



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

SIMCO ELECTRONICS
1701 Quincy Avenue, Suite 32
Naperville, IL 60540
Brian Nupen Phone: 630 717 1800

CALIBRATION

Valid To: September 30, 2024

Certificate Number: 1395.07

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 7}:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 5, 9} ($\pm$)	Comments
DC Voltage ³ – Generate	(0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1000) V	16 μ V/V + 1 μ V 8.6 μ V/V + 2 μ V 9.4 μ V/V + 20 μ V 14 μ V/V + 0.59 mV 17 μ V/V + 1.5 mV	Fluke 5520A/SC1100
DC Voltage ³ – Measure	(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 + 0.45 μ V 5.4 μ V/V + 0.46 μ V 5.4 μ V/V + 0.94 μ V 8 μ V/V + 45 μ V 8 μ V/V + 230 μ V*	HP 3458A, opt 2 *add 12 (V _{in} /1000) ² parts in 10 ⁶ to all V _{in} > 100
DC Current ³ – Generate	(0 to 330) μ A (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 11) A (11 to 20.5) A	0.012 % + 0.02 μ A 78 μ A/A + 0.04 μ A 78 μ A/A + 0.2 μ A 78 μ A/A + 2 μ A 0.016 % + 40 μ A [1] 0.041 % + 390 μ A [1] 0.079 % + 650 μ A	Fluke 5520A/SC1100 [1] Floor specification doubled after 30 seconds

Parameter/Equipment	Range	CMC ^{2, 4, 5, 9} ($\pm$)	Comments
DC Current ³ – Measure	(0.1 to 1) μ A (1 to 10) μ A (10 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	39 μ A/A + 64 pA 29 μ A/A + 130 pA 28 μ A/A + 1.1 nA 28 μ A/A + 7.5 nA 28 μ A/A + 75 nA 44 μ A/A + 0.75 μ A 0.013 % + 16 μ A	HP 3458A, opt 2
DC Current – Clamp-On Meters	(10 to 25) A (25 to 150) A (150 to 1025) A	0.62 % + 0.02 A 0.62 % + 0.14 A 0.63 % + 0.5 A	Fluke 5520A/SC1100, Fluke 5500A/coil
Resistance ³ – Generate	(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	40 $\mu\Omega/\Omega$ + 1 m Ω 24 $\mu\Omega/\Omega$ + 1.5 m Ω 22 $\mu\Omega/\Omega$ + 1.4 m Ω 29 $\mu\Omega/\Omega$ + 2 m Ω 22 $\mu\Omega/\Omega$ + 2 m Ω 52 $\mu\Omega/\Omega$ + 0.02 Ω 22 $\mu\Omega/\Omega$ + 0.02 Ω 25 $\mu\Omega/\Omega$ + 0.2 Ω 22 $\mu\Omega/\Omega$ + 0.2 Ω 44 $\mu\Omega/\Omega$ + 2 Ω 28 $\mu\Omega/\Omega$ + 2 Ω 52 $\mu\Omega/\Omega$ + 30 Ω 0.011 % + 50 Ω 0.028 % + 2.5 k Ω 0.042 % + 3 k Ω 0.24 % + 80 k Ω 1.2 % + 400 k Ω	Fluke 5520A/SC1100
Resistance ³ – Measure	(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 (100 to 1000) M Ω	19 $\mu\Omega/\Omega$ + 90 $\mu\Omega$ 16 $\mu\Omega/\Omega$ + 0.9 m Ω 14 $\mu\Omega/\Omega$ + 1 m Ω 14 $\mu\Omega/\Omega$ + 10 m Ω 14 $\mu\Omega/\Omega$ + 90 m Ω 20 $\mu\Omega/\Omega$ + 3 Ω 62 $\mu\Omega/\Omega$ + 120 Ω 0.059 % + 4 k Ω 0.58 % + 260 k Ω	HP 3458A, opt 2

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouple Indicators and Indicating Systems ³ –			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.5 °C 0.16 °C 0.14 °C 0.16 °C 0.21 °C	Fluke 5520A
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.4 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C	

Parameter/Range	Frequency	CMC ^{2, 4, 9} ($\pm$)	Comments
AC Voltage ³ – Generate			
(1 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	0.078 % + 6 μ V 0.02 % + 6 μ V 0.05 % + 6 μ V 0.1 % + 6 μ V 0.28 % + 12 μ V 0.66 % + 50 μ V	Fluke 5520A/SC1100
(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	0.027 % + 8 μ V 0.018 % + 8 μ V 0.019 % + 8 μ V 0.032 % + 8 μ V 0.064 % + 32 μ V 0.16 % + 70 μ V	
(0.33 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	0.027 % + 40 μ V 0.018 % + 50 μ V 0.020 % + 50 μ V 0.027 % + 40 μ V 0.056 % + 100 μ V 0.19 % + 70 μ V	
(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	0.027 % + 0.65 mV 0.018 % + 0.6 mV 0.023 % + 0.6 mV 0.03 % + 0.6 mV 0.071 % + 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	0.02 % + 2 mV 0.021 % + 6 mV 0.024 % + 6 mV 0.024 % + 6 mV 0.16 % + 50 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 10 mV 0.02 % + 10 mV 0.024 % + 10 mV	

