Laboratory	**Calibration & Standards Laboratory (Electro Thermal), Controllerate Of Quality Assurance (Electronics), JC Nagar P.O., Bangalore, Karnataka**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Electro-Technical Calibration**	**Issue Date**	**07.11.2016**
Certificate Number	**C-0838**	**Valid Until**	**06.11.2018**
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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
	SOURCE			
1.	**DC VOLTAGE$**	1 mV to 100 mV	0.047% to 0.0014%	Using Multi Function Calibrator Fluke 5720A by Direct Method
		100 mV to 1 V	0.0014% to 0.0007%	
		1 V to 10 V	0.0007% to 0.0005%	
		10 V to 1000 V	0.0005% to 0.0009%	
2.	**DC CURRENT$**	10 µA to 100 µA	0.077% to 0.006%	Using Multi Function Calibrator Fluke 5720A by Direct Method
		100 µA to 1 mA	0.006% to 0.005%	
		1 mA to 10 mA	0.005% to 0.0045%	
		10 mA to 100 mA	0.0045% to 0.006%	
		100 mA to 2 A	0.006% to 0.011%	
		2 A to 100 A	0.01% to 0.047%	Using Multi Function Calibrator Fluke 5720A with Transconductance Amplifier by Direct Method
3.	**AC VOLTAGE$**	**20 Hz to 40 Hz**		
		20 mV to 20 V	0.097% to 0.031%	Using Multi Function Calibrator Fluke 5720A by Direct Method
		40 Hz to 1 kHz		
		2 mV to 20 mV	0.22% to 0.035%	
		20 mV to 200 mV	0.037% to 0.017%	
		200 mV to 2 V	0.017% to 0.013%	
		2 V to 200 V	0.013%	
		200 V to 750 V	0.013% to 0.037%	
		1 kHz to 50 kHz		
		2 mV to 20 mV	0.28% to 0.1%	
		50 kHz to 300 kHz		
		200 mV to 20 V	0.2 % to 0.042%	
		300 kHz to 1 MHz		
		2 V to 20 V	0.26 %	

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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
4. AC CURRENT[$]	**40 Hz to 1 kHz**		
	10 µA to 200 µA	0.11% to 0.02%	Using Multi Function Calibrator Fluke 5720A by Direct Method
	200 µA to 100 mA	0.02% to 0.027%	
	100 mA to1 A	0.027% to 0.04%	
	1 kHz		
	1 A to 20 A	0.04% to 0.13%	Using Multi Function Calibrator Fluke 5720A with Transconductance Amplifier by Indirect Method
5. RESISTANCE[$]	1 Ω to 1.9 Ω	0.011%	Using Multi Function Calibrator Fluke 5720A by Direct Method
(in steps of 1-1.9-10)	1.9 Ω to 10 Ω	0.011 %to 0.0027%	
	10 Ω to 19 kΩ	0.0027% to 0.0011%	
	19 kΩ to 1 MΩ	0.0011% to 0.0046%	
6. OSCILLOSCOPE[$]			
VERTICAL CHANNEL			
a) DC Voltage	3 mV to 50 V (1MΩ)	2.32%	Using Multi Function Calibrator Fluke 5720A by Direct Method
	3 mV to 5 V (50Ω)	4.43%	
b) Square wave	**1 kHz**		
	6 mV to 60 V (1MΩ)	0.9%	
	1 kHz		
	30 mV to 5V (50Ω)	1.5%	
TIME BASE	10 ns to 1 s	115 ppm to 356 ppm	
BAND WIDTH	10 MHz to 1GHz	3.9% to 4.9%	

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
MEASURE			
1. DC VOLTAGE$	190 mV to 1.9 V 1.9 V to 19 V 19 V to 1000 V	0.0039% to 0.0015% 0.0015% 0.0015% to 0.0028%	Using DMM, Keithley 2002 by Direct Method
2. DC CURRENT$	190 µA to 1.9 mA 1.9 mA to 190 mA 190 mA to 1.9 A	0.045% to 0.043% 0.043% to 0.046% 0.046% to 0.09%	Using DMM, Keithley 2002 by Direct Method
3. DC CURRENT#	2A to 100A	0.016% to 0.0054%	Using DMM Keithley 2002, with Standard Resistor L&N by V/R Method
4. AC VOLTAGE$	**50 Hz to 1 kHz** 190 mV to 19 V 19 V to 190 V 190 V to 750 V	 0.1% 0.1% 0.1 to 0.13%	Using DMM, Keithley 2002 by Direct Method
	1 kHz to 50 kHz 190 mV to 19 V	 0.08% to 0.1%	
	5 kHz to 50 kHz 19 V to 100 V	 0.1% to 0.12%	
5. AC CURRENT$	**40 Hz to 100 Hz** 190 µA to1.9 mA 1.9 mA to190 mA 190 mA to 1.9 A	 0.42% to 0.37% 0.37 % 0.37 % to 0.43%	Using DMM, Keithley 2002 by Direct Method
	100 Hz to 1kHz 1.9 mA to 190 mA	 0.19%	

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
		50 Hz		
		2 A to10 A	1.6% to 1.1%	
		10 A to 20 A	0.13%	
6.	**RESISTANCE$**	1 Ω to 10 Ω	0.041% to 0.0066%	Using DMM, Keithley 2002 by Direct Method
		10 Ω to 100 Ω	0.0066% to 0.0051%	
		100 Ω to 1kΩ	0.0051% to 0.0019%	
		1 kΩ to 10 kΩ	0.002%	
		10 kΩ to 100 kΩ	0.002% to 0.005%	
		100 kΩ to 1MΩ	0.005% to 0.01%	
7.	**OSCILLOSCOPE$**			
	VERTICAL CHANNEL DC VOLTAGE	5mV to 190mV (1MΩ)	3.2 % to 2.03%	Using Oscilloscope Calibrator Fluke 9500 by Direct Method
	TIME BASE / PULSE WIDTH	2 ns to 10 ms	143 ppm to 446 ppm	

*** Measurement Capability is expressed as an uncertainty (±) 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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