



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

CONRAD KACSIK INSTRUMENT SYSTEMS, INC.
 30925 Aurora Rd.
 Solon, OH 44139
 Christopher S. Miller Phone: 440 836 0103 x 107

CALIBRATION

Valid To: February 29, 2012

Certificate Number: 1385.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4,5} (±)	Comments
DC Voltage – Measure ³	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1050) V	25 µV/V + 1 µV 10 µV/V + 1 µV 8 µV/V + 1 µV 10 µV/V + 30 µV 25 µV/V + 100 µV	HP 3458A, opt 002
DC Voltage – Generate ³	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	25 µV/V + 1 µV 14 µV/V + 2 µV 15 µV/V + 15 µV 22 µV/V + 150 µV 24 µV/V + 1.5 mV	Fluke 5520A/SC600
DC Current – Measure ³	(0 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (100 to 1) A	43 µA/A + 8 nA 40 µA/A + 5 nA 40 µA/A + 50 nA 60 µA/A + 500 nA 0.016 % + 10 µA	HP 3458A, opt 002

Parameter/Equipment	Range	CMC ^{2, 4, 5} (\pm)	Comments
DC Current – Generate ³	(0 to 299.9) μ A (0.3 to 3.299) mA (3 to 32.99) mA (33 to 329.9) mA (0.3 to 1) A (1 to 3) A (3 to 11) A (11 to 20.5) A	0.026 % + 20 nA 0.014 % + 50 nA 0.013 % + 250 nA 0.013 % + 2.5 μ A 0.028 % + 40 μ A 0.047 % + 40 μ A 0.065 % + 500 μ A 0.13 % + 750 μ A	Fluke 5520A/SC600
Resistance – Generate ³	(0 to 11) Ω (11 to 110) Ω (0.11 to 1.1) k Ω (1.1 to 11) k Ω (11 to 110) k Ω 110 k Ω to 1 M Ω (1 to 10) M Ω	0.016 % + 1.0 m Ω 50 $\mu\Omega/\Omega$ + 1.5 m Ω 35 $\mu\Omega/\Omega$ + 2.0 m Ω 36 $\mu\Omega/\Omega$ + 20 m Ω 36 $\mu\Omega/\Omega$ + 0.2 Ω 40 $\mu\Omega/\Omega$ + 2 Ω 0.017 % + 50 Ω	Fluke 5520A/SC600
Resistance – Measure ³	(0 to 10) Ω (10 to 100) Ω (0.10 to 1.0) k Ω (1.0 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1.0 M Ω (1 to 10) M Ω	33 $\mu\Omega/\Omega$ + 1 m Ω 27 $\mu\Omega/\Omega$ + 1 m Ω 16 $\mu\Omega/\Omega$ + 1 m Ω 16 $\mu\Omega/\Omega$ + 5 m Ω 17 $\mu\Omega/\Omega$ + 0.05 Ω 25 $\mu\Omega/\Omega$ + 2 Ω 75 $\mu\Omega/\Omega$ + 20 Ω	HP 3458A, opt 002
Electrical Calibration of mV Thermocouple Sources ³ –			
Type J	-210 °C to 760 °C	0.14 °C	HP 3458A and Kaye Ice Point
Type K	-270 °C to 1372 °C	0.16 °C	
Type N	-270 °C to 1300 °C	0.15 °C	
Type R	-50 °C to 1767 °C	0.35 °C	
Type S	-50 °C to 1767 °C	0.35 °C	
Type T	-270 °C to 400 °C	0.23 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators ³ – Type J Type K Type N Type R Type S Type T	-210 °C to 760 °C -270 °C to 1372 °C -270 °C to 1300 °C -50 °C to 1767 °C -50 °C to 1767 °C -270 °C to 400 °C	0.16 °C 0.16 °C 0.19 °C 0.31 °C 0.31 °C 0.18 °C	Fluke 5520A and Kaye Ice Point
Electrical Calibration of RTD Indicators ³ – Pt 385, 100 Ω Pt 385, 200 Ω Pt 385, 500 Ω Pt 385, 1 kΩ Pt 3916, 100 Ω Pt 3926, 100 Ω PtNi 385, 120 Ω	-200 °C to 800 °C -200 °C to 630 °C -200 °C to 630 °C -200 °C to 630 °C -200 °C to 630 °C -200 °C to 630 °C -80 °C to 260 °C	0.30 °C 0.22 °C 0.16 °C 0.30 °C 0.30 °C 0.17 °C 0.17 °C	Fluke 5520A

