



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

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CALIBRATION

Valid To: November 30, 2026

Certificate Number: 2260.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with R205 – A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations^{1,7}

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4,9} (±)	Comments
DC Power – Generate ³ 33 mV to 1020 V (0.33 to 330) mA (0.33 to 3) A (3 to 20.5) A	11 µW to 336 W 11 mW to 3.06 kW 99 mW to 20.9 kW	0.035 % 0.037 % 0.058 %	Multifunction calibrator
DC Voltage – Measure ³	Up to 200 mV (0.2 to 2) V (>2 to 20) V (>20 to 200) V (>200 to 1050) V	5.0 µV/V + 0.2 µV 3.3 µV/V + 0.9 µV 3.8 µV/V + 5.6 µV 5.5 µV/V + 56 µV 5.7 µV/V + 0.63 mV	Reference DMM
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 1020) V	15 µV/V + 0.7 µV 8.1 µV/V + 1.7 µV 8.1 µV/V + 17 µV 12 µV/V + 0.21 mV 13 µV/V + 1.6 mV	Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2, 4, 9} (\pm)	Comments
DC Voltage – Measure ³ – High Voltage	(1 to 10) kV	0.036 % + 0.05 V	Precision high voltage meter
DC Current – Measure ³	Up to 200 μ A >200 μ A to 2 mA (>2 to 20) mA (>20 to 200) mA >200 mA to 2 A (>2 to 20) A (>20 to 30) A	13 μ A/A + 0.4 μ A 13 μ A/A + 4 μ A 14 μ A/A + 4 μ A 48 μ A/A + 8 μ A 190 μ A/A + 17 μ A 400 μ A/A + 400 μ A 0.06 % + 41 μ A	Reference DMM
DC Current – Generate ³	Up to 330 μ A 330 μ A to 3.3 mA (>3.3 to 33) mA (>33 to 330) mA >330 mA to 1.1 A (>1.1 to 3) A (>3 to 11) A (>11 to 20.5) A	0.01 % + 14 nA 0.0076 % + 37 nA 0.0073 % + 19 nA 0.0073 % + 2 μ A 0.014 % + 34 μ A 0.025 % + 41 μ A 0.035 % + 350 μ A 0.07 % + 510 μ A	Multifunction calibrator
Clamp-On ³ Wound Type Hall Effect Type	Up to 41 A (2 Turn) Up to 205A (10 Turn) Up to 1025A (50 Turn) Up to 41 A (2 Turn) Up to 205A (10 Turn) Up to 1025A (50 Turn)	0.42 % + 9 mA 0.5 % + 12 mA 0.3 % + 36 mA 0.56 % + 80 mA 0.7 % + 130 mA 0.64 % + 0.24 A	DC standard/coil
Resistance – Measure ^{3,5}	10 μ Ω to 7 m Ω 7 m Ω to 2 Ω (>2 to 20) Ω (>20 to 200) Ω >200 Ω to 2 k Ω (>2 to 20) k Ω (>20 to 200) k Ω >200 k Ω to 2 M Ω (>2 to 20) M Ω (>20 to 200) M Ω >200 M Ω to 2 G Ω (>2 to 20) G Ω	0.06 % 17 μ Ω / Ω + 4 μ Ω 9.5 μ Ω / Ω + 14 μ Ω 8.1 μ Ω / Ω + 50 μ Ω 8.1 μ Ω / Ω + 0.5 m Ω 8.0 μ Ω / Ω + 5.1 m Ω 8.1 μ Ω / Ω + 50 m Ω 9.5 μ Ω / Ω + 1 Ω 17 μ Ω / Ω + 10 Ω 65 μ Ω / Ω + 1 k Ω 180 μ Ω / Ω + 100 k Ω 1.5 m Ω / Ω + 10 M Ω	Reference DMM Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2,4,9} (\pm)	Comments
Resistance – Generate ^{3,5}	(0 to 11) Ω (>11 to 33) Ω (>33 to 110) Ω (>110 to 330) Ω >330 Ω to 1.1 k 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 k Ω to 1.1 M 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 >330 M Ω to 1.1 G Ω	30 $\mu\Omega/\Omega$ + 0.7 $\mu\Omega$ 20 $\mu\Omega/\Omega$ + 1.0 m Ω 19 $\mu\Omega/\Omega$ + 0.94 m Ω 19 $\mu\Omega/\Omega$ + 1.3 m Ω 20 $\mu\Omega/\Omega$ + 1.2 m Ω 19 $\mu\Omega/\Omega$ + 14 m Ω 19 $\mu\Omega/\Omega$ + 14 m Ω 19 $\mu\Omega/\Omega$ + 0.14 Ω 19 $\mu\Omega/\Omega$ + 0.15 Ω 22 $\mu\Omega/\Omega$ + 1.3 Ω 22 $\mu\Omega/\Omega$ + 1.4 Ω 49 $\mu\Omega/\Omega$ + 21 Ω 100 $\mu\Omega/\Omega$ + 35 Ω 170 $\mu\Omega/\Omega$ + 1.7 k Ω 340 $\mu\Omega/\Omega$ + 2.2 k Ω 2.5 m Ω/Ω + 66 k Ω 10 m Ω/Ω + 370 k Ω	Multifunction calibrator
Fixed Points	1 Ω 25 Ω 100 Ω 200 Ω 400 Ω 4 k Ω 10 k Ω 40 k Ω 100 k Ω 500 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω 10 G Ω 100 G Ω 1 T Ω	1 $\mu\Omega/\Omega$ 0.64 $\mu\Omega/\Omega$ 0.52 $\mu\Omega/\Omega$ 2.3 $\mu\Omega/\Omega$ 2 $\mu\Omega/\Omega$ 2 $\mu\Omega/\Omega$ 0.68 $\mu\Omega/\Omega$ 3.1 $\mu\Omega/\Omega$ 3.2 $\mu\Omega/\Omega$ 4.4 $\mu\Omega/\Omega$ 0.11 % 0.017 % 0.016 % 0.024 % 0.24 % 0.55 % 1.2 %	Resistance fixed points

