

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

CT/PT ANALYSER

FOR

FOR NABL LAB OF MSEDCL

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1.00 SCOPE

The specification covers the requirement of complete test system for automatic testing of instrument transformers. The instrument shall be Portable and Micro processor controlled. The instrument should perform the functions like CT ratio measurement, polarity, CT secondary resistance measurement, Excitation characteristics plot, CT burden testing, Search nameplate parameters for unknown CTs, Saturation hysteresis loop curve measurement, Unit should be supplied with all accessories.

2.00 CLIMATIC CONDITION

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 |

3.00 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
- m) IS 9000 for Supply Voltage Variation test & Surge withstand test

4.00 GENERAL TECHNICAL REQUIREMENTS

4.01 General features:

- a) Instrument should be able to test parameter of Current transformer like: Excitation Curve and Parameter test, Turns ratio test, Ratio and Phase Error test, Polarity Mark Check, Winding Resistance Measurement, Secondary Loop Burden Measurement,

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- b) Instrument should be able to do, Error line curve test for protection CT and Transient CT parameter Test
- c) Instrument should be able to search Nameplate parameters for unknown CTs..
- d) Instrument should be able to plot Saturation hysteresis loop curve measurement.
- e) Instrument should have feature to measure ratio error, phase angle error measurement and secondary burden test of Potential transformer.
- f) The automatic CT PT analyzer shall have inbuilt USB communication port to dump data to computer with suitable communication software provided with the kit.
- g) The instrument shall be capable to test CTs having 1 Amp and 5 Amp secondary current as well as potential transformers having secondary voltage $110/\sqrt{3}$ Volts.
- h) It should have an automatic CT demagnetizer to demagnetize CTs prior to conducting test.
- i) The equipment should have sufficient storage memory to store at least 1000 group of test result.
- j) It should have data hold facility.
- k) The instrument should have facility to plot the graph display on the screen.
- l) The instrument should have auto ranging facility.
- m) After sales support: The after – sales service support / warranty services has to be provided.
- n) Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- o) Documentation- Sufficient no. of Operating/Service Manuals shall be provided along with supplied material

4.02 Test application:

The CT Analyzer shall be able to test single ratio and multi ratio current transformers as standalone version as well as current transformers installed in power transformers or gas insulated switches. The test set shall be able to perform test and verification for current transformer used for protection and metering (billing) purposes.

- Automated testing of single ratio current transformers
- Automated testing of multi taps (Min 5 taps at a time) of current transformers
- Automated testing of bushing current transformers installed in Power Transformers
- Automated testing of bushing current transformers installed in GIS (Gas Insulated Switch)
- Test current transformer up to class 0.1 accuracy for metering (billing)
- Test current transformer excitation curve up to 30000 Volt Knee-point level.

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- Demagnetization of the CT shall be performed automatically at the end of the each test.

4.03 Technical features

Sr. no.	Parameters	Specifications
1	Power Input	240 Vac \pm 20%, 50 Hz
2	Output voltage	0.1 — 180 V AC
3	Output current	0.001 —5 A RMS, 15 Amp peak
4	Output power	500 VA, peak output power 1800VA at 15A
5	Test frequency	0.1 to 60 Hz
6	Maximum Knee Voltage/ Excitation Voltage measured	30 kV
7	Current Measurement range	0-15Amp or better
8	Current measurement accuracy	\pm 0.1% Rdg +0.01%FS
9	Voltage Measurement range	0-200V
10	Voltage measurement accuracy	\pm 0.1% Rdg +0.01%FS
11	Turns ratio Measurement Range	0-35000
12	Turns ratio Measurement accuracy	\pm 0.1% Rdg
13	Phase error measurement accuracy	\pm 2 min
14	Phase error measurement resolution	0.01min
15	Coil winding Resistance measurement range	0 — 8 k Ω in step of 4 ranges
16	Accuracy	<.2%Rdg+0.2%FS
17	Temp measurement	5 to 100 Deg. Celsius.
18	CT Secondary Burden	15 VA
19	CT Secondary error, Resolution	< \pm 0.2%RDG+0.02%FS, 0.001 Ω
20	PT Secondary Burden	100 VA
21	PT Secondary error, Resolution	< \pm 0.2%RDG+0.02%FS, 0.1 Ω
22	PT Ratio Measurement range Accuracy	1-35000 < \pm 0.5% Reading
23	PT Phase angle test	<9min

