

Laboratory BLR Techno Solutions, No. 16, Vinayaka Nilaya, 2nd Main, BHCS
 2nd Stage, Chandra Layout, Vijaya Nagar, Bangalore, Karnataka
Accreditation Standard ISO/IEC 17025: 2005
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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage [#]	1 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.61 % to 0.01 % 0.01 % to 0.013 % 0.01 % to 0.009 % 0.01 % to 0.01 % 0.01 % to 0.01 %	Using Wavetek Datron 9000 By Direct Method
2.	DC Current [#]	10 µA to 100 µA 100 µA to 1 mA 1 mA to 100 mA 100 mA to 300 mA 300 mA to 1A	0.3 % to 0.05 % 0.05 % to 0.04 % 0.04 % to 0.04 % 0.04 % to 0.03 % 0.03 % to 1.40 %	Using Wavetek Datron 9000 By Direct Method
		1 A to 10 A 10 A to 1000 A	1.40 % to 0.31 % 0.31 % to 1.03 %	Using MFC Zeal 4.5 Digit By Direct Method With Current Coil
		2 mA to 20 mA	0.57 % to 0.07 %	Using Handy Calibrator Yokogawa CA71 By Direct Method
3.	AC Voltage [#]	50 Hz to 1 kHz 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	4.5 % to 0.11 % 0.11 % to 0.07 % 0.07 % to 0.05 % 0.05 % to 0.06 % 0.06 % to 0.10 %	Using Wavetek Datron 9000 By Direct Method
4.	AC Current [#]	50 Hz to 1 kHz 10 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A	10.52 % to 0.81 % 0.81 % to 0.14 % 0.14 % to 0.09 % 0.09 % to 0.06 %	Using Wavetek Datron 9000 By Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
		50 Hz 2 A to 10 A 10 A to 1000 A	0.49 % to 0.62 % 0.62 % to 1.24 %	Using MFC Zeal 4.5 Digit By Direct Method With Current Coil
5.	Capacitance [#]	1 kHz 100 pF to 1 nF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1000 nF 100 Hz 1 μ F to 10 μ F	2.3 % to 2.3 % 2.3 % to 2.3 % 2.3 % to 2.3 % 2.3 % to 2.3 % 2.3 %	Using Decade Capacitance Box By Direct Method
6.	DC Resistance [#]	0.1 Ω to 1 Ω	2.43 % to 2.31 %	Using Decade Resistance Box By Direct Method
		1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k 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	1.19 % to 0.14 % 0.14 % to 0.04 % 0.0071 % to 0.0070 % 0.070 % to 0.0070 % 0.0070 % to 0.039 % 0.039 % to 0.09 % 0.01 % to 0.65 %	Using Wavetek Datron 9000 By Direct Method
		10 M Ω to 100 M Ω 100 M Ω to 1000 M Ω	2.31 % to 2.50 % 2.50 % to 2.35 %	Using Decade Resistance Box By Direct Method
7.	Inductance [#]	1 kHz 100 μ H to 1000 mH 100 Hz 1 H to 10 H	2.4 % to 2.3 % 2.3 % to 2.3 %	Using Decade Inductance Box By Direct Method