Parameter/Range	Frequency	CMC ^{2,9} (±)	Comments
AC Voltage – Measure ³			
Up to 200 mV	(1 to 10) Hz (>10 to 40) Hz (>40 to 100) Hz >100 Hz to 2 kHz (>2 to 10) kHz (>10 to 30) kHz (>30 to 100) kHz	170 μV/V + 14 μV 150 μV/V + 4 μV 130 μV/V + 4 μV 110 μV/V + 3 μV 140 μV/V + 4.5 μV 340 μV/V + 8.6 μV 770 μV/V + 20 μV	Reference DMM
200 mV to 2 V	(1 to 10) Hz (>10 to 40) Hz (>40 to 100) Hz >100 Hz to 2 kHz (>2 to 10) kHz (>10 to 30) kHz (>30 to 100) kHz (>100 to 300) kHz >300 kHz to 1 MHz	150 μV/V + 130 μV 130 μV/V + 20 μV 95 μV/V + 21 μV 78 μV/V + 21 μV 110 μV/V + 21 μV 220 μV/V + 41 μV 580 μV/V + 200 μV 0.3 % + 2 mV 1 % + 20 mV	
(2 to 20) V	(1 to 10) Hz (>10 to 40) Hz (>40 to 100) Hz >100 Hz to 2 kHz (>2 to 10) kHz (>10 to 30) kHz (>30 to 100) kHz (>100 to 300) kHz >300 kHz to 1 MHz	160 μV/V + 1.2 mV 130 μV/V + 0.2 mV 95 μV/V + 0.2 mV 78 μV/V + 0.2 mV 110 μV/V + 0.21 mV 220 μV/V + 0.4 mV 580 μV/V + 2 mV 0.3 % + 20 mV 1 % + 200 mV	
(20 to 200) V	(1 to 10) Hz (>10 to 40) Hz (>40 to 100) Hz >100 Hz to 2 kHz (>2 to 10) kHz (>10 to 30) kHz (>30 to 100) kHz (>100 to 300) kHz >300 kHz to 1 MHz	160 μV/V + 12 mV 130 μV/V + 2 mV 97 μV/V + 2 mV 83 μV/V + 2 mV 120 μV/V + 2 mV 230 μV/V + 4 mV 580 μV/V + 20 mV 0.3 % + 0.2 V 1 % + 2 V	

