



# CERTIFICATE OF ACCREDITATION

**The ANSI National Accreditation Board**

Hereby attests that

**QRS Calibrations, LLC dba QRS Solutions**  
**4501 Waldemar Street**  
**Haltom City, TX 76177**  
(and satellite location as shown on the scope)

Fulfills the requirements of

**ISO/IEC 17025:2017**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

In the field of

**CALIBRATION**

This certificate is valid only when accompanied by a current scope of accreditation document.  
The current scope of accreditation can be verified at [www.anab.org](http://www.anab.org).

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 08 December 2022

Certificate Number: AC-2931



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)**

**QRS Calibrations, LLC dba QRS Solutions**

4501 Waldemar Street  
Haltom City, TX 76117  
Karie Heiselt 877-254-7086

**CALIBRATION**

Valid to: **December 8, 2022**

Certificate Number: **AC-2931**

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Capacitance – Source <sup>1</sup> (Fixed Points)	1 kHz		Transmille Multiproduct Calibrator
	1 nF	2.6 pF	
	2 nF	5.3 pF	
	5 nF	15 pF	
	10 nF	64 pF	
	100 nF	0.64 nF	
	1 μF	7.1 nF	
10 μF	85 nF		
Capacitance – Source <sup>1</sup> (Simulated)	1 kHz		Transmille Multiproduct Calibrator
	(0.95 to 9.5) μF	9.4 nF/μF + 0.11 nF	
	(9.5 to 95) μF	23 pF/μF + 89 nF	
	95 μF to 0.95 mF	7.9 μF/mF	
	(0.95 to 9.5) mF	7.2 μF/mF	
(9.5 to 100) mF	7.1 μF/mF + 0.6 μF		
AC Current – Source <sup>1</sup>	(20 to 202) μA		Transmille Multiproduct Calibrator
	(10 to 45) Hz	2 mA/A + 0.25 μA	
	45 Hz to 1 kHz	0.7 mA/A + 0.15 μA	
	(1 to 10) kHz	8 mA/A + 0.25 μA	
	(10 to 30) kHz	16 mA/A + 0.4 μA	
	(0.2 to 2.02) mA		
	(10 to 45) Hz	2 mA/A + 0.25 μA	
	45 Hz to 1 kHz	0.6 μA + 0.2 μA	
	(1 to 10) kHz	5 mA/A + 0.3 μA	
	(10 to 30) kHz	10 mA/A + 0.6 μA	

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source <sup>1</sup>	(2 to 20.2) mA (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz (20 to 202) mA (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz (0.2 to 2.02) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (2 to 30) A (10 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2 mA/A + 0.25 μA 0.7 mA/A + 0.15 μA 8 mA/A + 0.25 μA 16 mA/A + 0.4 μA 2 mA/A + 0.25 μA 0.6 mA/A + 0.2 μA 5 mA/A + 0.3 μA 10 mA/A + 0.6 μA 2 mA/A + 0.3 mA 0.6 mA/A + 0.2 mA 5 mA/A + 0.4 mA 6 mA/A + 1 mA 25 mA/A + 5 mA 2 mA/A + 3 mA 0.8 mA/A + 2 mA 3 mA/A + 4 mA 6 mA/A + 4 mA 30 mA/A + 5 mA	Transmille Multiproduct Calibrator
AC Current – Source <sup>1</sup> (Clamp-on Meters) 2-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 60 A (30 to 60) Hz Up to 60 A	3.7 mA/A + 10 mA 4.9 mA/A + 72 mA	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Source <sup>1</sup> (Clamp-on Meters) 10-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 300 A (30 to 60) Hz Up to 300 A	4.2 mA/A + 12 mA 6 mA/A + 0.112 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source <sup>1</sup> (Clamp-on Meters) 50-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 1 500 A (30 to 60) Hz Up to 1 500 A	2.6 mA/A + 42 mA 4.6 mA + 0.42 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Measure <sup>1</sup>	Up to 100 µA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (10 to 100) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) A (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) A (10 to 40) Hz 40 Hz to 1 kHz (10 to 30) A (10 to 40) Hz 40 Hz to 1 kHz	0.9 mA/A + 15 nA 0.5 mA/A + 12 nA 1.2 mA/A + 30 nA 0.9 mA/A + 0.15 µA 0.5 mA/A + 0.12 µA 1.2 mA/A + 0.3 µA 0.9 mA/A + 1.5 µA 0.5 mA/A + 1.2 µA 1.2 mA/A + 3 µA 0.9 mA/A + 15 µA 0.5 mA/A + 12 µA 1.2 mA/A + 30 µA 1.1 mA/A + 0.2 mA 0.7 mA/A + 0.15 mA 1.3 mA/A + 0.5 mA 1.6 mA/A + 4 mA 1.2 mA/A + 3 mA 1.6 mA/A + 12 mA 1.2 mA/A + 9 mA	Transmille 8.5 Digit Multimeter
DC Current – Source <sup>1</sup>	(0 to 202) µA (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A (2 to 20.2) A (20 to 30) A	0.1 mA/A + 10 nA 50 µA/A + 30 nA 50 µA/A + 0.2 µA 50 µA/A + 2 µA 0.13 mA/A + 30 µA 0.3 mA/A + 0.3 mA 0.5 mA/A + 0.45 mA	Transmille Multiproduct Calibrator



