National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

SHANTHALA POWER LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

SHANTHALA NO. 24, PRIYADARSHINI COLONY, GOKUL ROAD, HUBLI, DHARWAD, KARNATAKA, INDIA

in the field of

CALIBRATION

Certificate Number: CC-2217

Issue Date: 29/07/2022 **Valid Until:** 28/07/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : Shanthala Power Limited

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

SCOPE OF ACCREDITATION

Laboratory Name :	SHANTHALA POWER LIMITED, SHANTHALA NO. 24, PRIYADARSHINI COLONY, GOKUL ROAD, HUBLI, DHARWAD, KARNATAKA, INDIA		
Accreditation Standard	ISO/IEC 17025:2017		
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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Permanent Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	400 mA to 1 A	0.24 % to 0.17 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.25 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	1 mA to 10 mA	0.163% to 0.243 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	10 mA to 100 mA	0.243 % to 0.163 %

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5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 mA to 400 mA	0.163 % to 0.24 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 µA to 1 mA	0.36 % to 0.163 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 mV to 100 V	0.12 % to 0.10 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 V to 1000 V	0.10 % to 0.096 %
9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Active Energy 1 Ø & 3 Ø	3 Phase Portable Reference Standard Meter by Comparison Method	230V/1A/0.5 PF to 230V/12A UPF (115 Wh to 2760 Wh)	0.34 % to 0.07 %

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10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	High Voltage (50Hz)	Using HV probe with Digital Multimeter by Direct Method	1 kV to 25 kV	8.14 % to 6.85 %
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	1 A to 10 A	0.074 % to 0.14 %
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	10 A to 20 A	0.14 % to 2.20 %
13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	190 µA to 329 mA	0.025 % to 0.042 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	329 mA to 1 A	0.042 % to 0.074 %

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15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50Hz)	Using Multi Function Calibrator with Current Coil by Direct Method	20 A to 990 A	2.20 % to 0.37 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/0.5 PF Lead/Lag to 240 V/20 A/0.5 PF Lead/Lag (6 W to 2400 W)	1.38% to 0.120 %
17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/0.8PF Lead/Lag to 240 V/20 A/0.8 PF Lead/Lag (9.6 W to 3840 W)	0.49 % to 0.237 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/UPF to 240 V/20A/UPF (1.2 W to 4800 W)	0.842% to 0.115 %
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120V/10 mA/0.2 PF Lead/Lag to 240V/20 A/0.2 PF Lead/Lag (2.4 W to 960 W)	1.22% to 0.115%
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz)	Using Multi Function Calibrator by Direct Method	30V to 1000 V	0.020 % to 0.024 %

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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage(50 Hz)	Using Multi Function Calibrator by Direct Method	30 mV to 30V	0.044 % to 0.020 %
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	0.5 nF to 1 nF	2.90 % to 1.90 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	1 nF to 300 nF	1.90 % to 0.405 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	10 µF to 30 µF	0.41 % to 0.61 %
25	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	300 nF to 10 µF	0.41 % to 0.41 %
26	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	1 A to 10 A	0.081 % to 0.183%

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27	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	100 µA to 100 mA	0.087 % to 0.064%
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	100 mA to 1 A	0.064 % to 0.081 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ DMM by Direct Method	100 mV to 100 V	0.0084 % to 0.005 %
30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ DMM by Direct Method	100 V to 1000 V	0.005 % to 0.006%
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	1 M ohm to 10 M ohm	0.013 % to 0.047 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using Multi Function Calibrator by Direct Method	1 M ohm to 100 M ohm	0.008 % to 0.078 %

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33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	10 M ohm to 100 M ohm	0.047 % to 0.94 %
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	10 ohm to 100 ohm	0.046 % to 0.016 %
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using Multi Function Calibrator by Direct Method	100 M Ohm to 1000 M Ohm	0.94 % to 2.33 %
36	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	100 ohm to 1 M ohm	0.016% to 0.013 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	D C Voltage	Using Multi Function Calibrator by Direct Method	329 mV to 10 V	0.004 % to 0.010 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	1 mA to 329 mA	0.070 % to 0.041 %

