



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Martin Calibration, Inc.
2524 Alpine Road
Eau Claire, WI 54703

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the fields of

CALIBRATION and DIMENSIONAL MEASUREMENT

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 18 June 2028

Certificate Number: ACT-1265.02



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory
quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)

Martin Calibration LLC

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CALIBRATION AND DIMENSIONAL MEASUREMENT

ISO/IEC 17025 Accreditation Granted: **18 June 2018**

Certificate Number: **ACT-1265.02** Certificate Expiry Date: **18 June 2028**

CALIBRATION

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source ¹	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1 020) V	21 μ V/V + 1 μ V 11 μ V/V + 2 μ V 13 μ V/V + 20 μ V 18 μ V/V + 0.15 mV 18 μ V/V + 1.5 mV	Comparison to Multiproduct Calibrator
DC Voltage – Measure ¹	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1 000) V	12 μ V/V + 0.3 μ V 10 μ V/V + 0.3 μ V 10 μ V/V + 0.5 μ V 13 μ V/V + 30 μ V 13 μ V/V + 0.1 mV	Comparison to Precision Digital Multimeter
DC Current – Source ¹	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20) A	0.15 mA/A + 20 nA 0.1 mA/A + 50 nA 0.1 mA/A + 0.25 μ A 0.1 mA/A + 2.5 μ A 0.2 mA/A + 40 μ A 0.39 mA/A + 40 μ A 0.5 mA/A + 0.5 mA 1 mA/A + 0.75 mA	Comparison to Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Measure ¹	(10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	29 μ A/A + 0.8 nA 27 μ A/A + 5 nA 28 μ A/A + 50 nA 46 μ A/A + 0.5 μ A 0.12 mA/A + 10 μ A	Comparison to Precision Digital Multimeter
AC Voltage – Source ¹	Up to 33 mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.81 mV/V + 6 μ V 0.18 mV/V + 6 μ V 0.22 mV/V + 6 μ V 1 mV/V + 6 μ V 3.5 mV/V + 12 μ V 8 mV/V + 50 μ V 0.3 mV/V + 8 μ V 0.15 mV/V + 8 μ V 0.16 mV/V + 8 μ V 0.35 mV/V + 8 μ V 0.8 mV/V + 32 μ V 2 mV/V + 70 μ V 0.3 mV/V + 50 μ V 0.15 mV/V + 60 μ V 0.19 mV/V + 60 μ V 0.3 mV/V + 50 μ V 0.7 mV/V + 0.12 mV 2.4 mV/V + 0.6 mV 0.3 mV/V + 0.65 mV 0.15 mV/V + 0.6 mV 0.24 mV/V + 0.6 mV 0.35 mV/V + 0.6 mV 0.9 mV/V + 1.6 mV 0.19 mV/V + 2 mV 0.2 mV/V + 6 mV 0.25 mV/V + 6 mV 0.31 mV/V + 6 mV 2 mV/V + 50 mV	Comparison to Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source ¹	(330 to 1 020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.3 mV/V + 10 mV 0.25 mV/V + 10 mV 0.3 mV/V + 10 mV	Comparison to Multiproduct Calibrator
AC Voltage – Measure ¹	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (10 to 100) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz 100 mV to 1 V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (1 to 10) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz	0.3 mV/V + 3 µV 0.22 mV/V + 1.1 µV 0.32 mV/V + 1.1 µV 1 mV/V + 6 µV 5 mV/V + 1.1 µV 41 mV/V + 2 µV 70 µV/V + 4 µV 84 µV/V + 2 µV 0.16 mV/V + 2 µV 0.31 mV/V + 2 µV 0.88 mV/V + 2 µV 3.1 mV/V + 10 µV 10 mV/V + 10 µV 15 mV/V + 10 µV 70 µV/V + 40 µV 81 µV/V + 20 µV 0.15 mV/V + 20 µV 0.33 mV/V + 20 µV 0.82 mV/V + 20 µV 3.1 mV/V + 0.1 mV 10 mV/V + 0.1 mV 15 mV/V + 0.1 mV 77 µV/V + 0.4 mV 81 µV/V + 0.2 mV 0.15 mV/V + 0.2 mV 0.32 mV/V + 0.2 mV 0.82 mV/V + 0.2 mV 3.1 mV/V + 1 mV 10 mV/V + 1 mV 15 mV/V + 1 mV	Comparison to Precision Digital Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure	(10 to 100) V		Comparison to Precision Digital Multimeter
