

Schedule



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MEASURED QUANTITIES/ INSTRUMENT/RANGE TO BE CALIBRATED	METHOD / FREQUENCY	CALIBRATION AND MEASUREMENT CAPABILITY (CMC*)
0.33 V to 3.29999 V	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	230 ppm + 39 μ V 110 ppm + 49 μ V 140 ppm + 50 μ V 230 ppm + 39 μ V 550 ppm + 97 μ V
3.3 V to 32.9999 V	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	230 ppm + 510 μ V 120 ppm + 440 μ V 190 ppm + 440 μ V 270 ppm + 470 μ V 690 ppm + 1300 μ V
33 V to 329.999 V	45 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	140 ppm + 1.9 mV 150 ppm + 5.7 mV 190 ppm + 5.3 mV 230 ppm + 4.9 mV 1600 ppm + 36 mV
330 V to 1020 V	45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	230 ppm + 7.8 mV 200 ppm + 5.8 mV 230 ppm + 9.5 mV
5. AC Current Measuring Instrument	Direct Input	
29 μ A to 329.99 μ A	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz 10 to 30 kHz	0.12 % + 78 nA 0.097 % + 78 nA 0.23 % + 120 nA 0.62 % + 160 nA 1.2 % + 330 nA
0.33 μ A to 3.29999 mA	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz 10 to 30 kHz	0.097 % + 120 nA 0.078 % + 110 nA 0.16 % + 140 nA 0.39 % + 240 nA 0.78 % + 470 nA

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3.3 mA to 32.9999 mA	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz 10 to 30 kHz	0.070 % + 1.5 uA 0.031 % + 1.6 uA 0.062 % + 1.6 uA 0.15 % + 2.5 uA 0.31 % + 3.1 uA
33 mA to 329.999 mA	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz 10 to 30 kHz	0.068 % + 16 uA 0.031 % + 16 uA 0.080 % + 39 uA 0.15 % + 89 uA 0.31 % + 160 uA
0.33 A to 1.09999 A	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz	0.14 % + 78 uA 0.039 % + 78 uA 0.47 % + 750 uA 2.0% + 3900 uA
1.1 A to 2.99999 A	20 Hz to 45 Hz 45 Hz to 1 kHz 1 to 5 kHz 5 to 10 kHz	0.14 % + 78 uA 0.047 % + 76 uA 0.47 % + 760 uA 2 % + 3400 uA
3 A to 10.9999 A	45 Hz to 100 Hz 100 Hz to 1 kHz 1 to 5 kHz	0.046 % + 1.6 mA 0.077 % + 1.6 mA 2.3 % + 1.7 mA
11 A to 20.5 A	45 Hz to 100 Hz 100 Hz to 1 kHz 1 to 5 kHz	0.093 % + 4.0 mA 0.11 % + 5.0 mA 2.3 % + 9.0 mA

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<u>AC Toroidal-Type Current Clamp</u>	5500A/COIL	
20 A to 149.999 A	45 Hz to 65 Hz 65 Hz to 100 Hz 100 Hz to 440 Hz	0.22 % + 0.046 A 0.62 % + 0.030 A 0.65 % + 0.054 A
150 A to 1025 A	45 Hz to 65 Hz 65 Hz to 100 Hz	0.24 % + 0.10 A 0.62 % + 0.11 A
150 A to 600 A	100 Hz to 440 Hz	0.99 % + 0.21 A
<u>AC Current Clamp</u>	5500A / COIL	
20 A to 149.999 A	45 Hz to 65 Hz 65 Hz to 100 Hz 100 Hz to 440 Hz	0.44 % + 0.20 A 0.78 % + 0.20 A 0.81 % + 0.20 A
150 A to 1025 A	45 Hz to 65 Hz 65 Hz to 100 Hz	0.44 % + 0.70 A 0.78 % + 0.70 A
150 A to 600 A	100 Hz to 300 Hz	1.1 % + 0.70 A

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<p>6. Capacitance Measuring Instrument (DC Charge/Discharge and AC RCL Meters)</p> <p>0.4 nF to 1.0999 nF 1.1 nF to 3.2999 nF 3.3 nF to 10.9999 nF 11 nF to 32.9999 nF 33 nF to 109.999 nF 110 nF to 329.999 nF 0.33 nF to 1.09999 uF 1.1 uF to 3.29999 uF 3.3 uF to 10.9999 uF 11 uF to 32.9999 uF 33 uF to 109.999 uF 110 uF to 329.999 uF 0.33 uF to 1.09999 mF</p>	Direct Input	<p>0.38 % + 7.7 pF 0.39 % + 7.8 pF 0.20 % + 7.8 pF 0.20 % + 78 pF 0.20 % + 78 pF 0.19 % + 240 pF 0.20 % + 0.78 nF 0.19 % + 2.4 nF 0.20 % + 7.8 nF 0.31 % + 23 nF 0.35 % + 78 nF 0.35 % + 240 nF 0.35 % + 0.78 uF</p>
<p>7. Frequency Measuring Instrument 20 Hz to 1 MHz</p>	Direct Input	2.1 ppm + 1 uHz
<p>8. Frequency Sourcing Instrument 20 Hz to 100 Hz 100 Hz to 1 MHz</p>	Direct Input	<p>10 ppm + 0.2 mHz 12 ppm</p>
<p>9. DC Voltage Sourcing Instrument 0 to 199.99 mV 0 to 1.9999 V 0 to 19.999 V 0 to 199.99 V 0 to 1050 V</p>	Direct Input	<p>4.5 ppm + 0.1 uV 3.0 ppm + 0.4 uV 3.0 ppm + 4 uV 4.5 ppm + 40 uV 4.5 ppm + 1 mV</p>