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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	10 A to 20 A	0.064 % to 0.622%
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	190 µA to 1 mA	0.013 % to 0.070 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator with Current Coil by Direct Method	20A to 990A	0.622 % to 0.30 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Dc Current	Using Multi Function Calibrator by Direct Method	329 mA to 10 A	0.041 % to 0.064 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multi Function Calibrator by Direct Method	10 V to 50 V	0.010 % to 0.003 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multi Function Calibrator by Direct Method	50 V to 1000 V	0.003 % to 0.008 %

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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1 m ohm	0.34 %
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1.5 m ohm	0.63 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	10 m ohm	0.95 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	100 m ohm	0.11 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1000 m ohm	0.06 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	15 m ohm	0.09 %

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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	150 m ohm	0.07 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1500 m ohm	0.04 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	19.9 m ohm	0.12 %
54	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1990 m ohm	0.04 %
55	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	2 m ohm	0.95 %
56	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	200 m Ohm	0.06 %

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57	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	4 m ohm	0.23 %
58	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	40 m ohm	0.49 %
59	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	400 µohm	0.48 %
60	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	400 m ohm	0.16 %
61	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	1 ohm to 100 ohm	0.59 % to 0.01 %
62	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 k ohm to 1 M ohm	0.008 % to 0.008 %

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63	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 M ohm to 1000 M ohm	0.078 % to 0.28 %
64	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 ohm to 100 k ohm	0.010 % to 0.008 %
65	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope (Band Width)	Using Multi function Calibrator with Oscilloscope by Direct Method	50 kHz to 100 MHz	4.92 %
66	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope (Time Base)	Using Multi function Calibrator with Oscilloscope by Direct Method	5 ns to 5 s	0.38 % to 1.35 %
67	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope - Amplitude (@1 kHz)	Using Multi function Calibrator with Oscilloscope by Direct Method	5 mV to 130 V	1.07 % to 0.47 %
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	B- Type Thermocouple	Using Multi function Calibrator by Direct Method	600 °C to 1800 °C	0.77 °C

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69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	E- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-50 °C to 850 °C	0.29 °C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	J Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1100 °C	0.58 °C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	K Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1350 °C	0.49 °C
72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	N- Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1200 °C	0.49 °C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	R- Type Thermocouple	Using Multi function Calibrator by Direct Method	0 °C to 1600 °C	0.68 °C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	RTD PT 100	Using Multi function Calibrator by Direct Method	-200 °C to 600 °C	0.27 °C

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75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	S- Type Thermocouple	Using Multi function Calibrator by Direct Method	0 °C to 1700 °C	0.57 °C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	T- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-100 °C to 400 °C	0.32 °C
77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	B- Type Thermocouple	Using Multi function Calibrator by Direct Method	600 °C to 1800 °C °C	0.88°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	E Type Thermocouple	Using Multi Function Calibrator by Direct Method	-50 °C to 850 °C	0.29 °C
79	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	J- Type Thermocouple	Using Multi function Calibrator by Direct Method	-60 °C to 1120 °C	0.31 °C
80	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	K- Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1350 °C	0.49 °C

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81	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	N- Type Thermocouple	Using Multi function Calibrator by Direct Method	-200 °C to 1300 °C	0.49°C
82	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	R- Type Thermocouple	Using Multi Function Calibrator by Direct Method	0 °C to 1750 °C	0.89 °C
83	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	RTD PT 100	Using Multi function Calibrator by Direct Method	-200 °C to 799 °C	0.1 °C
84	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	S- Type Thermocouple	Using Multi Function Calibrator by Direct Method	0 °C to 1750 °C	0.81 °C
85	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	T- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-100 °C to 400 °C	0.32 °C
86	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6½ Digital Multimeter by Direct Method	10 Hz to 1 MHz	0.058 % to 0.012 %

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87	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Stop Watch	Using Stop Watch Direct Method	10 s to 9000 s	0.48 % to 0.28 %
88	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Multi Function Calibrator by Direct Method	120 Hz to 100 kHz	0.005 % to 0.006 %