	(1 to 40) Hz	0.2 mV/V + 4 mV	
	40 Hz to 1 kHz	0.21 mV/V + 2 mV	
	(1 to 20) kHz	0.21 mV/V + 2 mV	
	(20 to 50) kHz	0.36 mV/V + 2 mV	
	(50 to 100) kHz	1.2 mV/V + 2 mV	
	(100 to 300) kHz	4 mV/V + 2 mV	
	300 kHz to 1 MHz	15 mV/V + 10 mV	
	(100 to 1 000) V		
	(1 to 40) Hz	0.4 mV/V + 40 mV	
	40 Hz to 1 kHz	0.4 mV/V + 20 mV	
	(1 to 20) kHz	0.6 mV/V + 20 mV	
	(20 to 50) kHz	1.2 mV/V + 20 mV	
	(50 to 100) kHz	3 mV/V + 20 mV	
AC Current – Measure	Up to 100 μ A		Comparison to Precision Digital Multimeter
	(10 to 20) Hz	4 mA/A + 30 nA	
	(20 to 45) Hz	1.5 mA/A + 30 nA	
	(45 to 100) Hz	0.6 mA/A + 30 nA	
	100 Hz to 1 kHz	0.61 mA/A + 30 nA	
	100 μ A to 1 mA		
	(10 to 20) Hz	4 mA/A + 0.2 μ A	
	(20 to 45) Hz	1.5 mA/A + 0.2 μ A	
	(45 to 100) Hz	0.6 mA/A + 0.2 μ A	
	100 Hz to 5 kHz	0.32 mA/A + 0.2 μ A	
	(5 to 20) kHz	0.6 mA/A + 0.2 μ A	
	(20 to 50) kHz	4 mA/A + 0.4 μ A	
	(50 to 100) kHz	5.5 mA/A + 1.5 μ A	
	(1 to 10) mA		
	(10 to 20) Hz	4 mA/A + 2 μ A	
	(20 to 45) Hz	1.5 mA/A + 2 μ A	
	(45 to 100) Hz	0.6 mA/A + 2 μ A	
	100 Hz to 5 kHz	0.32 mA/A + 2 μ A	
	(5 to 20) kHz	0.6 mA/A + 2 μ A	
	(20 to 50) kHz	4 mA/A + 4 μ A	
	(50 to 100) kHz	5.5 mA/A + 15 μ A	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure ¹	(10 to 100) mA		Comparison to Precision Digital Multimeter
	(10 to 20) Hz	4 mA/A + 20 μ A	
	(20 to 45) Hz	1.5 mA/A + 20 μ A	
	(45 to 100) Hz	0.6 mA/A + 20 μ A	
	100 Hz to 5 kHz	0.32 mA/A + 20 μ A	
	(5 to 20) kHz	0.6 mA/A + 20 μ A	
	(20 to 50) kHz	4 mA/A + 40 μ A	
	(50 to 100) kHz	5.5 mA/A + 0.15 mA	
	100 mA to 1 A		
	(10 to 20) Hz	4 mA/A + 0.2 mA	
	(20 to 45) Hz	1.6 mA/A + 0.2 mA	
	(45 to 100) Hz	0.8 mA/A + 0.2 mA	
	100 Hz to 5 kHz	1 mA/A + 0.2 mA	
	(5 to 20) kHz	3 mA/A + 0.2 mA	
	(20 to 50) kHz	10 mA/A + 0.4 mA	
AC Current – Source ¹	(29 to 330) μ A		Comparison to Multiproduct Calibrator
	(10 to 20) Hz	2 mA/A + 0.1 μ A	
	(20 to 45) Hz	1.5 mA/A + 0.1 μ A	
	45 Hz to 1 kHz	1.3 mA/A + 0.1 μ A	
	(1 to 5) kHz	3 mA/A + 0.15 μ A	
	(5 to 10) kHz	8 mA/A + 0.2 μ A	
	(10 to 30) kHz	16 mA/A + 0.4 μ A	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	2 mA/A + 0.15 μ A	
	(20 to 45) Hz	1.3 mA/A + 0.15 μ A	
	45 Hz to 1 kHz	1 mA/A + 0.15 μ A	
	(1 to 5) kHz	2 mA/A + 0.2 μ A	
	(5 to 10) kHz	5.1 mA/A + 0.3 μ A	
	(10 to 30) kHz	10 mA/A + 0.6 μ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	1.8 mA/A + 2 μ A	
	(20 to 45) Hz	0.91 mA/A + 2 μ A	
	45 Hz to 1 kHz	0.42 mA/A + 2 μ A	
	(1 to 5) kHz	0.81 mA/A + 2 μ A	
	(5 to 10) kHz	2 mA/A + 3 μ A	
	(10 to 30) kHz	4.1 mA/A + 4 μ A	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source ¹	(33 to 330) mA		Comparison to Multiproduct Calibrator
	(10 to 20) Hz	1.8 mA/A + 20 μ A	
	(20 to 45) Hz	0.91 mA/A + 20 μ A	
	45 Hz to 1 kHz	0.42 mA/A + 20 μ A	
	(1 to 5) kHz	1 mA/A + 50 μ A	
	(5 to 10) kHz	2 mA/A + 0.1 mA	
	(10 to 30) kHz	4.1 mA/A + 0.2 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	1.8 mA/A + 0.1 mA	
	45 Hz to 1 kHz	0.51 mA/A + 0.1mA	
	(1 to 5) kHz	6 mA/A + 1 mA	
	(5 to 10) kHz	25 mA/A + 5 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	1.8 mA/A + 0.1 mA	
	45 Hz to 1 kHz	0.66 mA/A + 0.1 mA	