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8.	Frequency [#]	50 Hz to 9 kHz	0.48 % to 1.44 %	Using MFC Fluke 5100B By Direct method
9.	Temperature Indicator / Recorder / Controller / Simulator [#]			Using Handy calibrator Using Yokogawa CA71 By Direct Method
	T/C Type			
	K Type	(-) 200 °C to 1300 °C	1.2 °C to 0.9 °C	
	J Type	(-) 200 °C to 1200 °C	1.2 °C to 0.9 °C	
	B Type	600 °C to 1800 °C	2.9 °C to 2.3 °C	
	E Type	(-) 200 °C to 1000 °C	1.2 °C to 1.2 °C	
	N Type	(-) 200 °C to 1300 °C	1.3 °C to 0.9 °C	
	R Type	150 °C to 1700 °C	2.5 °C	
	S Type	150 °C to 1700 °C	2.5 °C	
	T Type	(-) 200 °C to 400 °C	1.5 °C	
	RTD Type	(-)200 °C to 800 °C	0.7 °C to 1.1 °C	
II.	MEASURE			
1.	DC Voltage [#]	1 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	1.1 % to 0.027 % 0.027 % to 0.025 % 0.025 % to 0.027 % 0.027 % to 0.025 % 0.025 % to 0.022 %	Using 5½ Fluke 8808A DMM By Direct Method
		1 kV to 25 kV	3.0 %	Using HV Probe with Fluke 17B+DMM
2.	DC Current [#]	10 µA to 1000 µA 1000 µA to 100 mA 100 mA to 1 A 1 A to 10 A	0.16 % to 0.93 % 0.93 % to 0.05 % 0.05 % to 0.059 % 0.059 % to 0.3 %	Using 5½ Fluke 8808A DMM By Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
3.	AC Voltage [#]	45 Hz to 1 kHz 1 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 750 V	11.8 % to 0.3 % 0.3 % to 0.35 % 0.35 % to 0.35 % 0.35 % to 0.35 % 0.35 % to 2.17 %	Using 5½ Fluke 8808A DMM By Direct Method
		50 Hz 0.75 kV to 25 kV	2.17 % to 3.0 %	Using HV Probe with Fluke 17B+DMM
4.	AC Current [#]	45 Hz to 1 kHz 1 mA to 100 mA 100 mA to 1 A 1 A to 10 A	1.7 % to 0.5 % 0.5 % to 0.5 % 0.5 % to 0.8 %	Using 5½ Fluke 8808A DMM By Direct Method
5.	DC Resistance [#]	1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k 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 100 M Ω	1.09 % to 0.14 % 0.14 % to 0.04 % 0.04 % to 0.032 % 0.032 % to 0.032 % 0.032 % to 0.031 % 0.031 % to 0.057 % 0.057 % to 0.3 % 0.3 % to 2.1 %	Using 5½ Fluke 8808A DMM By Direct Method
6.	Frequency [#]	10 Hz to 10 kHz	0.9 % to 0.58 %	Using 5 ½ Fluke 8808A DMM By Direct Method
7.	Time [#]	1 Sec to 18000 Sec	0.043 s to 11.46 s	Using Time Totaliser By Direct/Comparison Method
8.	Temperature Indicator / Recorder / Controller / Simulator [#]			Using Handy calibrator Yokogawa CA71 By Direct Method
	T/C Type			
	K Type	(-) 200 °C to 1300 °C	1.64 °C to 2.5 °C	
	J Type	(-) 200 °C to 1200 °C	2.21 °C to 2.4 °C	
	B Type	600 °C to 1800 °C	2.9 °C to 3.5 °C	

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
	E Type	(-) 200 °C to 1000 °C	2.2 °C to 2.4 °C	
	N Type	(-) 200 °C to 1300 °C	2.29 °C to 2.6 °C	
	R Type	150 °C to 1700 °C	2.66 °C to 3.6 °C	
	S Type	150 °C to 1700 °C	2.66 °C to 3.6 °C	
	T Type	(-) 200 °C to 400 °C	1.72 °C to 2 °C	
	RTD Type	(-)200 °C to 800 °C	0.6 °C to 1.2 °C	

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<u>MECHANICAL CALIBRATION</u>				
I.	DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)			
1.	Vernier/Dial/Digital Calipers ^{\$} L.C.: 0.01 mm	Upto 1000 mm	17.6 μ m	Using Caliper Checker / Gauge Blocks & Accessories
2.	Depth Micrometer ^{\$} (Analog/Digital) L.C.: 0.01 mm	Upto 100 mm	6.3 μ m	Using Gauge Blocks
3.	External Micrometer ^{\$} (Analog / Digital) L.C.: 0.001 mm	Upto 300 mm	8.31 μ m	Using Gauge Blocks & Long Gauge Blocks
4.	Depth Gauge ^{\$} (Vernier /Dial/Digital) L.C.: 0.01 mm	Upto 300 mm	8.4 μ m	Using Gauge Blocks & Long Gauge Blocks
5.	Height Gauge ^{\$} (Vernier /Dial/Digital) L.C.: 0.01 mm	0 mm to 1000 mm	17.48 μ m	Using Caliper Checker, Surface Plate
6.	Plunger Type Dial Gauge ^{\$} (Analog/Digital) L.C.: 0.001 mm	0 mm to 25 mm	2.9 μ m	Using Electronic Dial Calibration Tester
7.	Lever Type Dial Gauge ^{\$} L.C.: 0.001 mm	0 mm to 1.0 mm	2.5 μ m	Using Electronic Dial Calibration Tester
8.	Bore Gauge ^{\$} (Transmission Only) L.C.: 0.001 mm	0 mm to 1 mm	2.5 μ m	Using Electronic Dial Calibration Tester

