



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

SIMCO ELECTRONICS
2125 SW 28th Street, Suite 300
Allentown, PA 18103
Alex Katyan Phone: 610 798 0100

CALIBRATION

Valid To: September 30, 2024

Certificate Number: 1395.09

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 10}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 5} ($\pm$)	Comments
Calipers ³	Up to 6 in (> 6 to 40) in	$(190 + 1.7L) \mu\text{in} + 0.6R$ $(230 + 1.6L) \mu\text{in} + 0.6R$	Gage blocks
Micrometers ³	Up to 1 in (> 1 to 24) in	$(26 + 1.7L) \mu\text{in} + 0.6R$ $(46 + 1.7L) \mu\text{in} + 0.6R$	Gage blocks
Dial Indicators ³	Up to 1 in Up to 1 in	$(12 + 1.7L) \mu\text{in} + 0.6R$ $(35 + 1.7L) \mu\text{in} + 0.6R$	Gage blocks Supermicrometer TM
Crimp Tools ³ – Pin Comparison Crimp Height Pull Test	Up to 0.5 in Up to 0.9 in Up to 65 kgf, (140 lbf)	0.0012 in 0.0015 in 0.88 kgf, (2 lbf)	Pin gages Point micrometer Pull tester (w/ force gauge)

Parameter/Equipment	Range	CMC ^{2,5} ($\pm$)	Comments
Plug Gages Pins –			
Plain	Up to 0.40 in (> 0.4 to 5) in (> 5 to 10) in	(6.6 + 1.7L) μ in (6.8 + 2.7L) μ in 7.9L μ in	Pratt & Whitney LabMaster™ & gage blocks
Threaded (4 to 90) TPI	Up to 5 in (> 5 to 10) in	(51 + 1.7L) μ in 12L μ in	Pratt & Whitney Supermicrometer™ & thread wires
Ring Gages –			
Plain	Up to 0.40 in (> 0.4 to 5) in (> 5 to 10) in	(7.8 + 1.8L) μ in (6.2 + 2.8L) μ in 8.0L μ in	Pratt & Whitney LabMaster™ w/ gage blocks & master rings
Adjustable Thread Rings	Up to 5 in	W (Set Plug Tolerance)	Set using master plug gages ASME/ANSI B1.2-1983 & ASME/ANSI B1.3- 2007

II. Dimensional Testing/Calibration

Parameter/Equipment	Range	CMC ^{2,5} ($\pm$)	Comments
Length – 1D	Up to 5 in (> 5 to 10) in	(29 + 1.7L) μ in 7.9L μ in	Supermicrometer™ w/ gage blocks
	Up to 0.40 in (> 0.40 to 5) in (> 5 to 14) in	(4.5 + 1.8L) μ in (2.7 + 3.2L) μ in 8.0L μ in	Labmaster™ w/ gage blocks

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,7} ($\pm$)	Comments
DC Voltage – Generate ³	0 V (0 to 330) mV 330 mV to 3.3 V	0.018 μ V 16 μ V/V + 1.0 μ V 9.0 μ V/V + 2.0 μ V	4-terminal short Fluke 5522A/SC1100 (1-yr cal interval)