Parameter/Range	Frequency	CMC ^{2,9} (±)	Comments
AC Voltage – Measure ³ (cont) (200 to 1050) V	(1 to 10) Hz (>10 to 40) Hz >40 Hz to 10 kHz (>10 to 30) kHz (>30 to 100) kHz	160 μV/V + 72 mV 130 μV/V + 20 mV 130 μV/V + 20 mV 240 μV/V + 34 mV 650 μV/V + 180 mV	Reference DMM
AC Voltage – Measure ³ , High Voltage (1 to 10) kV	(30 to 200) Hz (>200 to 450) Hz	0.14 % + 0.09 V 0.46 % + 0.16 V	Precision high-voltage meter
AC Voltage – Generate ³ (1 to 33) mV (33 to 330) mV (0.33 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 (>100 to 500) kHz (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 (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	530 μV/V + 4.2 μV 110 μV/V + 4.3 μV 140 μV/V + 4.3 μV 670 μV/V + 4.3 μV 2.3 mV/V + 8.2 μV 5.5 mV/V + 33 μV 200 μV/V + 6 μV 99 μV/V + 6.5 μV 110 μV/V + 6.5 μV 240 μV/V + 6.1 μV 540 μV/V + 22 μV 1.4 mV/V + 46 μV 200 μV/V + 35 μV 100 μV/V + 44 μV 130 μV/V + 43 μV 200 μV/V + 36 μV 470 μV/V + 83 μV 1.6 mV/V + 400 μV	Multifunction calibrator

Parameter/Range	Frequency	CMC ^{2,4,9} (\pm)	Comments
AC Voltage – Generate ³ (cont)			
(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	200 μ V/V + 450 μ V 100 μ V/V + 420 μ V 160 μ V/V + 420 μ V 240 μ V/V + 410 μ V 610 μ V/V + 1.1 mV	Multifunction calibrator
(33 to 330) V	45 Hz to 1 kHz (>1 to 10) kHz (>10 to 20) kHz (>20 to 50) kHz (>50 to 100) kHz	130 μ V/V + 2 mV 140 μ V/V + 4.5 mV 170 μ V/V + 4.5 mV 220 μ V/V + 3.8 mV 1.3 mV/V + 33 mV	
(330 to 1020) V	45 Hz to 1 kHz (>1 to 5) kHz (>5 to 10) kHz	200 μ V/V + 7.1 mV 170 μ V/V + 7.2 mV 250 μ V/V + 6.5 mV	
AC Current – Measure ³			
Up to 200 μ A	(1 to 10) Hz >10 Hz to 10 kHz (>10 to 30) kHz (>30 to 100) kHz	510 μ A/A + 20 nA 510 μ A/A + 20 nA 710 μ A/A + 20 nA 0.4 % + 20 nA	Reference DMM
200 μ A to 2 mA	(1 to 10) Hz >10 Hz to 10 kHz (>10 to 30) kHz (>30 to 100) kHz	320 μ A/A + 200 nA 310 μ A/A + 200 nA 720 μ A/A + 200 nA 0.4 % + 200 nA	
(2 to 20) mA	(1 to 10) Hz >10 Hz to 10 kHz (>10 to 30) kHz (>30 to 100) kHz	320 μ A/A + 2 μ A 310 μ A/A + 2 μ A 720 μ A/A + 2 μ A 0.4 % + 2 μ A	
(20 to 200) mA	(1 to 10) Hz >10 Hz to 10 kHz (>10 to 30) kHz	320 μ A/A + 20 μ A 300 μ A/A + 20 μ A 630 μ A/A + 20 μ A	
200 mA to 2 A	10 Hz to 2 kHz (>2 to 10) kHz (>10 to 30) kHz	620 μ A/A + 200 μ A 740 μ A/A + 200 μ A 0.3 % + 200 μ A	
(2 to 20) A	10 Hz to 2 kHz (>2 to 10) kHz	830 μ A/A + 2 mA 0.25 % + 2 mA	
(20 to 30) A	40 Hz to 2 kHz	0.12 %	