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**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Source <sup>1</sup> (Clamp-on Meters) 2-turn Coil Hall-effect Clamps	(0 to 60) A	4.9 mA/A + 72 mA	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Source <sup>1</sup> (Clamp-on Meters) 10-turn Coil Hall-effect Clamps	(0 to 300) A	6 mA/A + 0.11 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Source <sup>1</sup> (Clamp-on Meters) 50-turn Coil Hall-effect Clamps	(0 to 1 500) A	4.6 mA/A + 0.42 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Measure <sup>1</sup>	(0 to 10) nA (10 to 100) nA (0.1 to 1) μA (1 to 10) μA (10 to 100) μA (0.1 to 1) mA (1 to 1) mA (10 to 100) mA (0.1 to 1) A (1 to 10) A (10 to 30) A	0.86 nA 0.6 mA/A + 0.85 nA 24 μA/A + 0.91 nA 18 μA/A + 0.92 nA 13 μA/A + 0.97 nA 22 μA/A + 0.14 nA 1.8 mA/A - 1.8 μA 16 μA 0.31 mA/A - 25 μA 0.73 mA/A - 0.45 mA 1.3 mA/A - 5.7 mA	Transmille 8.5 Digit Multimeter
Inductance – Source <sup>1</sup> (Fixed Points)	1 kHz 1 mH 10 mH 20 mH 30 mH 50 mH 100 mH 1 H 10 H	17 μH 55 μH 0.11 mH 0.16 mH 0.28 mH 0.79 mH 5.1 mH 52 mH	Transmille Multiproduct Calibrator
Resistance – Source <sup>1</sup> (Fixed Points) 4-wire Configuration	0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ	7.1 mΩ 7.1 mΩ 7.3 mΩ 9.3 mΩ 32 mΩ 0.21 Ω 7.4 Ω	Transmille Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source <sup>1</sup> (Fixed Points) 2-wire Configuration	1 MΩ 10 MΩ 100 MΩ 1 GΩ	40 Ω 1.3 kΩ 230 kΩ 13 MΩ	Transmille Multiproduct Calibrator
Resistance – Source <sup>1</sup> (Simulated)	(0 to 100) Ω (100 to 330) Ω (0.33 to 1) kΩ (1 to 3.3) kΩ (3.3 to 10) kΩ (10 to 33) kΩ (33 to 100) kΩ (100 to 330) kΩ (0.33 to 1) MΩ (1 to 3.3) MΩ (3.3 to 10) MΩ (10 to 33) MΩ (33 to 100) MΩ (100 to 330) MΩ (0.33 to 1) GΩ	0.1 mΩ/Ω + 5 mΩ 0.1 mΩ/Ω + 52 mΩ 0.2 mΩ/Ω + 30 mΩ 0.1 mΩ/Ω + 89 mΩ 0.2 mΩ/Ω - 44 mΩ 0.1 mΩ/Ω + 0.37 Ω 0.2 mΩ/Ω - 0.9 Ω 0.1 mΩ/Ω + 3.2 Ω 0.2 mΩ/Ω - 9.2Ω 0.1 mΩ/Ω + 19 Ω 0.2 mΩ/Ω - 79 Ω 0.5 mΩ/Ω - 3.7 kΩ 2.1 mΩ/Ω - 51 kΩ 16 mΩ/Ω - 1.4 MΩ 27 mΩ/Ω - 48 MΩ	Transmille Multiproduct Calibrator
Resistance – Measure <sup>1</sup>	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	38 μΩ/Ω + 10 μΩ 21.3 μΩ/Ω + 27 μΩ 17.3 μΩ/Ω + 67 μΩ 14.3 μΩ/Ω + 1.7 mΩ 18.7 μΩ/Ω + 3.3 mΩ 33 μΩ/Ω + 11 mΩ 24 μΩ/Ω + 0.9 Ω 46 μΩ/Ω - 21 Ω	Transmille 8.5 Digit Multimeter
Resistance – Measure <sup>1</sup> (Electrometer Function) 2-wire Configuration	50 V (5 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ 1 GΩ to 1 TΩ 100 V (8 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ 1 GΩ to 1 TΩ	2 kΩ 0.7 mΩ/Ω - 4.9 kΩ 2.8 mΩ/Ω - 218 kΩ 33 mΩ/Ω - 30.4 kΩ 2 kΩ 0.63 mΩ/Ω - 4.3 kΩ 2.8 mΩ/Ω - 223 kΩ 6 mΩ/Ω - 3.4 MΩ	Transmille 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
Resistance – Measure <sup>1</sup> (Electrometer Function) 2-wire Configuration	150 V (12 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ  200 V (20 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ  250 V (25 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ  300 V (30 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ	19 kΩ 0.7 mΩ/Ω – 51 kΩ 3 mΩ/Ω – 2.9 MΩ 25.2 mΩ – 225 MΩ  19 kΩ 0.7 mΩ/Ω – 47 kΩ 2.8 mΩ/Ω – 2.2 MΩ 21.2 mΩ/Ω – 186 MΩ  19 kΩ 0.7 mΩ/Ω – 47 kΩ 2.8 mΩ/Ω – 2.2 MΩ 19.2 mΩ/Ω – 166 MΩ  19 kΩ 0.7 mΩ/Ω – 44.4 kΩ 3 mΩ/Ω – 2.2 MΩ 17 mΩ/Ω – 16.5 MΩ	Transmille 8.5 Digit Multimeter
Electrical Simulation of RTD Indicating Devices – Source (Passive) <sup>1</sup> 2-wire Configuration	Pt 100 -100 °C 0 °C 30 °C 60 °C 100 °C 200 °C 300 °C 800 °C	0.007 °C 0.011 °C 0.014 °C 0.015 °C 0.016 °C 0.02 °C 0.027 °C 0.074 °C	Transmille Multiproduct Calibrator