Parameter/Equipment	Range	CMC ^{2, 6, 7} ($\pm$)	Comments
DC Voltage – Generate ³ (cont)	(3.3 to 33) V (33 to 330) V (100 to 1000) V	9.8 μ V/V + 20 μ V 14 μ V/V + 150 μ V 14 μ V/V + 1.5 mV	4-terminal short Fluke 5522A/SC1100 (1-yr cal interval)
DC Voltage – Measure ³	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V	6.9 μ V/V + 0.3 μ V 4.7 μ V/V + 0.3 μ V 4.6 μ V/V + 0.5 μ V 6.9 μ V/V + 30 μ V 21 μ V/V + 100 μ V*	HP 3458A OPT002 *Add (Vinput/1000) ² times 12 μ V/V for inputs over 100 V
DC High Voltage – Generate & Measure ^{3, 8}	Up to 10 kV	0.012 %	Fluke 80E-10, Hipotronic HD150, Agilent 3458A
DC Current – Generate ³	(0 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 20.5) A	0.012 % + 0.02 μ A 78 μ A/A + 0.05 μ A 78 μ A/A + 0.25 μ A 80 μ A/A + 2.5 μ A 0.16 mA/A + 40 μ A 0.30 mA/A + 40 μ A 0.39 mA/A + 0.5 mA 0.78 mA/A + 0.75 mA	Fluke 5522A/SC1100 (1-yr cal interval)
DC Current – Measure ³	(0 to 100) nA 100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A (0 to 1) A (0 to 3) A (3 to 10) A	100 μ A/A + 0.040 nA 28 μ A/A + 0.040 nA 25 μ A/A + 0.10 nA 24 μ A/A + 0.0008 μ A 23 μ A/A + 0.005 μ A 23 μ A/A + 0.05 μ A 43 μ A/A + 0.5 μ A 0.13 mA/A + 10 μ A 0.58 mA/A + 0.0002 A 1.2 mA/A + 0.0006 A 1.8 mA/A + 0.0008 A	HP 3458A OPT002 Fluke 8845A
DC High Current ³ Measure & Generate Measure Only	Up to 1 A (> 1 to 10) A (> 10 to 100) A (> 100 to 300) A (0 to 3) A (0 to 30) A (0 to 300) A	0.010 % 0.010 % 0.050 % 0.10 % (Measure only) 0.012 % + 150 μ A 0.012 % + 1.5 mA 0.022 % + 15 mA	Guildline 9211A & HP 3458A, Valhalla 2555A GW Instek PCS-1000i

Parameter/Equipment	Range	CMC ^{2, 7} ($\pm$)	Comments
DC Induced Current ^{3, 9}	(0.33 to 1.099 99) A (1.1 to 2.999 99) A (3 to 10.9999) A (11 to 20.5000) A (16.5 to < 55) A (55 to < 150) A (150 to < 550) A (550 to 1025) A	160 μ A/A + 40 μ A 300 μ A/A + 40 μ A 390 μ A/A + 500 μ A 780 μ A/A + 750 μ A 0.43 % + 0.015 A 0.38 % + 0.015 A 0.37 % + 0.05 A 0.38 % + 0.05 A	Fluke 5522A main output through single turn copper wire (< 1 μ H inductance) Fluke 5522A/SC1100 Fluke 5500-coil
Capacitance – Generate ³	(0.2 to 0.4) nF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF (0.33 to 1.1) μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F (33 to 110) μ F (110 to 330) μ F (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	0.56 % + 10 pF 0.72 % + 10 pF 0.40 % + 10 pF 0.20 % + 10 pF 0.20 % + 100 pF 0.20 % + 100 pF 0.21 % + 300 pF 0.20 % + 1 nF 0.20 % + 3 nF 0.21 % + 10 nF 0.32 % + 30 nF 0.37 % + 100 nF 0.37 % + 300 nF 0.37 % + 1 μ F 0.35 % + 3 μ F 0.35 % + 10 μ F 0.58 % + 30 μ F 0.85 % + 100 μ F	Fluke 5522A/SC1100 (1-yr cal interval)
Resistance – Generate ³	0 Ω (0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω (0.33 to 1.1) M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω (0.33 to 1.1) G Ω	23 $\mu\Omega$ 42 $\mu\Omega/\Omega$ + 1 m Ω 28 $\mu\Omega/\Omega$ + 1.5 m Ω 14 $\mu\Omega/\Omega$ + 1.4 m Ω 18 $\mu\Omega/\Omega$ + 2 m Ω 21 $\mu\Omega/\Omega$ + 2 m Ω 19 $\mu\Omega/\Omega$ + 20 m Ω 22 $\mu\Omega/\Omega$ + 20 m Ω 19 $\mu\Omega/\Omega$ + 200 m Ω 22 $\mu\Omega/\Omega$ + 200 m Ω 21 $\mu\Omega/\Omega$ + 2 Ω 24 $\mu\Omega/\Omega$ + 2 Ω 41 $\mu\Omega/\Omega$ + 30 Ω 99 $\mu\Omega/\Omega$ + 50 Ω 0.15 m Ω/Ω + 2.5 k Ω 0.38 m Ω/Ω + 3.0 k Ω 2.1 m Ω/Ω + 100 k Ω 11 m Ω/Ω + 500 k Ω	4-terminal short Fluke 5522A/SC1100 (1-yr cal interval)

