

Laboratory	Perfect Calibration Centre Pvt. Ltd., No. 40, 71 st Cross, 5 th Block, Rajaji Nagar, Bangalore, Karnataka		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electro-Technical Calibration	Issue Date	21.10.2014
Certificate Number	C-0667	Valid Until	20.10.2016
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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>SOURCE</u>			
1. DC VOLTAGE [#]	0.1 mV to 10 mV	1.16 % to 0.138 %	Using Standard Calibrator MPC Fluke 5520A By Direct Method
	10 mV to 100 mV	0.016 % to 0.0036 %	
	100 mV to 1V	0.0036 % to 0.0016 %	
	1V to 10 V	0.0016 % to 0.0017 %	
	10 V to 1000V	0.0017 % to 0.0023 %	
DC VOLTAGE ^{\$}	0.5 to 30 kV	2.8 %	Using HV Source with HV Probe Fluke by Comparison Method
2. AC VOLTAGE [#]	10 Hz to 10 kHz		Using MPC Fluke 5520A by Direct Method
	1 mV to 100 mV	0.12 % to 0.03 %	
	100 mV to 10 V	0.03 % to 0.23 %	
	10 V to 30 V	0.023 % to 0.06 %	
	45 Hz to 1kHz		
	1mV to 1 V	0.03 % to 0.02 %	
	1V to 10 V	0.02 % to 0.024 %	
	10 V to 100 V	0.024 % to 0.027 %	
	100 V to 1000 V	0.027 % to 0.047 %	
	10 kHz to 100 kHz		0.26 % to 0.11 %
	1mV to 100mV	0.11 % to 0.07 %	
	100 mV to 1V	0.11 % to 0.07 %	
	1V to 100V		
	100 kHz to 450 kHz		0.07 % to 0.03 %
	30mV to 3V		

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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (\pm)	Remarks
	50 Hz 1kV to 28kV	4 %	Using HV Source with HV probe Fluke with DMM by Comparison Method
3. DC CURRENT[#]	10 μ A to 100 μ A 100 μ A to 1 mA 1 mA to 100 mA 100 mA to 1A 1 A to 10 A 10 A to 20 A 20 A to 1000A	0.04 % to 0.06 % 0.06 % to 0.04 % 0.04 % to 0.046 % 0.046 % to 0.06 % 0.06 % to 0.20 % 0.20 % to 0.12 % 0.12 % to 0.43 %	Using MPC Fluke 5520A by Direct Method Using MPC Fluke 5520A with 50 TURNS Current coil by Direct Method
4. AC CURRENT[#]	10 Hz to 10 kHz 30 μ A to 100 mA 100 mA to 1A 1 A to 3 A 50 Hz to 1 kHz 30 μ A to 100 μ A 45 Hz to 1 kHz 190 μ A to 100 mA 100 mA to 1A 1 A to 10 A 10 A to 20 A 50 Hz 20 A to 1000 A	0.35 % to 0.14 % 0.14 % to 0.04 % 0.04 % to 0.02 % 0.35 % to 0.27 % 0.098 % to 0.08 % 0.08 % to 0.07 % 0.07 % to 0.10 % 0.10 % to 0.18 % 0.15 % to 0.47 %	Using MPC Fluke 5520A by Direct Method

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	5 kHz		
	100 mA to 1 A	0.08 % to 0.46 %	
	1 A to 20 A	0.46 % to 3.47 %	
5. RESISTANCE[#] Upto 5 kV	50 $\mu\Omega$ to 100 $\mu\Omega$	0.59 % to 0.40 %	Using Micro/ Milliohm Standard MPC Fluke 5520A by Direct Method
	100 $\mu\Omega$ to 1 Ω	0.60 % to 0.12 %	
	1 Ω to 100 Ω	0.090 % to 0.005 %	
	100 Ω to 100 k Ω	0.005 % to 0.0032 %	
	100k Ω to 1M Ω	0.0032 % to 0.004%	
	1 M Ω to 100M Ω	0.004 % to 0.006 %	
	100 M Ω to 1G Ω	0.006 % to 1.40 %	
	1G Ω to 10G Ω	1.4 % to 2.5 %	
6. CAPACITANCE[#]	1 kHz		
	0.190 nF to 10 nF	4.55 % to 0.40 %	Using MPC Fluke 5520A by Direct Method
	10 nF to 100nF		
	100nF to 1 μ F		
	100 Hz		
	1 μ F to 10 μ F	0.68 % to 0.40 %	
	10 μ F to 100 μ F		
7. DC POWER[#]	1 V to 600 V		
	1 mA to 1000 A		
	1 mW to 10 W	0.05 % to 0.08 %	
	10 W to 1 kW	0.08 % to 0.1 %	
	1 kW to 600 kW	0.1 % to 0.65 %	