	(1 to 5) kHz	6 mA/A + 1 mA	
	(5 to 10) kHz	25 mA/A + 5 mA	
	(3 to 11) A		
	(45 to 100) Hz	1.8 mA/A + 0.1 mA	
	100 Hz to 1 kHz	0.66 mA/A + 0.1 mA	
	(1 to 5) kHz	6 mA/A + 1 mA	
Resistance – Measure ¹	(11 to 20.5) A		Comparison to Precision Digital Multimeter
	(45 to 100) Hz	1.2 mA/A + 5 mA	
	100 Hz to 1 kHz	1.5 mA/A + 5 mA	
	(1 to 5) kHz	30 mA/A + 5 mA	
	100 $\mu\Omega$ to 10 Ω	20 $\mu\Omega/\Omega$ + 50 $\mu\Omega$	
	(10 to 100) Ω	17 $\mu\Omega/\Omega$ + 5 $\mu\Omega$	
	100 Ω to 1 k Ω	15 $\mu\Omega/\Omega$ + 0.5 m Ω	
	(1 to 10) k Ω	15 $\mu\Omega/\Omega$ + 5 m Ω	
	(10 to 100) k Ω	15 $\mu\Omega/\Omega$ + 50 m Ω	
	100 k Ω to 1 M Ω	20 $\mu\Omega/\Omega$ + 2 Ω	
	(1 to 10) M Ω	83 $\mu\Omega/\Omega$ + 0.1 k Ω	
	(10 to 100) M Ω	0.82 m Ω/Ω + 1 k Ω	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source ¹	Up to 11 Ω	36 $\mu\Omega/\Omega$	Comparison to Multiproduct Calibrator
	(11 to 33) Ω	26 $\mu\Omega/\Omega$	
	(33 to 110) Ω	23 $\mu\Omega/\Omega$	
	(110 to 330) Ω	23 $\mu\Omega/\Omega$	
	330 Ω to 1.1 k Ω	23 $\mu\Omega/\Omega$	
	(1.1 to 3.3) k Ω	23 $\mu\Omega/\Omega$	
	(3.3 to 11) k Ω	23 $\mu\Omega/\Omega$	
	(11 to 33) k Ω	23 $\mu\Omega/\Omega$	
	(33 to 110) k Ω	24 $\mu\Omega/\Omega$	
	(110 to 330) k Ω	26 $\mu\Omega/\Omega$	
	330 k Ω to 1.1 M Ω	26 $\mu\Omega/\Omega$	
	(1.1 to 3.3) M Ω	42 $\mu\Omega/\Omega$	
	(3.3 to 11) M Ω	0.11 m Ω/Ω	
	(11 to 33) M Ω	0.2 m Ω/Ω	
	(33 to 110) M Ω	0.4 m Ω/Ω	
Capacitance – Source ¹	(110 to 330) M Ω	2.5 m Ω/Ω	Comparison to Multiproduct Calibrator
	330 M Ω to 1.1 G Ω	12 m Ω/Ω	
	10 Hz to 10 kHz		
	(220 to 400) pF	6.4 mF/F + 10 pF	
	(0.4 to 1.1) nF	5.3 mF/F + 10 pF	
	10 Hz to 3 kHz		
	(1.1 to 3.3) nF	5.1 mF/F + 10 pF	
	10 Hz to 1 kHz		
	(3.3 to 11) nF	2.6 mF/F + 10 pF	
	(11 to 33) nF	2.6 mF/F + 0.1 fF	
	(33 to 110) nF	2.6 mF/F + 0.1 fF	
	(110 to 330) nF	2.6 mF/F + 0.3 fF	
	(10 to 600) Hz		
	(0.33 to 1.1) μ F	2.6 mF/F + 1 nF	
	(10 to 300) Hz		
	(1.1 to 3.3) μ F	2.6 mF/F + 3 nF	
	(10 to 150) Hz		
	(3.3 to 11) μ F	2.6 mF/F + 10 nF	
	(10 to 120) Hz		
	(11 to 33) μ F	4.1 mF/F + 30 nF	
	(10 to 80) Hz		
	(33 to 110) μ F	4.7 mF/F + 0.1 μ F	
	DC to 50 Hz		
	(110 to 330) μ F	4.6 mF/F + 0.3 μ F	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source ¹	DC to 20 Hz (0.33 to 1.1) mF	4.6 mF/F + 1 μ F	Comparison to Multiproduct Calibrator
	DC to 6 Hz (1.1 to 3.3) mF	4.5 mF/F + 3 μ F	
	DC to 2 Hz (3.3 to 11) mF	4.5 mF/F + 10 μ F	
	DC 0.6 Hz (11 to 33) mF	7.5 mF/F + 30 μ F	
	DC to 0.2 Hz (33 to 110) mF	11 mF/F + 0.1 mF	
Electrical Simulation of Thermocouple Indicators ¹	Type B (600 to 800) °C	0.44 °C	Comparison to Multiproduct Calibrator
	(800 to 1 000) °C	0.34 °C	
	(1 000 to 1 550) °C	0.3 °C	
	(1 550 to 1 820) °C	0.33 °C	
	Type C (0 to 150) °C	0.3 °C	
	(150 to 650) °C	0.26 °C	
	(650 to 1 000) °C	0.31 °C	
	(1 000 to 1 800) °C	0.5 °C	
	(1 800 to 2 316) °C	0.84 °C	
	Type E (-250 to -100) °C	0.5 °C	
	(-100 to -25) °C	0.16 °C	
	(-25 to 350) °C	0.14 °C	
	(350 to 650) °C	0.16 °C	
	(650 to 1 000) °C	0.21 °C	
	Type J (-210 to -100) °C	0.27 °C	
	(-100 to -30) °C	0.16 °C	
	(-30 to 150) °C	0.14 °C	
	(150 to 760) °C	0.17 °C	
	(760 to 1 200) °C	0.23 °C	
	Type K (-200 to -100) °C	0.33 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.16 °C	
	(120 to 1 000) °C	0.26 °C	