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
9.	Ultra-Sonic Thickness Gauge ^{\$} L.C.: 0.01 mm	0 mm to 100 mm	6.44 μ m	Using Gauge Blocks
10.	Coating Thickness Gauge ^{\$} L.C.: 0.001 mm	10 mm to 865 μ m	2.8 μ m	Using Standard Thickness foil set
11.	Feeler Gauge ^{\$}	0.05 mm to 1 mm	2.61 μ m	Using Digital Micrometer
12.	Dial Thickness Gauge ^{\$} L.C.: 0.01 mm	0 mm to 10 mm	5.8 μ m	Using Gauge Block Set
II.	PRESSURE INDICATING DEVICES			
1.	Pressure - Pneumatic Digital and Dial Pressure Gauges & Pressure Transmitters [#]	0 to 40 bar	0.74 bar to 0.74 bar	Using Digital Pressure Gauge used as per DKD guidelines R-6-1
2.	Pressure-Hydraulic Pressure Indicators & Pressure Transmitters [#]	40 bar to 1000 bar	1.19 bar to 1.19 bar	Using Digital Pressure Gauge used as per DKD guidelines R-6-1
3.	Vacuum Gauges & Vacuum Transmitters [#]	(-) 0.8 bar to 0 bar	0.08 bar to 0.08 bar	Using Digital Pressure Gauge used as per DKD guidelines R-6-1
4.	Digital Manometers / Magnahelic Gauges / Differential Pressure Gauge [#]	0 mbar to 196 mbar	1.27 %rdg to 1.27 %rdg	Using Digital Manometer used as per DKD guidelines R-6-1

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III.	ACCELERATION AND SPEED			
1.	Speed Non-Contact Tachometers and RPM Indicators ^{\$}	10 RPM to 90000 RPM	0.5 % rdg to 0.5 % rdg	Using Digital Tachometer as per SANAS TR 45-1

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<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	Temperatures RTD's, Thermocouples Temperature Gauges (Stand Alone Sensors With and Without Indicators, Sensors With and Without Indicators Only Used for Furnaces/Ovens / Freezers/ Bath/ Autoclaves (for Non-Medical Applications)/ Incubators (for Non-Medical Applications) [#]	(-) 35 °C to 300 °C	0.35 °C to 0.35 °C	Using RTD (Pt-100) 4 Wire with Indicator and Dry Well Bath by Comparison Method
		300 °C to 800 °C	1.5 °C to 1.5 °C	Using S Type Thermocouple with Indicator and Dry Well Bath by Comparison Method
		800 °C to 1200 °C	2.1 °C to 2.1 °C	
2.	Temperature Oven, Furnace, Incubator (for Non-Medical Applications), Chamber, Baths, Freezers, Refrigerator, Autoclave (for Non-Medical Applications), Vacuum Tray Dryer, (Mapping) [*]	(-) 80 °C to 300 °C	0.75 °C to 0.75 °C	Using Paperless Recorder with RTD Sensor by Direct Method
		100 °C to 1000 °C	2.1 °C to 2.1 °C	
		1000 °C to 1200 °C	2.7 °C to 2.7 °C	

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3.	Temperature Oven, Furnace, Incubator (for Non-Medical Applications), Chamber, Baths, Freezers, Refrigerator, Autoclave (for Non-Medical Applications), Vacuum Tray Dryer, Cold Room (Single Point) *	(-) 80.0 °C to 300.0 °C	0.58 °C	Using RTD (Pt-100) 4 Wire with Indicator By Direct Method
II.	SPECIFIC HEAT AND HUMIDITY			
1.	Humidity (Stand Alone Sensors With Indicators, Sensors With Indicators Only Used for Humidity/ Thermal/ Environment Chambers) #	20 % RH to 90 % RH @ 25 °C	1.9 % RH	Using Humidity Sensor with Indicator and Humidity Generator by Comparison Method
2.	Humidity (Stand Alone Sensors With Indicators, Sensors With Indicators Only Used for Humidity/Thermal/ Environment Chambers) *	10 °C to 50 °C @ 50 % RH	0.35 °C to 0.35 °C	Using Humidity Sensor with Indicator and Humidity Generator by Comparison Method

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3.	Humidity Oven/ Thermal/Environment Chambers, Humidity Generator*	10 % to 95 % RH @ 25 °C	1.9 % RH to 1.9 % RH	Using Dig Hygro Meter 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.