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**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Measure <sup>1</sup> 4-wire Configuration Normal Current Mode	Pt 100 (-100 to 0) °C (0 to 800) °C	0.002 % of reading + 0.003 °C 0.005 % of reading + 0.003 °C	Transmille Multiproduct Calibrator
Low Current Mode	(-100 to 0) °C (0 to 800) °C	0.005 % of reading + 0.007 °C 0.006 % of reading + 0.007 °C	
AC Voltage – Source <sup>1</sup>	Up to 202 mV (10 to 45) Hz	0.8 mV/V + 15 µV	Transmille Multiproduct Calibrator
	45 Hz to 1 kHz	0.16 mV/V + 15 µV	
	(1 to 20) kHz	200 µV/V + 28 µV	
	(20 to 100) kHz	1 mV/V + 40 µV	
	(100 to 500) kHz	4 mV/V + 0.1 mV	
	200 mV to 2.02 V (10 to 45) Hz	0.5 mV/V + 0.18 mV	
	45 Hz to 1 kHz	0.16 mV/V + 0.12 mV	
	(1 to 20) kHz	0.21 mV/V + 0.18 mV	
	(20 to 100) kHz	0.65 mV/V + 0.3 mV	
	(0.1 to 1) MHz	3 mV/V + 0.45 mV	
	(2 to 20.2) V (10 to 45) Hz	0.5 mV/V + 1.6 mV	
	45 Hz to 1 kHz	0.16 mV/V + 1 mV	
	(1 to 20) kHz	0.21 mV/V + 1.6 mV	
	(20 to 100) kHz	0.6 mV/V + 3 mV	
(20 to 202) V (10 to 45) Hz	0.5 mV/V + 20 mV		
45 Hz to 1 kHz	0.15 mV/V + 12 mV		
(1 to 10) kHz	0.2 mV/V + 16 mV		
(10 to 40) kHz	0.3 mV/V + 30 mV		
(40 to 100) kHz	2 mV/V + 50 mV		
(200 to 1 020) V (10 to 45) Hz	0.55 mV/V + 0.2 V		
45 Hz to 1 kHz	0.2 mV/V + 60 mV		
(1 to 20) kHz	0.25 mV/V + 0.12 V		
(20 to 100) kHz	0.3 mV/V + 0.2 V		