Parameter/Range	Frequency	CMC ^{2,9} (\pm)	Comments
AC Current – Generate ³			
(29 to 330) μ A	(10 to 20) Hz (>20 to 45) Hz >45 Hz to 1 kHz (>1 to 5) kHz (>5 to 10) kHz (>10 to 30) kHz	0.13 % + 0.073 μ A 0.1 % + 0.073 μ A 0.083 % + 0.074 μ A 0.2 % + 0.1 μ A 0.54 % + 0.15 μ A 1.2 % + 0.25 μ A	Multifunction calibrator
(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 (>10 to 30) kHz	0.13 % + 0.11 μ A 0.083 % + 0.12 μ A 0.067 % + 0.12 μ A 0.13 % + 0.21 μ A 0.33 % + 0.21 μ A 0.67 % + 0.41 μ A	
(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 (>10 to 30) kHz	0.12 % + 1.5 μ A 0.06 % + 1.7 μ A 0.025 % + 1.8 μ A 0.052 % + 1.7 μ A 0.13 % + 2.2 μ A 0.27 % + 2.7 μ A	
(33 to 330) mA	(10 to 20) Hz (>20 to 45) Hz >45 Hz to 1 kHz (1 to 5) kHz (>5 to 10) kHz (>10 to 30) kHz	0.12 % + 16 μ A 0.059 % + 17 μ A 0.025 % + 19 μ A 0.066 % + 36 μ A 0.13 % + 68 μ A 0.27 % + 130 μ A	
(0.33 to 3) A	(10 to 45) Hz >45 Hz to 1 kHz (>1 to 5) kHz (>5 to 10) kHz	0.12 % + 87 μ A 0.04 % + 120 μ A 0.43 % + 590 μ A 1.7 % + 3400 μ A	
(3 to 11) A	(45 to 100) Hz >100 Hz to 1 kHz (>1 to 5) kHz	0.041 % + 1.4 mA 0.067 % + 1.4 mA 2 % + 1.3 mA	
(11 to 20.5) A	(45 to 100) Hz >100 Hz to 1 kHz (>1 to 5) kHz	0.1 % + 1.3 mA 0.12 % + 1 mA 2 % + 2.8 mA	
Clamp-On Only ³ Wound Type: Up to 41 A (2 Turn) Up to 205 A (10 Turn) Up to 1025 A (50 Turn)	(30 to 400) Hz	0.45 % + 11 mA 0.5 % + 12 mA 0.3 % + 70 mA	