	(1 000 to 1 372) °C	0.4 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators ¹	Type L		Comparison to Multiproduct Calibrator
	(-200 to -100) °C	0.37 °C	
	(-100 to 800) °C	0.26 °C	
	(800 to 900) °C	0.17 °C	
	Type N		
	(-200 to -100) °C	0.4 °C	
	(-100 to - 25) °C	0.22 °C	
	(-25 to 120) °C	0.19 °C	
	(120 to 410) °C	0.18 °C	
	(410 to 1 300) °C	0.27 °C	
	Type R		
	(0 to 250) °C	0.57 °C	
	(250 to 400) °C	0.35 °C	
	(400 to 1 000) °C	0.33 °C	
	(1 000 to 1 767) °C	0.4 °C	
	Type S		
	(0 to 250) °C	0.47 °C	
	(250 to 400) °C	0.36 °C	
	(400 to 1 000) °C	0.37 °C	
	(1 000 to 1 767) °C	0.46 °C	
	Type T		
	(-250 to -150) °C	0.63 °C	
	(-150 to 0) °C	0.24 °C	
	(0 to 120) °C	0.16 °C	
	(120 to 400) °C	0.14 °C	
	Type U		
	(-200 to 0) °C	0.56 °C	
	(0 to 600) °C	0.27 °C	
Electrical Simulation of RTD Indicators ¹ (Source)	Pt 385, 100 Ω		Comparison to Multiproduct Calibrator
	(-200 to -80) °C	0.05 °C	
	(-80 to 0) °C	0.05 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 300) °C	0.09 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.12 °C	
	(630 to 800) °C	0.23 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicators ¹ (Source)	Pt 3926, 100 Ω		Comparison to Multiproduct Calibrator
	(-200 to -80) °C	0.05 °C	
	(-80 to 0) °C	0.05 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 300) °C	0.09 °C	
	(300 to 400) °C	0.10 °C	
	(400 to 630) °C	0.12 °C	
	Pt 3916, 100 Ω		
	(-200 to -190) °C	0.25 °C	
	(-190 to -80) °C	0.04 °C	
	(-80 to 0) °C	0.05 °C	
	(0 to 100) °C	0.06 °C	
	(100 to 260) °C	0.07 °C	
	(260 to 300) °C	0.08 °C	
	(300 to 400) °C	0.09 °C	
	(400 to 600) °C	0.1 °C	
	(600 to 630) °C	0.23 °C	
	Pt 385, 200 Ω		
	(-200 to -80) °C	0.04 °C	
	(-80 to 0) °C	0.04 °C	
	(0 to 100) °C	0.04 °C	
	(100 to 260) °C	0.05 °C	
	(260 to 300) °C	0.12 °C	
	(300 to 400) °C	0.13 °C	
	(400 to 600) °C	0.14 °C	
	(600 to 630) °C	0.16 °C	
	Pt 385, 500 Ω		
	(-200 to -80) °C	0.04 °C	
	(-80 to 0) °C	0.05 °C	
	(0 to 100) °C	0.05 °C	
	(100 to 260) °C	0.06 °C	
	(260 to 300) °C	0.08 °C	
	(300 to 400) °C	0.08 °C	
	(400 to 600) °C	0.09 °C	
	(600 to 630) °C	0.11 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicators ¹ (Source)	Pt 385, 1 000 Ω		Comparison to Multiproduct Calibrator
	(-200 to -80) °C	0.03 °C	
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.04 °C	
	(100 to 260) °C	0.05 °C	
	(260 to 300) °C	0.06 °C	
	(300 to 400) °C	0.07 °C	
	(400 to 600) °C	0.07 °C	
	(600 to 630) °C	0.23 °C	
	PtNi 385, 120 Ω (Ni120)		
	(-80 to 0) °C	0.08 °C	
	(0 to 100) °C	0.08 °C	
	(100 to 260) °C	0.14 °C	
Cu 427, 10 Ω			
	(100 to 260) °C	0.3 °C	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Indicators ^{1,2}	(0.000 1 to 6) in	(8+3L) μ in	Comparison to Horizontal Measuring Machine
Calipers ^{1,2}	Up to 60 in (60 to 80) in	(5+8L) μ in (410 + 2L) μ in	Comparison to Gage Blocks
Micrometers OD ^{1,2} Length	Up to 12 in (12 to 24) in	(5+8L) μ in (34 + 4.6L) μ in	Comparison to Gage Blocks
Anvil Flatness	Up to 1 inD (0 to 84) μ in	4 μ in	Optical Parallels
Height Measuring Devices ^{1,2}	Up to 36 in (36 to 48) in	(45 + 2L) μ in (7 + 3L) μ in	Comparison to Gage Blocks
External Diameter ^{1,2}	(0.000 1 to 6) in	(8 + 3L) μ in	Comparison to Horizontal Measuring Machine
Internal Diameter ^{1,2}	(0.04 to 13) in	(8 + 3L) μ in	Comparison to Horizontal Measuring Machine

