CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Transcat – Palm Beach Gardens
10415 Riverside Drive, Suite 107
Palm Beach Gardens, FL 33410

Fulfills the requirements of

ISO/IEC 17025:2017

and national standards

ANSI/NCSL Z540-1-1994 (R2002) AND ANSI/NCSL Z540.3-2006 (R2013)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
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Jason Stine, Vice President

Expiry Date: 07 September 2027
Certificate Number: AC-2489.25

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. 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).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)
ANSI/NCSL Z540.3-2006 (R2013)

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CALIBRATION

ISO/IEC 17025 Accreditation Granted: **02 September 2025**

Certificate Number: **AC-2489.25** Certificate Expiry Date: **07 September 2027**

Acoustics and Vibration

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Sound Measuring Equipment	125 Hz to 2 kHz (74 to 104) dB 114 dB 4 kHz (74 to 104) dB 114 dB	 0.45 dB 0.33 dB 0.72 dB 0.6 dB	Comparison to GenRad 1986 Sound Level Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure [1]	(0.2 to 20) µA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	 0.2 % of reading + 2.5 nA 0.2 % of reading + 2.5 nA 0.2 % of reading + 2.5 nA	Comparison to Fluke 8588A 8.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure [1]	(20 to 200) µA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (0.2 to 2) mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (2 to 20) mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (20 to 200) mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (0.2 to 2) A 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (2 to 20) A 10 Hz to 2 kHz (2 to 10) kHz (20 to 30) A 10 Hz to 2 kHz (2 to 10) kHz	 0.28 mA/A + 5 nA 0.53 mA/A + 5 nA 0.74 mA/A + 5 nA 4.1 mA/A + 10 nA 0.28 mA/A + 50 nA 0.53 mA/A + 50 nA 0.74 mA/A + 50 nA 4.1 mA/A + 0.1 µA 0.28 mA/A + 0.5 µA 0.53 mA/A + 0.5 µA 0.74 mA/A + 0.5 µA 4.1 mA/A + 1 µA 0.28 mA/A + 5 µA 0.52 mA/A + 5 µA 0.74 mA/A + 5 µA 0.3 mA/A + 0.1 mA 0.56 mA/A + 0.1 mA 0.8 mA/A + 0.1 mA 0.84 mA/A + 0.5 mA 0.86 mA/A + 0.5 mA 0.84 mA/A + 12 mA 1.2 mA/A + 12 mA	Comparison to Fluke 8588A 8.5 Digit Multimeter
AC Current – Measure [1]	(10 to 100) A (50 to 60) Hz 400 Hz 1 kHz	 0.23 mA/A + 5 mA 1.1 mA/A + 5 mA 2 mA/A + 5 mA	Comparison to Ohms Labs CS-100 Precision Shunt, Fluke 8588A 8.5 Digit Multimeter

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source [1]	Up to 220 µA		Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
	(10 to 20) Hz	0.025 % of reading + 16 nA	
	(20 to 40) Hz	0.016 % of reading + 10 nA	
	40 Hz to 1 kHz	0.011 % of reading + 8 nA	
	(1 to 5) kHz	0.028 % of reading + 12 nA	
	(5 to 10) kHz	0.11 % of reading + 65 nA	
	220 µA to 2.2 mA		
	(10 to 20) Hz	0.025 % of reading + 40 nA	
	(20 to 40) Hz	0.016 % of reading + 35 nA	
	40 Hz to 1 kHz	0.011 % of reading + 35 nA	
	(1 to 5) kHz	0.02 % of reading + 0.11 µA	
	(5 to 10) kHz	0.11 % of reading + 0.65 µA	
	(2.2 to 22) mA		
	(10 to 20) Hz	0.025 % of reading + 0.4 µA	
	(20 to 40) Hz	0.016 % of reading + 0.35 µA	
	40 Hz to 1 kHz	0.011 % of reading + 0.35 µA	
	(1 to 5) kHz	0.02 % of reading + 0.55 µA	
	(5 to 10) kHz	0.11% of reading + 5 µA	
	(22 to 220) mA		
	(10 to 20) Hz	0.025 % of reading + 4 µA	
	(20 to 40) Hz	0.016 % of reading + 3.5 µA	
	40 Hz to 1 kHz	0.011 % of reading + 2.5 µA	
	(1 to 5) kHz	0.02 % of reading + 3.5 µA	
	(5 to 10) kHz	0.11 % of reading + 10 µA	
	220 mA to 2.2 A		
	20 Hz to 1 kHz	0.025 % of reading + 35 µA	
	(1 to 5) kHz	0.045 % of reading + 80 µA	
	(5 to 10) kHz	0.7 % of reading + 0.16 mA	
	2.2 A to 11 A		
	20 Hz to 1 kHz	0.046 % of reading + 0.17 µA	
	(1 to 5) kHz	0.095 % of reading + 0.38 µA	
	(5 to 10) kHz	0.36 % of reading + 0.75 µA	
AC Current – Source [1]	Up to 2 A		Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 52120A Current Amplifier
	(10 to 850) Hz	0.009 % of reading + 40 µA	
	(0.85 to 6) kHz	0.04 % of reading + 80 µA	
	(6 to 10) kHz	1.6 % of reading + 62 mA	
	2 A to 20 A		
	(10 to 850) Hz	0.009 % of reading + 0.4 mA	
	(0.85 to 6) kHz	0.04 % of reading + 0.8 mA	
	(6 to 10) kHz	2.3 % of reading + 94 mA	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source [1]	20 A to 120 A (10 to 850) Hz (0.85 to 6) kHz (6 to 10) kHz	0.009 % of reading + 2.4 mA 0.04 % of reading + 4.8 mA 3.1 % of reading + 0.7 A	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 52120A Current Amplifier
AC Clamp-on Ammeter [1] (Toroidal Type) Transformer Type Sensor	(20 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 1 000) A (45 to 65) Hz (65 to 440) Hz	0.3 % of reading + 26 mA 0.83 % of reading + 47 mA 0.35 % of reading + 0.12 A 1.1 % of reading + 0.22 A	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
AC Clamp-on Ammeter [1] (Non-Toroidal Type) Hall Effect Sensor	(20 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 1 000) A (45 to 65) Hz (65 to 440) Hz	0.57 % of reading + 0.25 A 1 % of reading + 0.25 A 0.6 % of reading + 0.9 A 1.3 % of reading + 0.92 A	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
AC Clamp-on Ammeter [1] (Non-Toroidal Type) Hall Effect Sensor	(1 to 6) kA (10 to 300) Hz (1 to 2) kA (300 to 440) Hz (2 to 6) kA (300 to 440) Hz	0.62 % of reading 0.8 % of reading 0.66 % of reading	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 52120A Transconductance Amplifier, 6 kA Coil
AC Voltage – Measure [1]	(0.1 to 10) mV 1 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	0.029 % of reading + 1.1 µV 0.037 % of reading + 1.1 µV 0.038 % of reading + 1.1 µV 0.3 % of reading + 0.78 µV 1 % of reading + 3.9 µV 2 % of reading + 3.9 µV	Comparison to Fluke 8588A 8.5 Digit Multimeter

