

Laboratory Central Power Research Institute, Switchgear Testing & Development Station (STDS), Govindpura, Bhopal, Madhya Pradesh
Accreditation Standard ISO/IEC 17025: 2005
Certificate Number CC-2647 **Page** 1 of 5
Validity 13.04.2018 to 12.04.2020 **Last Amended on** 16.10.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage ^s	30 mV to 300 mV 300 mV to 1000 V	0.0085 % to 0.003 % 0.003 % to 0.0025 %	Using Multi-Product Calibrator (5520A) By Direct Method
2.	AC Voltage ^s	50 Hz to 1 kHz 5.0 mV to 30mV 30 mV to 3V 3 V to 1000 V 1 kHz to 100 kHz 30mV to 200V	0.56 % to 0.05 % 0.05 % to 0.025 % 0.025 % to 0.036 % 0.048 % to 0.203 %	Using Multi-Product Calibrator (5520A) By Direct Method
3.	DC Current ^s	30 μ A to 300 mA 300 mA to 3 A 3 A to 20 A (with current Coil) 20 A to 1000 A	0.095 % to 0.04 % 0.04 % to 0.08 % 0.08 % to 0.39 % 0.35 % to 0.96 %	Using Multi-Product Calibrator (5520A) By Direct Method
4.	AC Current ^s	50 Hz to 1 kHz 30 μ A to 300 mA 300 mA to 3 A 3 A to 20 A (with current Coil) >20 A to 1000 A	50 Hz to 1 kHz 0.3 % to 0.070 % 0.070 % to 0.15 % 0.15 % to 0.19 % 50 Hz 0.43 % to 0.70 %	Using Multi-Product Calibrator (5520A) By Direct Method
5.	Resistance DC ^s	1 Ω to 1M Ω 1M Ω to 100M Ω 100M to 1G Ω	0.07 % to 0.006 % 0.006 % to 0.06 % 0.06 % to 1.72 %	Using Multi-Product Calibrator (5520A) By Direct Method
6.	Low Resistance ^s	1 m Ω 10 m Ω , 100 m Ω 1, 10, 100 Ω	0.08 % 0.04 %	Using Discrete Resistors By Direct Method

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7.	High Resistance (DC) ^{\$}	1 G Ω 10 G Ω	0.03 % 0.662 %	Using Discrete Resistors By Direct Method
8.	Frequency ^{\$}	50 Hz to 1 MHz	0.002 %	Using Multi-Product Calibrator (5520A) By Direct Method
9.	Ratio ^{\$}	40 to 400 400 to 1000	0.07 % to 0.04 % 0.04 % to 0.22 %	Using Standard Voltage Transformer TTR Standard By Direct Method
10.	Capacitance ^{\$}	1 nF to 10 nF 10 nF to 100 uF	1.7 % to 0.40 % 0.40 % to 0.64 %	Using Multi-Product Calibrator (5520A) By Direct Method
11.	Oscilloscope ^{\$}	25 mV to 80 V 1 nS to 50 mS Upto 500 MHz	0.35 % 0.008 % to 0.02 % 5.6%	Using Amplitude Time Base Band width By Direct Method
II.	MEASURE			
1.	DC Voltage ^{\$}	1mV to 10V 10V to 1000V	0.146 % to 0.001 % 0.001 % to 0.0014 %	Using 8½ DMM Wavetek 1281 By Direct Measuring
2.	AC Voltage ^{\$}	50Hz to 10 kHz 10mV to100mV 100mV to1000V	0.056 % to 0.026 % 0.026 % to 0.018 %	Using 8½ DMM Wavetek By Direct Measuring
3.	DC Current ^{\$}	10 μ A to 100 mA 100 mA to 1 A 1 A to 10 A	0.17 % to 0.013 % 0.013 % to 0.026 % 0.026 % to 0.18 %	Using 8½ DMM Wavetek 1280 6½ DMM By Direct Measuring