Parameter/Range	Frequency	CMC ^{2, 5, 9} ($\pm$)	Comments
AC Voltage ³ – Measure			
(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	0.04 % + 3.5 μ V 0.025 % + 1.3 μ V 0.035 % + 1.3 μ V 0.14 % + 1.3 μ V 0.58 % + 1.3 μ V 4.6 % + 2.5 μ V	HP 3458A, opt 2
(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	90 μ V/V + 5 μ V 90 μ V/V + 2.5 μ V 0.017 % + 2.5 μ V 0.036 % + 2.5 μ V 0.093 % + 2.5 μ V 0.35 % + 15 μ V 1.2 % + 15 μ V	
(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	90 μ V/V + 50 μ V 90 μ V/V + 25 μ V 0.017 % + 25 μ V 0.035 % + 25 μ V 0.092 % + 25 μ V 0.35 % + 130 μ V 1.2 % + 130 μ V	
(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	90 μ V/V + 0.5 mV 90 μ V/V + 0.25 mV 0.017 % + 0.25 mV 0.035 % + 0.25 mV 0.093 % + 0.25 mV 0.35 % + 1.5 mV 1.2 % + 1.5 mV	
(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	0.03 % + 5 mV 0.03 % + 2.5 mV 0.024 % + 2.5 mV 0.041 % + 2.5 mV 0.14 % + 2.5 mV	

Parameter/Range	Frequency	CMC ^{2, 4, 5, 9} ($\pm$)	Comments
AC Voltage – Measure ³ (cont) (100 to 1000) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.05 % + 50 mV 0.05 % + 25 mV 0.07 % + 25 mV 0.14 % + 25 mV 0.35 % + 25 mV	HP 3458A, opt 2
AC Current – Generate ³ (30 to 330) μ A (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	45 Hz to 1 kHz 100 Hz to 1 kHz	0.1 % + 0.1 μ A 0.078 % + 0.15 μ A 0.032 % + 2 μ A 0.032 % + 20 μ A 0.04 % + 0.1 mA 0.05 % + 0.1 mA 0.081 % + 2 mA 0.12 % + 5 mA	Fluke 5520A/SC1100; LCOMP off
AC Current – Measure ³ (5 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	45 Hz to 1 kHz (45 to 100) Hz 100 Hz to 5 kHz (45 to 100) Hz 100 Hz to 5 kHz (45 to 100) Hz 100 Hz to 5 kHz (45 to 100) Hz 100 Hz to 5 kHz	0.075 % + 0.04 μ A 0.072 % + 0.25 μ A 0.041 % + 0.25 μ A 0.072 % + 2.5 μ A 0.041 % + 2.5 μ A 0.072 % + 25 μ A 0.041 % + 25 μ A 0.10 % + 0.25 mA 0.12 % + 0.25 mA	HP 3458A, opt 2

Parameter/Range	Frequency	CMC ^{2, 4, 9} ($\pm$)	Comments
AC Current – Clamp on Meter			
(10 to 25) A	(45 to 60) Hz (64 to 440) Hz	0.71 % + 0.03 A 1.3 % + 0.03 A	Fluke 5520A/SC1100, Fluke 5500A/coil
(25 to 150) A	(45 to 60) Hz (64 to 440) Hz	0.71 % + 0.25 A 1.7 % + 0.25 A	
(150 to 1000) A	(45 to 60) Hz (64 to 440) Hz	0.74 % + 0.9 A 1.6 % + 0.9 A	

II. Mechanical

Parameter/Equipment	Range	CMC ^{2, 6, 8} ($\pm$)	Comments
Torque Wrenches – Measure	(20 to 200) ozf·in (5 to 50) lbf·in (40 to 400) lbf·in (100 to 1000) lbf·in (25 to 250) lbf·ft	0.61 % 0.96 % 0.62 % 0.82 % 0.60 %	CDI torque transducers

III. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 8} ($\pm$)	Comments
Frequency ³ – Measuring Equipment	10 MHz 0.01 Hz to 2 MHz	0.85 mHz 1.9 μ Hz/Hz + 5 μ Hz	HP 58503A GPS Fluke 5520A

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. CMCs 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 the 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 introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.
- ⁴ Based on using the standard at the temperature the Fluke 5520A with SC1100 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 $5\text{ }^{\circ}\text{C}$. For resistance, a zero calibration is performed at least every 12 hours within $\pm 1\text{ }^{\circ}\text{C}$ of use.
- ⁵ Based on using the standard at the temperature the HP 3458A was calibrated ($t_{cal} \pm 5\text{ }^{\circ}\text{C}$) and an auto-calibration (ACAL) was performed within the previous 24 hours ($\pm 1\text{ }^{\circ}\text{C}$ of ambient).
- ⁶ In the statement of CMC, the value is defined as the percentage of reading unless otherwise noted.
- ⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.
- ⁸ 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.
- ⁹ 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's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

SIMCO ELECTRONICS

Naperville, IL

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 30th of August 2022.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1395.07
Valid to September 30, 2024

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