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thread Plugs ^{1,2} Pitch Diameter	Up to 8 in Pitch (0.2 to 5) mm	$(87 + 1.9L) \mu\text{in}$	Comparison to Horizontal Measuring Machine, Thread Measuring Wires
Major Diameter	Pitch 90 – 4 TPI Up to 4 in	$(8 + 3L) \mu\text{in}$	
Adjustable Thread Rings ⁵ Pitch Diameter	Up to 4 in	See footnote	Tactile fit using a Thread Setting Plug
Optical Comparators ^{1,2} Linear Accuracy	Up to 6 in 6 to 12 in	$(43 + 11L) \mu\text{in}$ $(30 + 7.5L) \mu\text{in}$	Comparison to Glass Scale
Magnification	(5 to 100) X	350 μin	Glass Scale (Sphere)
Surface Plates ^{1,2} Overall Flatness	Up to 238 inDL	$(25 + 2.9L) \mu\text{in}$	In accordance with ASME B89.3.7 using Laser System
Local Area Flatness	Up to 0.02 in	34 μin	Repeat-O-Meter
Coordinate Measuring Machines ^{1,2} Linearity	(0 to 144) in	$(25 + 2.4L) \mu\text{in}$	Comparison to Laser Measuring System
Video Measuring Machines ^{1,2} X-Y Linearity	Up to 6 in	$(32 + 4.1L) \mu\text{in}$	Comparison to Glass Scales
Horizontal Measuring Systems ^{1,2} Travel Linearity	Up to 8 in (8 to 60) in	$(6 + 1.7L) \mu\text{in}$ $(3 + 2.5L) \mu\text{in}$	Comparison to Gage Blocks
Feeler/Thickness Gages ²	Up to 0.2 in	$(4.3 + 3L) \mu\text{in}$	Comparison to Horizontal Measuring System
Indicator Calibrator ^{2,7} Linearity	Up to 6 in	60 μin	Comparison to Horizontal Measuring System
Groove Micrometers ^{2,7}	Up to 12 in	$(44 + 2.6L) \mu\text{in}$	Comparison to Gage Blocks
Microscopes, Stereo Reticle Linearity	Up to 2 in	870 μin	Comparison to Stage Micrometer
Microscopes – Toolmakers ² Scale Linearity	Up to 4 in	$(774 + 70L) \mu\text{in}$	Comparison to Stage Micrometer

