

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

TRANSFORMER WINDING RESISTANCE METER

FOR

FIELD USE

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1.0 SCOPE

This specification covers the Transformer Winding Resistance Meter suitable for measuring winding resistance for single phase and three phase transformers.

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 GENERAL FEATURES

- 3.01 The Equipment offered shall be line-operated, field-portable designed specifically to measure the dc resistance of all types of magnetic windings safely and accurately.
- 3.02 The Equipment should be capable of measuring winding resistance of distribution, Power, Auto Transformer in live switchyard & factory Environment.
- 3.03 The equipment shall have direct Single Channel digital reading allows for testing single winding at a time without the need for time-Consuming bridge balancing.
- 3.04 The equipment should use classic Kelvin's 4 wire method to measure resistance so that need of lead resistance compensation is eliminated.
- 3.05 It should quickly overcome the inductance offer by large inductive winding and make current stabilize very fast.
- 3.06 It should also be check any discontinuity in the tap changer while changing the tap from one position to another and should have MAKE BEFORE BREAK sequence reorganization feature with indicator.
- 3.07 It should have protection against the back EMF offered by large transformer, consist of very fast discharge time [preferably 1 minute] & should able to display % current stability.
- 3.08 The equipment shall have Built-in demagnetization circuitry that allows the operator to de-magnetize the transformer core, either before or upon completion of resistance testing, or as a standalone feature.
- 3.09 It should have Bi-directional current capability feature to sense pre test core polarization or direct the test current in the direction that reduce the test time.

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- 3.10 The equipment shall have built in Safety indicator which gives a visual indication of a charged or discharged specimen, even if power to the instrument is lost.
- 3.11 The equipment should have Trouble free operation in charged switchyards under electrostatic & magnetic interference condition.
- 3.12 The equipment shall have 3 Decimals reading for resistance measurement
- 3.13 The Meter should have various protection features like Over Voltage, Short Circuit, Accidental disconnection of Test Lead, Back emf, Over Temperature / Thermal overload etc.
- 3.14 Built-in non-volatile memory for 100 readings storage on First In First Out (FIFO) basis should be available.
- 3.15 All the standard accessories for desired monitoring, operation & control of instrument shall have to be provided for the proper functioning of the kit.
- 3.16 Instrument shall be CE certified which shall prove compliance with European Union standards for health, safety and environmental protection legislation and confirms a product's compliance with relevant requirements.
- 3.17 Instrument should have Protection for high voltage flashover caused by inductive kickback.
- 3.18 Instrument should have facility for Auto discharge for operator safety/ safety interlock circuit
- 3.19 The test kit shall be supplied with accessories viz, sufficient test leads i.e current leads, potential leads, shorting lead, grounding lead, mains power cord, instruction manual.
- 3.20 After sales support: The after – sales service support / warranty services has to be provided.
- 3.21 Technical evaluation: Technical evaluation of offer of the equipment shall be carried out.
- 3.22 Documentation:
Sufficient no. of Operating/Service Manuals shall be provided along with supplied material.
- 3.23 Standard Accessories:
Test leads with heavy duty Crocodile clamps (6 No): -10 Meter Each
Earthing Cable : 2 No
Mains power cord : 1 No.
Operating/Service Manual : 1 No.
Calibration Sheet : 1 No.

Rugged Carrying case : 1 No.

USB cord : 1 No.

3.24 General technical requirements

1.	Channel	Minimum 1 channel for winding resistance
2.	Display	Minimum 5-inch, High contrast, large alphanumeric LCD for accommodate data display
3.	Current	Upto 10 A DC Continuous
4.	Resistance Range	10 micro-ohm to 2 Kilo-ohm
5.	Open circuit voltage	Minimum 40 V DC
6.	Demagnetization	Should have demagnetization feature
7.	Resolution	Minimum 0.01 micro-ohm
8.	Accuracy	+/- 0.5%
9.	Discharge	Auto Discharge
10.	Keypad	For operation of Kit
11.	Indications	current Injection on and Discharge
12.	Test Lead	suitable for Power transformer testing
13.	Power Supply	240V AC +/-20%, 750VA
14.	Humidity	0 to 90% or better none condensing
15.	Operating Temperature	0°C to 55 °C
16.	Storage Temperature	-20 °C to 70 °C
17.	Weight	Not more than 10 kg
18.	Safety	IEC 61010-1
19.	EMC	IEC 61326-1

4.0 APPLICABLE STANDARDS

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

l) IEC 60068-2-27/IS 9000 Part 7/Sec 1 for Mechanical Shock test

5.0 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.

6.0 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.

7.0 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

8.0 GUARANTEE

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

9.0 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:

- i) Name of consignee.
- ii) Details of consignment
- iii) Destination
- iv) Total Weight of consignment.
- v) Sign showing upper / lower side of the crate.
- vi) Sign showing fragility of the material.
- vii) Handling and unpacking instructions

10.0 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	WINDING RESISTANCE METER		
SR. NO.	PARTICULARS	REQUIREMENT	GTP VALUES
1	Power Supply	240V AC +/-20%, 750VA	
2	Measurement range	10 micro-ohm to 2 Kilo-ohm	
3	Open Circuit test voltage	minimum 40V	
4	Resolution	Minimum 0.01 micro-ohm	
5	Current measurement ranges	Upto 10 A,	
6	Accuracy	+/- 0.5%	
7	Operating Temperature	0 °C to 55 °C	
8	Storage Temperature	-20°C to 70 °C	
9	Humidity	0% to 90%	
10	Display	Minimum 5-inch, alphanumeric LCD	
11	Weight	not more than 10 Kg	
12	Calibration certificate is submitted	Yes	