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	(10 to 100) mV		Comparison to Fluke 8588A 8.5 Digit Multimeter
	1 Hz to 2 kHz	0.008 9 % of reading + 0.5 µV	
	(2 to 10) kHz	0.013 % of reading + 0.5 µV	
	(10 to 30) kHz	0.023 % of reading + 1 µV	
	(30 to 100) kHz	0.053 % of reading + 5 µV	
	(100 to 300) kHz	0.21 % of reading + 31 µV	
	300 kHz to 1 MHz	1 % of reading + 0.1 mV	
	(1 to 2) MHz	1.5 % of reading + 0.5 mV	
	(2 to 4) MHz	4.1 % of reading + 1 mV	
	(4 to 8) MHz	8.4 % of reading + 1 mV	
	(8 to 10) MHz	16 % of reading + 1 mV	
	(0.1 to 1) V		
	1 Hz to 2 kHz	0.007 7% of reading + 5 µV	
	(2 to 10) kHz	0.012 % of reading + 5 µV	
	(10 to 30) kHz	0.023 % of reading + 10 µV	
	(30 to 100) kHz	0.053 % of reading + 50 µV	
	(100 to 300) kHz	0.21 % of reading + 0.31 mV	
	300 kHz to 1 MHz	1 % of reading + 1 mV	
	(1 to 2) MHz	1.5 % of reading + 5 mV	
	(2 to 4) MHz	4 % of reading + 10 mV	
	(4 to 8) MHz	8.2 % of reading + 10 mV	
	(8 to 10) MHz	15 % of reading + 10 mV	
	(1 to 10) V		
	1 Hz to 2 kHz	0.007 6 % of reading + 50 µV	
	(2 to 10) kHz	0.012 % of reading + 50 µV	
	(10 to 30) kHz	0.023 % of reading + 0.1 mV	
	(30 to 100) kHz	0.053 % of reading + 0.5 mV	
	(100 to 300) kHz	0.21 % of reading + 3.1 mV	
	300 kHz to 1 MHz	1 % of reading + 10 mV	
	(1 to 2) MHz	1.5 % of reading + 50 mV	
	(2 to 4) MHz	4 % of reading + 0.1 V	
	(4 to 8) MHz	8.2 % of reading + 0.1 V	
	(8 to 10) MHz	15 % of reading + 0.1 V	
	(10 to 100) V		
	1 Hz to 2 kHz	0.009 % of reading + 0.5 mV	
	(2 to 10) kHz	0.011 % of reading + 0.5 mV	
	(10 to 30) kHz	0.023 % of reading + 1 mV	
	(30 to 100) kHz	0.059 % of reading + 5 mV	
	(100 to 300) kHz	0.37 % of reading + 47 mV	
	300 kHz to 1 MHz	1 % of reading + 0.5 V	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	(100 to 1 050) V 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	 0.011 % of reading + 25 mV 0.011 % of reading + 25 mV 0.023 % of reading + 25 mV 0.059 % of reading + 0.1 V	Comparison to Fluke 8588A 8.5 Digit Multimeter
AC Voltage – Measure	Up to 40 mVp-p DC to 100 MHz (40 to 400) mVp-p DC to 100 MHz (400 to 500) mVp-p DC to 100 MHz	 1.6 % of reading + 0.15 mV 1.6 % of reading + 1.5 mV 1.6 % of reading + 3 mV	Comparison to Differential Amplifier w/ Oscilloscope
AC High Voltage – Measure [1]	(0.7 to 5) kV 10 mHz to 10 Hz (10 to 30) Hz (30 to 50) Hz (50 to 70) Hz (70 to 100) Hz (100 to 200) Hz (200 to 450) Hz (450 to 600) Hz (5 to 30) kV 10 mHz to 10 Hz (10 to 30) Hz (30 to 50) Hz (50 to 70) Hz (70 to 100) Hz (100 to 200) Hz (200 to 450) Hz (450 to 600) Hz (30 to 50) kV 10 mHz to 10 Hz (10 to 30) Hz (30 to 50) Hz (50 to 70) Hz (70 to 100) Hz (100 to 200) Hz (200 to 450) Hz	 0.14 % of reading + 0.17 V 0.12 % of reading + 0.29 V 0.099 % of reading + 0.37 V 0.068 % of reading + 0.37 V 0.099 % of reading + 0.37 V 0.099 % of reading + 0.37 V 0.48 % of reading + 0.17 V 0.47 % of reading + 0.17 V 0.19 % of reading + 2.4 V 0.13 % of reading + 2.4 V 0.11 % of reading + 2.4 V 0.077 % of reading + 2.4 V 0.11 % of reading + 2.4 V 0.11 % of reading + 2.4 V 0.7 % of reading + 2.4 V 1.4 % of reading + 2.4 V 0.24 % of reading + 2.5 V 0.18 % of reading + 2.5 V 0.13 % of reading + 2.5 V 0.10 % of reading + 2.5 V 0.13 % of reading + 2.5 V 0.69 % of reading + 2.5 V 2.9 % of reading + 2.5 V	Comparison to Vitrek 4700 High Voltage Meter and Associated High Voltage Probes

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC High Voltage – Measure [1]	(50 to 70) kV		Comparison to Vitrek 4700 High Voltage Meter and Associated High Voltage Probes
	10 mHz to 10 Hz	0.37 % of reading + 2.6 V	
	(10 to 30) Hz	0.26 % of reading + 2.6 V	
	(30 to 50) Hz	0.16 % of reading + 2.6 V	
	(50 to 70) Hz	0.16 % of reading + 2.6 V	
	(70 to 100) Hz	1.2 % of reading + 2.6 V	
	(100 to 200) Hz	1.2 % of reading + 2.6 V	
	(200 to 450) Hz	17 % of reading + 2.6 V	
AC Voltage – Source [1]	Up to 2.2 mV		Comparison to Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.024 % of reading + 4 µV	
	(20 to 40) Hz	0.009 % of reading + 4 µV	
	40 Hz to 20 kHz	0.008 % of reading + 4 µV	
	(20 to 50) kHz	0.02 % of reading + 4 µV	
	(50 to 100) kHz	0.05 % of reading + 5 µV	
	(100 to 300) kHz	0.11 % of reading + 10 µV	
	(300 to 500) kHz	0.14 % of reading + 20 µV	
	500 kHz to 1 MHz	0.27 % of reading + 20 µV	
	(2.2 to 22) mV		
	(10 to 20) Hz	0.024 % of reading + 4 µV	
	(20 to 40) Hz	0.009 % of reading + 4 µV	
	40 Hz to 20 kHz	0.008 % of reading + 4 µV	
	(20 to 50) kHz	0.02 % of reading + 4 µV	
	(50 to 100) kHz	0.05 % of reading + 5 µV	
	(100 to 300) kHz	0.11 % of reading + 10 µV	
	(300 to 500) kHz	0.14 % of reading + 20 µV	
	500 kHz to 1 MHz	0.27 % of reading + 20 µV	
	(22 to 220) mV		
	(10 to 20) Hz	0.024 % of reading + 12 µV	
	(20 to 40) Hz	0.009 % of reading + 7 µV	
	40 Hz to 20 kHz	0.005 7 % of reading + 7 µV	
	(20 to 50) kHz	0.012 % of reading + 7 µV	
	(50 to 100) kHz	0.031 % of reading + 17 µV	
	(100 to 300) kHz	0.066 % of reading + 20 µV	
	(300 to 500) kHz	0.14 % of reading + 25 µV	
	500 kHz to 1 MHz	0.27 % of reading + 45 µV	

