



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

ELECTRICAL TEST INSTRUMENTS, LLC
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CALIBRATION

Valid To: August 31, 2026

Certificate Number: 5636.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations^{1, 5}:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
DC Voltage ³ – Generate	(0 to 202) mV (0.2 to 2.02) V (2 to 20.2) V (20 to 202) V (200 to 1025) V	22 µV/V + 2 µV 11 µV/V + 2.5 µV 9.7 µV/V + 24 µV 13 µV/V + 0.24 mV 16 µV/V + 2.4 mV	Transmille 4010
DC Voltage ³ – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V*	14 µV/V + 1.4 µV 8.1 µV/V + 1.8 µV 11 µV/V + 13 µV 11 µV/V + 99 µV 12 µV/V + 1.5 mV	Keysight 3458A *add 12 µV/V x (Vin/1000) ² additional error >100 V per 3548A specifications
DC Current ³ – Generate	(0 to 202) µA (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A	250 µA/A + 0.01 µA 130 µA/A + 0.03 µA 120 µA/A + 0.2 µA 60 µA/A + 2.0 µA 310 µA/A + 30 µA	Transmille 4010

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Current ³ – Measure	(0.1 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	18 μ A/A + 1.8 nA 25 μ A/A + 0.3 μ A 2 μ A/A + 0.32 μ A 49 μ A/A + 0.83 μ A 130 μ A/A + 11 μ A	Keysight 3458A

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage ³ – Generate			
(0 to 202) mV	(10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz	740 μ V/V + 15 μ V 310 μ V/V + 15 μ V 250 μ V/V + 28 μ V 430 μ V/V + 40 μ V	Transmille 4010
(0.2 to 2) V	(10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz	650 μ V/V + 180 μ V 210 μ V/V + 120 μ V 260 μ V/V + 180 μ V 800 μ V/V + 300 μ V	
(2 to 20) V	(10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz	620 μ V/V + 1.6 mV 280 μ V/V + 1.0 mV 260 μ V/V + 1.6 mV 750 μ V/V + 3.0 mV	
(20 to 200) V	(30 to 45) Hz 45 Hz to 1 kHz (1 to 40) kHz (40 to 100) kHz	600 μ V/V + 20 mV 190 μ V/V + 12 mV 400 μ V/V + 30 mV 2.3 mV/V + 50 mV	
(200 to 1000) V	(30 to 45) Hz 45 Hz to 1 kHz	910 μ V/V + 200 mV 330 μ V/V + 60 mV	
AC Voltage ³ – Measure			
(10 to 100) mV	10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	310 μ V/V + 38 μ V 320 μ V/V + 16 μ V 1.1 mV/V + 25 μ V 5.2 mV/V + 71 μ V 7.7 mV/V + 33 μ V	Keysight 3458A
100 mV to 1 V	10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	76 μ V/V + 54 μ V 150 μ V/V + 40 μ V 300 μ V/V + 68 μ V 840 μ V/V + 0.12 mV 2.8 mV/V + 0.82 mV	

