

Scope of Accreditation For ANMAR Metrology, Inc.

7726 Arjons Drive
San Diego, CA. 92126
Martin Bakker
858-621-2630

In recognition of a successful assessment to ISO/IEC 17025:2005, 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	Best Measurement Capability (+/-) ^{2,3}	Remarks
DC Volts - Source	0 to 100 mV	1.64 μ V + 1 μ V	Compared to Multifunction Calibrator
	100 mV to 1V	9.6 μ V + 2 μ V	
	1 to 10 V	102 μ V + 20 μ V	
	10 to 100 V	1.45 mV + 150 μ V	
	100 to 1000 V	13.8 mV + 1500 μ V	
AC Volts – Source 1 to 10 mV	10 to 45 Hz	6.26 μ V + 6 μ V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	1.86 μ V + 6 μ V	
	10 to 20 kHz	2.12 μ V + 6 μ V	
	20 to 50 kHz	7.75 μ V + 6 μ V	
	50 to 100 kHz	26.7 μ V + 12 μ V	
	100 to 500 kHz	153 μ V + 50 μ V	
AC Volts – Source 10 to 100 mV	10 to 45 Hz	23.3 μ V + 8 μ V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	12.0 μ V + 8 μ V	
	10 to 20 kHz	13.0 μ V + 8 μ V	
	20 to 50 kHz	27.6 μ V + 8 μ V	
	50 to 100 kHz	61.9 μ V + 32 μ V	
	100 to 500 kHz	157 μ V + 70 μ V	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ^{2,3}	Remarks
AC Volts – Source 100 mV to 1 V	10 to 45 Hz	302 μ V/V + 50 μ V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	118 μ V + 60 μ V	
	10 to 20 kHz	150 μ V + 60 μ V	
	20 to 50 kHz	239 μ V + 50 μ V	
	50 to 100 kHz	543 μ V + 130 μ V	
	100 to 500 kHz	1.89 mV + 600 μ V	
AC Volts – Source 1 to 10 V	10 to 45 Hz	2.31 mV + 650 μ V	Compared to Multifunction Calibrator
	45 Hz to 10 kHz	1.20 mV + 600 μ V	
	10 to 20 kHz	1.87 mV + 600 μ V	
	20 to 50 kHz	2.76 mV + 600 μ V	
	50 to 100 kHz	6.94 mV + 1.6 mV	
AC Volts – Source 10 to 100 V	45 Hz to 1 kHz	15.3 mV + 2 mV	Compared to Multifunction Calibrator
	1 to 10 kHz	16.0 mV + 6 mV	
	10 to 20 kHz	19.7 mV + 6 mV	
	20 to 50 kHz	27.3 mV + 6 mV	
	50 to 100 kHz	164 mV + 50 mV	
AC Volts – Source 100 to 1000 V	45 Hz to 1 kHz	229 mV + 10 mV	Compared to Multifunction Calibrator
	1 to 5 kHz	191 mV + 10 mV	
	5 to 10 kHz	229 mV + 10 mV	

Electricity and Magnetism – Resistance

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

Electricity and Magnetism – Current

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ^{2,3}	Remarks
DC Current - Source	0 to 100 μ A	13 nA + 0.02 μ A	Compared to Multifunction Calibrator
	100 μ A to 1mA	574 nA + 0.05 μ A	
	1 to 10 mA	782 nA + 0.25 μ A	
	10 to 100 mA	8.61 μ A + 2.5 μ A	
	100 mA to 1.1 A	153 μ A + 40 μ A	
	1.1 to 3 A	586 μ A + 40 μ A	
AC Current – Source 29 to 100 μ A	10 to 20 Hz	589 nA + 0.1 μ A	Compared to Multifunction Calibrator
	20 to 45 Hz	580 nA + 0.1 μ A	
	45 Hz to 1 kHz	576 nA + 0.1 μ A	
	1 to 5 kHz	613 nA + 0.15 μ A	
	5 to 10 kHz	834 nA + 0.2 μ A	
	10 to 30 kHz	1.35 μ A + 0.4 μ A	
AC Current – Source 100 μ A to 1 mA	10 to 20 Hz	1.69 μ A + 0.15 μ A	Compared to Multifunction Calibrator
	20 to 45 Hz	1.16 μ A + 0.15 μ A	
	45 Hz to 1 kHz	978 nA + 0.15 μ A	
	1 to 5 kHz	1.69 μ A + 0.2 μ A	
	5 to 10 kHz	3.78 μ A + 0.3 μ A	
	10 to 30 kHz	7.67 μ A + 0.6 μ A	
AC Current – Source 1 to 10 mA	10 to 20 Hz	14.0 μ A + 2 μ A	Compared to Multifunction Calibrator
	20 to 45 Hz	7.28 μ A + 2 μ A	
	45 Hz to 1 kHz	4.01 μ A + 2 μ A	
	1 to 5 kHz	6.57 μ A + 2 μ A	
	5 to 10 kHz	15.5 μ A + 3 μ A	
	10 to 30 kHz	30.5 μ A + 4 μ A	
AC Current – Source 10 to 100 mA	10 to 20 Hz	138 μ A + 20 μ A	Compared to Multifunction Calibrator
	20 to 45 Hz	62.1 μ A + 20 μ A	
	45 Hz to 1 kHz	32 μ A + 20 μ A	
	1 to 5 kHz	76.7 μ A + 50 μ A	
	5 to 10 kHz	152 μ A + 100 μ A	
	10 to 30 kHz	305 μ A + 200 μ A	
AC Current – Source 100 mA to 1.1 A	10 to 45 Hz	1.57 mA + 100 μ A	Compared to Multifunction Calibrator
	45 Hz to 1 kHz	761 μ A + 100 μ A	
	1 to 5 kHz	4.51 mA + 1000 μ A	
	5 to 10 kHz	25.0 mA + 5000 μ A	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ^{2,3}	Remarks
AC Current – Source 1.1 to 3 A	10 to 45 Hz	3.14 mA + 100 μ A	Compared to Multifunction Calibrator
	45 to 1 kHz	770 μ A + 100 μ A	
	1 to 5 kHz	9.21 mA + 1 mA	
	5 to 10 kHz	38.0 mA/A + 5 mA	


Electricity and Magnetism –Time Frequency

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ^{2,3}	Remarks
Frequency - Source	0.01 to 1199.9 Hz	57ppm + 5 uHz	Compared to Multifunction Calibrator

Notes:

- 1) Laboratory offers calibration services at the laboratory's own facility.
- 2) Best uncertainties represent expanded uncertainties at approximately the 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 ($t_{cal} \pm 5 \text{ }^\circ\text{C}$) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than 5 $^\circ\text{C}$.

Approved by: _____


 R. Douglas Leonard
 Chief Technical Officer

 Date: September 1, 2009

Revised: 9/1/09