



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

KIMBALL ELECTRONIC LABORATORY, INC.
2200 E Road to Six Flags
Arlington, TX 76011
Javier Balceiro Phone: 214 412 3944

CALIBRATION

Valid To: June 30, 2024

Certificate Number: 2178.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 6}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 3} (±)	Comments
Calipers	Up to 24 in	(280 + 11L) µin	Gage blocks
Micrometers	Up to 12 in	(62 + 15L) µin	Gage blocks
Dial and Test Indicators	Up to 1 in	(58 + 3.7L) µin	Gage blocks
Ring Gage	Up to 4 in	(22 + 1.4L) µin	ULM and gage blocks

II. Electrical – DC Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
DC Voltage – Generate	Up to 329.999 mV (0.33 to 3.299) V (3.3 to 32.999) V (33 to 329.999) V (330 to 1000) V	61 µV/V + 3 µV 51 µV/V + 5 µV 51 µV/V + 50 µV 56 µV/V + 500 µV 0.055 mV/V + 1.5 mV	Fluke 5500A

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
DC Voltage – Measure	Up to 100 mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	14 μ V/V + 0.4 μ V 14 μ V/V + 0.3 μ V 14 μ V/V + 0.5 μ V 14 μ V/V + 31 μ V 15 μ V/V + 90 μ V	HP 3458A
DC Current – Generate	(0.3 to 3.29) mA (3.3 to 32.9) mA (33 to 329.9) mA 330 mA to 1 A (1 to 10) A	0.013 % + 0.052 μ A 0.010 % + 0.25 μ A 0.010 % + 3.3 μ A 0.031 % + 43 μ A 0.069 % + 250 μ A	Fluke 5500A
DC Current – Measure	(10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	22 μ A/A + 0.83 nA 18 μ A/A + 0.017 μ A 18 μ A/A + 0.17 μ A 28 μ A/A + 2.3 μ A 0.010 % + 44 μ A	HP 3458A
Electrical Calibration of Thermocouple Indicating Equipment –			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C	0.29 °C 0.19 °C 0.17 °C 0.20 °C	Fluke 5500A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.34 °C 0.21 °C 0.19 °C 0.28 °C 0.41 °C	

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
Electrical Calibration of Thermocouple Indicating Equipment – (cont) Type T	(-250 to -150) °C (-150 to 0) °C Up to 120 °C (120 to 400) °C	0.64 °C 0.26 °C 0.19 °C 0.17 °C	Fluke 5500A
Resistance – Generate	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (330 to 1100) 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 (330 to 1100) k 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	0.012 % + 8 m Ω 0.012 % + 15 m Ω 90 $\mu\Omega/\Omega$ + 15 m Ω 90 $\mu\Omega/\Omega$ + 15 m Ω 0.010 % + 56 m Ω 90 $\mu\Omega/\Omega$ + 60 m Ω 90 $\mu\Omega/\Omega$ + 600 m Ω 90 $\mu\Omega/\Omega$ + 600 m Ω 0.011 % + 6 Ω 0.012 % + 6 Ω 0.015 % + 55 Ω 0.015 % + 55 Ω 0.060 % + 560 Ω 0.10 % + 550 Ω 0.51 % + 5.3 k Ω 0.51 % + 17 k Ω	Fluke 5500A
Resistance – Measure	Up 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	10 $\mu\Omega/\Omega$ + 0.6 m Ω 11 $\mu\Omega/\Omega$ + 2.4 m Ω 14 $\mu\Omega/\Omega$ + 5.0 m Ω 18 $\mu\Omega/\Omega$ + 9.3 m Ω 18 $\mu\Omega/\Omega$ + 93 m Ω 23 $\mu\Omega/\Omega$ + 3.8 Ω 80 $\mu\Omega/\Omega$ + 97 Ω 0.11 % + 690 Ω	HP 3458A