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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure <sup>1</sup>	Up to 105 mV		Transmille 8.5 Digit Multimeter
	(10 to 40) Hz	0.8 mV/V + 0.15 mV	
	(40 to 200) Hz	0.3 mV/V + 9 μV	
	200 Hz to 1 kHz	0.3 mV/V + 8 μV	
	(1 to 2) kHz	0.3 mV/V + 8 μV	
	(2 to 20) kHz	0.4 mV/V + 10 μV	
	(20 to 100) kHz	0.9 mV/V + 50 μV	
	105 mV to 1.05 V		
	(10 to 40) Hz	0.6 mV/V + 0.15 mV	
	(40 to 200) Hz	0.3 mV/V + 60 μV	
	200 Hz to 1 kHz	0.2 mV/V + 60 μV	
	(1 to 2) kHz	0.2 mV/V + 60 μV	
	(2 to 20) kHz	0.4 mV/V + 0.1 mV	
	(20 to 100) kHz	0.9 mV/V + 0.5 mV	
	100 kHz to 1 MHz	15.6 mV/V + 25 mV	
	(1.05 to 10.5) V		
	(10 to 40) Hz	0.6 mV/V + 1.5 mV	
	(40 to 200) Hz	0.3 mV/V + 0.6 mV	
	200 Hz to 1 kHz	0.2 mV/V + 0.6 mV	
	(1 to 2) kHz	0.2 mV/V + 0.6 mV	
	(2 to 20) kHz	0.4 mV/V + 1 mV	
	(20 to 100) kHz	0.9 mV/V + 5 mV	
	(100 to 500) kHz	15.6 mV/V + 0.25 V	
	(10.5 to 105) V		
	(10 to 40) Hz	0.8 mV/V + 15 mV	
	(40 to 200) Hz	0.3 mV/V + 9 mV	
	200 Hz to 1 kHz	0.3 mV/V + 7 mV	
(1 to 2) kHz	0.3 mV/V + 7 mV		
(2 to 20) kHz	0.5 mV/V + 10 mV		
(20 to 50) kHz	1.2 mV/V + 50 mV		
(105 to 1 050) V			
(10 to 40) Hz	0.8 mV/V + 0.15 V		
(40 to 200) Hz	0.3 mV/V + 90 mV		
200 Hz to 1 kHz	0.3 mV/V + 70 mV		
(1 to 2) kHz	0.3 mV/V + 70 mV		
(2 to 10) kHz	0.5 mV/V + 0.1 V		
DC Voltage – Source <sup>1</sup>	(0 to 202) mV	15 μV/V + 2 μV	Transmille Multiproduct Calibrator
	(0.2 to 2.02) V	9 μV/V + 2.5 μV	
	(2 to 20.2) V	8 μV/V + 24 μV	
	(20 to 202) V	12 μV/V + 0.24 mV	
	(200 to 1 025) V	12 μV/V + 2.4 mV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Measure <sup>1</sup>	(0 to 120) mV (0.12 to 1.2) V (1.2 to 12) V (12 to 120) V (120 to 1 050) V	9 μV/V + 0.17 μV 6.4 μV/V + 0.6 μV 6.8 μV/V + 6 μV 9.5 μV/V + 80 μV 9.5 μV/V + 1.2 mV	Transmille 8.5 Digit Multimeter
Electrical Simulation of Thermocouple Indicators – Source <sup>1</sup>	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C Type E -250 to -100 °C -100 to -25 °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C Type J (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C Type K (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1 000 to 1 370) °C Type L (-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.89 0.78 0.65 0.66 0.38 0.33 0.39 0.56 0.59 0.13 0.12 0.15 0.18 0.28 0.14 0.12 0.17 0.23 0.33 0.19 0.14 0.24 0.31 0.41 0.39 0.4	Transmille Multiproduct Calibrator w/ Thermocouple Adapter