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AC Voltage – Source [1]	220 mV to 2.2 V		Comparison to Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.024 % of reading + 40 µV	
	(20 to 40) Hz	0.009 % of reading + 15 µV	
	40 Hz to 20 kHz	0.004 2 % of reading + 8 µV	
	(20 to 50) kHz	0.006 7 % of reading + 10 µV	
	(50 to 100) kHz	0.008 5 % of reading + 30 µV	
	(100 to 300) kHz	0.034 % of reading + 80 µV	
	(300 to 500) kHz	0.1 % of reading + 0.2 mV	
	500 kHz to 1 MHz	0.17 % of reading + 0.3 mV	
	(2.2 to 22) V		
	(10 to 20) Hz	0.024 % of reading + 0.4 mV	
	(20 to 40) Hz	0.009 % of reading + 0.15 mV	
	40 Hz to 20 kHz	0.004 2 % of reading + 0.05 mV	
	(20 to 50) kHz	0.006 7 % of reading + 0.1 mV	
	(50 to 100) kHz	0.008 3 % of reading + 0.2 mV	
	(100 to 300) kHz	0.034 % of reading + 0.6 mV	
	(300 to 500) kHz	0.1 % of reading + 2 mV	
	500 kHz to 1 MHz	0.17 % of reading + 3.2 mV	
	(22 to 220) V		
	(10 to 20) Hz	0.024 % of reading + 4 mV	
	(20 to 40) Hz	0.009 % of reading + 1.5 mV	
	40 Hz to 20 kHz	0.005 2 % of reading + 0.6 mV	
	(20 to 50) kHz	0.008 % of reading + 1 mV	
	(50 to 100) kHz	0.015 % of reading + 2.5 mV	
	(100 to 300) kHz	0.09 % of reading + 16 mV	
	(300 to 500) kHz	0.44 % of reading + 40 mV	
	500 kHz to 1 MHz	0.8 % of reading + 80 mV	
	(220 to 250) V		
	(15 to 50) Hz	0.03 % of reading + 16 mV	
	(250 to 1 100) V		
	50 Hz to 1 kHz	0.007 % of reading + 3.5 mV	
AC Voltage – Source[1]	(220 to 750) V		Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
	(30 to 50) kHz	0.06 % of reading + 11 mV	
	(50 to 100) kHz	0.06 % of reading + 11 mV	
	(220 to 1100) V		
	40 Hz to 1 kHz	0.009 % of reading + 4 mV	
	(1 to 20) kHz	0.017 % of reading + 6 mV	
	(20 to 30) kHz	0.23 % of reading + 45 mV	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1] Wide-Band Voltage (50 Ω)	30 Hz to 500 kHz (0.33 to 1.1) mV (1.1 to 3.3) mV (3.3 to 11) mV (11 to 33) mV (33 to 110) mV (110 to 330) mV (0.33 to 1.1) V (1.1 to 3.5) V	 0.62 % of reading + 0.78 µV 0.54 % of reading + 1.2 µV 0.54 % of reading + 3.1 µV 0.47 % of reading + 6.2 µV 0.47 % of reading + 16 µV 0.39 % of reading + 39 µV 0.39 % of reading + 0.16 mV 0.31 % of reading + 0.19 mV	Comparison to Fluke 5730A/05 Multiproduct Calibrator
AC Voltage – Source [1] Wide-Band Flatness (50 Ω) 1 kHz Reference	(0.33 to 1.1) mV (10 to 30) Hz (30 to 119.99) Hz (120 to 1.199 9) kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz (1.2 to 2) MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz (30 to 50) MHz (1.1 to 3.3) mV (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9) kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz (1.2 to 2) MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz (30 to 50) MHz	 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.16 % of reading + 1.2 µV 0.16 % of reading + 1.2 µV 0.31 % of reading + 1.2 µV 0.47 % of reading + 1.2 µV 1.2 % of reading + 5.8 µV 2.3 % of reading + 5.8 µV 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading + 1.2 µV 0.078 % of reading + 1.2 µV 0.23 % of reading + 1.2 µV 0.39 % of reading + 1.2 µV 1.2 % of reading + 1.2 µV 2.3 % of reading + 1.2 µV	Comparison to Fluke 5730A/05 Multiproduct Calibrator

