

Laboratory Larsen and Toubro, Electrical Calibration Laboratory, VIth Floor, TC-III, Tower 'B', Mount Poonamallee Road, Manapakkam, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2525

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Validity 28.05.2018 to 27.05.2020

Last Amended on

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage [§]	10 mV to 100 mV 100 mV to 1000 V	0.64 % to 0.061 % 0.061 %	Using Multi product Calibrator Model 3041A by Direct Method
2.	DC Current [§]	100 μ A to 1 mA 1 mA to 10 mA 10 mA to 1 A 1 A to 10 A 10 A to 19.99 A 20 A to 100 A 100 A to 1000 A	0.08 % to 0.061 % 0.061 % to 0.06 % 0.06 % 0.06 % to 0.072 % 0.072 % to 0.05 % 1.13 % to 0.85 % 0.85 % to 0.58 %	Using Multi product Calibrator Model 3041A by Direct Method Current Coil EA002
3.	AC Voltage [§]	50 Hz 20 mV to 200 mV 200 mV to 2 V 2 V to 200 V 200 V to 1000 V	0.34 % to 0.06 % 0.06 % to 0.08 % 0.08 % to 0.05 % 0.05 % to 0.087 %	Using Multi product Calibrator Model 3041A by Direct Method
4.	AC Current [§]	50 Hz 25 μ A to 200 μ A 200 μ A to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 10 A	1.24 % to 0.20 % 0.20 % to 0.31 % 0.31 % to 0.08 % 0.08 % to 0.11 % 0.11 % to 0.12 % 0.12 % to 0.11 %	Using Multi product Calibrator Model 3041A by Direct Method

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		10 A to 19.99 A 20 A to 100 A 100 A to 1000 A	0.11 % to 0.08 % 0.66 % to 0.52 % 0.52 % to 0.31 %	Current Coil EA002
5.	DC Resistance [§] (2 Wire Method)	1 Ω to 100 Ω 100 Ω to 100 k Ω 100 k Ω to 10 M Ω	5.04 % to 0.10 % 0.10 % to 0.062 % 0.062 % to 0.07 %	Using Multi product Calibrator Model 3041A by Direct Method.
6.	Frequency [§]	100 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 100kHz	0.006 % to 0.06 % 0.06 % to 0.006 % 0.006 %	Using Multi product Calibrator Model 3041A by Direct Method.
7.	Capacitance [§]	1 kHz 1 nF to 100 nF 100 nF to 1 μ F 1 μ F to 10 μ F	0.68 % to 0.30 % 0.30 % to 0.48 % 0.48 % to 0.75 %	Using Multi product Calibrator Model 3041A by Direct Method.
8.	DC Resistance [#] (4 Wire Method)	10m Ω 100 m Ω 160 $\mu\Omega$ 1600 $\mu\Omega$ 1 Ω 10 Ω	0.03 % 0.07 % 0.12 % 0.12 % 0.02 % 0.02 %	Using Vaiseshika STD Resistance model: 9409-CB, 9410-CB by Direct Method.
9.	DC High Resistance [§] (2 Wire Method)	1 M Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1000 M Ω 1 G Ω to 10 G Ω 10 G Ω to 100 G Ω	3.1 % to 2.4 % 2.38 % to 2.31 % 2.31 % to 3.04 % 5.72 % to 5.8 % 5.8 %	Using Vaiseshika STD Resistance Box Model: 8400HV by Direct Method.

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10.	DC Low Resistance ^{\$} (2 Wire Method)	0.01 Ω to 0.1 Ω 0.1 Ω to 1 Ω 1 Ω to 10 k Ω	2.8 % to 0.6 % 0.6 % to 0.06 % 0.06 % to 0.06 %	Using Vaiseshika STD Resistance Box Model: 7400 by Direct Method.
II. MEASURE				
1.	DC Voltage [#]	100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.008 % to 0.0038 % 0.0038 % to 0.0043 % 0.0043 % to 0.0058 % 0.0058 % to 0.0067 %	Using Fluke 8846A, 6 $\frac{1}{2}$ Digit Multimeter by Direct Method
2.	DC Current [#]	100 μ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	0.087 % to 0.064 % 0.064 % to 0.096 % 0.096 % to 0.07 % 0.07 % to 0.081 % 0.081 % to 0.2 %	Using Fluke 8846A, 6 $\frac{1}{2}$ Digit Multimeter by Direct Method
3.	AC Voltage [#]	10 Hz to 1 kHz 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.12 % to 0.14 % 0.14 % to 0.11 % 0.11 % to 0.13 % 0.11 %	Using Fluke 8846A, 6 $\frac{1}{2}$ Digit Multimeter by Direct Method
4.	AC Current [#]	40 Hz to 1 kHz 100 μ A to 1 mA 1 mA to 10 mA 10 mA to 1 A 1 A to 10 A	0.27 % to 0.17 % 0.17 % to 0.29 % 0.29 % to 0.17 % 0.17 % to 0.25 %	Using Fluke 8846A, 6 $\frac{1}{2}$ Digit Multimeter by Direct Method
5.	DC Resistance [#]	10 Ω to 100 Ω 100 Ω to 1 M Ω 1 M Ω to 10 M Ω	0.046 % to 0.017 % 0.017 % to 0.013 % 0.013 % to 0.047 %	Using Fluke 8846A, 6 $\frac{1}{2}$ Digit Multimeter by Direct Method

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6.	Frequency [#]	40 Hz to 300 kHz	1.44 % to 0.19 %	Using Fluke 8846A, 6 ½ Digit Multimeter by Direct Method
7.	AC High Voltage [#]	50 Hz 1 kV to 28 kV	8.5 % to 7.2 %	Using HV Probe 80k-40 with 87V Multimeter
8.	DC High Voltage [#]	1 kV to 20 kV 20 kV to 40 kV	6.3 % to 1.6 % 1.6 % to 2.5 %	Using HV Probe 80k-40 with 87V Multimeter

* 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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