Parameter/Range	Frequency	CMC ^{2,4} (\pm)	Comments
AC Voltage ³ – Measure (cont)			
(1 to 10) V	10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	76 μ V/V + 0.54 mV 150 μ V/V + 0.39 mV 310 μ V/V + 0.58 mV 830 μ V/V + 1.2 mV 3.1 mV/V + 4.6mV	Keysight 3458A
(10 to 100) V	10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	210 μ V/V + 6.9 mV 210 μ V/V + 5.6 mV 380 μ V/V + 6.4 mV 1200 μ V/V + 16 mV 4100 μ V/V + 58 mV	
(100 to 750) V	40 Hz to 1 kHz	410 μ V/V + 0.07 mV	
AC Current ³ – Generate			
(20 to 202) μ A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz	2.5 mA/A + 0.25 μ A 0.94 mA/A + 0.15 μ A 9.8 mA/A + 0.25 μ A 19 mA/A + 0.4 μ A	Transmille 4010
(0.2 to 2.02) mA	(10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz	2.9 mA/A + 0.25 μ A 0.74 mA/A + 0.2 μ A 5.8 mA/A + 0.3 μ A μ A 12 mA/A + 0.6 μ A	
(2 to 20.2) mA	(10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz	2.2 mA/A + 3 μ A 0.4 mA/A + 2 μ A 2.8 mA/A + 3 μ A 5.8 mA/A + 4 μ A	
(20 to 202) mA	(10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz	2.4 mA/A + 30 μ A 0.5 mA/A + 30 μ A 5.7 mA/A + 40 μ A 8.5 mA/A + 0.32 mA	
(0.2 to 2.02) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz	2.3 mA/A + 0.3 mA 0.74 mA/A + 0.2 mA 6.9 mA/A + 1 mA 29 mA/A + 5 mA	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current ³ – Measure			
(0.1 to 1) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	1.3 mA/A + 24 μA 0.67 mA/A + 23 μA 3.3 mA/A + 23 μA 4.4 mA/A + 23 μA	Keysight 3458A
(1 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	4.1 mA/A + 28 μA 1.6 mA/A + 25 μA 0.6 mA/A + 24 μA 1.3 mA/A + 23 μA	
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	4.2 mA/A + 69 μA 1.6 mA/A + 40 μA 0.63 mA/A + 30 μA 0.31 mA/A + 27 μA	
(0.1 to 1) A	(20 to 45) Hz 100 Hz to 5 kHz	1.7 mA/A + 0.21 mA 0.89 mA/A + 0.31 mA	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Resistance ³ – Generate	(0 to 100) Ω (100 to 330) Ω 330Ω to 1kΩ (1.0 to 3.3) kΩ (3.3 to 10) kΩ (10 to 33) kΩ (33 to 100) kΩ (100 to 330) kΩ 330kΩ to 1MΩ (1.0 to 3.3) MΩ (3.3 to 10) MΩ	0.41 mΩ/Ω + 78 mΩ 0.13 mΩ/Ω + 78 mΩ 0.12 mΩ/Ω + 78 mΩ 0.11 mΩ/Ω + 78 mΩ 0.13 mΩ/Ω + 78 mΩ 0.12 mΩ/Ω + 78 mΩ 0.13 mΩ/Ω + 78 mΩ 0.12 mΩ/Ω + 78 mΩ 0.13 mΩ/Ω + 78 mΩ 0.18 mΩ/Ω + 78 mΩ 0.16 mΩ/Ω + 78 mΩ	Transmille 4010 (Includes additional 50mΩ added to floor as specified for all ranges up to 33 MΩ.
DC Resistance ³ – Measure	(0 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	0.52 mΩ/Ω + .58 mΩ 16 μΩ/Ω + 81 mΩ 5.4 μΩ/Ω + 96 mΩ 15 μΩ/Ω + 28 mΩ 24 μΩ/Ω + 28 mΩ 89 μΩ/Ω + 28 mΩ	Keysight 3548A

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Circuit Breaker Tester ³ Time – Measure	(0 to 1) s (1 to 10) s	3.1 ms 3.1 ms	Circuit breaker tester analyzer BTSA-3
BTS Circuit Breaker Tester Analyzer – Measuring Equipment Frequency – Measure Analyzer Time Timer Side Function	5 Hz <1 s >10 s 10 s 1 s 60 s	0.59 Hz 12 ms 8.9 ms 3.1 ms 3.1 ms 3.1 ms	53181A Counter

¹ This laboratory offers commercial 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, repeatability) 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 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. CMCs 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.

⁵ This scope meets A2LA's *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

ELECTRICAL TEST INSTRUMENTS, LLC

Frederick, MD

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 15th day of November 2024.

A blue ink signature of Mr. Trace McInturff, written in a cursive style.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 5636.01
Valid to August 31, 2026
Revised February 6, 2025

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