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10. DC Current Sourcing Instrument 0 to 199.99 μ A 0 to 1.9999 mA 0 to 19.999 mA 0 to 199.99 mA 0 to 1.9999 A 0 to 19.999 A	Direct Input	12 ppm + 0.4 nA 12 ppm + 4 nA 13 ppm + 40 nA 36 ppm + 0.8 μ A 170 ppm + 16 μ A 380 ppm + 0.4 mA
11. Resistance Sourcing Instrument 0 to 1.9999 Ω 0 to 19.999 Ω 0 to 199.99 Ω 0 to 1.9999 k Ω 0 to 19.999 k Ω 0 to 199.99 k Ω 0 to 1.9999 M Ω 0 to 19.999 M Ω 0 to 199.99 M Ω	Direct Input Lo Current Lo Current Lo Current Lo Current	15 ppm + 4 $\mu\Omega$ 9 ppm + 14 $\mu\Omega$ 7.5 ppm + 50 $\mu\Omega$ 7.5 ppm + 0.5 m Ω 7.5 ppm + 5 m Ω 7.5 ppm + 100 m Ω 10 ppm + 1 Ω 35 ppm + 100 Ω 520 ppm + 100 k Ω
12. <u>AC Voltage Sourcing Instrument</u> 2.0 mV to 199.99 mV 20 mV to 1.9999 V	Direct Input 40 Hz to 100 Hz 100 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 50 kHz to 100 kHz 40 Hz to 100 Hz 100 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 50 kHz to 100 kHz	110 ppm + 4 μ V 110 ppm + 1 μ V 110 ppm + 3 μ V 310 ppm + 7 μ V 710 ppm + 20 μ V 85 ppm + 20 μ V 65 ppm + 20 μ V 85 ppm + 20 μ V 210 ppm + 30 μ V 510 ppm + 200 μ V

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200 mV to 19.999 V	40 Hz to 100 Hz 100 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 50 kHz to 100 kHz	85 ppm + 200 μ V 65 ppm + 200 μ V 85 ppm + 200 μ V 210 ppm + 300 μ V 510 ppm + 2000 μ V
2 V to 199.99 V	40 Hz to 100 Hz 100 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 50 kHz to 100 kHz	85 ppm + 2 mV 65 ppm + 2 mV 85 ppm + 2 mV 210 ppm + 3 mV 510 ppm + 20 mV
20 V to 1050 V	40 Hz to 10 kHz	95 ppm + 40 mV
13. AC Current Sourcing Instrument	Direct Input	
2.0 μ A to 199.99 μ A	10 Hz to 5 kHz	480 ppm + 19 nA
20 μ A to 1.9999 mA	10 Hz to 10 kHz	280 ppm + 200 nA
200 μ A to 19.999 mA	10 Hz to 10 kHz	280 ppm + 2 μ A
2 mA to 199.99 mA	10 Hz to 10 kHz	250 ppm + 20 μ A
20 mA to 1.9999 A	10 Hz to 2 kHz 2 kHz to 10 kHz	600 ppm + 200 μ A 710 ppm + 200 μ A
200 mA to 19.999 A	10 Hz to 2 kHz 2 kHz to 10 kHz	800 ppm + 2 mA 0.25 % + 2 mA

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B. <u>Temperature Calibration</u>		
1. RTD Thermometer (Exclude sensor)		
<u>Pt385 - 100Ω</u>	Direct Input	
-75 to 0 °C		0.040 °C
0 to 100 °C		0.055 °C
100 to 300 °C		0.070 °C
300 to 400 °C		0.078 °C
400 to 630 °C		0.094 °C
2. Thermocouple Thermometer (Exclude sensor)		
<u>Type-J</u>	Direct Input	
-210 to -100 °C		0.22 °C
-100 to -30 °C		0.14 °C
-30 to 150 °C		0.13 °C
150 to 760 °C		0.15 °C
760 to 1200 °C		0.19 °C
<u>Type-K</u>	Direct Input	
-200 to -100 °C		0.27 °C
-100 to -25 °C		0.16 °C
-25 to 120 °C		0.14 °C
120 to 1000 °C		0.22 °C
1000 to 1372 °C		0.32 °C
3. <u>Digital Thermometer</u> (with liquid immersion probe)		
0 °C	Ice Fixed-Point	0.012 °C
-5 °C to 125 °C	Direct Comparison with Reference Thermometer through Silicone Oil Bath	0.050 °C

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4. <u>Bath and Dry Block</u> (Indicator/Display Accuracy) -5 °C to 125 °C	Direct Measurement with PRT Reference Thermometer	0.029 °C

* CMC is expressed as an expanded uncertainty estimated at a level of confidence of approximately 95%.

Approved Signatories:

Mr Anthony Ng) For all items

Mr Jay Neo)

Note :

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid calibrations. The **management system requirements** in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.