

Laboratory Electrical Research and Development Association, ERDA North
 Laboratory, CBIP Centre of Excellence, Ground Floor, Plot No. 21,
 Sector-32, Gurgaon, Haryana

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2726

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Validity 22.06.2018 to 21.06.2020

Last Amended on -

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
1.	MEASURE			
1.	DC Voltage [#]	10 mV to 1000 V	0.039 % to 0.001 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct Method
2.	DC Current [#]	1 mA to 3 A	0.01 % to 0.038 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct Method
3.	AC Voltage [#]	50 Hz 10 mV to 750 V	0.18 % to 0.06 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct Method
		45 Hz to 55 Hz 10 mV to 750 V	0.03 % to 0.065 %	Using MTE Portable Reference Meter by Direct/Comparison Method
4.	AC Current [#]	50 Hz 0.1 A to 3 A	0.19 % to 0.15 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct Method
		50 Hz 10 mA to 120 A	0.035 %	Using MTE Portable Reference Meter by Direct/ Comparison Method

Sangeeta Kunwar
 Convenor

Avijit Das
 Program Manager

Laboratory

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5.	Power Factor [#]	50Hz UPF to 0.01PF	0.039 % to 1.29 %	MTE Reference Energy Meter by Direct/ Comparison Method
6.	Frequency [#]	20 Hz to 300 kHz	0.003 % to 0.002 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct/ Comparison Method
7.	Resistance [#]	10 Ω to 10 M Ω 10 M Ω to 100 M Ω	0.05 % to 0.06 % 0.06 % to 0.162 %	Using 6 ½ Digital Multimeter Agilent 34401A by Direct Method
8.	Active Power [#] (Single & Three Phase)	45 Hz to 55 Hz 40 V to 300 V 10 mA to 120 A UPF – 0.01 PF	0.038 % to 1.34 %	MTE Reference Energy Meter by Direct/ Comparison Method
9.	Reactive Power [#] (Single & Three Phase)	45 Hz to 55 Hz 40 V to 300 V 10 mA to 120 A UPF – 0.01 PF	0.038 % to 1.34 %	MTE Reference Energy Meter by Direct/ Comparison Method
10.	Apparent Power [#] (Single & Three Phase)	45 Hz to 55 Hz 40 V to 300 V 10 mA to 120 A	0.04 % to 1.4 %	MTE Reference Energy Meter by Direct/ Comparison Method
11.	Active & Reactive Energy [#] (Single & Three Phase)	45 Hz to 55 Hz 40 V to 300 V 0.01 A to 120 A UPF – 0.25 PF	0.03 % to 0.05 %	MTE Reference Energy Meter by Direct/ Comparison Method
12.	Current Transformer [#]	3200A to 5A/ 1 to 5 A		Using Std. CT and Eltel AITTS Bridge by Comparison Method

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		120 % to 20 %	Ratio Error :0.015% Phase Displacement:0.87min	
		5 %	Ratio Error :0.019% Phase Displacement: 0.99 min	
		1 %	Ratio Error: 0.022% Phase Displacement: 2.37min	
		At 2.5/1-5A 120 % to 1 %	Ratio Error: 0.024% Phase Displacement: 1.09 min	
13.	Voltage Transformer [#]	220-330-440-550-660-770-880/110 V - 110 V/ $\sqrt{3}$ 1000-1100-2200-3300/110 V - 110 V/ $\sqrt{3}$ 4400/110-110/ $\sqrt{3}$ 5500-6600-11000/110 V - 110 V/ $\sqrt{3}$ 22kV-33kV/110 V - 110 V/ $\sqrt{3}$	Ratio Error: 0.065 % Phase Displacement: 3.19 min	Using Std. PTs and Eitel AITTS Bridge by Comparison Method
14.	CT-PT Test Set [#]	CT mode:- 1 A to 5 A PT mode:- 110V to 110V/ $\sqrt{3}$	Ratio Error:0.011% Phase Error: 0.48 min Ratio Error:0.010%, Phase Error:0.36 min	Using Eitel CTPT Bridge by Comparison Method

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15.	Harmonics Voltage & Current Circuit #	50 Hz fundamental 1 st to 41 th Order At 100V, 1A	0.36 %	Using Yokogawa Power Analyzer by Direct Method
16.	AC High Voltage#	1 kV to 45 kV	2.05 %	AC/DC High Voltage Divided with KV Meter by Direct/Comparison Method
	AC High Voltage*	1 kV to 100 kV	2.05 %	Using AC/DC High Voltage divider with kV meter by Direct Method/ Comparison Method
17.	Time Interval#	10 s to 90000 s	0.26 % to 0.053 %	Using Digital Time Interval Meter by Comparison Method
II.	SOURCE			
1.	AC Voltage#	50 Hz 0.1 V to 1000 V	0.25 % to 0.013 %	Using Electrical Power Standard Master Fluke by Direct Method
		50 Hz 10 mV to 1000 V	0.82 % to 0.014 %	Using Universal Calibrator 9100
2.	AC Current#	50 Hz 0.1 A to 20 A 20 A to 80 A	0.066 % to 0.013 % 0.013 % to 0.019 %	Using Electrical Power Standard Master Fluke by Direct Method
		50 Hz 100 μ A to 20 A 30 A to 1000 A	0.21 % to 0.021 % 0.25 %	Using Universal Calibrator 9100 With Current Coil

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3.	DC Voltage [#]	10 mV to 1000 V DC	0.05 % to 0.01 %	Using Universal Calibrator 9100 by Direct Method
4.	DC Current [#]	10 μ A to 20 A 30 A to 1000 A	0.01 % to 0.046 % 0.25%	Using Universal Calibrator 9100 with Current Coil by Direct Method
5.	Resistance [#]	1 Ω to 100 M Ω	0.09 % to 0.01 %	Using Universal Calibrator 9100 by Direct Method
6.	Frequency [#]	20 Hz to 1 MHz	0.004 %	Using Universal Calibrator 9100 by Direct Method
7.	Active Power [#]	10 V to 575 V 10 mA to 80 A 0.01 PF to UPF	1.12 % to 0.013 %	Using Electrical Power Standard Master Fluke by Direct Method
8.	Power Factor [#]	UPF to 0.01PF	0.012 % to 0.9 %	Using Electrical Power Standard Master Fluke by Direct Method
9.	Harmonics (Voltage and Current) [#]	50 Hz Fundamental 1 st to 41 th Order At 100V, 1A	0.3 %	Using Electrical Power Standard Master Fluke by Direct Method
10.	Impulse Parameters (for Calibration of Impulse measuring System) [*]	Lightning Impulse: 80 Vp to 1600 Vp 0.84 μ s to 60 μ s Switching Impulse: 100 Vp to 1600 Vp 20 μ s to 4000 μ s	0.85 % T1: 1.97 % T2: 2.22 % 0.88 % T1: 1.94 % T2: 2.23 %	Using Reference Impulse Calibrator and Digital Oscilloscope By Direct /Comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
		Chopping: 400 Vp to 1250 Vp 0.5 μ s Divider Ratio: 80 Vp to 1600 Vp	1.37 % Tc: 2.36 % 1.56 %	

* Measurement Capability is expressed as an uncertainty (\pm) at a confidence probability of 95%

*Only for Site Calibration

The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.