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

METROLOGY MANAGEMENT
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CALIBRATION

Valid To: October 31, 2012 Certificate Number: 3060.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1]:

I. Electrical – DC/Low Voltage

Parameter/Equipment	Range	CMC[2, 3, 4] (±)	Comments
DC Voltage – Generate	(0 to 0.33) V (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1000) V	70 µV/V + 3.5 µV 58 µV/V + 5.8 µV 59 µV/V + 58 µV 66 µV/V + 0.58 mV 66 µV/V + 1.5 mV	Fluke 5500A
DC Voltage – Measure	(0 to 0.1) V (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	17 µV/V + 9.0 µV 13 µV/V + 8.0 µV 13 µV/V + 10 µV 15 µV/V + 0.1 mV 16 µV/V + 1.0 mV	HP 3458
DC Current – Measure	(0 to 0.1) µA 0.1 µA to 0.01 A (0.01 to 1) A	48 µA/A + 0.093 µA 25 µA/A + 0.093 µA 0.014 % + 0.093 µA	HP 3458

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Parameter/Equipment	Range	CMC[2, 3] (±)	Comments
DC Current – Generate	(0 to 3.3) mA (3.3 to 330) mA 330 mA to 2.2 A (2.2 to 11) A	0.016 % + 0.05 µA 0.013 % + 3.3 µA 0.035 % + 44 µA 0.078 % + 0.33 mA	Fluke 5500A

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Measure			
(0 to 0.01) 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	1.8 % + 3.0 µV 0.092 % + 1.1 µV 0.089 % + 1.1 µV 0.15 % + 1.1 µV 0.28 % + 1.1 µV 4.7 % + 2 µV	HP 3458
(0.01 to 0.1) 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 300 kHz to 1 MHz (1 to 2) MHz	0.054 % + 2 µV 0.054 % + 2 µV 0.053 % + 2 µV 0.064 % + 2 µV 0.12 % + 2 µV 0.42 % + 10 µV 1.5 % + 10 µV 1.8 % + 10 µV	
(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 300 kHz to 1 MHz (1 to 2) MHz	0.055 % + 10 µV 0.054 % + 20 µV 0.057 % + 20 µV 0.068 % + 20 µV 0.11 % + 20 µV 0.36 % + 10 µV 1.2 % + 100 µV 1.8 % + 100 µV	
(1 to 10) V	(1 to 40) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.063 % + 100 µV 0.058 % + 20 µV 0.059 % + 20 µV 0.064 % + 20 µV 0.12 % + 20 µV 0.36 % + 10 µV 1.3 % + 100 µV 1.3 % + 10 mV	

Parameter/Range	Frequency	CMC[2, 3, 4] (±)	Comments
AC Voltage – Measure (cont)			
(10 to 100) V	(1 to 40) Hz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	0.078 % + 20 µV 0.077 % + 20 µV 0.07 % + 20 µV 0.12 % + 2 mV 0.36 % + 2 mV 1.2 % + 10 mV	HP 3458
(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 (100 to 300) kHz 300 kHz to 1 MHz	0.074 % + 40 µV 0.058 % + 20 µV 0.06 % + 20 µV 0.064 % + 2 mV 0.11 % + 2 mV 0.36 % + 2 mV 1.2 % + 10 mV	
AC Voltage – Generate			
(1 to 33) mV	(1 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.1 % + 24 µV 0.2 % + 24 µV 0.25 % + 24 µV 0.32 % + 24 µV 0.22 % + 33 µV 1.2 % + 70 µV	Fluke 5500A
(33 to 330) mV	(1 to 45) Hz 40 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.55 % + 58 µV 0.066 % + 24 µV 0.14 % + 24 µV 0.2 % + 47 µV 0.29 % + 0.2 mV 0.82 % + 0.39 mV	
330 mV to 3.3 V	(1 to 45) Hz 40 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.5 % + 290 µV 0.065 % + 70 µV 0.11 % + 70 µV 0.18 % + 350 µV 0.29 % + 2 mV 0.59 % + 3.9 mV	
(3.3 to 33) V	(1 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.19 % + 2.9 mV 0.072 % + 0.7 mV 0.12 % + 3.1 mV 0.23 % + 5.8 mV 0.29 % + 20 mV	