Parameter/Equipment	Range	CMC ^{2, 6, 7} ($\pm$)	Comments
Resistance – Generate ³ Fixed Values (Low Resistance)	333 $\mu\Omega$ 1 m Ω 10 m Ω 100 m Ω 1000 m Ω 10 Ω 100 Ω 1000 Ω 10 k Ω	120 $\mu\Omega/\Omega$ 110 $\mu\Omega/\Omega$ 65 $\mu\Omega/\Omega$ 42 $\mu\Omega/\Omega$ 63 $\mu\Omega/\Omega$ 44 $\mu\Omega/\Omega$ 48 $\mu\Omega/\Omega$ 64 $\mu\Omega/\Omega$ 48 $\mu\Omega/\Omega$	Guildline 9211A
Resistance – Generate ³ Fixed Values (High Resistance, High Voltage)	1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω 10 G Ω 100 G Ω 1 T Ω	32 $\mu\Omega/\Omega$ 32 $\mu\Omega/\Omega$ 32 $\mu\Omega/\Omega$ 43 $\mu\Omega/\Omega$ 160 $\mu\Omega/\Omega$ 340 $\mu\Omega/\Omega$ 0.58 % 0.74 % 1.2 % 2.4 %	IET LABS VRS-100-10-1K-BP
Resistance – Measure ³	(0 to 10) Ω (10 to 100) Ω (0.1 to 1) k Ω (1 to 10) k Ω (10 to 100) k Ω (0.1 to 1) M Ω (1 to 10) M Ω (10 to 100) M Ω (0.1 to 1) G Ω	18 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 14 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 12 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 12 $\mu\Omega/\Omega$ + 5 m Ω 12 $\mu\Omega/\Omega$ + 50 m Ω 17 $\mu\Omega/\Omega$ + 2.0 Ω 58 $\mu\Omega/\Omega$ + 100 Ω 580 $\mu\Omega/\Omega$ + 1.0 k Ω 5.8 m Ω/Ω + 10 k Ω	HP 3458A OPT002
Electrical Simulation of Thermocouples – Generate/Measure ^{3, 8}			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.37 °C 0.30 °C 0.28 °C 0.30 °C	Fluke 5522A/SC1100 (1-yr cal interval)
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.41 °C 0.19 °C 0.18 °C 0.19 °C 0.22 °C	ITS-90 or ITS-68 selectable

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouples – Generate/Measure ^{3, 8} (cont)			
Type J	(-250 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.26 °C 0.19 °C 0.18 °C 0.20 °C 0.23 °C	Fluke 5522A/SC1100 (1-yr cal interval)
Type K	(-200 to -100) °C (-250 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.30 °C 0.20 °C 0.19 °C 0.25 °C 0.34 °C	ITS-90 or ITS-68 selectable
Type N	(-200 to -100) °C (-250 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.34 °C 0.23 °C 0.21 °C 0.20 °C 0.26 °C	
Type R	(0 to 250) °C (250 to 1000) °C (400 to 1000) °C (1000 to 1767) °C	0.47 °C 0.31 °C 0.30 °C 0.34 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.39 °C 0.32 °C 0.32 °C 0.39 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.51 °C 0.24 °C 0.19 °C 0.18 °C	
Type U	(-200 to 0) °C (0 to 600) °C	0.46 °C 0.26 °C	
Electrical RTD Simulation – Generate & Measure			
Pt385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.040 °C 0.040 °C 0.056 °C 0.073 °C 0.081 °C 0.098 °C 0.18 °C	5522 A main output COMP off; 2 wire or 4 wire

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical RTD Simulation – Generate & Measure (cont)			
Pt 385, 200 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.032 °C 0.033 °C 0.033 °C 0.042 °C 0.095 °C 0.10 °C 0.11 °C 0.13 °C	5522A main output COMP off; 2 wire or 4 wire
Pt 385, 500 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.032 °C 0.040 °C 0.040 °C 0.049 °C 0.064 °C 0.068 °C 0.078 °C 0.093 °C	
Pt 385, 1000 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.024 °C 0.025 °C 0.034 °C 0.043 °C 0.051 °C 0.059 °C 0.062 °C 0.18 °C	
Pt 3926, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.040 °C 0.040 °C 0.056 °C 0.073 °C 0.081 °C 0.098 °C	
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.19 °C 0.033 °C 0.040 °C 0.049 °C 0.058 °C 0.065 °C 0.073 °C 0.083 °C 0.18 °C	
PtNi 285, 120 Ω (Ni 120)	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.063 °C 0.063 °C 0.11 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.24 °C	

