

<b>Laboratory</b>	<b>Scientific And Industrial Testing and Research Centre, 83 &amp; 84, Avarampalayam Road, K.R. Puram P.O., Coimbatore, Tamil Nadu</b>		
<b>Accreditation Standard</b>	<b>ISO/IEC 17025: 2005</b>		
<b>Discipline</b>	<b>Electro-Technical Calibration</b>	<b>Issue Date</b>	<b>11.12.2014</b>
<b>Certificate Number</b>	<b>C-0169</b>	<b>Valid Until</b>	<b>10.12.2016</b>
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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks		
<b><u>SOURCE</u></b>					
<b>1. DC VOLTAGE<sup>\$</sup></b>	100 $\mu$ V to 1mV	3.47% to 0.37%	Using Fluke 5500 A Calibrator		
	1 mV to 10 mV	0.37% to 0.04%			
	10 mV to 100 mV	0.04% to 0.01%			
	100 mV to 1 V	0.01% to 0.01%			
	1 V to 100 V	0.01%			
	100 V to 1000 V	0.01%			
<b>2. AC VOLTAGE<sup>\$</sup></b>	<b>10 Hz to 1 kHz</b>		Using Fluke 5500 A Calibrator		
	1 mV to 10 mV	2.7% to 0.64%			
	10 mV to 100 mV	0.64% to 0.35%			
	100 mV to 1 V	0.35% to 0.20%			
	1 V to 10 V	0.20% to 0.05%			
	<b>1 kHz to 100 kHz</b>				
	10 mV to 100 mV	0.41% to 0.5%			
	100 mV to 1 V	0.08% to 0.47%			
	<b>3. AC VOLTAGE<sup>\$</sup></b>	<b>1 kHz to 90 kHz</b>			Using Fluke 5500 A Calibrator
		1 V to 10 V		0.04% to 0.47%	
<b>45 Hz to 1 kHz</b>					
10 V to 100 V		0.2% to 0.07%			
100V to 1000V		0.07%			
<b>1 kHz to 18 kHz</b>					
10V to 100V		0.05% to 0.14%			
<b>1 kHz to 10 kHz</b>					
100V to 1000V		0.07% to 0.3%			
<b>4. DC CURRENT<sup>\$</sup></b>		10 $\mu$ A to 100 mA	0.8% to 0.02%	Using Fluke 5500 A Calibrator	
	100 mA to 1 A	0.02% to 0.04%			
	1 A to 10 A	0.04% to 0.07%			

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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
	10A to 50 A	0.88 % to 0.63%	Using Fluke 5500 A Current Coil with Fluke 5500 A Calibrator
	50 A to 100 A	0.63% to 0.43%	
	100 A to 550 A	0.43% to 0.50 %	
<b>5. AC CURRENT<sup>\$</sup></b>	<b>45 Hz to 1 kHz</b>		Using Fluke 5500 A Calibrator
	30 $\mu$ A to 10mA	1.13% to 0.2%	
	10 mA to 100 mA	0.2% to 0.5%	
	100 mA to 1 A	0.14% to 0.3%	
	1 A to 10 A	0.3% to 0.41%	
	<b>1 kHz to 5 kHz</b>		Using Fluke 5500A Calibrator/ Current Coil
	10 mA to 1 A	0.2% to 0.90%	
	<b>50 Hz</b>		Using Fluke 5500A Calibrator/ Current Coil
	5 A to 50 A	2.87% to 0.74 %	
	100 A to 550 A	0.51 % to 1.0 %	
<b>6. AC POWER SINGLE PHASE 0.2 P.F TO UPF<sup>\$</sup></b>	<b>50 Hz</b>		Using Fluke 5500A Calibrator
	2.4 W to 2.4 kW	1.15 % to 0.15 %	
<b>7. POWER FACTOR<sup>\$</sup></b>	<b>50 Hz</b>		Using Fluke 5500 A Calibrator
	0.2 PF to 1 PF	1.7%	
<b>8. FREQUENCY<sup>\$</sup></b>	10 Hz to 1MHz	0.6% to 0.06%	Using Fluke 5500 A Calibrator
<b>9. CAPACITANCE<sup>\$</sup></b>	<b>1 kHz</b>		Using Fluke 5500 A Calibrator / Decade Capacitance Box Agronic CDB6
	0.35 nF to 10 nF	4.21% to 0.70%	
	10 nF to 330 nF	0.70% to 0.40%	
	<b>100 Hz</b>		Using Fluke 5500 A Calibrator / Decade Capacitance Box Agronic CDB6
	1.09 $\mu$ F to 1.1 mF	0.40% to 1.3%	