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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Site Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	400 mA to 1 A	0.24 % to 0.17 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.25 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	1 mA to 10 mA	0.163% to 0.243 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	10 mA to 100 mA	0.243 % to 0.163 %

SCOPE OF ACCREDITATION

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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 mA to 400 mA	0.163 % to 0.24 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 µA to 1 mA	0.36 % to 0.163 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 mV to 100 V	0.12 % to 0.10 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Using 6½ Digital Multimeter by Direct Method	100 V to 1000 V	0.10 % to 0.096 %
9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Active Energy 1 Ø & 3 Ø	3 Phase Portable Reference Standard Meter by Comparison Method	230V/1A/0.5 PF to 230V/12A UPF (115 Wh to 2760 Wh)	0.34 % to 0.07 %

SCOPE OF ACCREDITATION

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10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	High Voltage (50Hz)	Using HV probe with Digital Multimeter by Direct Method	1 kV to 25 kV	8.14 % to 6.85 %
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	1 A to 10 A	0.074 % to 0.14 %
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	10 A to 20 A	0.14 % to 2.20 %
13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	190 µA to 329 mA	0.025 % to 0.042 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multi Function Calibrator by Direct Method	329 mA to 1 A	0.042 % to 0.074 %

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15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50Hz)	Using Multi Function Calibrator with Current Coil by Direct Method	20 A to 990 A	2.20 % to 0.37 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/0.5 PF Lead/Lag to 240 V/20 A/0.5 PF Lead/Lag (6 W to 2400 W)	1.38% to 0.120 %
17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/0.8PF Lead/Lag to 240 V/20 A/0.8 PF Lead/Lag (9.6 W to 3840 W)	0.49 % to 0.237 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120 V/10 mA/UPF to 240 V/20A/UPF (1.2 W to 4800 W)	0.842% to 0.115 %
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power (50 Hz)	Using Multi Function Calibrator by Direct Method	120V/10 mA/0.2 PF Lead/Lag to 240V/20 A/0.2 PF Lead/Lag (2.4 W to 960 W)	1.22% to 0.115%
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz)	Using Multi Function Calibrator by Direct Method	30V to 1000 V	0.020 % to 0.024 %

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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage(50 Hz)	Using Multi Function Calibrator by Direct Method	30 mV to 30V	0.044 % to 0.020 %
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	0.5 nF to 1 nF	2.90 % to 1.90 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	1 nF to 300 nF	1.90 % to 0.405 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	10 µF to 30 µF	0.41 % to 0.61 %
25	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (50 Hz)	Using Multi Function Calibrator by Direct Method	300 nF to 10 µF	0.41 % to 0.41 %
26	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	1 A to 10 A	0.081 % to 0.183%

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27	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	100 µA to 100 mA	0.087 % to 0.064%
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6½ DMM by Direct Method	100 mA to 1 A	0.064 % to 0.081 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ DMM by Direct Method	100 mV to 100 V	0.0084 % to 0.005 %
30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6½ DMM by Direct Method	100 V to 1000 V	0.005 % to 0.006%
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	1 M ohm to 10 M ohm	0.013 % to 0.047 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using Multi Function Calibrator by Direct Method	1 M ohm to 100 M ohm	0.008 % to 0.078 %

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33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	10 M ohm to 100 M ohm	0.047 % to 0.94 %
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	10 ohm to 100 ohm	0.046 % to 0.016 %
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using Multi Function Calibrator by Direct Method	100 M Ohm to 1000 M Ohm	0.94 % to 2.33 %
36	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6½ DMM by Direct Method	100 ohm to 1 M ohm	0.016% to 0.013 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	D C Voltage	Using Multi Function Calibrator by Direct Method	329 mV to 10 V	0.004 % to 0.010 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	1 mA to 329 mA	0.070 % to 0.041 %

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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	10 A to 20 A	0.064 % to 0.622%
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator by Direct Method	190 µA to 1 mA	0.013 % to 0.070 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multi Function Calibrator with Current Coil by Direct Method	20A to 990A	0.622 % to 0.30 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Dc Current	Using Multi Function Calibrator by Direct Method	329 mA to 10 A	0.041 % to 0.064 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multi Function Calibrator by Direct Method	10 V to 50 V	0.010 % to 0.003 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multi Function Calibrator by Direct Method	50 V to 1000 V	0.003 % to 0.008 %