Parameter/Equipment	Range	CMC ^{2, 6, 7} ($\pm$)	Comments
Oscilloscope ³ –			Fluke 5522A/SC1100
Squarewave Amplitude	1.0 mV to 130 V _{p-p} 1.0 mV to 6.6 V _{p-p}	0.078 % + 31 μ V 0.12 % + 31 μ V	Into 1 M Ω Into 50 Ω
Squarewave Frequency	10 Hz to 10 kHz	1.9 μ Hz/Hz	
DC Signal Level	(0 to $\pm$ 130) V (0 to $\pm$ 6.6) V	0.039 % + 31 μ V 0.20 % + 31 μ V	Into 1 M Ω Into 50 Ω
Risetime	$\leq$ 300 ps at 2 MHz $\leq$ 350 ps at 10 MHz	0.14 ps 0.14 ps	
Edge Amplitude	4 mV to 2.75 V	1.6 % + 200 μ V	
Edge Frequency	1 kHz to 10 MHz	1.9 μ Hz/Hz	REF frequency
Leveled Sinewave Amplitude at 50 kHz	5.0 mV to 5.5 V _{p-p}	1.6 % + 230 μ V	
Sinewave Frequency	50 kHz to 1100 MHz	1.9 μ Hz/Hz	Relative to 50 kHz
Leveled Sinewave Flatness	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	1.4 % + 78 μ V 1.8 % + 78 μ V 3.2 % + 78 μ V 4 % + 78 μ V	Into 1 M Ω Into 50 Ω
Wave Generator Amplitude	1.8 mV to 55 V _{p-p} 1.8 mV to 2.5 V _{p-p}	2.3 % + 78 μ V 2.3 % + 78 μ V	
Time Markers	2 ns to 20 ms 50 ms to 5 s	2 μ s/s 19 + (780t**) μ s/s	**t is in seconds
Pulse Width	(4 to 500) ns	1.7 % + 1.6 ns	
Pulse Period	200 ns to 20 ms	1.9 μ Hz/Hz	
Impedance Measurement	(40 to 60) Ω (0.5 to 1.5) M Ω (5.0 to 50) pF	0.083 % 0.079 % 3.9 % + 0.4 pF***	***Within 30 minutes of capacitance zero

Parameter/Range	Frequency	CMC ^{2, 7} ($\pm$)	Comments
AC Voltage – Generate ³			
(1.0 to 33) mV	(0.01 to 9.99) Hz (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	3.9 % + 170 μ V 0.066 % + 6 μ V 0.015 % + 6 μ V 0.018 % + 6 μ V 0.080 % + 6 μ V 0.27 % + 12 μ V 0.62 % + 50 μ V	Fluke 5522A/SC1100 (1-yr cal interval) (sinewave output)
(33 to 330) mV	(0.01 to 9.99) Hz (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	3.9 % + 1.7 mV 0.29 mV/V + 8 μ V 0.12 mV/V + 8 μ V 0.13 mV/V + 8 μ V 0.28 mV/V + 8 μ V 0.63 mV/V + 32 μ V 1.6 mV/V + 70 μ V	
(0.33 to 3.3) V	(0.01 to 9.99) Hz (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	3.9 % + 17 mV 0.28 mV/V + 50 μ V 0.12 mV/V + 60 μ V 0.15 mV/V + 60 μ V 0.24 mV/V + 50 μ V 0.55 mV/V + 130 μ V 1.9 mV/V + 600 μ V	
(3.3 to 33) V	(0.01 to 9.99) Hz (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	3.9 % + 170 mV 0.28 mV/V + 650 μ V 0.12 mV/V + 600 μ V 0.19 mV/V + 600 μ V 0.27 mV/V + 600 μ V 0.70 mV/V + 1.6 mV	
(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	0.15 mV/V + 2 mV 0.16 mV/V + 6 mV 0.2 mV/V + 6 mV 0.25 mV/V + 6 mV 1.6 mV/V + 50 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 10 mV 0.020 % + 10 mV 0.023 % + 10 mV	

