

Scope of Accreditation For Anmar Metrology, Inc.

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In recognition of a successful assessment to ISO/IEC 17025:2005 and ANSI/NCCL Z540.3, accreditation is granted to **Anmar Metrology, Inc.** to perform the following Calibrations:

Accreditation granted through: **September 1, 2012**

Calibration

Electricity and Magnetism – Voltage

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
DC Volts - Source	(0 to 100) mV	1.64 μ V + 1 μ V/V	Compared to Multifunction Calibrator
	100 mV to 1V	9.6 μ V + 2 μ V/V	
	(1 to 10) V	102 μ V + 20 μ V/V	
	(10 to 100) V	1.45 mV + 150 μ V/V	
	(100 to 1 000) V	13.8 mV + 1500 μ V/V	
AC Volts – Source (1 to 10) mV	(10 to 45) Hz	6.26 μ V + 6 μ V/V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	1.86 μ V + 6 μ V/V	
	(10 to 20) kHz	2.12 μ V + 6 μ V/V	
	(20 to 50) kHz	7.75 μ V + 6 μ V/V	
	(50 to 100) kHz	26.7 μ V + 12 μ V/V	
	(100 to 500) kHz	153 μ V + 50 μ V/V	
AC Volts – Source (10 to 100) mV	(10 to 45) Hz	23.3 μ V + 8 μ V/V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	12 μ V + 8 μ V/V	
	(10 to 20) kHz	13 μ V + 8 μ V/V	
	(20 to 50) kHz	27.6 μ V + 8 μ V/V	
	(50 to 100) kHz	61.9 μ V + 32 μ V/V	
	(100 to 500) kHz	157 μ V + 70 μ V	

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
AC Volts – Source 100 mV to 1 V	(10 to 45) Hz	302 μ V + 50 μ V/V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	118 μ V + 60 μ V/V	
	(10 to 20) kHz	150 μ V + 60 μ V/V	
	(20 to 50) kHz	239 μ V + 50 μ V/V	
	(50 to 100) kHz	543 μ V + 130 μ V/V	
	(100 to 500) kHz	1.89 mV + 600 μ V/V	
AC Volts – Source (1 to 10) V	(10 to 45) Hz	2.31 mV + 650 μ V/V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	1.20 mV + 600 μ V/V	
	(10 to 20) kHz	1.87 mV + 600 μ V/V	
	(20 to 50) kHz	2.76 mV + 600 μ V/V	
	(50 to 100) kHz	6.94 mV + 1.6 mV/V	
AC Volts – Source (10 to 100) V	45 Hz to 1 kHz	15.3 mV + 2 mV/V	Compared to Multifunction Calibrator
	(1 to 10) kHz	16.0 mV + 6 mV/V	
	(10 to 20) kHz	19.7 mV + 6 mV/V	
	(20 to 50) kHz	27.3 mV + 6 mV/V	
	(50 to 100) kHz	164 mV + 50 mV/V	
AC Volts – Source (100 to 1 000) V	45 Hz to 1 kHz	229 mV + 10 mV/V	Compared to Multifunction Calibrator
	(1 to 5) kHz	191 mV + 10 mV/V	
	(5 to 10) kHz	229 mV + 10 mV/V	

Electricity and Magnetism – Resistance

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
Resistance – Source	(0 to 11) Ω	335 $\mu\Omega$ + 0.001 Ω/Ω	Compared to Multifunction Calibrator
	(11 to 33) Ω	455 $\mu\Omega$ + 0.0015 Ω/Ω	
	(33 to 110) Ω	2.15 m Ω + 0.0014 Ω/Ω	
	(110 to 330) Ω	4.13 m Ω + 0.002 Ω/Ω	
	330 Ω to 1.1 k Ω	21.6 m Ω + 0.002 Ω/Ω	
	(1.1 to 3.3) k Ω	41.8 m Ω + 0.02 Ω/Ω	
	(3.3 to 11) k Ω	219 m Ω + 0.02 Ω/Ω	
	(11 to 33) k Ω	426 m Ω + 0.2 Ω/Ω	
	(33 to 110) k Ω	2.19 Ω + 0.2 Ω/Ω	
	(110 to 330) k Ω	4.74 Ω + 2 Ω/Ω	
	330 k Ω to 1.1 M Ω	6.13 Ω + 2 Ω/Ω	
	(1.1 to 3.3) M Ω	17.5 Ω + 30 Ω/Ω	
	(3.3 to 11) M Ω	460 Ω + 50 Ω/Ω	
	(11 to 33) M Ω	554 Ω + 2.5 k Ω/Ω	
	(33 to 110) M Ω	29.5 k Ω + 3 k Ω/Ω	

