



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

CONTROLS SERVICE, INC.
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CALIBRATION

Valid To: July 31, 2019

Certificate Number: 1740.01

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} (±)	Comments
DC Voltage – Generate	(-20 to 200) mV (-0.2 to 2) V (-2 to 20) V (-11 to 11) V	0.0094 mV 0.00013 V 0.0013 V 0.00039 V	Eurotron MicroCal 2000+ Ectron 1140A
DC Voltage – Generate ³	(0 to 110) mV (0.11 to 1.1) V (1.1 to 15) V	0.011 % + 6 µV 0.018 % + 55 µV 0.011 % + 0.75 mV	Fluke 74x calibrator
DC Voltage – Measure	(-20 to 200) mV (-0.2 to 2) V (-2 to 20) V (-11 to 11) V	0.0096 mV 0.00014 V 0.0013 V 0.00039 V	Eurotron MicroCal 2000+ Ectron 1140A
DC Voltage – Measure ³	(0 to 110) mV (0.11 to 1.1) V (1.1 to 11) V (11 to 110) V (110 to 300) V	0.026 % + 17 µV 0.03 % + 55 µV 0.026 % + 0.55 mV 0.051 % + 6 mV 0.051 % + 15 mV	Fluke 74x calibrator
DC Current – Generate	(0 to 50) mA	0.0041 mA	Eurotron MicroCal 2000+

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
DC Current – Generate ³ Source Simulate	(0 to 22) mA (0 to 22) mA	0.015 % + 4 μA 0.02 % + 7 μA	Fluke 74x calibrator
DC Current – Measure	(-5 to 50) mA	0.0042 mA	Eurotron MicroCal 2000+
DC Current – Measure ³	(0 to 30) mA (30 to 110) mA	0.013 % + 5 μA 0.018 % + 17 μA	Fluke 74x calibrator
Resistance – Generate	(0 to 500) Ω (0 to 5) kΩ	0.044 Ω 0.44 Ω	Eurotron MicroCal 2000+
Resistance – Generate ³	(0 to 11) Ω (11 to 110) Ω (0.11 to 1.1) kΩ (1.1 to 11) kΩ	0.023 % + 0.02 Ω 0.018 % + 0.04 Ω 0.025 % + 0.5 Ω 0.031 % + 5 Ω	Fluke 74x calibrator
Resistance – Generate ³	(20 to 1121.1) Ω	0.021 %	General resistance decade box
Resistance – Measure	(0 to 500) Ω (0 to 5) kΩ	0.045 Ω 0.45 Ω	Eurotron MicroCal 2000+
Resistance – Measure ³	(0 to 11) Ω (11 to 110) Ω (0.11 to 1.1) kΩ (1.1 to 11) kΩ	0.055 % + 0.05 Ω 0.053 % + 0.05 Ω 0.053 % + 0.5 Ω 0.1 % + 10 Ω	Fluke 74x calibrator
Electrical Calibration of Thermocouples – Measure			
Type N	(-70 to 1300) °C	0.19 °C	Ectron 1140A
Type J	(-50 to 1200) °C	0.15 °C	
Type K	(-55 to 1372) °C	0.15 °C	
Type T	(-210 to 400) °C	0.26 °C	
Type S	(105 to 1768) °C	0.41 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouples – Measure (cont)			
Type R	(160 to 1768) °C	0.38 °C	Ectron 1140A
Type E	(-100 to 815) °C	0.17 °C	
Electrical Calibration of Thermocouples – Measure ³			
Type E	(-200 to -100) °C (-100 to 600) °C (600 to 1000) °C	0.8 °C 0.6 °C 0.7 °C	Fluke 74x calibrator
Type N	(-100 to 900) °C (900 to 1300) °C	0.8 °C 0.9 °C	
Type J	(-100 to 800) °C (800 to 1200) °C	0.6 °C 0.8 °C	
Type K	(-100 to 400) °C (400 to 1200) °C (1200 to 1372) °C	0.6 °C 0.8 °C 1 °C	
Type T	(-200 to 0) °C (0 to 400) °C	0.9 °C 0.6 °C	
Type B	(800 to 1000) °C (1000 to 1820) °C	1.3 °C 1.2 °C	
Type R	(0 to 100) °C (100 to 1767) °C	1.8 °C 1.3 °C	
Type S	(0 to 200) °C (200 to 1400) °C (1400 to 1767) °C	1.8 °C 1.2 °C 1.4 °C	
Type C	(0 to 800) °C (800 to 1200) °C (1200 to 1800) °C (1800 to 2316) °C	0.9 °C 1.1 °C 1.4 °C 2.3 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators –			
Type N	(-70 to 1300) °C	0.19 °C	Ectron 1140A
Type J	(-50 to 1200) °C	0.15 °C	
Type K	(-55 to 1372) °C	0.15 °C	
Type T	(-210 to 400) °C	0.26 °C	
Type S	(105 to 1768) °C	0.41 °C	
Type R	(160 to 1768) °C	0.38 °C	
Type E	(-100 to 815) °C	0.17 °C	
Electrical Calibration of Thermocouple Indicators ³ –			
Type E	(-200 to 600) °C (600 to 1000) °C	0.6 °C 0.5 °C	Fluke 74x calibrator
Type N	(-100 to 900) °C (900 to 1300) °C	0.8 °C 0.6 °C	
Type J	(-100 to 1200) °C	0.5 °C	
Type K	(-100 to 1372) °C	0.6 °C	
Type T	(-200 to 0) °C (0 to 400) °C	0.7 °C 0.6 °C	
Type B	(800 to 1820) °C	1.1 °C	
Type R	(0 to 100) °C (100 to 1767) °C	1.4 °C 1.2 °C	
Type S	(0 to 200) °C (200 to 1400) °C (1400 to 1767) °C	1.4 °C 1.2 °C 1.3 °C	
Type C	(0 to 800) °C (800 to 1200) °C (1200 to 1800) °C (1800 to 2316) °C	0.9 °C 1 °C 1.2 °C 1.6 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTDs – Measure			
100 Ω, Pt (3926)	(-200 to 850) °C	0.15 °C	Eurotron MicroCal 2000+
100 Ω, Pt (385)	(-200 to 850) °C	0.15 °C	
100 Ω, Pt (3916)	(-200 to 600) °C	0.15 °C	
Electrical Calibration of RTDs – Measure ³			
100 Ω, Pt (3926)	(-200 to 630) °C	1 °C	Fluke 74x calibrator
100 Ω, Pt (385)	(-200 to 0) °C (0 to 400) °C (400 to 800) °C	0.8 °C 1 °C 1.3 °C	
100 Ω, Pt (3916)	(-200 to 630) °C	1 °C	
Electrical Calibration of RTD Indicators –			
100 Ω, Pt (3926)	(-200 to 850) °C	0.14 °C	Eurotron MicroCal 2000+
100 Ω, Pt (385)	(-200 to 850) °C	0.14 °C	
100 Ω, Pt (3916)	(-200 to 600) °C	0.14 °C	
Electrical Calibration of RTD Indicators ³ –			
100 Ω, Pt (3926)	(-200 to 630) °C	0.7 °C	Fluke 74x calibrator
100 Ω, Pt (385)	(-200 to 0) °C (0 to 400) °C (400 to 800) °C	0.6 °C 0.7 °C 0.9 °C	
100 Ω, Pt (3916)	(-200 to 630) °C	0.8 °C	

II. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure – Measure ³	(0 to 1000) psi	0.7 psi	GE druck gage
	(0 to 10) inH ₂ O	0.07 inH ₂ O	Dwyer manometer
	(0 to 200) inH ₂ O	0.7 inH ₂ O	Meriam manometer

III. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature – Measure PRT	(-40 to 204) °C	0.19 °C	Keithley w/PRT
Temperature –Measure ³ Type J	(0 to 800) °C	1.4 °C	Fluke 74X w/ SLE T/C
Type K	(0 to 1200) °C	1.6 °C	Fluke 74X w/ SLE T/C
Type N	(0 to 1200) °C	1.6 °C	Fluke 74X w/ SLE T/C
Type T	(-196 to 260) °C	1.3 °C	Fluke 74X w/ SLE T/C
PRT	(-40 to 204) °C	0.6 °C	Fluke 74X w/PRT
Temp/RH Meter	(-30 to 120) °C	0.54 °C	Vaisala temp/RH meter
Thermal Processing Equipment ³ – System Accuracy Test (SAT)	(0 to 800) °C	1.4 °C	(AMS2750 and AIAG CQI-9, CQI-11, CQI-12) Fluke 74X w/ SLE T/C
Type J	(0 to 1200) °C	1.6 °C	Fluke 74X w/ SLE T/C
Type K	(0 to 1200) °C	1.6 °C	Fluke 74X w/ SLE T/C
Type N	(-196 to 260) °C	1.3 °C	Fluke 74X w/ SLE T/C
Type T	(-40 to 204) °C	0.6 °C	Fluke 74X w/PRT

Parameter/Equipment	Range	CMC ² (±)	Comments
Thermal Processing Equipment – Temperature Uniformity Surveys (TUS) ³			(AMS2750 and AIAG CQI-9, CQI-11, CQI-12)
Type J	(38 to 815) °C	1.5 °C	Datalogger/recorder w/ SLE T/C's
Type K	(38 to 1260) °C	1.6 °C	
Type N	(38 to 1260) °C	1.6 °C	
Type T	(-185 to 38) °C	1.2 °C	
Relative Humidity – Controllers, Indicators, Recorders and Transmitters ³	(11 to 90) % RH (90 to 95) % RH	1.9 % RH 2.4 % RH	Vaisala humidity calibrator

¹ This laboratory offers commercial and field 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 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 Fluke 74X series calibrator CMCs are read as percent of reading plus percent of full scale or floor specification where appropriate.



Accredited Laboratory

A2LA has accredited

CONTROLS SERVICE, INC.

Livonia, MI

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/NCSLI 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 8 January 2009).



Presented this 13th day of June 2017.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 1740.01
Valid to July 31, 2019

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