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Voltage – 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	0.35 % + 20 μV 0.15 % + 20 μV 0.21 % + 20 μV 0.25 % + 20 μV 0.35 % + 33 μV 1.1 % + 60 μV	Fluke 5500A
(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	0.25 % + 50 μV 0.05 % + 21 μV 0.10 % + 20 μV 0.16 % + 40 μV 0.24 % + 170 μV 0.70 % + 330 μV	
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	0.15 % + 250 μV 0.03 % + 60 μV 0.08 % + 60 μV 0.14 % + 300 μV 0.24 % + 1700 μV	
(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	0.15 % + 2600 μV 0.04 % + 600 μV 0.08 % + 2.6 mV 0.19 % + 5 mV 0.24 % + 17 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.05 % + 6.7 mV 0.08 % + 15 mV 0.09 % + 33 mV	
(330 to 1000) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.05 % + 81 mV 0.21 % + 120 mV 0.21 % + 510 mV	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Voltage – 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	0.022 % + 4.5 μV 0.011 % + 3.2 μV 0.02 % + 3.1 μV 0.05 % + 9.3 μV 0.041 % + 11 μV 3.4 % + 75 μV	HP 3458A
(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	90 μV/V + 4.7 μV 0.012 % + 2.8 μV 0.018 % + 2.8 μV 0.044 % + 5.9 μV 0.085 % + 4.9 μV 0.27 % + 50 μV	
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	80 μV/V + 39 μV 80 μV/V + 21 μV 0.015 % + 21 μV 0.031 % + 32 μV 0.082 % + 25 μV 0.31 % + 0.1 mV	
(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	80 μV/V + 0.39 mV 80 μV/V + 0.19 mV 0.016 % + 0.19 mV 0.033 % + 0.19 mV 0.082 % + 0.21 mV	
(10 to 100) V	40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.023 % + 1.8 mV 0.023 % + 1.8 mV 0.038 % + 1.9 mV 0.13 % + 1.6 mV	
(100 to 700) V	40 Hz to 1 kHz	0.042 % + 20 mV	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Current – Generate			
(30 to 330) μA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.25 % + 0.15 μA 0.13 % + 0.15 μA 0.13 % + 0.25 μA 0.40 % + 0.15 μA 1.3 % + 0.15 μA	Fluke 5500A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.20 % + 0.3 μA 0.10 % + 0.3 μA 0.10 % + 0.3 μA 0.20 % + 0.3 μA 0.60 % + 0.3 μA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.20 % + 3 μA 0.10 % + 3 μA 0.09 % + 3 μA 0.20 % + 3 μA 0.60 % + 3 μA	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.20 % + 30 μA 0.10 % + 30 μA 0.09 % + 30 μA 0.20 % + 30 μA	
(0.33 to 1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.22 % + 0.25 mA 0.13 % + 0.21 mA 0.81 % + 0.10 mA	
(1 to 10) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.07 % + 2.1 mA 0.10 % + 2.1 mA 0.33 % + 2.1 mA	

Parameter/Range	Frequency	CMC ^{2, 4, 5} (\pm)	Comments
AC Current – Measure			
Up to 100 μ A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.40 % + 0.04 μ A 0.15 % + 0.03 μ A 0.06 % + 0.03 μ A 0.06 % + 0.03 μ A	HP 3458A
100 μ A to 1 mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.41 % + 0.21 μ A 0.15 % + 0.22 μ A 0.06 % + 0.20 μ A 0.03 % + 0.20 μ A	
(1 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.40 % + 2 μ A 0.15 % + 2 μ A 0.06 % + 2 μ A 0.03 % + 2 μ A	
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.40 % + 20 μ A 0.15 % + 20 μ A 0.06 % + 20 μ A 0.03 % + 20 μ A	
100 mA to 1A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.40 % + 200 μ A 0.16 % + 200 μ A 0.08 % + 200 μ A 0.10 % + 200 μ A	

Parameter/Equipment	Range	CMC ² (±)	Comments
Capacitance – Generate	(0.5 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) μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μF to 1.1 mF	0.45 % + 11 pF 0.51 % + 10 pF 0.50 % + 11 pF 0.26 % + 100 pF 0.26 % + 100 pF 0.26 % + 290 pF 0.23 % + 1.1 nF 0.36 % + 3 nF 0.36 % + 9.9 nF 0.41 % + 30 nF 0.79 % + 13 nF 0.67 % + 490 nF 1.1 % + 370 nF	Fluke 5500A

III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure (Gauges, Transducers, Air Data Test Sets, Pitot Testers)	0.5 to 32) in·Hg (32 to 68) in·Hg	0.0012 in·Hg 0.0016 in·Hg	Fluke 7750i
	Up to 400 psi (400 to 4000) psi	0.12 % + 0.07 psi 0.003 % + 0.6 psi	Mensor
	(-13.8 to 2000) psi	0.11 % + 1.0 psi	Winchester model-1
	(2000 to 10 000) psi	0.10 % + 2.3 psi	Crystal XP2I
Torque – Measuring Equipment	Up to 1000 lbf	1.0 % full scale	AKO TSD 1011 and TSD 2511
	(0 to 50) lbf in (30 to 400) lbf in (100 to 1000) lbf in (20 to 250) lbf	0.17 % + 0.11 lbf in 0.28 % + 0.17 lbf in 0.31 % + 0.03 lbf in 0.26 % + 0.16 lbf	CDI 2000-400-02
	(60 to 600) lbf	0.30 % + 0.10 lbf	CDI 2000-12-02

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. Where ranges are not specified, the best measurement uncertainty stated is for the cardinal points only.

³ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches.

⁴ The measurands stated are generated with the Fluke 5500A. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

⁵ The measurands stated are measured with the HP 3458A. This capability is suitable for the calibration of the devices intended to generate the measurand in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a combination of the fraction of the reading/output plus a range specification.

⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁷ f is the numerical value of the measurement of the device in lbf,

⁸ 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

KIMBALL ELECTRONIC LABORATORY, INC.

Arlington, TX

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 22nd of July 2022.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2178.02
Valid to June 30, 2024
Revised November 27, 2023

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