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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1 m ohm	0.34 %
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1.5 m ohm	0.63 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	10 m ohm	0.95 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	100 m ohm	0.11 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1000 m ohm	0.06 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	15 m ohm	0.09 %

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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	150 m ohm	0.07 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1500 m ohm	0.04 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	19.9 m ohm	0.12 %
54	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	1990 m ohm	0.04 %
55	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	2 m ohm	0.95 %
56	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	200 m Ohm	0.06 %

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57	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	4 m ohm	0.23 %
58	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	40 m ohm	0.49 %
59	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	400 µohm	0.48 %
60	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Low Resistance	Using Standard Resisters by Direct Method	400 m ohm	0.16 %
61	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	1 ohm to 100 ohm	0.59 % to 0.01 %
62	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 k ohm to 1 M ohm	0.008 % to 0.008 %

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63	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 M ohm to 1000 M ohm	0.078 % to 0.28 %
64	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance	Using Multi Function Calibrator by Direct Method	100 ohm to 100 k ohm	0.010 % to 0.008 %
65	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope (Band Width)	Using Multi function Calibrator with Oscilloscope by Direct Method	50 kHz to 100 MHz	4.92 %
66	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope (Time Base)	Using Multi function Calibrator with Oscilloscope by Direct Method	5 ns to 5 s	0.38 % to 1.35 %
67	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Digital Oscilloscope - Amplitude (@1 kHz)	Using Multi function Calibrator with Oscilloscope by Direct Method	5 mV to 130 V	1.07 % to 0.47 %
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	B- Type Thermocouple	Using Multi function Calibrator by Direct Method	600 °C to 1800 °C	0.77 °C

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69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	E- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-50 °C to 850 °C	0.29 °C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	J Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1100 °C	0.58 °C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	K Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1350 °C	0.49 °C
72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	N- Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1200 °C	0.49 °C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	R- Type Thermocouple	Using Multi function Calibrator by Direct Method	0 °C to 1600 °C	0.68 °C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	RTD PT 100	Using Multi function Calibrator by Direct Method	-200 °C to 600 °C	0.27 °C

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75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	S- Type Thermocouple	Using Multi function Calibrator by Direct Method	0 °C to 1700 °C	0.57 °C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	T- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-100 °C to 400 °C	0.32 °C
77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	B- Type Thermocouple	Using Multi function Calibrator by Direct Method	600 °C to 1800 °C °C	0.88°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	E Type Thermocouple	Using Multi Function Calibrator by Direct Method	-50 °C to 850 °C	0.29 °C
79	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	J- Type Thermocouple	Using Multi function Calibrator by Direct Method	-60 °C to 1120 °C	0.31 °C
80	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	K- Type Thermocouple	Using Multi function Calibrator by Direct Method	-100 °C to 1350 °C	0.49 °C

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81	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	N- Type Thermocouple	Using Multi function Calibrator by Direct Method	-200 °C to 1300 °C	0.49°C
82	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	R- Type Thermocouple	Using Multi Function Calibrator by Direct Method	0 °C to 1750 °C	0.89 °C
83	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	RTD PT 100	Using Multi function Calibrator by Direct Method	-200 °C to 799 °C	0.1 °C
84	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	S- Type Thermocouple	Using Multi Function Calibrator by Direct Method	0 °C to 1750 °C	0.81 °C
85	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	T- Type Thermocouple	Using Multi Function Calibrator by Direct Method	-100 °C to 400 °C	0.32 °C
86	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6½ Digital Multimeter by Direct Method	10 Hz to 1 MHz	0.058 % to 0.012 %

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87	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Stop Watch	Using Stop Watch Direct Method	10 s to 9000 s	0.48 % to 0.28 %
88	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Multi Function Calibrator by Direct Method	120 Hz to 100 kHz	0.005 % to 0.006 %

*** CMCs represent expanded uncertainties expressed at approximately the 95% level of confidence, using a coverage factor of k = 2.**