Electricity and Magnetism – Current

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
DC Current - Source	(0 to 100) μ A	13 nA + 0.02 μ A/A	Compared to Multifunction Calibrator
	100 μ A to 1mA	574 nA + 0.05 μ A/A	
	(1 to 10) mA	782 nA + 0.25 μ A/A	
	(10 to 100) mA	8.61 μ A + 2.5 μ A/A	
	100 mA to 1.1 A	153 μ A + 40 μ A/A	
	(1.1 to 3) A	586 μ A + 40 μ A/A	
AC Current – Source (29 to 100) μ A	(10 to 20) Hz	589 nA + 0.1 μ A/A	Compared to Multifunction Calibrator
	(20 to 45) Hz	580 nA + 0.1 μ A/A	
	45 Hz to 1 kHz	576 nA + 0.1 μ A/A	
	(1 to 5) kHz	613 nA + 0.15 μ A/A	
	(5 to 10) kHz	834 nA + 0.2 μ A/A	
	(10 to 30) kHz	1.35 μ A + 0.4 μ A/A	
AC Current – Source 100 μ A to 1 mA	(10 to 20) Hz	1.69 μ A + 0.15 μ A/A	Compared to Multifunction Calibrator
	(20 to 45) Hz	1.16 μ A + 0.15 μ A/A	
	45 Hz to 1 kHz	978 nA + 0.15 μ A/A	
	(1 to 5) kHz	1.69 μ A + 0.2 μ A/A	
	(5 to 10) kHz	3.78 μ A + 0.3 μ A/A	
	(10 to 30) kHz	7.67 μ A + 0.6 μ A/A	
AC Current – Source (1 to 10) mA	(10 to 20) Hz	14 μ A + 2 μ A/A	Compared to Multifunction Calibrator
	(20 to 45) Hz	7.28 μ A + 2 μ A/A	
	45 Hz to 1 kHz	4.01 μ A + 2 μ A/A	
	(1 to 5) kHz	6.57 μ A + 2 μ A/A	
	(5 to 10) kHz	15.5 μ A + 3 μ A/A	
	(10 to 30) kHz	30.5 μ A + 4 μ A/A	
AC Current – Source (10 to 100) mA	(10 to 20) Hz	138 μ A + 20 μ A/A	Compared to Multifunction Calibrator
	(20 to 45) Hz	62.1 μ A + 20 μ A/A	
	45 Hz to 1 kHz	32 μ A + 20 μ A/A	
	(1 to 5) kHz	76.7 μ A + 50 μ A/A	
	(5 to 10) kHz	152 μ A + 100 μ A/A	
	(10 to 30) kHz	305 μ A + 200 μ A/A	
AC Current – Source 100 mA to 1.1 A	(10 to 45) Hz	1.57 mA + 100 μ A/A	Compared to Multifunction Calibrator
	45 Hz to 1 kHz	761 μ A + 100 μ A/A	
	(1 to 5) kHz	4.51 mA + 1000 μ A/A	
	(5 to 10) kHz	25 mA + 5000 μ A/A	

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
AC Current – Source (1.1 to 3) A	(10 to 45) Hz	3.14 mA + 100 µA/A	Compared to Multifunction Calibrator
	45 Hz to 1 kHz	770 µA + 100 µA/A	
	(1 to 5) kHz	9.21 mA + 1 mA/A	
	(5 to 10) kHz	38 mA/A + 5 mA/A	

Electricity and Magnetism –Time Frequency

Calibration Parameter/Equipment	Range	Calibration and Measurement Capability (+/-) ^{2,3}	Remarks
Frequency - Source	(0.01 to 1199.9) Hz	0.057 Hz + 5 µHz/Hz	Compared to Multifunction Calibrator

Notes:

- 1) Laboratory offers calibration services at the laboratory's own facilities and at the client or other agreed upon facilities.
- 2) Calibration and Measurement Capability represents expanded uncertainties at approximately a 95% confidence level using a coverage factor of k=2.
- 3) Based on an accredited calibration by the manufacturer and used at the temperature the Multifunction Calibrator was calibrated (tcal ± 5 °C) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than 5 °C.

Approved by:



 R. Douglas Leonard
Chief Technical Officer

 Date: March 3, 2011

Revised: 9/1/09

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