Parameter/Range	Frequency	CMC ^{2, 7} (±)	Comments
AC Voltage – Measure ³			
(1 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 (0.3 to 4) MHz	0.035 % + 3 µV 0.023 % + 1.1 µV 0.035 % + 1.1 µV 0.12 % + 1.1 µV 0.58 % + 1.1 µV 4.6 % + 2.0 µV 8.1 % + 0.007 mV	HP 3458A OPT002 (sinewave inputs) AC mode = SYNC AC band = <2 MHz AC band 10 MHz
(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 (0.3 to 1) MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	0.0084 % + 4 µV 0.0084 % + 2 µV 0.016 % + 2 µV 0.035 % + 2 µV 0.092 % + 2 µV 0.35 % + 10 µV 1.2 % + 10 µV 4.6 % + 0.07 mV 4.6 % + 0.08 mV 17 % + 0.1 mV	AC band 10 MHz
(0.1 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 (0.3 to 1) MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	0.0082 % + 40 µV 0.0082 % + 20 µV 0.016 % + 20 µV 0.035 % + 20 µV 0.092 % + 20 µV 0.35 % + 0.1 mV 1.2 % + 0.1 mV 4.6 % + 0.0007 V 4.6 % + 0.0008 V 17 % + 0.0010 V	AC band 10 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 (0.3 to 1) MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	0.0083 % + 0.4 mV 0.0082 % + 0.2 mV 0.016 % + 0.2 mV 0.035 % + 0.2 mV 0.092 % + 0.2 mV 0.35 % + 1.0 mV 1.2 % + 1.0 mV 4.6 % + 0.007 V 4.9 % + 0.008 V 17 % + 0.010 V	AC band 10 MHz to 3 volts
(10 to 100) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.023 % + 4 mV 0.023 % + 2 mV 0.023 % + 2 mV 0.041 % + 2 mV 0.14 % + 2 mV	
(100 to 1000) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz	0.046 % + 40 mV 0.046 % + 20 mV 0.069 % + 20 mV 0.14 % + 20 mV	

Parameter/Range	Frequency	CMC ^{2, 6, 7} (±)	Comments
AC High Voltage – Generate & Measure ^{3, 8}	Up to 7 kV, 60 Hz	0.16 %	Fluke 80E-10, Hipotronic HD150, Agilent 3458A
AC Current – Generate ³ (29.00 to 329.99) µA (0.33 to 3.2999) mA (3.3 to 32.999) mA (33 to 329.99) mA (0.33 to 1.099 99) A (1.1 to 2.999 99) A (3.0 to 10.9999) A (3.0 to 10.9999) A (11.0 to 20.5) A (11.0 to 20.5) A	 45 Hz to 1 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz (45 to 100) Hz 100 Hz to 1 kHz (45 to 100) Hz 100 Hz to 1 kHz	 0.098 % + 0.1 µA 0.078 % + 0.15 µA 0.034 % + 2 µA 0.033 % + 20 µA 0.040 % + 100 µA 0.054 % + 100 µA 0.052 % + 2 mA 0.081 % + 2 mA 0.096 % + 5 mA 0.12 % + 5 mA	Fluke 5522A/SC1100 (1-yr cal interval) (LCOMP off) compliance adder: 0.05 µA/V
AC Current – Measure ³ (0 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A (0 to 1) A (0 to 3) A (3 to 10) A	 45 Hz to 5 kHz 100 Hz to 5 kHz 100 Hz to 5 kHz 100 Hz to 5 kHz 100 Hz to 5 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz	 0.069 % + 30 nA 0.035 % + 0.2 µV 0.035 % + 2 µA 0.035 % + 20 µA 0.12 % + 200 µA 0.13 % + 0.4 mA 0.18 % + 1.8 mA 0.20 % + 6 mA	HP 3458A OPT002 (sinewave inputs) Fluke 8845A
AC High Current – Generate & Measure ³ (> 0.1 to 2.0) A (> 0.1 to 2.0) A (> 2 to 20.0) A (> 2 to 20.0) A (> 20 to 100) A Measure Only (0 to 3) A (0 to 3) A (0 to 30) A (0 to 300) A	 ≤ 1 kHz (> 1 to 10) kHz ≤ 1 kHz (> 1 to 5) kHz (0.06 to 1) kHz 45 Hz to 2 kHz (2 to 10) kHz 60 Hz 60 Hz	 0.11 % 0.50 % 0.11 % 0.50 % 0.13 % 0.51 % + 1.5 mA 1.1 % + 1.5 mA 0.64 % + 15 mA 0.66 % + 150 mA	Valhalla 2575A, 2555A GW Instek PCS- 1000i