Parameter/Range	Frequency	CMC[2, 3, 4] (±)	Comments
AC Voltage – Generate (cont)			
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.08 % + 77 mV 0.08 % + 15 mV 0.11 % + 33 mV	Fluke 5500A
(330 to 1000) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.082 % + 93 mV 0.24 % + 0.12 V 0.24 % + 0.58 V	
AC Current – Measure			
(0 to 0.1) mA	(10 to 20) Hz (40 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (10 to 20) kHz	0.47 % + 0.03 µA 0.18 % + 0.03 µA 0.082 % + 0.03 µA 0.091 % + 0.03 µA 0.47 % + 0.02 µA	HP 3458
0.1 mA to 0.1 A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 100) kHz	0.47 % + 0.02 µA 0.19% + 0.02 µA 0.11 % + 0.02 µA 0.048 % + 0.02 µA 0.14 % + 0.02 µA 0.68 % + 0.15 µA	
(0.1 to 1) A	(20 to 40) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	0.2 % + 0.02 µA 0.11 % + 0.02 µA 0.18 % + 0.02 µA 0.8 % + 0.02 µA 1.4 % + 0.04 µA	
AC Current – Generate			
(0.03 to 0.33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.55 % + 0.15 µA 0.23 % + 0.15 µA 0.18 % + 0.25 µA 0.47 % + 0.15 µA 1.5 % + 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	0.24 % + 0.3 µA 0.16 % + 0.3 µA 0.35 % + 0.3 µA 0.12 % + 0.3 µA 0.58 % + 0.3 µA	

Parameter/Range	Frequency	CMC[2, 3] (±)	Comments
AC Current – Generate (cont)			
(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	0.24 % + 3 µA 0.12 % + 3 µA 0.11 % + 3 µA 0.24 % + 3 µA 0.7 % + 3 µA	Fluke 5500A
33 mA to 0.33 A	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.24 % + 30 µA 0.24 % + 30 µA 0.11 % + 30 µA 0.24 % + 30 µA 0.7 % + 30 µA	
(0.33 to 2.2) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.24 % + 0.3 mA 0.12 % + 0.3 mA 0.87 % + 0.3 mA	
(2.2 to 11) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.12 % + 2 mA 0.15 % + 2 mA 0.4 % + 2 mA	

Parameter/Equipment	Range	CMC[2, 3] (±)	Comments
Capacitance – Generate			
@ 1 kHz	(0.33 to 33) nF (33 to 330) nF 330 nF to 1.1 mF	0.47 % + 0.1 nF 0.31 % + 0.3 nF 0.47 % + 0.3 µF	Fluke 5500A
Resistance – Generate	(1 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ 330 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ	0.015 % + 0.01 Ω 0.014 % + 0.015 Ω 0.011 % + 0.015 Ω 0.011 % + 0.015 Ω 0.011 % + 0.06 Ω 0.052 % + 0.06 Ω 0.011 % + 0.6 Ω 0.011 % + 0.6 Ω 0.013 % + 6 Ω 0.014 % + 6 Ω 0.018 % + 55 Ω 0.053 % + 55 Ω	Fluke 5500A

Parameter/Equipment	Range	CMC[2, 3, 4] (±)	Comments
Resistance – Generate (cont)	(3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ	0.07 % + 0.55 kΩ 0.15 % + 0.55 kΩ 0.58 % + 5.5 kΩ 0.58 % + 17 kΩ	Fluke 5500A
Resistance – Measure	(0 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	74 μΩ/Ω + 10 μΩ 63 μΩ/Ω + 0.1 mΩ 55 μΩ/Ω + 1.0 mΩ 39 μΩ/Ω + 10 mΩ 39 μΩ/Ω + 0.1 Ω 0.052 % + 1.0 Ω 0.022 % + 20 Ω 0.19 % + 0.2 kΩ 1.9 % + 2.0 kΩ	HP 3458
Electrical Calibration of Thermocouple Indicating Devices –			
Type K	(-200 to -100) °C (-100 to 1000) °C (1000 to 1325) °C	0.46 °C 0.31 °C 0.47 °C	Fluke 5500A
Type J	(-210 to -100) °C (-100 to 760) °C (760 to 1200) °C	0.39 °C 0.27 °C 0.22 °C	
Type R	(0 to 250) °C (250 to 1000) °C (1000 to 1767) °C	0.61 °C 0.33 °C 0.22 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1767) °C	0.60 °C 0.35 °C 0.22 °C	
Type T	(-250 to -150) °C (-150 to 1) °C (0 to 400) °C	0.60 °C 0.62 °C 0.14 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Calibration of RTD Indicating Devices –			
Type RDT PT-3926	(-200 to -80) °C (-80 to 400) °C (400 to 630) °C	0.26 °C 0.10 °C 0.12 °C	Fluke 5500A
Type RDT PT-3916	(-200 to -80) °C (-80 to 400) °C (400 to 630) °C	0.56 °C 0.10 °C 0.30 °C	

[1] This laboratory offers commercial 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] The measurands stated are generated with the Fluke 5500A series of instruments. 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.

[4] The measurands stated are measured with the HP 3458. 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.

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

METROLOGY MANAGEMENT

Palm Bay, FL

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 4th day of August 2010.

President & CEO
For the Accreditation Council
Certificate Number 3060.01
Valid to October 31, 2012

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