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8.	AC POWER[#] (Single Phase)	50 Hz @ UPF 120V to 240V 0.01A to 20A 1.2W to 4.8 kW	0.11 %	Using MPC Fluke 5520A by Direct Method
		50 Hz @ 0.8 Lead 120V to 240V 0.1A to 20A 9.6W to 3.8kW	0.23 %	
		50 Hz @ 0.5 Lag 120V to 240V 0.1A to 20A 6W to 2.4 kW	0.39 %	
		50 Hz @ 0.2 Lag 120 V to 240 V 0.1A to 20A 2.4 W to 960W	0.32 %	
9.	POWER FACTOR[#]	0.2 lead to UPF 0.2 Lag to UPF	0.0062 pf to 0.0101 pf	Using 3 \emptyset power source by Direct Method
10.	INDUCTANCE[#]	1 kHz 100 μ H to 1 H 1 H to 10 H	1.23 %	Using Decade Inductance Box by Direct Method
11.	FREQUENCY[#]	10 Hz to 1 kHz 1 kHz to 1 MHz	0.0006 %	Using MPC Fluke 5520A by Direct Method

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12. OSCILLOSCOPE[#] AMPLITUDE	1 mV to 130 V (DC signal) 1 mV to 130 V _{p-p} (Square wave Signal)	0.20 %	Using MPC Fluke 5520A by Direct Method
TIME MARKER	2 ns to 5s	0.29 % to 0.06 %	
BANDWIDTH	10 kHz to 600 MHz	2.30 %	
13. TEMPERATURE SIMULATION[#] (Temperature Indicator, Recorder/ Controller) RTD	(-)200°C to 800°C	0.03°C	Using MPC Fluke 5520A by Direct Method
Thermocouple			
S T/C	100°C to 1760°C	0.70°C	
R T/C	100°C to 1760°C	0.68°C	
J T/C	(-)200°C to 1200°C	0.13°C	
K T/C	(-)200°C to 1300°C	0.17°C	
E T/C	(-)250°C to 1000°C	0.15°C	
B T/C	600°C to 1800°C	0.79°C	
T T/C	(-)200 to 400°C	0.14°C	
N T/C	(-)200°C to 1300°C	0.27°C	
14. ENERGY[#] (1Ø, 50 Hz) AC VOLTAGE AC CURRENT POWER FACTOR	50 Hz 63.5 V to 300 V 100 mA to 5 A 0.5 Lead UPF	0.26 %	Using 3 Power Source with Power analyser by Comparison Method

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15. POWER /ENERGY (3\emptyset, 50 Hz) AC VOLTAGE AC CURRENT POWER FACTOR^{\$} <u>MEASURE</u>	50 Hz 63.5 V to 300 V 100 mA to 5 A 0.5 Lead UPF 0.5 Lag UPF	0.26 %	
1. DC VOLTAGE[#]	1 mV to 100 mV 100 mV to 1 V 1 V to 1000 V 0.5 kV to 30 kV	0.06 % to 0.008 % 0.008 % to 0.004 % 0.004 % to 0.006 % 2.8 %	Using 6½ Digit Multimeter by Direct Method Using Fluke HV Probe DMM by Comparison Method
2. AC VOLTAGE[#]	50 Hz to 50 kHz 10 mV to 100 mV 100 mV to 10 V 10 V to 100 V 100 V to 1000 V 10 Hz to 300 kHz 100 mV to 10 V 50 kHz to 100 kHz 10 mV to 100 mV 45 kHz to 50 Hz 10 mV to 1000 V 50 Hz 1 kV to 28 kV	0.54 % to 0.12 % 0.12 % to 0.019 % 0.019 % to 0.03 % 0.03 % to 0.11 % 0.11 % 0.760 % to 0.20 % 0.80 % to 0.10 % 4.0 %	Using 6½ Digit Multimeter by Direct Method Using Fluke HV Probe DMM by Direct Method