Parameter/Range	Frequency	CMC ^{2, 7} ($\pm$)	Comments
AC Induced Current ³			
(0.33 to 1.099 99) A	45 Hz to 1 kHz	0.040 % + 100 μ A	Fluke 5522A main output through single turn copper wire (<1 μ H inductance)
(1.1 to 2.999 99) A	45 Hz to 1 kHz	0.054 % + 100 μ A	
(3.0 to 10.9999) A	45 Hz to 100 Hz	0.054 % + 2.0 mA	
(3.0 to 10.9999) A	100 Hz to 1 kHz	0.082 % + 2.0 mA	
(11.0 to 20.5000) A	45 Hz to 100 Hz	0.096 % + 5.0 mA	
(11.0 to 20.5000) A	100 Hz to 1 kHz	0.12 % + 5.0 mA	
(16.5 to < 55) A	(45 to 65) Hz	0.42 % + 0.025 A	Fluke 5522A/SC1100 (1-yr cal interval) Fluke 5500-COIL
(55 to < 150) A		0.41 % + 0.025 A	
(150 to < 550) A		0.39 % + 0.09 A	
(550 to 1025) A		0.40 % + 0.09 A	
(16.5 to < 150) A	(65 to 440) Hz ⁹	0.95 % + 0.027 A	
(150 to 550) A		0.94 % + 0.10 A	

IV. Mechanical

Parameter/Equipment	Range	CMC ^{2, 6, 11} ($\pm$)	Comments
Torque – Measuring Equipment	(1 to 10) ozf·in	0.72 %	AWS ITIO-10 Mountz BMX-20z Mountz BMX-80z Mountz LTT-2100:25i Mountz BMX-100i
	(4 to 20) ozf·in	0.59 %	
	(16 to 80) ozf·in	0.60 %	
	(5 to 25) lbf·in	0.54 %	
	(20 to 100) lbf·in	0.57 %	
	(10 to 100) ozf·in	0.12 % + 0.01 ozf·in	AKO TSD1250 system AKO TSD6000-3 w/ TSD011 TSD111 TSD1011
	(32 to 320) ozf·in	0.14 % + 0.01 ozf·in	
	(10 to 40) lbf·in	0.22 % + 0.16 lbf·in	
	(40 to 100) lbf·in	0.16 % + 0.08 lbf·in	
	(10 to 40) lbf·ft	0.12 % + 0.04 lbf·ft	
	(40 to 100) lbf·ft	0.13 % + 0.12 lbf·ft	
	(100 to 1000) lbf·ft	0.13 % + 1.1 lbf·ft	

Parameter/Equipment	Range	CMC ^{2, 5, 6, 11} ($\pm$)	Comments
Pressure – Measuring Equipment			
Vacuum	(0.0005 to 0.001) Torr (0.001 to 100) Torr (100 to 1000) Torr	14 % of reading 6.9 % of reading 34 % of reading	MKS PDR900/925
	(0 to 5.0) in·H ₂ O (0 to 0.25) in·H ₂ O	0.0035 in·H ₂ O 0.00021 in·H ₂ O	Ashcroft AQS-1
Pneumatic ³	(0 to 200) psi (0 to 500) psi (0 to 1000) psi	0.026 % + 0.10 psi 0.018 % + 0.26 psi 0.014 % + 0.50 psi	Eaton UPC5000BBAA
	(0 to 400) psi (0 to 1000) psi (0 to 2000) psi	0.026 % + 0.21 psi 0.018 % + 0.50 psi 0.015 % + 1.0 psi	Eaton UPC5000BACA
	(0 to 19) psi (0 to 150) psi	0.0032 % + 0.0027 psi 0.0047 % + 0.042 psi	Ruska 7222
Hydraulic	(15 to 3500) psi (> 3500 to 10 000) psi	0.47 psi 0.015 %	Ruska RPM4-A70
	(15 to 9000) psi (> 9000 to 30 000) psi	1.9 psi 0.021 %	Ruska RMP4-A200
Pneumatic	(0.2 to 19) psi (2 to 700) psi	0.0022 % + 0.000 02 psi 0.0021 % + 0.0008 psi	Ruska 2465 Deadweight system
Force Gauges & Transducers ^{3, 9} (Tension & Compression)	(1 to 15) lbf (> 15 to 350) lbf	0.0015 lbf + 0.6R 0.012 lbf + 0.6R	Class 7 weights