Parameter/Range	Frequency	CMC ^{2,9} (±)	Comments
AC Current – Generate ³ (cont) Clamp-On Only ³ Hall effect Type Up to 41 A (2 Turn) Up to 205 A (10 Turn) Up to 1025 A (50 Turn)	(30 to 400) Hz	0.57 % + 82 mA 0.7 % + 130 mA 0.53 % + 0.48 A	Multifunction calibrator , AC standard/coil
Capacitance – Generate ³ (0.19 to 0.4) nF (>0.4 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 (0.33 to 1.1) mF (>1.1 to 3.3) mF (>3.3 to 11) mF (>11 to 33) mF (>33 to 110) mF	10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz Up to 50 Hz Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz	0.33 % + 6.9 pF 0.29 % + 7.1 pF 0.34 % + 6.7 pF 0.17 % + 6.6 pF 0.17 % + 6.5 pF 0.17 % + 6.4 pF 0.17 % + 19 pF 0.17 % + 75 pF 0.17 % + 2 nF 0.19 % + 5.5 nF 0.28 % + 20 nF 0.33 % + 51 nF 0.32 % + 190 nF 0.3 % + 0.77 μF 0.3 % + 2 μF 0.31 % + 6.4 μF 0.5 % + 20 μF 0.74 % + 67 μF	Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2,4,9} (±)	Comments
AC Power – Generate ³ PF = 1 @ (45 to 65) Hz (33 to 329.999) mV: (3.3 to 8.999) mA (9 to 32.999) mA (33 to 89.99) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A	(0.1 to 3) mW (0.3 to 10.9) mW (1.09 to 30) mW (3 to 109) mW (10.9 to 300) mW (30 to 726) mW	0.11 % 0.11 % 0.11 % 0.092 % 0.11 % 0.098 %	Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2,4,9} (±)	Comments
AC Power – Generate ³ (cont) PF = 1 @ (45 to 65) Hz (33 to 329.999) mV: (2.2 to 4.4999) A (4.5 to 20.5) A (0.33 to 1020) V: (3.3 to 8.999) mA (9 to 32.999) mA (33 to 89.999) mA (90 to 329.99) mA (0.33 to 0.8999) A (0.9 to 2.1999) A (2.2 to 4.4999) A (4.5 to 20.5) A	(0.072 to 1.49) W (0.148 to 6.77) W (0.001 to 9.18) W (0.003 to 33.7) W (0.01 to 91.8) W (0.03 to 337) W (0.1 to 918) W (0.3 to 2244) W (0.72 to 4590) W (1.49 to 20 910) W	0.11 % 0.097 % 0.10 % 0.086 % 0.11 % 0.089 % 0.098 % 0.095 % 0.11 % 0.092 %	Multifunction calibrator
Electrical Calibration of Thermocouples & Thermocouple Indicating Devices – Measure & Generate ³ Type B Type E Type J Type K	(600 to 800) °C (>800 to 1000) °C (>1000 to 1550) °C (>1550 to 1820) °C (-250 to -100) °C (>-100 to -25) °C (>-25 to 350) °C (>350 to 650) °C (>650 to 1000) °C (-210 to -100) °C (>-100 to -30) °C (>-30 to 150) °C (>150 to 760) °C (>760 to 1200) °C (-200 to -100) °C (>-100 to -25) °C (>-25 to 120) °C (>120 to 1000) °C (>1000 to 1372) °C	0.16 °C 0.1 °C 0.1 °C 0.1 °C 0.08 °C 0.08 °C 0.08 °C 0.08 °C 0.08 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C 0.07 °C	Multifunction calibrator, reference DMM, ice point

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouples & Thermocouple Indicating Devices – Measure & Generate ³ (cont)			
Type N	(-200 to -100) °C (>-100 to -25) °C (>-25 to 120) °C (>120 to 410) °C (>410 to 1300) °C	0.08 °C 0.08 °C 0.08 °C 0.08 °C 0.08 °C	Multifunction calibrator, reference DMM, ice point
Type R	(0 to 250) °C (>250 to 400) °C (>400 to 1000) °C (>1000 to 1767) °C	0.11 °C 0.11 °C 0.11 °C 0.11 °C	
Type S	(0 to 250) °C (>250 to 1000) °C (>1000 to 1400) °C (>1400 to 1767) °C	0.11 °C 0.11 °C 0.11 °C 0.11 °C	
Type T	(-250 to -150) °C (>-150 to 0) °C (>0 to 120) °C (>120 to 400) °C	0.09 °C 0.09 °C 0.09 °C 0.09 °C	
Electrical Calibration of RTD Indicating Devices – Generate ^{3,5}			
Pt 385, 100 Ω	(-200 to -80) °C (>-80 to 0) °C (>0 to 100) °C (>100 to 300) °C (>300 to 400) °C (>400 to 630) °C (>630 to 800) °C	0.033 °C 0.033 °C 0.047 °C 0.06 °C 0.067 °C 0.08 °C 0.16 °C	Multifunction calibrator