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Measure ³ (0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 700) V	40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz 40 Hz to 1 kHz	0.013 % + 4 μV 0.02 % + 2 μV 0.039 % + 2 μV 0.012 % + 20 μV 0.02 % + 20 μV 0.038 % + 20 μV 0.011 % + 200 μV 0.02 % + 200 μV 0.038 % + 200 μV 0.026 % + 2 mV 0.026 % + 2 mV 0.044 % + 2 mV 0.049 % + 20 mV	HP 3458A, opt 002, synchronous sub-sampled mode

Parameter/Range	Frequency	CMC ^{2, 4, 5} (\pm)	Comments
AC Voltage – Generate ³			
(0 to 330) mV	45 Hz to 10 kHz (1 to 20) kHz (20 to 50) kHz	0.021 % + 8 μ V 0.023 % + 8 μ V 0.045 % + 8 μ V	Fluke 5520A
330 mV to 3.3 V	45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz	0.02 % + 60 μ V 0.025 % + 60 μ V 0.038 % + 60 μ V	
(3.3 to 33) V	45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz	0.021 % + 600 μ V 0.031 % + 600 μ V 0.044 % + 600 μ V	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz	0.024 % + 6 mV 0.024 % + 6 mV 0.032 % + 6 mV 0.043 % + 6 mV	
(330 to 1000) V	(45 to 999) Hz (1 to 5) kHz	0.037 % +10 mV 0.031 % +10 mV	
AC Current – Measure ³			
(0 to 100) μ A	45 Hz to 1 kHz	0.12 % + 0.03 μ A	HP 3458A, opt 002
100 μ A to 1 mA	(45 to 100) Hz 100 Hz to 5 kHz	0.12 % + 0.2 μ A 0.06 % + 0.2 μ A	
(1 to 10) mA	(45 to 100) Hz 100 Hz to 5 kHz	0.12 % + 2 μ A 0.06 % + 2 μ A	
(10 to 100) mA	(45 to 100) Hz 100 Hz to 5 kHz	0.12 % + 20 μ A 0.06 % + 20 μ A	
100 mA to 1 A	(45 to 100) Hz 100 Hz to 5 kHz	0.12 % + 200 μ A 0.15 % + 200 μ A	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current – Generate ³			
(0 to 330) μA	45 Hz to 1 kHz	0.19 % + 0.1 μA	Fluke 5520A
(0.3 to 3.3) mA	45 Hz to 1 kHz	0.13 % + 0.15 μA	
(3.3 to 33) mA	45 Hz to 1 kHz	0.057 % + 2 μA	
(33 to 330) mA	45 Hz to 1 kHz	0.057 % + 20 μA	
330 mA to 1 A	45 Hz to 1 kHz	0.071 % + 100 μA	
(1 to 3) A	45 Hz to 1 kHz	0.076 % + 100 μA	
(3 to 11) A	(45 to 100) Hz	0.095 % + 2 mA	
	100 Hz to 1 kHz	0.15 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz	0.17 % + 5 mA	
	100 Hz to 1 kHz	0.21 % + 5 mA	

II. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Thermocouples and Extension Wires for Furnaces & Ovens	400 °F 700 °F 1000 °F 1400 °F 1600 °F 1900 °F 2200 °F	2.5 °F 2.5 °F 3.0 °F 3.6 °F 4.0 °F 5.1 °F 7.3 °F	Hart 1560 scanner, Lindberg tube oven
Ovens –			ASTM E145 Testing
Ventilation Rate	(50 to 200) air changes/hr	3.0 % exchanges/hr	
Temperature	(20 to 500) °C	0.7 °C	Digital Survey Recorder
Time Constant	(10 to 660) sec	0.05 sec	Stop Watch

¹ This laboratory offers commercial and field calibration service.

- ² Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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 and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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 The measurands stated are generated with the Fluke 5520A. This capability is suited for the calibration of the devices intended to measure the stated measurand in the ranges indicated. Calibration and Measurement Capability (CMC) are expressed as either a specific value that covers the full range or as a combination of the percent or portion 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 stated measurand in the ranges indicated. Calibration and Measurement Capability (CMC) are expressed as either a specific value that covers the full range or as a combination of the percent or portion of the reading plus a fixed floor specification.



World Class Accreditation

The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

CONRAD KACSIK INSTRUMENT SYSTEMS, INC.

Solon, OH

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. 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 8 January 2009*).

Presented this 7th day of May 2010.





Peter Meyer

President & CEO
For the Accreditation Council
Certificate Number 1385.01
Valid to February 29, 2012
Revised December 29, 2011

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