Parameter/Equipment	Range	CMC ^{2, 5, 6} ($\pm$)	Comments
Scales & Balances ^{3, 8}	(1 to 500) mg	0.010 mg + 0.6R	ASTM Class 1 weights
	1 g	0.036 mg + 0.6R	
	2 g	0.035 mg + 0.6R	
	3 g	0.035 mg + 0.6R	
	5 g	0.042 mg + 0.6R	
	10 g	0.051 mg + 0.6R	
	20 g	0.076 mg + 0.6R	
	30 g	0.077 mg + 0.6R	
	50 g	0.12 mg + 0.6R	
	100 g	0.26 mg + 0.6R	
	200 g	0.56 mg + 0.6R	
	300 g	7.2 mg + 0.6R	
	500 g	1.2 mg + 0.6R	
	1 kg	2.7 mg + 0.6R	
	2 kg	5.3 mg + 0.6R	
	5 kg	12 mg + 0.6R	
	10 kg	26 mg + 0.6R	
	20 kg	51 mg + 0.6R	
	25 kg	96 mg + 0.6R	
	(> 25 to 165) kg	16 mg/kg + 0.6R	
	0.5 lb	0.00035 lb + 0.6R	ASTM Class 7 weights
	1 lb	0.000 60 lb + 0.6R	
	2 lb	0.000 95 lb + 0.6R	
	5 lb	0.0017 lb + 0.6R	
	10 lb	0.0029 lb + 0.6R	
	20 lb	0.0044 lb + 0.6R	
	25 lb	0.0055 lb + 0.6R	
	50 lb	0.0091 lb + 0.6R	
	(> 50 to 1000) lb	0.000 18 lb/lb + 0.6R	

V. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 5, 11} ($\pm$)	Comments
Temperature – Measure ⁸	(-50 to 150) °C	0.053 °C	Fluke 1551A
	(150 to 300) °C	0.057 °C	Fluke 1552A
Temperature – Measuring Equipment	(-25 to 150) °C	0.079 °C + 0.6R	Fluke 1551A
	(35 to 300) °C	0.14 °C + 0.6R	Fluke 1552A
Humidity – Measuring Equipment	(10 to 75) % RH (75 to 90) % RH	0.64 % RH + 0.6R 0.73 % RH + 0.6R	EG&G 911 w/ Michell HG-1

VI. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 5, 7, 11} ($\pm$)	Comments
Frequency – Measuring Equipment	10 MHz Reference	10 pHz/Hz	Fluke 910
Sinewave ^{3,4}	0.01 Hz to 2 MHz 50 kHz to 1100 MHz	1.9 μ Hz/Hz + 5 μ Hz 1.9 μ Hz/Hz	Fluke 5522A: main output scope output
Timers & Stopwatches ³			
Digital	(0 to 100 000) s	1.0 μ s/s 0.045 sec/day	HP 53131A Helmut Klein 4500
Analog	Up to 24 hours	1.6 μ s/s + 0.037 s 0.034 s/day	HP 53131A Helmut Klein 4500
Tachometers ³	(1 to 6 000 000) RPM	2.0 μ RPM/RPM + 0.6R	Fluke 5522A

¹ This laboratory offers commercial and field calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ The output represents the timebase externally locked to the 10 MHz reference, the CMC is the same as the 10 MHz reference.

⁵ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches. In the statement of CMC, R is the numerical value of the resolution of the device.

⁶ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.

⁷ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

⁸ The contributions from the “best existing device” are not included in the CMC claim.

⁹ Current output range may be limited due to exceeding compliance voltage.

¹⁰ This scope meets A2LA’s *P112 Flexible Scope Policy*.

¹¹ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

SIMCO ELECTRONICS

Allentown, PA

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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).



Presented this 29th day of September 2022.

A blue ink signature of a person, likely the Vice President of Accreditation Services, written over a horizontal line.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1395.09
Valid to September 30, 2024

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.