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3.	DC CURRENT[#]	10 μ A to 100 μ A 100 μ A to 1 mA 1 mA to 100 mA 100 mA to 1 A 1 A to 10 A	0.022 % to 0.348 % 0.06 % to 0.04 % 0.04 % to 0.046 % 0.046 % to 0.082 % 0.06 % to 0.20 %	Using 6½ Digit Multimeter by Direct Method
4.	AC CURRENT^{\$}	1kHz to 5 kHz 10 μ A to 1 mA 1 mA to 100 mA 100 mA to 1 A 1 A to 10 A 10 A to 30 A 30 A to 1000 A	0.50 % to 0.15 % 0.15 % to 0.17 % 0.17 % to 0.25 % 0.25 % to 0.60 % 0.60 % to 0.75 % 0.75 % to 2.21 %	Using 6½ Digit Multimeter by Direct Method
		45 Hz to 5 kHz 100 μ A to 100 mA 100 mA to 1 A 1 A to 10 A	0.25 % to 0.098 % 0.098 % to 0.42 % 0.42 % to 0.60 %	
5.	RESISTANCE[#] Upto 5 kV	1 m Ω to 100 Ω 100 Ω to 10 k Ω 10 k Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 1 G Ω 1 G Ω to 10 G Ω	0.35 % to 0.010 % 0.010 % to 0.012 % 0.012 % to 0.011 % 0.011 % to 0.013 % 0.013 % to 0.04 % 0.04 % to 2.3 % 2.3 % to 3.3 %	Using 6½ Digit Multimeter by Direct Method
6.	CAPACITANCE[#]	1 kHz 1 nF to 100 μ F	0.27 % to 1.11 %	Using LCR Meter with Fluke 5520 A by Direct Method

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7.	INDUCTANCE[#]	1 kHz 1 μ H to 10 H	0.50 %	Using LCR Meter with Decade Inductance Box by Direct Method
8.	FREQUENCY[#]	1 Hz to 4 MHz	0.002 % to 0.005 %	Using Frequency Counter by Direct Method
9.	TEMPERATURE SIMULATION[#]			
	RTD	(-)200° C to 800° C	0.50° C to 0.90° C	
	Thermocouple			
	S Type	100° C to 1760° C	0.59° C	Using Yokogawa Calibrators by Direct Method
	R Type	100° C to 1760° C	0.59° C	
	J Type	(-)200° C to 1200° C	0.75° C	
	K Type	(-)200° C to 1300° C	0.75° C	
	E Type	(-)250° C to 1000° C	0.18° C	
	B Type	600° C to 1800° C	0.75° C	
	T Type	(-)200° C to 400° C	0.50° C	
	N Type	(-)200° C to 1300° C	0.25° C	
10.	TIME INTERVAL[#]	1 s to 1 min 1 min to 1 hr 1 Hr to 10 hr 10 Hr to 24 hr	0.06 %	Using Digital Timer by Comparison Method
1.	ENERGY[#] (1\emptyset, 50 Hz)	50 Hz		
	AC VOLTAGE	63.5 V to 300 V	0.25 %	Using 3 \emptyset power Analyzer by Comparison Method
	AC CURRENT	100 mA to 5 A		
	POWER FACTOR	0.5 Lead UPF 0.5 Lag UPF		

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12.	POWER/ENERGY[#] (3\emptyset, 50 Hz) AC VOLTAGE AC CURRENT POWER FACTOR	50 Hz 63.5 V to 300 V 100 mA to 5 A 0.5 Lead UPF 0.5 Lag UPF	0.25 %	
13.	POWER FACTOR[#]	0.2 Lead to UPF 0.2 Lag to UPF	0.0045 pf to 0.012 pf	Using 3 \emptyset Power Source by Direct Method

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

\$ Only in Permanent Laboratory

* 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.

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