

**MATERIAL SPECIFICATIONS CELL**

TECHNICAL SPECIFICATION

OF

POWER METER FOR TRANSFORMER LOSS MEASUREMENT

**TECHNICAL SPECIFICATION OF POWER METER FOR TRANSFORMER LOSS  
MEASUREMENT**

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## **TECHNICAL SPECIFICATION OF POWER METER FOR TRANSFORMER LOSS MEASUREMENT**

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### **1.0 SCOPE**

General functions of low power factor Power Meter for T/F Loss measurement Kit For measurement of No Load and Full Load losses (watt) for Transformers compatible for Lab as well as site testing. Specification are suitable for Direct measurement without external CT/PT.

### **2.0 CLIMATIC CONDITION**

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 instrument 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.
- 3.02 Instrument should be able to measure parameter like Voltage, current, active power, apparent power, power factor, frequency, integrated current & active power, Crest Factor, Voltage & Current, THD, every Harmonics upto 50th Harmonic.
- 3.03 Instrument should have measurement modes of RMS, Mean, Average and DC.
- 3.04 Instrument should be able to measure in single phase 2 wire, three phase three wire, three phase four wire, three voltage and three current.
- 3.05 The instrument should be able to measure minimum, maximum and average values for a selected parameter during measurement period.
- 3.06 The display of meter should be in minimum 6 digits with 7 segment LED / Backlit LCD. The display should show simultaneously four items/parameters (selectable). For power parameter, total power (including harmonics) and fundamental power should be displayed.
- 3.07 The power meter shall have inbuilt USB communication port to dump data to computer with suitable communication software provided with the kit.
- 3.08 The equipment should have sufficient storage memory to store at least 200 group of test result.
- 3.09 It should have data hold facility.
- 3.10 The instrument should have auto ranging facility.

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- 3.11 The instrument shall be provided with minimum 4 nos of LED display windows with provision for selecting parameters and per phase various functions.
- 3.12 Standard CT & PT with intermediate transformer shall be required for loss measurement of transformer. Standard CT & PT and intermediate transformer for Lab as well as for field shall as per below mentioned table.

	Standard CT	Standard PT	Intermediate transformer
Field	50/5 Amps, 0.2s accuracy class, Insulation level:1.1 kV Burden: 20 VA	11000/110 V, 0.2 accuracy class, Burden: 30 VA	10 kVA, Air cooled Input: 400 V & Output: 1200 V Vector group: Delta-Star
NABL lab	50/5 Amps, 0.2s accuracy class, Insulation level:1.1 kV Burden: 20 VA	11000/110 V, 0.2 accuracy class, Burden: 30 VA	35 kVA, Oil immersed Input: 400 V & Output: 1200 V Vector group: Delta-Star

- 3.13 After sales support: The after – sales service support / warranty services has to be provided.
- 3.14 Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- 3.15 Documentation:  
Sufficient no. of Operating/Service Manuals shall be provided along with supplied material.
- 3.16 General technical requirements

Sr. No.	Particulars	Requirements
1.	Input Channel	Three
2.	Frequency Range & Response	DC, 0.5HZ to 100KHZ
3.	Voltage Accuracy	0.1%Reading +0.1%range
4.	Current Accuracy	0.1% Reading + 0.1%range
5.	Power Accuracy	0.1%reading +0.1% range for 0.1 to 1 PF
6.	DC Power Accuracy	0.1%reading +0.2% range
7.	Influence of Power Factor	±0.2% Of S (apparent Power)
8.	Measuring mode switching	RMS,V-MEAN, DC Simultaneous measurement
9.	Voltage Range	15 to 600V AC/DC in range
10.	Current Range	1mA to 20A AC/DC in range

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		Suitable for Direct measurement without external CT/PT.
11.	Guaranteed accuracy range for voltage and current ranges	1% to 130%
12.	Common mode voltage	600V
13.	Wiring Combination	1 Phase-2 wire, 1 Phase-3wire, 3phase-3wire,3 phase-4 wire, 3voltage & 3 Currents.
15.	Measurement parameters	Voltage, current, active power, apparent power, power factor, frequency, integrated current & active power, CF, MAX Hold, THD, Voltage, Current & Power for individual Harmonic frequency upto 50th harmonic.
16.	Auto Range	Yes
17.	Crest Factor	3 or 6
18.	Harmonics	Yes, upto 50th selectable
19.	Simultaneous measurement	RMS/VMEAN/DC, Harmonics
20.	Communication	USB with communication software for data downloading on PC, Ethernet connectivity

**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 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

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**5.0 CALIBRATION CERTIFICATE**

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

The manufacturer's 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

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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

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**GUARANTEED AND TECHNICAL PARTICULARS**

ITEM NAME	TRANSFORMER LOSS MEASUREMENT METER		
SR. NO.	PARTICULARS	REQUIREMENT	GTP VALUES
1	Input Channel	Three	
2	Frequency Range & Response	DC, 0.5HZ to 100KHZ	
3	Voltage Accuracy	0.1%Reading +0.1%range	
4	Current Accuracy	0.1% Reading + 0.1%range	
5	Power Accuracy	0.1%reading +0.1% range for 0.1 to 1 PF	
6	DC Power Accuracy	0.1%reading +0.2% range	
7	Influence of Power Factor	±0.2% Of S (apparent Power)	
8	Measuring mode switching	RMS,V-MEAN, DC Simultaneous measurement	
9	Voltage Range	15 to 600V AC/DC in range	
10	Current Range	1mA to 20A AC/DC in range Suitable for Direct measurement without external CT/PT.	
11	Guaranteed accuracy range for voltage and current ranges	1% to 130%	
12	Common mode voltage	600V	
12A	Auxiliary power supply	240 V ± 20%	