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Length Standards ²	(1 to 60) in	$(3.4 + 3.5L) \mu\text{in}$	Comparison to Horizontal Measuring System
Micrometers – Inside ²	Up to 8 in 8 to 60 in	$(6 + 1.7L) \mu\text{in}$ $(3 + 2.5L) \mu\text{in}$	Comparison to Horizontal Measuring System
Parallels ² Steel Granite	Up to 18 in Up to 18 in	$(96 + 1.8L) \mu\text{in}$ $(49 + 0.7L) \mu\text{in}$	Comparison to Electronic Amplifier with Probe, Surface Plate
Thickness Gages ^{2,7} Dial Digital	Up to 1 in Up to 1 in	410 μin 44 μin	Comparison to Gage Blocks
Thread Micrometers ^{2,7} (Screw Thread, Pitch Point) Linearity Anvil Wear	Up to 12 in -	$(44 + 2.6L) \mu\text{in}$ 690 μin	Comparison to Gage Blocks, Thread Setting Plug

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force Measuring Devices ¹	(0.035 to 16) ozf (1 to 10) lbf (10 to 50) lbf (50 to 500) lbf	0.018 % of reading + 0.000 000 21 ozf 0.018 % of reading + 0.000 000 33 lbf 0.018 % of reading + 0.009 3 lbf 0.036 % of reading + 0.005 3 lbf	Comparison to Dead Weight
Pressure Measuring Devices ¹	(0 to 100) psia (0 to 1) inH ₂ O (-15 to 30) psig (0.036 to 1) psig (100 to 300) psig (300 to 1 000) psig (1 000 to 10 000) psig	0.07 psi 0.003 5 inH ₂ O 0.019 psi 0.001 3 psi 0.12 psi 0.4 psi 2.4 psi	Comparison to Pressure Calibrator