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AC Voltage – Source [1] Wide-Band Flatness (50 Ω) 1 kHz Reference	(3.3 to 11) mV		Comparison to Fluke 5730A/05 Multiproduct Calibrator
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(11 to 33) mV		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(11 to 16.5) mV		
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(16.5 to 33) mV		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(33 to 110) mV		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1] Wide-Band Flatness (50 Ω) 1 kHz Reference	(33 to 55) mV		Comparison to Fluke 5730A/05 Multiproduct Calibrator
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(55 to 110) mV		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(110 to 330) mV		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 Hz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(110 to 165) mV		
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(165 to 330) mV		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(0.33 to 1.1) V		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 Hz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1] Wide-Band Flatness (50 Ω) 1 kHz Reference	(0.33 to 0.55) V		Comparison to Fluke 5730A/05 Multiproduct Calibrator
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(0.55 to 1.1) V		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(1.1 to 3.5) V		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 Hz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(1.1 to 1.75) V		
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
	(1.75 to 3.5) V		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(30 to 50) MHz	1.6 % of reading + 1.2 µV	
DC Current – Measure [1]	(0 to 20) µA	29 µA/A + 0.4 nA	Comparison to Fluke 8588A 8.5 Digit Multimeter
	(20 to 200) µA	10 µA/A + 0.39 nA	
	(0.2 to 2) mA	9.9 µA/A + 3.9 nA	
	(2 to 20) mA	15 µA/A + 39 nA	
	(20 to 200) mA	58 µA/A + 1 µA	
	(0.2 to 2) A	0.13 mA/A + 0.1 mA	
	(2 to 20) A	0.23 mA/A + 0.4 mA	
	(20 to 30) A	0.55 mA/A + 4.4 mA	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Measure [1]	(10 to 100) A	0.15 mA/A + 3 mA	Comparison to Ohm Labs CS-100 Current Shunt, Fluke 8588A 8.5 Digit Multimeter
DC Current – Source [1]	(0.2 to 220) µA (0.22 to 2.2) mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	40 µA/A + 6 nA 35 µA/A + 7 nA 35 µA/A + 40 nA 45 µA/A + 0.7 µA 80 µA/A + 12 µA	Comparison to Fluke 5730A Multiproduct Calibrator
DC Current – Source [1]	(2.2 to 11) A Up to 2 A (2 to 20) A	0.036 % of reading + 0.48 mA 0.012 % of reading + 0.16 mA 0.012 % of reading + 1.6 mA	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
DC Current – Source [1]	(20 to 120) A	0.012 % of reading + 9.6 mA	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 52120A Current Amplifier
DC Clamp-on Ammeter [1] (Non-Toroidal Type) Hall Effect Sensor	(20 to 150) A (150 to 1 000) A	0.5 % of reading + 0.14 A 0.52 % of reading + 0.5 A	Comparison to Fluke 5522A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
DC Clamp-on Ammeter [1] (Non-Toroidal Type) Hall Effect Sensor	(1 to 5) kA	0.58 % of reading	Comparison to Fluke 5522A Multiproduct Calibrator, Current Coils
DC Voltage – Measure [1]	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1050) V	7.7 µV/V + 0.2 µV 2.9 µV/V + 0.3 µV 2.9 µV/V + 0.47 µV 4.3 µV/V + 30 µV 4.4 µV/V + 0.5 mV	Comparison to Fluke 8588A 8.5 Digit Multimeter
DC Voltage – Source [1]	(0 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1100 V	7.5 µV/V + 0.4 µV 5 µV/V + 0.7 µV 3.5 µV/V + 2.5 µV 3.5 µV/V + 4 µV 5 µV/V + 40 µV 6.5 µV/V + 0.4 mV	Comparison to Fluke 5730A Multiproduct Calibrator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC High Voltage – Measure [1]	(1 to 10) kV (10 to 20) kV (20 to 30) kV (30 to 40) kV (40 to 50) kV (50 to 60) kV (60 to 70) kV (70 to 80) kV (80 to 90) kV (90 to 100) kV	0.039 % of reading + 0.092 V 0.038 % of reading + 2.4 V 0.041 % of reading + 2.4 V 0.047 % of reading + 2.4 V 0.056 % of reading + 2.4 V 0.071 % of reading + 2.4 V 0.089 % of reading + 2.4 V 0.12 % of reading + 2.5 V 0.15 % of reading + 2.5 V 0.17 % of reading + 2.5 V	Comparison to Vitrek 4700 High Voltage Meter, Associated High Voltage Probes
Resistance – Measure [1]	(0 to 2) Ω (2 to 20) Ω (20 to 200) Ω (0.2 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ (0.2 to 2) MΩ (2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ	16 μΩ/Ω + 4 μΩ 10 μΩ/Ω + 14 μΩ 9.2 μΩ/Ω + 47 μΩ 9.1 μΩ/Ω + 0.47 mΩ 9.2 μΩ/Ω + 4.7 mΩ 9.3 μΩ/Ω + 47 mΩ 11 μΩ/Ω + 1 Ω 19 μΩ/Ω + 0.1 kΩ 0.12 mΩ/Ω + 10 kΩ 0.13 % of reading + 1 MΩ	Comparison to Fluke 8588A 8.5 Digit Multimeter
Low Current Resistance – Measure [1]	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω (0.2 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ (0.2 to 2) MΩ (2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ	17 μΩ/Ω + 4 μΩ 10 μΩ/Ω + 14 μΩ 17 μΩ/Ω + 0.2 mΩ 18 μΩ/Ω + 2 mΩ 22 μΩ/Ω + 20 mΩ 22 μΩ/Ω + 62 mΩ 26 μΩ/Ω + 1 Ω 0.38 mΩ/Ω + 0.30 kΩ 0.13 % of reading + 10 kΩ 0.13 % of reading + 1.0 MΩ	Comparison to Fluke 8588A 8.5 Digit Multimeter
High Voltage Resistance – Measure [1]	(2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ (2 to 20) GΩ	17 μΩ/Ω + 10 Ω 68 μΩ/Ω + 0.1 kΩ 0.23 mΩ/Ω + 0.1 MΩ 0.13 % of reading + 10 MΩ	Comparison to Fluke 8588A 8.5 Digit Multimeter