Parameter/Equipment	Range	CMC ^{2,9} (±)	Comments
Electrical Calibration of RTD Indicating Devices –Generate ^{3,5} (cont)			
Pt 385, 200 Ω	(-200 to -80) °C (>-80 to 0) °C (>0 to 100) °C (>100 to 260) °C (>260 to 300) °C (>300 to 400) °C (>400 to 600) °C (>600 to 630) °C	0.027 °C 0.027 °C 0.027 °C 0.033 °C 0.08 °C 0.087 °C 0.093 °C 0.11 °C	Multifunction calibrator
Pt 3916, 100 Ω	(-200 to -190) °C (>-190 to -80) °C (>-80 to 0) °C (>0 to 100) °C (>100 to 260) °C (>260 to 300) °C (>300 to 400) °C (>400 to 600) °C (>600 to 630) °C	0.17 °C 0.03 °C 0.033 °C 0.04 °C 0.047 °C 0.053 °C 0.06 °C 0.067 °C 0.15 °C	
Pt 3926, 100 Ω	(-200 to -80) °C (>-80 to 0) °C (>0 to 100) °C (>100 to 300) °C (>300 to 400) °C (>400 to 630) °C	0.033 °C 0.033 °C 0.047 °C 0.06 °C 0.067 °C 0.08 °C	
Electrical Calibration of RTD Simulation Devices – Measure ^{3,5}	(-200 to 850) °C	0.0011 % + 0.003 °C	Reference DMM

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Oscilloscopes ³			
DC Signal 50 Ω Load 1 MΩ Load	(-6.6 to 6.6) V (-130 to 130) V	0.25 % + 44 μV 0.05 % + 46 μV	Fluke 5522A-SC600
Square Wave 50 Ω Load 1 MΩ Load	±1 mV to 6.6 V _{pp} ±1 mV to 130 V _{pp}	0.25 % + 45 μV 0.10 % + 45 μV	
Leveled Sine Wave 50 Ω Load	5 mV to 5 V (50 kHz)	2 % + 350 μV	
Flatness (@ 50 kHz Reference)	50 kHz to 100 MHz (>100 to 300) MHz (>300 to 600) MHz	3.3 % + 280 μV 4.1 % + 300 μV 6.1 % + 300 μV	
Time Markers 50 Ω Load	2 ns to 20 ms 50 ms to 5 s	2.5 μs/s (30 + 1000 <i>t</i>) μs/s	<i>t</i> = time in seconds

II. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2,4,8} (±)	Comments
Gas Flow – Measure ³	(0 to 10) SCCM (>10 to 100) SCCM	0.51 % + 0.012 SCCM 0.43 % + 0.2 SCCM	Transfer standard
	(0 to 2) SLM (>2 to 10) SLM (>10 to 50) SLM (>50 to 100) SLM (>100 to 300) SLM (>300 to 1000) SLM	0.21 % + 0.0004 SLM 0.21 % + 0.002 SLM 0.21 % + 0.01 SLM 0.14 % + 0.02 SLM 0.21 % + 0.06 SLM 0.21 % + 0.2 SLM	Molbloc flow elements

III. Mechanical

Parameter/Equipment	Range	CMC ^{2, 4, 8} (±)	Comments
Pressure – Measure & Measuring Equipment ³			
Differential	(-30 to 30) inH ₂ O (-60 to 60) inH ₂ O	0.01 % + 0.0001 inH ₂ O 0.005 % + 0.0037 inH ₂ O	Ruska 7250LP pressure calibrator
Pneumatic	(0 to 15) psig (>15 to 300) psig (>300 to 1000) psig	0.011 % + 0.0016 psig 0.008 % + 0.0023 psig 0.0072 % + 0.031 psig	Pressure calibrator see footnote 6
Barometric	(0 to 30) psia (>30 to 300) psia (>300 to 1015) psia	0.006 % + 0.0011 psia 0.008 % + 0.0004 psia 0.007 % + 0.031 psia	Reference pressure monitor
Hydraulic	(200 to 2000) psi (>2000 to 20 000) psi	0.028 % + 0.0012 psi 0.029 % + 0.005 psi	Fluke RPM4-E-DWT
Vacuum – Measure & Measuring Equipment ³	(0 to -14.5) psig	0.0015 psig	Pressure calibrator ⁶