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools ¹	(5 to 50) lbf·in (50 to 400) lbf·in (400 to 1000) lbf·in (80 to 250) lbf·ft	0.33 % of reading 0.36 % of reading 0.4 % of reading 0.28 % of reading	Comparison to Torque Tester
Scales and Balances ^{1,6} (SI)	(0 to 500) mg 500 mg to 5 g (5 to 10) g (10 to 30) g (30 to 50) g (50 to 100) g (100 to 200) g (200 to 300) g 300 g to 1 kg (1 to 2) kg (2 to 3) kg (3 to 5) kg (5 to 10) kg (10 to 20) kg (20 to 25) kg (25 to 30) kg	10 µg 34 µg 50 µg 74 µg 0.12 mg 0.25 mg 0.5 mg 0.75 mg 2.5 mg 5 mg 7.5 mg 12 mg 25 mg 50 mg 62 mg 75 mg	Comparison to ASTM E 617 Class 1 Weights and internal calibration procedure utilized in the calibration of the weighing system.
Scales and Balances ^{1,6} (Avoidrouplis)	(0.5 to 1 000) lb	0.01 % of reading	Comparison to ASTM E 617 Class 6 Weights and internal calibration procedure utilized in the calibration of the weighing system.

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure ¹	(-20 to 100) °C (100 to 425) °C (425 to 500) °C	0.058 °C 0.069 °C 0.086 °C	Comparison to Digital Temperature Gage
Humidity – Measure ¹	(10 to 90) %RH (90 to 98) %RH	1.1 %RH 2 %RH	Comparison to Humidity Indicator

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Uniformity Survey ¹ (TUS)	Up to 200 °F (200 to 1 000) °F (1 000 to 1 400) °F (1 400 to 1 800) °F (1 800 to 2 000) °F (2 000 to 2 300) °F	1.6 °F 1.8 °F 2.1 °F 2.9 °F 4.1 °F 4.3 °F	Comparison to Temperature Datalogger, Type K Thermocouples per AMS 2750.
Infrared Thermometers	(35 to 100) °C (100 to 200) °C (200 to 350) °C (350 to 500) °C	0.67 °C 1.1 °C 1.6 °C 2.1 °C	Comparison to Black Body Source (flat plate) $\epsilon = (0.9 \text{ to } 1)$, $\lambda = (8 \text{ to } 14) \mu\text{m}$

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Reference ⁴	1 MHz	2.5×10^{-5} Hz	Comparison to Multiproduct Calibrator

DIMENSIONAL MEASUREMENT

2 Dimensional

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
2D Dimensional Measurement ²	X: Up to 15.4 in Y: Up to 10.8 in	$(126 + 12L) \mu\text{in}$	Comparison to Vision System

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

Notes:

- On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
- The use of (*L*) represents Length in inches; the use of (*D*) represents Diameter in inches; the use of *DL* represents Diagonal Length in inches.
- Uncertainties listed for Electromagnetic - DC/Low Frequency and RF/Microwave does not include possible contributions from a “best available” unit under test
- Derivatives of 10MHz will have different uncertainties due to resolution, noise, and gating errors.

5. The tactile fit of an adjustable thread ring to a thread-setting plug is not a measurement of pitch diameter. The uncertainty for this pitch diameter setting is based on the contributors associated with the thread setting plug and environmental contributors only.
6. The CMC for scales and balances are highly dependent upon the resolution of the unit under test. The uncertainties presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
7. $0.6R$ will be added to the Measurement Uncertainty at the time of calibration (where R = resolution of the device under calibration).
8. Unless otherwise specified in the far-right column, the calibration method/procedure utilized by the laboratory was written and validated internally.
9. The legal owner of Martin Calibration LLC is Transcat, Inc.



Jason Stine, Vice President

