



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: February 28, 2025

Certificate Number: 2789.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 5}:

I. Electrical – DC / Low Frequency

Parameter/Range	Frequency	CMC ^{2, 6} (±)	Comments
AC Voltage – Measure			
(1 to 100) mV 100 mV to 1 V (1 to 750) V	10 Hz to 20 kHz	0.16 % + 0.04 mV 0.11 % + 0.4 mV 0.07 % + 0.3 V	HP 34401A direct read
(10 to 30) V (30 to 100) V (100 to 300) V (300 to 1000) V	(40 to 1000) Hz	0.05 % + 0.2 % rng 0.14 % + 0.1 % rng 0.09 % + 0.1 % rng 0.09 % + 0.1 % rng	N4L PPA530 direct read
(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V	(40 to 1000) Hz	0.012 % + 2.0 µV 0.012 % + 20 µV 0.012 % + 0.2 mV 0.012 % + 2.0 mV	HP 3458A direct read for wideband leakage
(10 to 100) mV 100 mV to 1 V (1 to 10) V	(1 to 20) kHz	0.02 % + 2.0 µV 0.02 % + 20 µV 0.02 % + 0.2 mV	
(10 to 100) mV 100 mV to 1 V (1 to 10) V	(20 to 50) kHz	0.04 % + 2.0 µV 0.04 % + 20 µV 0.04 % + 0.2 mV	

Parameter/Range	Frequency	CMC ^{2, 6, 7} ($\pm$)	Comments
AC Voltage – Measure (cont)			
(10 to 100) mV 100 mV to 1 V (1 to 10) V	(50 to 100) kHz	0.09 % + 2.0 μ V 0.09 % + 20 μ V 0.09 % + 0.2 mV	HP 3458A direct read for wideband leakage
(10 to 100) mV 100 mV to 1 V (1 to 10) V	(100 to 300) kHz	0.31 % + 2.0 μ V 0.32 % + 0.1 mV 0.32 % + 1 mV	
(10 to 100) mV 100 mV to 1 V (1 to 10) V	300 kHz to 1 MHz	1.1 % + 10 μ V 1.1 % + 0.1 mV 1.1 % + 1.0 mV	
AC High Voltage – Measure			
(1 to 2) kV (2 to 19.5) kV	(50, 60) Hz (50, 60) Hz	0.0072 kV 0.03 kV	Keysight 34665A & HV Dividers
AC Current – Measure			
(10 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA	(45 to 1000) Hz (45 to 5000) Hz (45 to 5000) Hz (45 to 5000) Hz	0.1 % 0.09 % 0.09 % 0.14 %	HP 3458A
(0.1 to 1) mA (1 to 10) mA	(5 to 20) kHz (5 to 20) kHz	0.09 % 0.11 %	
(0.1 to 1) mA (1 to 10) mA	(20 to 50) kHz (20 to 50) kHz	0.44 % 0.42 %	
(0.1 to 1) mA (1 to 10) mA	(50 to 100) kHz (50 to 100) kHz	0.71 % 0.8 %	
(30 to 300) mA	(50 to 60) Hz	0.5 % + 0.3 mA	MetraHit 29s
(0 to 300) μ A (0.3 to 20) mA (20 to 100) mA	(65 to 800) Hz (65 to 800) Hz (65 to 800) Hz	1.3 % + 35 μ A 1.3 % + 35 μ A 1.3 % + 0.35 mA	Powerlogger 10

Parameter/Range	Frequency	CMC ^{2, 6} ($\pm$)	Comments
AC Current – Measure (cont)			
(0.3 to 1) A	(50, 60) Hz	0.15 % + 0.1 % rng	Line test with N4L PPA530 direct read
(1 to 3) A	(50, 60) Hz	0.35 % + 0.1 % rng	
(3 to 10) A	(50, 60) Hz	0.21 % + 0.1 % rng	
(10 to 20) A	(50, 60) Hz	0.35 % + 0.1 % rng	
(20 to 60) A	(50, 60) Hz	0.83 mA	N4L PPA530 with Voltech CT1000 Current Transformer
(1 to 60) A	(50, 60) Hz	0.31 % + 0.04 A	Ground bond test with HP 34401A & Reidon 100A Shunt
Power ³ – Measure			N4L PPA530
(10 to 1000) W (1500 to 6000) W	(50, 60) Hz	1.3 W 6.9 W	Power factor is computed based on measured real power divided by apparent power. Pf = W/VA
Power Factor			
0.250	(50, 60) Hz	0.019	
0.700		0.019	
1.000		0.012	

Parameter/Equipment	Range	CMC ^{2, 6, 7} ($\pm$)	Comments
DC Voltage – Measure	(1 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V	0.015 % + 3.5 μ V 0.017 % + 70 μ V 0.014 % + 50 μ V 92 μ V/V + 600 μ V 64 μ V/V + 10 mV	HP 34401A direct read
	(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V	0.002 % 0.001 % 0.001 % 0.001 %	HP 3458A direct read for DC line leakage test

Parameter/Equipment	Range	CMC ^{2, 6, 7} ($\pm$)	Comments
DC High Voltage – Measure	(1 to 6) kV (6 to 19.5) kV	0.0081 kV 0.026 kV	Keysight 34665A & HV Dividers
DC Current – Measure	Up to 100 nA (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 (30 to 300) mA (1 to 40) A	0.49 nA/A + 0.04 nA 71 μ A/A + 0.04 nA 68 μ A/A + 0.4 nA 33 μ A/A + 0.8 nA 35 μ A/A + 5.0 nA 0.41 mA/A + 5.0 nA 0.016 % + 0.5 μ A 0.05 % + 35 μ A 0.3 %	HP 3458A MetraHit 29s & Powerlogger 10 Ground bond test with HP 3458A & Reidon 100 A Shunt
Resistance – Generate	(25 to 600) m Ω (0.01 to 0.1) Ω (0.1 to 100) Ω (100 to 1000) Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω (10 to 1000) M Ω	0.45 m Ω 0.37 % + 15 m Ω 0.1 % + 15 m Ω 0.1 % + 15 m Ω 0.1 % 0.1 % 0.1 % 0.1 % 1.2 %	Custom load fixture Decade resistance box Decade resistance box Custom built resistance load fixture
Resistance – Measure	(0.010 to 10) Ω (10 to 100) Ω (100 to 1000) Ω (1 to 10) k Ω (10 to 100) k Ω (100 to 1000) k Ω (1 to 10) M Ω (10 to 100) M Ω	14 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 0.5 m Ω 13 $\mu\Omega/\Omega$ + 0.5 m Ω 13 $\mu\Omega/\Omega$ + 5.0 m Ω 13 $\mu\Omega/\Omega$ + 50 m Ω 43 $\mu\Omega/\Omega$ + 2.0 Ω 0.012 % + 100 Ω 0.3 % + 1.0 k Ω	HP 3458A

II. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 7} ($\pm$)	Comments
Frequency – Measure 100 mV to 750 V	40 Hz to 300 kHz	0.02 %	HP 34401A

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 CMC is computed based on voltage and current measurement.

⁴ 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.

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

⁶ 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 percentage or fraction of the reading plus a fixed floor specification.

⁷ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.



Accredited Laboratory

A2LA has accredited

IKONIX USA, LLC

Lake Forest, 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 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 1st day of June 2023.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2789.01
Valid to February 28, 2025

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