IV. Optical Quantities

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Aerosol Particle Counter –			
Counting Efficiency	(0.3 to 1.0) μm	7.8 %	Comparison against particle counter
Particle Size	(0.3 to 5.0) μm	4.4 %	Comparison against standard particles

V. Thermodynamic

Parameter/Equipment	Range	CMC ^{2,4,8} (±)	Comments
Temperature – Measure ³	(-200 to -80) °C (>-80 to 0) °C (>0 to 300) °C (>300 to 660) °C	0.0035 % 0.003 °C 0.001 % + 0.003 °C 0.002 %	SPRT & Superthermometer
	(>660 to 1000) °C (>1000 to 1200) °C	1.1 °C 3.6 °C	TC-S
Temperature – Measuring Equipment ³	(-95 to <-80) °C (-80 to -40) °C (>-40 to 0) °C (>0 to 100) °C (>100 to 300) °C (>300 to 420) °C (>420 to 660) °C (>660 to 1000) °C (>1000 to 1200) °C	0.06 °C 0.013 % + 0.002 °C 0.007 °C 0.004 % + 0.007 °C 0.01 % + 0.001 °C 0.4 °C 0.6 °C 1.2 °C 3.5 °C	Temperature baths, temperature chamber, dry well calibrator
	-196 °C -38.83 °C 0.01 °C 231.928 °C 419.527 °C 660.323 °C (-15 to 50) °C (>50 to 500) °C	6 mK (0.006 °C) 4.4 mK (0.0044 °C) 2 mK (0.002 °C) 4 mK (0.004 °C) 6 mK (0.006 °C) 8 mK (0.008 °C) 0.6 °C 0.4 % + 0.35 °C	Liquid nitrogen & fixed points Infrared calibrator $\lambda = (8 \text{ to } 14) \mu\text{m}$, where $\epsilon = 0.95$
Relative Humidity – Measuring Equipment	(0 to 10) % RH (>10 to 50) % RH (>50 to 95) % RH	0.15 % RH 0.22 % RH 0.32 % RH	Humidity generator
Dew Point Temperature	(-95 to -90) °C (>-90 to -80) °C (>-80 to -70) °C (>-70 to 70) °C	0.91 °C 0.6 °C 0.23 °C 0.15 °C	
Humidity – Measure ³	(0 to 95) % RH	0.7 % RH	Rotronic HygroClip HC2

VI. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,4,8} (\pm)	Comments
Frequency – Measure ³	DC to 225 MHz	8.6 μ Hz / Hz + 0.2 nHz	Frequency counter
Frequency – Generate ³	1 mHz to 200 MHz	2.5 μ Hz / Hz	Waveform generator
Time – Measure ³	Up to 18.7 s / Day	0.058 s/day	Timometer 4500
Tachometer Non-Contact ³	Up to 99.999 rpm (100 to 999.99) rpm (1000 to 9999.9) rpm (10 000 to 100 000) rpm	0.000 22 % + 0.0007 rpm 0.000 27 % + 0.006 rpm 0.0002 % + 0.06 rpm 0.000 41 % + 0.6 rpm	Multifunction calibrator & LED

¹ This laboratory offers commercial and field calibration services, where noted.

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. 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 In the statement of CMC, percentages are percentages of reading/output, unless otherwise noted. FS denotes a percentage of the full scale.

⁵ The method used for the CMC is a 4-wire method.

⁶ Auto zero function performed referenced to a standard barometer.

⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁸ 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.

⁹ 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. CMCs are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

ALPHA CONTROLS AND INSTRUMENTATION, INC

Markham, ON, CANADA

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/NC SL 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 17TH day of December 2024.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2260.01
Valid to November 30, 2026

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