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24	Internal storage	>1000 group of test result
25	Display	LCD screen (Hard keypad)

4.04 Assessment

The CT analyzer shall provide an automated Assessment of all class relevant parameters according to the relevant standard selected for the test. The test set shall indicate if one or more parameters are out of the limits defined by the standard

4.05 Reporting

The CT Analyzer shall be able to generate automatic report in suitable format after completion of the test

5.00 HARDWARE & SOFTWARE SPECIFICATION

5.01 Hardware General

- The Test set should be easily operated by external laptop or Inbuilt display.
- All testing leads & accessories should be supplied by vendor required to test 5 taps of CT at a time.
- Rugged housing for outdoor use

5.01.1 Accessories

The test set shall be delivered with a full set of necessary Accessories to test current transformers of single ratio and multi tap configuration. Additional accessories shall be offered to support further test options of the test equipment.

- Measurement cables Primary cable 10 mtrs, secondary cables 18 meter long.
- Ground cable with cattery clamp and power cords
- PC Software and connection cable / interface
- Connection clamps.
- Vendor has to be supplied additional switch box if required to test five taps of CT at time.
- Carry Bag for test set and Accessories

5.02 SOFTWARE SPECIFICATION

The CT Analyzer operating PC Software shall be able to operate on actual Windows Software. The CT Analyzer record shall be able to download via LAN/USB to a PC in windows excel/equivalent format. CT set and ratio test can also run on windows latest based software application.

6.00 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

7.00 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.

8.00 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

9.00 GUARANTEE

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

10.00 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

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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

11.00 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 TECHNICAL PARAMETERS OF CT/PT ANALYSER

ITEM NAME	CT/PT ANALYSER		
SR. NO.	PARTICULARS	REQUIREMENT	GTP VALUES
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	
4	Power Input	240 VAC \pm 20%, 50 Hz	
5	Output voltage	0.1 — 180 V AC	
6	Output current	0.001 — 5 A RMS, 15 Amp peak	
7	Output power	500 VA, peak output power 1800VA at 15A	
8	Test frequency	0.1 to 60 Hz	
9	Maximum Knee Voltage/ Excitation Voltage measured	30 kV	
10	Current Measurement range	0-15Amp or better	
11	Current measurement accuracy	\pm 0.1% Rdg +0.01%FS	
12	Voltage Measurement range	0-200V	
13	Voltage measurement accuracy	\pm 0.1% Rdg +0.01%FS	
14	Turns ratio Measurement Range	0-35000	
15	Turns ratio Measurement accuracy	\pm 0.1% Rdg	
16	Phase error measurement accuracy	\pm 2 min	
17	Phase error measurement resolution	0.01min	

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18	Coil Resistance measurement range	0 — 8 k Ω in step of 4 ranges	
19	Accuracy	<.2%Rdg+0.2%FS	
20	Temp measurement	5 to 100 Deg. Celsius.	
21	CT Secondary Burden	15 VA	
22	CT Secondary error, Resolution	< \pm 0.2%RDG+0.02%FS, 0.001 Ω	
23	PT Secondary Burden	100 VA	
24	PT Secondary error, Resolution	< \pm 0.2%RDG+0.02%FS, 0.1 Ω	
25	PT Ratio Measurement range Accuracy	1-35000 < \pm 0.5% Reading	
26	PT Phase angle test	<9min	
27	Internal storage	>1000 group of test result	
28	Display	LCD screen (Hard keypad)	
29	Safety Standard	IEC 61010 or equivalent	
30	Operating Temp	0-50 Deg C	
31	Calibration Certificate submitted	Yes	