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<b>10. INDUCTANCE<sup>§</sup></b>	<b>1 kHz</b> 1mH to 10 H	4.8 % to 2.3 %	Using Decade Inductance Box Agronic CDB 6
<b>11. DC RESISTANCE<sup>§</sup></b>	10 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$ 10M $\Omega$ to 100M $\Omega$ 100 M $\Omega$ to 1 G $\Omega$ 1 G $\Omega$ to 1 T $\Omega$	2.7% to 1.1 % 1.1% to 0.03% 0.03% to 0.02% 0.02% 0.02% to 0.08% 0.08% to 0.6% 0.6% to 2.4% 2.4%	Using Fluke 5500 A Calibrator / Vaiseshika 7400 Decade Resistance Box / Vaiseshika 8400 Decade Meg Ohm Box / Decde Tera Ohm Box / Cropico RH 9A-5 Decade Resistance Box / Tinsely ZX-74 E Decade Resistance Box
<b>12. OSCILLOSCOPE<sup>§</sup></b>			
<b>AMPLITUDE</b>	1 mV to 55 V (p-p) ( Square / Sine / Triangle Wave Signal )	11.8% to 2.3%	Using Fluke 5500 A Calibrator
<b>TIMER MARKER</b>	5 ns to 5 s	1.2%	
<b>BAND WIDTH</b>	50 kHz to 200 MHz ( 50 kHz Ref)	0.58% to 0.30%	
<b>13. TEMPERATURE SIMULATION</b>			
<b>TEMPERATURE INDICATORS / RECORDERS / CONTROLLERS</b>			
<b>THERMOCOUPLE<sup>§</sup></b>			
	- 30°C to 1000°C	0.25°C	Using Fluke 5500 A Calibrator
<b>'E' TYPE</b>	- 30°C to 1200°C	0.3°C	
<b>'J' TYPE</b>	- 30°C to 1372°C	0.47°C	
<b>'K' TYPE</b>	- 30°C to 1372°C	0.47°C	
<b>'N' TYPE</b>	- 30°C to 1300°C	0.32°C	
<b>'R' TYPE</b>	50°C to 1767°C	0.7°C to 0.5°C	
<b>'S' TYPE</b>	50°C to 1767°C	0.5°C	
<b>'T' TYPE</b>	-30°C to 400°C	0.3°C to 0.2°C	
<b>RTD</b>	-200°C to 800°C	0.1°C to 0.3°C	

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<b><u>MEASURE</u></b>			
1. DC VOLTAGE <sup>\$</sup>	10 mV to 100 mV	0.05% to 0.01%	Using Keithely 6 ½ DMM 2000, Fluke 4 ½ DMM 287, HV Probe
	100 mV to 1 V	0.01% to 0.004%	
	1 V to 100 V	0.004% to 0.006%	
	100 V to 1000 V	0.006% to 0.01%	
	1 kV to 12 kV	0.01% to 2.75 %	
2. AC VOLTAGE <sup>\$</sup>	<b>50 Hz</b>		Using Keithely 6 ½ DMM 2000, Fluke 4 ½ DMM 287, HV Probe
	5 mV to 10 V	0.42% to 0.1%	
	10 V to 100 V	0.1%	
	100 V to 750 V	0.1 %	
	0.75 kV to 28 kV	0.1% to 6.1%	
3. DC CURRENT <sup>\$</sup>	1 mA to 100 mA	0.1 %	Using Keithely 6 ½ DMM 2000, Fluke 4 ½ DMM 287, HV Probe
	100 mA to 3 A	0.14 %	
	3 A to 15 A	0.06%	
4. AC CURRENT <sup>\$</sup>	<b>50 Hz</b>		Using Keithely 6 ½ DMM 2000, Fluke 4 ½ Ballantine Current Shunt
	1 mA to 10 mA	0.2% to 0.1%	
	10 mA to 100 mA	0.12%	
	100 mA to 3 A	0.12% to 0.24%	
	3A to 10A	0.24% to 0.12%	
5. DC RESISTANCE <sup>\$</sup>	10 $\Omega$ to 100 $\Omega$	0.5% to 0.02%	Using Keithely 6 ½ DMM 2000, Fluke 4 ½ DMM 287
	100 $\Omega$ to 10 k $\Omega$	0.02% to 0.01%	
	10 k $\Omega$ to 1 M $\Omega$	0.01%	
	1 M $\Omega$ to 10 M $\Omega$	0.01% to 0.05%	
	10M $\Omega$ to 100M $\Omega$	0.05% to 0.2%	
6. TIME <sup>\$</sup>	1 sec to 1 min	0.15sec	Using Aplab Universal Time and Frequency Counter 119
	1 min to 90 min	0.15sec	

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	<b>Quantity Measured/ Instrument</b>	<b>Range / Frequency</b>	<b>*Calibration Measurement Capability (<math>\pm</math>)</b>	<b>Remarks</b>
7.	<b>FREQUENCY<sup>§</sup></b>	10 Hz to 100 Hz 100Hz to 500kHz	0.06% to 0.01% 0.01% to 0.02%	Using Keithely 2000 61/2 DMM
8.	<b>TEMPERATURE SIMULATION TEMPERATURE INDICATORS / RECORDERS / CONTROLLERS THERMOCOUPLE<sup>§</sup></b>			
	<b>'E' TYPE</b>	- 30°C to 1000°C	0.22°C	Using Keithely 2000 61/2 DMM, Digital Temperature Read-out 1529
	<b>'J' TYPE</b>	- 30°C to 1200°C	0.24°C to 0.32°C	
	<b>'K' TYPE</b>	- 30°C to 1372°C	0.27°C to 0.53°C	
	<b>'N' TYPE</b>	- 30°C to 1300°C	0.35°C	
	<b>'R' TYPE</b>	50°C to 1767°C	0.80°C	
	<b>'S' TYPE</b>	50°C to 1767°C	0.80°C	
	<b>'T' TYPE</b>	-30°C to 400°C	0.30°C	
9.	<b>DC VOLTAGE<sup>*</sup></b>	1 kV to 12 kV	2.8%	Using Fluke 4 ½ DMM 287, HV Probe
10.	<b>AC VOLTAGE<sup>*</sup></b>	<b>50 Hz</b> 0.5 kV to 28 kV	6.0%	Using Fluke 4 ½ DMM 287, HV Probe

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

<sup>§</sup>Only in Permanent Laboratory

<sup>\*</sup>Only for Site Calibration

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