagnetic Field
- vii) IEC 60068-2-2/IS 9000 Part 3/Sec3 for Dry Heat Test
- viii) IEC 60068-2-78/IS 9000 Part 4 for for Steady State Damp Test
- ix) IEC 60068-2-14/IS 9000 Part 14/Sec 1 for Change of temperature
- x) IEC 60068-2-6/IS 9000 Part 8 for Vibration test
- xi) IEC 60068-2-29/IS 9000 Part 7/Sec 2 for Bump Test
- xii) IEC 60068-2-27/IS 9000 Part 7/Sec 1 for Mechanical Shock test
- xiii) IS 9000 for Supply Voltage Variation test & Surge withstand test

6.0 TECHNICAL SPECIFICATIONS

1.	Test Currents	100 A DC Current
2.	Test current Injection	100A DC PULSE Current
3.	Test ON alert	BEEP
4.1	Measurement Ranges	1 $\mu\Omega$ - 200 m Ω
4.2	Range selection	Manual as well as Auto
4.3	Resolution	0.1 $\mu\Omega$
5.	Output voltage	Max. 10 V DC
7.	Measurement Principle	Four Terminal Type, Heavy "C" clamp with wing nut bolting arrangement.
8.	Basic Accuracy	\pm 2% of reading, +/- 1 digit
9.	Memory Storage	100 reading storage facility
10.	Computer Interface	Standard USB port communication port with

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		required software and communication cables.
11.	Power Supply	Mains 230V AC \pm 20%, 50Hz \pm 1Hz, Battery: 12V, 7.2 Ah, rechargeable battery
12.	Recharge time	Less than 6 hours
13.	Power consumption	6 W or less
14.	Display	Custom Built 3 ½ LCD Display.
15.	Inbuilt Memory	100 TEST RESULTS.
16.	Operating Temperature range	0-55°C
17.	Storage Temp range	-20°C -50°C
18.	Humidity	Upto 95% non-condensing

7.0 Accessories

- | | | |
|-------|---|--------|
| i. | 20 meter strong cable with Heavy duty" C" clamp with wing nut & bolts | 1 No. |
| ii. | Mains power cord | 1 No. |
| iii. | Mains Protection Fuse (5A) | 03 Nos |
| iv. | User Manual | 1 No. |
| v. | Calibration Sheet | 1 No. |
| vi. | Carrying case | 1 No. |
| vii. | Battery charger | 1 No. |
| viii. | Software CD/ Online Support | 1 No. |
| ix. | USB cord | 1 No. |

8.0 CALIBRATION CERTIFICATE

The calibration of equipment shall be carried out at approved laboratory by National Board of Accreditation 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.

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.

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GUARANTEED TECHNICAL PARTICULARS OF CONTACT RESISTANCE METER

Sr. No.	Technical Parameters	Offered Specification	Remarks
1.	Manufacturer's Name & Country of Manufacture.		
2.	Type/Model details of Equipment.		
3.	Applicable Indian/International Standard to which the equipment conforms	As per clause no. 4.00	
4.	Test Currents	100 A DC Current	
5.	Test current Injection	100A DC PULSE Current	
7.	Test ON alert	BEEP	
8.	Measurement Ranges	1 $\mu\Omega$ - 200 m Ω	
9.	Range selection	Manual as well as Auto	
10.	Resolution	0.1 $\mu\Omega$	
11.	Output voltage	Max.10 V DC	
12.	Measurement Principle	Four Terminal Type, Heavy "C" clamp with wing nut bolting arrangement.	
13.	Basic Accuracy	$\pm 2\%$ of reading, +/- 1 digit	
14.	Memory Storage	100 reading storage facility	
15.	Power consumption	6 W or less	
16.	Display	Custom Built 3 ½ LCD Display.	
17.	Inbuilt Memory	100 TEST RESULTS.	
18.	Operating Temperature range	5°C -55°C	
19.	Storage Temp range	-20°C to 70°C	
20.	Equipment is warranted for minimum period	5 years.	
21.	Calibration certificate is submitted	Yes	