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators – Source <sup>1</sup>	Type N (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1 300) °C Type R (0 to 250) °C (250 to 1 000) °C (1 000 to 1 760) °C Type S (0 to 250) °C (250 to 1 000) °C (1 000 to 1 760) °C Type T (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C Type U (-200 to 0) °C (0 to 600) °C	0.51 0.25 0.2 0.19 0.19 0.98 0.53 0.62 0.98 0.53 0.62 0.72 0.13 0.12 0.14 0.5 0.36	Transmille Multiproduct Calibrator w/ Thermocouple Adapter
Electrical Simulation of Thermocouple Indicators – Measure <sup>1</sup>	Type B (300 to 500) °C (500 to 1 820) °C Type E (0 to 800) °C Type J (-210 to 1 200) °C Type K (-140 to 1 340) °C Type N (-200 to 1 300) °C Type R (-50 to 600) °C (600 to 1 760) °C Type S (0 to 1 760) °C Type T (-200 to 400) °C	0.3 °C 0.18 °C 0.07 °C 0.11 °C 0.11 °C 0.11 °C 0.11 °C 0.59 °C 0.22 °C 0.18 °C 0.11 °C	Transmille 8.5 Digit Multimeter

### Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass Determination <sup>2</sup>	0.5 mg to 120 g (120 to 8 000) g (8 to 60) kg	0.001 2 % of reading + 0.8 mg 0.001 8 % of reading + 8 mg 28 g	Mettler-Toledo Analytical Balances
Pressure Devices	(-12 to -0.7) psig (0.7 to 15) psig (10 to 400) psig	0.024 % of reading + 0.000 5 psi 0.025 % of reading + 0.000 4 psi 0.033 % of reading + 0.000 4 psi	DH-Budenberg Deadweight Tester

### Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure <sup>1</sup>	(-75 to -38) °C (-37 to 0) °C (0 to 250) °C	0.033 °C 0.029 °C 0.03 °C	Isotech Precision Thermometer w/ PRT Probe

### Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source <sup>1</sup>	10 MHz	8.2 nHz	Transmille GPS Frequency Standard
Frequency – Source/Measure <sup>1</sup>	1 Hz to 1 GHz	0.000 024 % of reading	Transmille GPS Frequency Standard, Agilent Universal Counter
Non-contact Tachometers <sup>1</sup> (Photo)	(240 to 60 000) rpm	0.005 % of reading	Transmille Multiproduct Calibrator w/ Optical Tachometer Adaptor
Timers and Stopwatches <sup>1</sup>	1 ms to 86 000 s	0.58 μs/s + 4 ms	Agilent Universal Counter, Transmille GPS Frequency Standard

### Services performed at satellite location

22620 Goldencrest Drive  
 Building D119  
 Moreno Valley, CA 92553  
 Karie Heiselt 877-254-7086

#### Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source <sup>1</sup> (Fixed Points)	1 kHz		Transmille Multiproduct Calibrator
	1 nF	6.5 pF	
	2 nF	26 pF	
	5 nF	62 pF	
	10 nF	87 pF	
	100 nF	0.52 nF	
	1 μF	8.2 nF	
10 μF	0.12 μF		
Capacitance – Source <sup>1</sup> (Simulated)	1 kHz		Transmille Multiproduct Calibrator
	(0.95 to 9.5) μF	15 nF	
	(9.5 to 95) μF	0.2 % of reading + 12 nF	
	95 μF to 0.95 mF	0.4 % of reading	
	(0.95 to 9.5) mF	0.13 % of reading + 1.9 μF	
(9.5 to 100) mF	0.07 % of reading + 7.7 μF		
AC Current – Source <sup>1</sup>	(20 to 202) μA		Transmille Multiproduct Calibrator
	(10 to 45) Hz	2 mA/A + 0.25 μA	
	45 Hz to 1 kHz	0.7 mA/A + 0.15 μA	
	(1 to 10) kHz	8 mA/A + 0.25 μA	
	(10 to 30) kHz	16 mA/A + 0.4 μA	
	(0.2 to 2.02) mA		
	(10 to 45) Hz	2 mA/A + 0.25 μA	
	45 Hz to 1 kHz	0.6 μA + 0.2 μA	
	(1 to 10) kHz	5 mA/A + 0.3 μA	
	(10 to 30) kHz	10 mA/A + 0.6 μA	
	(2 to 20.2) mA		
	(10 to 45) Hz	2 mA/A + 0.25 μA	
	45 Hz to 1 kHz	0.7 mA/A + 0.15 μA	
	(1 to 10) kHz	8 mA/A + 0.25 μA	
	(10 to 30) kHz	16 mA/A + 0.4 μA	