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source [1] (Simulation)	(0 to 11) Ω	32 μΩ/Ω + 0.78 mΩ	Comparison to Fluke 5522A Multiproduct Calibrator
	(11 to 33) Ω	24 μΩ/Ω + 1.2 mΩ	
	(33 to 111) Ω	22 μΩ/Ω + 1.1 mΩ	
	(110 to 330) Ω	22 μΩ/Ω + 1.6 mΩ	
	330 Ω to 1.1 kΩ	22 μΩ/Ω + 1.6 mΩ	
	(1.1 to 3.3) kΩ	22 μΩ/Ω + 1.6 mΩ	
	(3.3 to 11) kΩ	22 μΩ/Ω + 1.6 mΩ	
	(11 to 33) kΩ	22 μΩ/Ω + 0.16 Ω	
	(33 to 110) kΩ	22 μΩ/Ω + 0.16 Ω	
	(110 to 330) kΩ	27 μΩ/Ω + 1.6 Ω	
	330 kΩ to 1.19 MΩ	26 μΩ/Ω + 1.6 Ω	
	(1.1 to 3.3) MΩ	66 μΩ/Ω + 23 Ω	
	(3.3 to 11) MΩ	100 μΩ/Ω + 39 Ω	
	(11 to 33) MΩ	190 μΩ/Ω + 1.9 kΩ	
	(33 to 110) MΩ	410 μΩ/Ω + 2.3 kΩ	
	(110 to 330) MΩ	0.23 % of reading + 78 kΩ	
	330 MΩ to 1.1 GΩ	12 % of reading + 0.39 MΩ	
Resistance – Source [1] (Fixed-point Simulation)	0 Ω	40 μΩ	Comparison to Fluke 5730A Multiproduct Calibrator
	1 Ω	95 μΩ/Ω	
	1.9 Ω	95 μΩ/Ω	
	10 Ω	23 μΩ/Ω	
	19 Ω	23 μΩ/Ω	
	100 Ω	10 μΩ/Ω	
	190 Ω	10 μΩ/Ω	
	1 kΩ	6.5 μΩ/Ω	
	1.9 kΩ	6.5 μΩ/Ω	
	10 kΩ	6.5 μΩ/Ω	
	19 kΩ	6.5 μΩ/Ω	
	100 kΩ	8.5 μΩ/Ω	
	190 kΩ	8.5 μΩ/Ω	
	1 MΩ	13 μΩ/Ω	
	1.9 MΩ	18 μΩ/Ω	
	10 MΩ	40 μΩ/Ω	
	19 MΩ	47 μΩ/Ω	
	100 MΩ	0.1 mΩ/Ω	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source [1] (Fixed Artifacts)	1 mΩ 10 mΩ 100 mΩ 1 Ω	0.16 mΩ/Ω 0.13 mΩ/Ω 0.1 mΩ/Ω 43 µΩ/Ω	Comparison to Ohms Labs CS-100 Current Shunt; IET DCCS-0.01, IET DCCS-0.1, IET DCCS-1 Standard Resistors
Resistance – Source [1] (Variable Artifact)	(100 to 1 000) kΩ (1 to 10) MΩ (10 to 100) MΩ (100 to 1 000) MΩ (1 to 10) GΩ (10 to 100) GΩ (100 to 1 000) GΩ	0.037 % of reading 0.037 % of reading + 1.2 µΩ/Ω/V 0.12 % of reading + 1.2 µΩ/Ω/V 0.23 % of reading + 1.2 µΩ/Ω/V 0.59 % of reading + 1.2 µΩ/Ω/V 1.2 % of reading + 1.2 µΩ/Ω/V 1.2 % of reading + 1.2 µΩ/Ω/V	Comparison to IET HRRS-B-7-100k-10kV Decade Resistor
Capacitance – Measure [1]	Up to 2 nF (2 to 20) nF (20 to 200) nF (0.2 to 2) µF (2 to 20) µF (20 to 200) µF (0.2 to 2) mF (2 to 20) mF (20 to 200) mF	0.19 % of reading + 1 pF 0.081 % of reading + 2 pF 0.049 % of reading + 10 pF 0.041 % of reading + 0.1 nF 0.042 % of reading + 1 nF 0.061 % of reading + 10 nF 0.061 % of reading + 0.1 µF 0.071 % of reading + 1 µF 0.072 % of reading + 10 µF	Comparison to Fluke 8588A 8.5 Digit Multimeter
Capacitance – Source [1] (Simulation)	(220 to 400) pF 10 Hz to 10 kHz (0.4 to 1.1) nF 10 Hz to 10 kHz (1.1 to 3.3) nF 10 Hz to 3 kHz (3.3 to 11) nF 10 Hz to 3 kHz (11 to 33) nF 10 Hz to 1 kHz (33 to 110) nF 10 Hz to 1 kHz (110 to 330) nF 10 Hz to 1 kHz (0.33 to 1.1) µF (10 to 600) Hz (1.1 to 3.3) µF (10 to 300) Hz	0.4 % of reading + 7.8 pF 0.4 % of reading + 7.8 pF 0.4 % of reading + 7.8 pF 0.21 % of reading + 7.8 pF 0.2 % of reading + 78 pF 0.21 % of reading + 78 pF 0.2 % of reading + 0.23 nF 0.21 % of reading + 0.78 nF 0.21 % of reading + 2.3 nF	Comparison to Fluke 5522A Multiproduct Calibrator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source [1] (Simulation)	(3.3 to 11) µF (10 to 150) Hz (11 to 33) µF (10 to 120) Hz (33 to 110) µF (10 to 80) Hz (110 to 330) µF DC to 50 Hz (0.33 to 1.1) mF DC to 20 Hz (1.1 to 3.3) mF DC to 6 Hz (3.3 to 11) mF DC to 2 Hz (11 to 33) mF DC to 0.6 Hz (33 to 110) mF DC to 0.2 Hz	 0.2 % of reading + 7.8 nF 0.32 % of reading + 23 nF 0.37 % of reading + 78 nF 0.38 % of reading + 0.23 µF 0.35 % of reading + 0.78 µF 0.35 % of reading + 2.3 µF 0.35 % of reading + 7.8 µF 0.58 % of reading + 23 µF 0.85 % of reading + 78 µF	Comparison to Fluke 5522A Multiproduct Calibrator
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure [1]	Type B (250 to 350) °C (350 to 445) °C (445 to 580) °C (580 to 750) °C (750 to 1 000) °C (1 000 to 1 820) °C Type C (0 to 250) °C (250 to 1 000) °C (1 000 to 1 500) °C (1 500 to 1 800) °C (1 800 to 2 000) °C (2 000 to 2 250) °C (2 250 to 2 315) °C	 1.2 °C 0.9 °C 0.71 °C 0.55 °C 0.45 °C 0.35 °C 0.24 °C 0.19 °C 0.21 °C 0.24 °C 0.27 °C 0.33 °C 0.37 °C	Comparison to Ectron 1140A Thermocouple Calibrator/Simulator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure [1]	Type E		Comparison to Ectron 1140A Thermocouple Calibrator/Simulator
	(-270 to -245) °C	1.6 °C	
	(-245 to -195) °C	0.24 °C	
	(-195 to -155) °C	0.12 °C	
	(-155 to -90) °C	0.095 °C	
	(-90 to 0) °C	0.08 °C	
	(0 to 15) °C	0.076 °C	
	(15 to 890) °C	0.064 °C	
	(890 to 1 000) °C	0.074 °C	
	Type J		
	(-210 to -180) °C	0.15 °C	
	(-180 to -120) °C	0.12 °C	
	(-120 to -50) °C	0.093 °C	
	(-50 to 990) °C	0.08 °C	
	(990 to 1 200) °C	0.094 °C	
	Type K		
	(-270 to -255) °C	2.5 °C	
	(-255 to -195) °C	0.85 °C	
	(-195 to -115) °C	0.16 °C	
	(-115 to -55) °C	0.12 °C	
	(-55 to 1 000) °C	0.087 °C	
	(1 000 to 1 372) °C	0.096 °C	
	Type N		
	(-270 to -260) °C	5.4 °C	
	(-260 to -200) °C	1.5 °C	
	(-200 to -140) °C	0.29 °C	
	(-140 to -70) °C	0.18 °C	
	(-70 to 25) °C	0.14 °C	
	(25 to 160) °C	0.12 °C	
	(160 to 1 300) °C	0.11 °C	
	Type R		
	(-50 to -30) °C	0.8 °C	
	(-30 to 45) °C	0.69 °C	
	(45 to 160) °C	0.49 °C	
	(160 to 380) °C	0.35 °C	
	(380 to 775) °C	0.3 °C	
	(775 to 1 768) °C	0.26 °C	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure [1]	Type S		Comparison to Ectron 1140A Thermocouple Calibrator/Simulator
	(-50 to -30) °C	0.76 °C	
	(-30 to 45) °C	0.68 °C	
	(45 to 105) °C	0.49 °C	
	(105 to 310) °C	0.41 °C	
	(310 to 615) °C	0.35 °C	
	(615 to 1 768) °C	0.31 °C	
	Type T		
	(-270 to -255) °C	1.9 °C	
	(-255 to -240) °C	0.6 °C	
	(-240 to -210) °C	0.36 °C	
	(-210 to -150) °C	0.22 °C	
	(-180 to -40) °C	0.15 °C	
	(-40 to 100) °C	0.095 °C	
	(100 to 400) °C	0.08 °C	
Electrical Simulation of RTD Indicating Devices – Source [1]	Pt 385, 100 Ω		Comparison to Fluke 5522A Multiproduct Calibrator
	(-200 to -80) ºC	0.039 ºC	
	(-80 to 0) ºC	0.039 ºC	
	(0 to 100) ºC	0.054 ºC	
	(100 to 300) ºC	0.07 ºC	
	(300 to 400) ºC	0.078 ºC	
	(400 to 630) ºC	0.093 ºC	
	(630 to 800) ºC	0.18 ºC	
	Pt 385, 200 Ω		
	-200 to -80) ºC	0.031 ºC	
	(-80 to 0) ºC	0.031 ºC	
	(0 to 100) ºC	0.031 ºC	
	(100 to 260) ºC	0.039 ºC	
	(260 to 300) ºC	0.093 ºC	
	(300 to 400) ºC	0.1 ºC	
	(400 to 600) ºC	0.11 ºC	
	(600 to 630) ºC	0.12 ºC	
	Pt 385, 500 Ω		
	(-200 to -80) ºC	0.031 ºC	
	(-80 to 0) ºC	0.039 ºC	
	(0 to 100) ºC	0.039 ºC	
	(100 to 260) ºC	0.047 ºC	
	(260 to 300) ºC	0.062 ºC	
	(300 to 400) ºC	0.062 ºC	
	(400 to 600) ºC	0.07 ºC	
	(600 to 630) ºC	0.085 ºC	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source [1]	Pt 385, 1 000 Ω		Comparison to Fluke 5522A Multiproduct Calibrator
	(-200 to -80) ºC	0.023 ºC	
	(-80 to 0) ºC	0.023 ºC	
	(0 to 100) ºC	0.031 ºC	
	(100 to 260) ºC	0.039 ºC	
	(260 to 300) ºC	0.047 ºC	
	(300 to 400) ºC	0.054 ºC	
	(400 to 600) ºC	0.054 ºC	
	(600 to 630) ºC	0.18 ºC	
	Pt 3916, 100 Ω		
	(-200 to -190) ºC	0.19 ºC	
	(-190 to -80) ºC	0.031 ºC	
	(-80 to 0) ºC	0.039 ºC	
	(0 to 100) ºC	0.047 ºC	
	(100 to 260) ºC	0.054 ºC	
	(260 to 300) ºC	0.062 ºC	
	(300 to 400) ºC	0.07 ºC	
	(400 to 600) ºC	0.078 ºC	
	(600 to 630) ºC	0.018 ºC	
	Pt 3926, 100 Ω		
	(-200 to -80) ºC	0.039 ºC	
	(-80 to 0) ºC	0.039 ºC	
	(0 to 100) ºC	0.054 ºC	
	(100 to 300) ºC	0.07 ºC	
	(300 to 400) ºC	0.078 ºC	
	(400 to 630) ºC	0.093 ºC	
	PtNi 385, 120 Ω		
	(-80 to 0) ºC	0.062 ºC	
	(0 to 100) ºC	0.062 ºC	
	(100 to 260) °C	0.1 ºC	
	Cu 427, 10 Ω		
	(-100 to 260) °C	0.23 ºC	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Power – Source [1]			
330 µW to 330 mA	11 µW to 1.1 mW	0.024 % of reading	
	(1.1 to 110) mW	0.027 % of reading	
	110 mW to 110 W	0.024 % of reading	
	(110 to 330) W	0.018 % of reading	
330 mA to 3 A	11 µW to 110 mW	0.044 % of reading	Comparison to Fluke 5522A Multiproduct Calibrator
	110 mW to 990 W	0.053 % of reading	
	1 W to 3 kW	0.009 6 % of reading	
(3 to 20.5) A	99 mW to 0.99 W	0.088 % of reading	
	0.99 W to 6.8 kW	0.07 % of reading	
	6.8 W to 20.5 kW	0.04 % of reading	
AC Power – Source [1,2]			
PF = 1			
(3.3 to 9) mA	(10 to 65) Hz		
	(0.11 mW to 3) mW	0.13 % of reading	Comparison to Fluke 5522A Multiproduct Calibrator
	3 mW to 9 W	0.077 % of reading	
(9 to 33) mA	(10 to 65) W		
	(0.3 to 10) mW	0.089 % of reading	
	10 mW to 33 W	0.077 % of reading	
AC Power – Source [1,2]			
PF = 1			
(33 to 90) mA	(10 to 65) Hz		
	(1 to 30) mW	0.071 % of reading	
	30 mW to 90 W	0.057 % of reading	
(90 to 330) mA	(10 to 65) Hz		
	(3 to 100) mW	0.089 % of reading	
	100 mW to 300 W	0.078 % of reading	
330 mA to 0.9 A	(10 to 65) Hz		
	(11 to 300) mW	0.071 % of reading	Comparison to Fluke 5522A Multiproduct Calibrator
	300 mW to 900 W	0.081 % of reading	
(0.9 to 2.2) A	(10 to 65) Hz		
	30 mW to 0.72 W	0.089 % of reading	
	0.72 W to 2 kW	0.079 % of reading	
(2.2 to 4.5) A	(10 to 65) Hz		
	80 mW to 1.4 W	0.088 % of reading	
	1.4 W to 4.5 kW	0.18 % of reading	
(4.5 to 20.5) A	(10 to 65) Hz		
	150 mW to 6.7 W	0.17 % of reading	
	6.7 W to 20 kW	0.17 % of reading	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Phase – Source [1]	(0 to 180)° (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 20) kHz	 0.11° 0.2° 0.4° 1.9° 3.9° 7.8°	Comparison to Fluke 5522A Multiproduct Calibrator
Phase – Measure [1]	20 Hz to 50 kHz (0 to 360)°	 0.19°	Comparison to Krohn Hite 6400A Phase Meter
Oscilloscopes [1,3]			Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
Amplitude – DC			
into 50 Ω load	(-6.6 to 6.6) V	0.22 % of reading + 31 µV	
into 1 MΩ load	(-130 to 130) V	0.12 % of reading + 31 µV	
Amplitude – Square Wave			
into 50 Ω load	10 Hz to 100 kHz 1 mVp-p to 6.6 Vp-p	 0.22 % of reading + 31 µV	
into 1 MΩ load	10 Hz to 1 kHz 1 mVp-p to 130 Vp-p (1 kHz to 10) kHz 1 mVp-p to 130 Vp-p	 0.14 % of reading + 31 µV 0.22 % of reading + 31 µV	
Time Markers			
into 50 Ω load	1 ns to 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s 2 s 5 s	0.000 22 % of reading 0.005 9 % of reading 0.009 8 % of reading 0.018 % of reading 0.041 % of reading 0.08 % of reading 0.16 % of reading 0.39 % of reading	
Rise Time			
into 50 Ω load	5 mVp-p to 2.5 Vp-p		
Rate: 1 kHz to 2 MHz	(200 to 300) ps	50 ps	
Rate: 2 MHz to 10 MHz	(250 to 350) ps	50 ps	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes [1,3]			Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
Leveled Sine Wave			
into 50 Ω load	5 mVp-p to 5.5 Vp-p		
	50 kHz	1.8 % of reading + 0.23 mV	
	50 kHz to 100 MHz	2.8 % of reading + 0.23 mV	
	(100 to 300) MHz	3.2 % of reading + 0.23 mV	
	(300 to 600) MHz	4 % of reading + 0.23 mV	
	5.0 mVp-p to 3.5 Vp-p		
	600 MHz to 1.1 GHz	5.5 % of reading + 0.23 mV	
Bandwidth/Flatness (50 kHz Reference)			
into 50 Ω load	5 mVp-p to 5.5 Vp-p		
	50 kHz to 100 MHz	1.4 % of reading + 78 µV	
	(100 to 300) MHz	1.8 % of reading + 78 µV	
	(300 to 600) MHz	3.2 % of reading + 78 µV	
	5.0 mVp-p to 3.5 Vp-p		
	600 MHz to 1.1 GHz	4.0 % of reading + 78 µV	
Input Impedance – Measure	(40 to 60) Ω	0.082 % of reading	
	500 kΩ to 1.5 MΩ	0.081 % of reading	
Input Capacitance – Measure	(5 to 50) pF	3.9 % of reading + 0.39 pF	
Oscilloscopes [1,3]			
Waveform Generator (Sine, Square, Triangle)			
Amplitude	10 Hz to 10 kHz		
into 50 Ω load	1.8 mVp-p to 2.5 Vp-p	2.3 % of reading + 78 µV	
into 1 MΩ load	1.8 mVp-p to 55 Vp-p	2.3 % of reading + 78 µV	
Frequency	10 Hz to 10 kHz	0.001 9 % of reading + 12 mHz	