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4.	AC Current ^s	50 Hz to 1 kHz 100 μ A to 100 mA 100 mA to 1 A	0.07 % to 0.06 % 0.06 % to 0.12 %	Using 8½ DMM Wavetek 1281 By Direct Measuring
		50 Hz 1 A to 10 A	0.12 % to 0.20 %	Using 6½ DMM By Direct Measuring
		50 Hz 10 mA to 120 A	0.04 % to 0.021 %	Using Reference Comparator COM3003, Make: Zera by Direct Method
5.	Low Resistance ^s	1m Ω to 10 Ω 10 Ω to 100K Ω 100K Ω to 1M Ω	0.18 % 0.004 % to 0.002 % 0.002 % to 0.003 %	Using 5520 & 81/2 DMM 8½ DMM Wavetek 1281 by VI Method
	Resistance ^s	1M Ω to 100M Ω 100M Ω to 1G Ω	0.003 % to 0.05 % 0.05 % to 0.45 %	By Direct Measuring
6.	Frequency ^s	50 Hz to 1 MHz	0.015 %	Using 6½ DMM, 8846 Fluke By Direct Measuring
7.	High Voltage ^s	50 Hz >1 kV to 10 kV	0.4 %	Using Std V T and DMM By Direct Measurement
8.	AC Resistance ^s	50 Hz 50 m Ω to 13 K Ω	0.25 %	Using 8½ DMM 1281 & 6½ DMM 8846 by V/I Method
9.	Capacitance ^s	50 Hz 100 pF to 1 μ F	0.1 %	Using Schering Bridge by Comparison Method
10.	High Voltage ^s	50 Hz 1 kV to 10 kV	0.4 %	Using Std V T & 6½ DMM 8846 By Direct Measuring

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11.	AC Power / Energy 1 Phase & 3 Phase Active ^{\$} COS $\emptyset \pm 0.25$ to 1 Reactive SIN $\emptyset \pm 0.25$ to 1 Apparent	50 Hz 63.5 V to 240 V 10 mA to 20 mA 20 mA to 50 mA 50 mA to 30 A 30 A to 120 A Active 158 mW to 86.4 kW Reactive 158 mW to 86.4 kW	0.04 % to 0.0135 %	Using Reference Comparator COM3003, Make: Zera by Direct Method
12.	AC Power/Energy 1 Phase & 3 Phase Active ^{\$} COS $\emptyset \pm 0.01$ to ± 0.1	50 Hz 50 V to 320 V 0.01 A to 10 A 5 mW to 960 W	0.9 % to 0.05 %	Using Reference Comparator COM3003, Make: Zera by Direct Method
13.	Power Factor ^{\$}	40 Hz to 70 Hz + 1 to - 1	0.005 %	Using Reference Comparator COM3003, Make: Zera by Direct Method

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<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	Liquid in Glass Thermometer ^{\$}	0 to 150 °C	0.6 °C	Using Digital Thermometer with PRT Sensor Along with Oil Bath/ Metrology Well/ Furnace By Comparison Method
2.	Digital Temperature Indicator with Sensors (RTD/ Thermocouple) ^{\$}	(-) 25 °C to 150 °C 150 °C to 650 °C 650 °C to 1000 °C	0.1 °C 0.6 °C 2.6 °C	Using Digital Thermometer with PRT/S- Type Thermocouple along with Oil Bath/ Metrology Well/ Furnace By Comparison Method
3.	Freezer, Oven, Chamber [*]	(-) 25 °C to 150 °C	2.65 °C	Using 9 RTDs with Digital Thermometer Multi-Point Calibration
4.	Indicator of RH Chamber/ Environmental Chamber [*]	40 % RH to 95 % RH 25 °C to 55 °C	2.0 % RH	Using Digital Hygrometer with Sensor Single - Point Calibration

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

^{\$}Only in Permanent Laboratory

^{*}Only for Site Calibration

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