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Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers [1]			Comparisons to
Travel (Outside, Inside, Depth, Step)	(0.05 to 1) in	(13 + 1*L*) µin	Gage Blocks,
	(1 to 9) in	(8 + 5*L*) µin	
	(4 to 15) in	(10 + 5*L*) µin	Long Gage Blocks
	(15 to 40) in	(11 + 5*L*) µin	
Jaw Flatness	Up to 1 in*D*	4.4 µin	Optical Flats
Jaw Parallelism	Up to 1 in*D*	34 µin	Gage Pins
Micrometers [1]			Comparisons to
Travel (Outside, Inside, Depth)	(0.05 to 1) in	(13 + 1*L*) µin	Gage Blocks,
	(1 to 9) in	(8 + 5*L*) µin	
	(4 to 15) in	(10 + 5*L*) µin	Long Gage Blocks
	(15 to 40) in	(11 + 5*L*) µin	
Anvil Flatness	Up to 1 in*D*	4.4 µin	Optical Flats
Anvil Parallelism	Up to 1 in*D*	6.5 µin	Optical Parallels
Indicators [1,3] Digital, Dial, Drop, Test	(0 to 0.05) in	5.6 µin	Comparison to Universal Length Measuring Machine
Indicators [1,3] Digital, Dial, Drop, Test	up to 1 in	34 µin	Comparison to
	(1 to 5) in	(60 + 2*L*) µin	Gage Blocks, Stand
Length Single Axis [3]			
Outside Dimension	(0 to 1) in	(7.3 + 1*L*) µin	
	(1 to 7) in	(5.3 + 3.3*L*) µin	
	(7 to 12) in	(2 + 4*L*) µin	Comparison to Universal Length Measuring Machine
Inside Dimension	(0.04 to 1) in	(10 + 1*L*) µin	
	(1 to 2.5) in	(10 + 4*L*) µin	
	(2.5 to 10) in	(15 + 3*L*) µin	
	(10 to 14) in	(27 + 3*L*) µin	
Thread Wires	2 TPI to 120 TPI (0.008 33 to 0.5) in	12 µin	Comparison to Universal Length Measuring Machine

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Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Cylindrical Plug Gages [4] (Outside Diameter)	Up to 1 in (1 to 7) in	13 µin (11 + 3*L*) µin	Comparison to Universal Length Measuring Machine
Pin Gages (Outside Diameter)	(0.01 to 0.04) in (0.04 to 0.5) in (0.5 to 1) in (1 to 2) in	40 µin 39 µin 39 µin 41 µin	Non-contact Method using Laser Micrometer.
Optical Comparators [3] Length Squareness	Up to 8 in (0.04 to 1) in	(100 + 14*L*) µin (120 + 1.5*L*) µin	Comparisons to Calibration Grids Calibration Grids
Thread Plug Gages [3] Pitch Diameter, 60° Thread Major Diameter Step Height	 Up to 1 in (1 to 4) in (4 to 7) in Up to 1 in (1 to 7) in Up to 1 in	 82 µin 84 µin 88 µin 36 µin (33 + 3*L*) µin 62 µin	Comparisons to Master Thread Wires, Super-micrometer® Model C Gage Blocks, Test Stand
Thread Ring Gages Inner Pitch Diameter	Up to 1 in (1 to 4) in (4 to 7) in	88 µin 85 µin 93 µin	Tactile fit using Master Plug Gage
Ring Gages [3] Inside Diameter	(0.04 to 1) in (1 to 2.5) in (2.5 to 5) in	(9 + 1*L*) µin (10 + 3*L*) µin (15 + 3*L*) µin	Comparison to Universal Length Measuring Machine, Working Reference Rings
Tapered Thread Plug Pitch Diameter Taper	Up to 3 in	90 µin	Comparison to Universal Length Measuring Machine, Thread Wires

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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Drivers, Indicators [1]	(5 to 50) ozf·in (50 to 200) ozf·in (4 to 400) lbf·in	1.6 % of reading 0.98% of reading 0.56% of reading	Comparison to CDI Torque Measuring System
Torque Wrenches [1]	4 lbf·in to 600 lbf·ft	0.44% of reading	Comparison to CDI Torque Measuring System
Scales and Balances [1,7] (SI)	(1 to 5) g (5 to 20) g 20 g to 11 kg	40 µg 90 µg 0.000 31 % of reading	ASTM E617 Class 1 weights and internal calibration procedure utilized for calibration of the weighing system.
Scales and Balances [1,7] (Avoirdupois)	(5 to 350) lb	0.012 % of reading	NIST Class F weights and internal calibration procedure utilized for the calibration of the weighing system.
Pneumatic Pressure Devices (Gauge) at 20 °C	(-1 to 1) inH_2O	0.001 2 inH_2O	Comparison to Additel ADT761-LLP, Pressure Module
Pneumatic Pressure Devices (Gauge) at 20 °C	(-60 to -36) inH_2O (-36 to 36) inH_2O (36 to 60) inH_2O	0.01% of reading + 0.003 3 inH_2O 0.0048 inH_2O 0.01% of reading + 0.003 3 inH_2O	Comparison to Fluke 6720A Pressure Controller
Pneumatic Pressure Devices (Gauge)	(-14.5 to -4) psig (-4 to 8.5) psig (8.5 to 100) psig (100 to 300) psig (300 to 1 000) psig	0.01 % of reading + 0.002 2 psi 0.002 7 psi 0.01% of reading + 0.003 2 psi 0.038 psi 0.01 % of reading + 0.014 psi	Comparison to Fluke 6270A Pressure Controller
Hydraulic Pressure Devices (Gauge)	(1 000 to 10 000) psig	0.008 % of reading + 0.01 psi	Comparison to Deadweight Tester
Pneumatic Pressure Devices (Absolute)	Up to 4.5 psia (4.5 to 15) psia (15 to 30) psia (30 to 100) psia (100 to 300) psia (300 to 1 000) psia	0.001 6 psi 0.006 6 % of reading + 0.001 8 psi 0.006 6 % of reading + 0.003 2 psi 0.006 6 % of reading + 0.006 8 psi 0.086 psi 0.006 6 % of reading + 0.068 psi	Comparison to Fluke 6270A Pressure Controller

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Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Humidity – Measure [1]	(15 to 25) °C (10 to 90) %RH (90 to 98) %RH	 1.3 %RH 2 %RH	Direct measure using Master Thermohygrometer
Humidity – Generate	(-10 to 15) °C (10 to 75) %RH (75 to 95) %RH (15 to 35) °C (10 to 95) %RH (35 to 70) °C (10 to 50) %RH (50 to 75) %RH (75 to 95) %RH	 0.5 %RH 0.65 %RH 0.5 %RH 0.5 %RH 0.7 %RH 0.85 %RH	Comparison to Humidity Generator
Temperature – Measure [1]	(-195 to 155) °C (155 to 420) °C (420 to 660) °C	0.023 °C 0.033 °C 0.045 °C	Comparison to Fluke 1502A Temperature Readout, AccuMac AM1760 Secondary SPRT
Temperature – Source [1]	(-40 to 0) °C (0 to 100) °C (155 to 420) °C (420 to 660) °C	0.041 °C 0.02% of reading + 0.037°C 0.056% of reading + 0.064°C 0.071% of reading	Comparison to Fluke 1502A Temperature Readout, AccuMac AM1760 Secondary SPRT, Additel ADT878 Reference Dry Well Calibrator

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Reference	10 MHz	0.59 nHz/Hz	Comparison to Stanford Research FS725 Rubidium Frequency Oscillator

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Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Period – Source	(1 to 100) s	58 ns/s	Comparison to Keysight 33250A Function/Arbitrary Waveform Generator, Stanford Research FS725 Rubidium Frequency Oscillator
Period – Measure	(1 to 100) s	45 µs	Comparison to HP 53132A Universal Counter, Stanford Research FS725 Rubidium Frequency Oscillator
Frequency – Source	1 Hz to 80 MHz	58 nHz/Hz	Comparison to Keysight 33250A Function/Arbitrary Waveform Generator, Stanford Research FS725 Rubidium Frequency Oscillator
Frequency – Measure	1 Hz to 10 kHz 10 kHz to 10 MHz (10 to 225) MHz	0.64 nHz/Hz + 4.5 µHz 0.64 nHz/Hz + 5 µHz 0.64 nHz/Hz	Comparison to HP 53132A Universal Counter, Stanford Research FS725 Rubidium Frequency
AC Duty Cycle – Source [1] Square Wave: < 3.3 Vp-p Freq: 0.1 Hz to 100 kHz	(1 to 10) % Duty Cycle 10 µs to 100 s (10 to 49) % Duty Cycle 10 µs to 100 s 50 % Duty Cycle 10 µs to 100 s (51 to 90) % Duty Cycle 10 µs to 100 s (90 to 99) % Duty Cycle 10 µs to 100 s	 0.62 % of reading + 78 ns 0.039 % of reading + 78 ns 0.001 6 % of reading + 78 ns 0.039 % of reading + 78 ns 0.62 % of reading + 78 ns	Comparison to Fluke 5522A Multiproduct Calibrator

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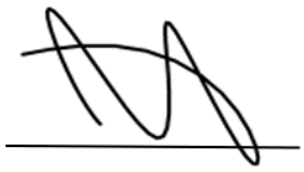
Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Non-Contact Rate of Rotation [5]	(5 to 99.999) rpm (100.00 to 999.99) rpm (1 000.0 to 9 999.9) rpm (10 000 to 99 999) rpm (100 000 to 200 000) rpm	0.012 % of reading + 0.0012 rpm 0.012 % of reading + 0.012 rpm 0.012 % of reading + 0.12 rpm 0.014 % of reading + 1.2 rpm 0.014 % of reading + 12 rpm	Comparison to Optical Tachometer
Stopwatches/Timers	Up to 599 s/mon	58 ms/d	Comparison to Vibrograf TM-4500 Timometer

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. The uncertainties shown are for the most favorable conditions. There is an increase in uncertainty that corresponds to the laboratory's AC voltage and current uncertainties at different frequencies other than the ones shown. Power factors (PF) other than the one shown contribute to the power uncertainty. PF is related to the cosine of phase. Therefore, uncertainties track the laboratory's phase uncertainty closely at PF near one but are magnified heavily as PF approaches zero. The lab may also report reactive power, apparent power, and power factor under this accreditation. If needed, contact the laboratory for more information regarding uncertainties at frequency and power factor combinations other than the ones shown.
3. Dimensional Lab Environment ± 2 °F.
4. The stated uncertainty is the laboratory's ability to source a fast rise pulse that is approximately 250 ps. In the typical application of measuring rise time of an oscilloscope, this value is one of the contributing factors, but other factors are derived from the DUT.
5. D = diameter; L = length in inches; rpm = revolutions per minute.
6. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
7. The CMC presented here does not include the Resolution of the Device Under Test (DUT). The Resolution will be added at the time of calibration in the Measurement Uncertainty (MU).
8. Unless otherwise specified in the far-right column, the calibration method/procedure utilized by the laboratory was developed internally.
9. The legal entity of this location is Transcat, Inc.



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