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source <sup>1</sup>	(20 to 202) mA (10 to 45) Hz 45 Hz to 1 kHz (1 to 10) kHz (10 to 30) kHz (0.2 to 2.02) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (2 to 30) A (10 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2 mA/A + 0.25 μA 0.6 mA/A + 0.2 μA 5 mA/A + 0.3 μA 10 mA/A + 0.6 μA 2 mA/A + 0.3 mA 0.6 mA/A + 0.2 mA 5 mA/A + 0.4 mA 6 mA/A + 1 mA 25 mA/A + 5 mA 2 mA/A + 3 mA 0.8 mA/A + 2 mA 3 mA/A + 4 mA 6 mA/A + 4 mA 30 mA/A + 5 mA	Transmille Multiproduct Calibrator
AC Current – Source <sup>1</sup> (Clamp-on Meters) 2-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 60 A (30 to 60) Hz Up to 60 A	3.7 mA/A + 10 mA 4.9 mA/A + 72 mA	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Source <sup>1</sup> (Clamp-on Meters) 10-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 300 A (30 to 60) Hz Up to 300 A	4.2 mA/A + 12 mA 6 mA/A + 0.112 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Source <sup>1</sup> (Clamp-on Meters) 50-turn Coil Wound Clamps Hall-effect Clamps	(30 to 60) Hz Up to 1 500 A (30 to 60) Hz Up to 1 500 A	2.6 mA/A + 42 mA 4.6 mA + 0.42 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure <sup>1</sup>	Up to 100 $\mu$ A (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (10 to 100) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) A (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) A (10 to 40) Hz 40 Hz to 1 kHz (10 to 30) A (10 to 40) Hz 40 Hz to 1 kHz	0.9 mA/A + 15 nA 0.5 mA/A + 12 nA 1.2 mA/A + 30 nA 0.9 mA/A + 0.15 $\mu$ A 0.5 mA/A + 0.12 $\mu$ A 1.2 mA/A + 0.3 $\mu$ A 0.9 mA/A + 1.5 $\mu$ A 0.5 mA/A + 1.2 $\mu$ A 1.2 mA/A + 3 $\mu$ A 0.9 mA/A + 15 $\mu$ A 0.5 mA/A + 12 $\mu$ A 1.2 mA/A + 30 $\mu$ A 1.1 mA/A + 0.2 mA 0.7 mA/A + 0.15 mA 1.3 mA/A + 0.5 mA 1.6 mA/A + 4 mA 1.2 mA/A + 3 mA 1.6 mA/A + 12 mA 1.2 mA/A + 9 mA	Transmille 8.5 Digit Multimeter
DC Current – Source <sup>1</sup>	(0 to 202) $\mu$ A (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A (2 to 20.2) A (20 to 30) A	0.1 mA/A + 10 nA 50 $\mu$ A/A + 30 nA 50 $\mu$ A/A + 0.2 $\mu$ A 50 $\mu$ A/A + 2 $\mu$ A 0.13 mA/A + 30 $\mu$ A 0.3 mA/A + 0.3 mA 0.5 mA/A + 0.45 mA	Transmille Multiproduct Calibrator
DC Current – Source <sup>1</sup> (Clamp-on Meters) 2-turn Coil Hall-effect Clamps	(0 to 60) A	4.9 mA/A + 72 mA	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Source <sup>1</sup> (Clamp-on Meters) 10-turn Coil Hall-effect Clamps	(0 to 300) A	6 mA/A + 0.11 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor



**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Source <sup>1</sup> (Clamp-on Meters) 50-turn Coil Hall-effect Clamps	(0 to 1 500) A	4.6 mA/A + 0.42 A	Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Measure <sup>1</sup>	(0 to 12) nA (10 to 120) nA (0.1 to 1.2) $\mu$ A (1 to 12) $\mu$ A (10 to 120) $\mu$ A (0.1 to 1.2) mA (1 to 12) mA (10 to 120) mA (0.1 to 1.2) A (1 to 12) A (10 to 30.5) A	15.1 $\mu$ A/A + 0.8 pA 3.1 $\mu$ A/A + 3.4 pA 0.34 $\mu$ A/A + 17 pA 50 $\mu$ A/A + 0.1 nA 14 $\mu$ A/A + 0.4 nA 14 $\mu$ A/A + 4 nA 16 $\mu$ A/A + 40 nA 47 $\mu$ A/A + 0.6 $\mu$ A 0.23 mA/A + 13 $\mu$ A 0.56 mA/A + 0.35 mA 0.76 mA/A + 0.43 A	Transmille 8.5 Digit Multimeter
Resistance – Source <sup>1</sup> (Fixed Points) 4-wire Configuration	0.1 $\Omega$ 1 $\Omega$ 10 $\Omega$ 100 $\Omega$ 1 k $\Omega$ 10 k $\Omega$ 100 k $\Omega$	7.8 m $\Omega$ 7.8 m $\Omega$ 7.9 m $\Omega$ 10 m $\Omega$ 32 m $\Omega$ 0.22 $\Omega$ 3.2 $\Omega$	Transmille Multiproduct Calibrator
2-wire Configuration	1 M $\Omega$ 10 M $\Omega$ 100 M $\Omega$ 1 G $\Omega$	42 $\Omega$ 1.4 k $\Omega$ 250 k $\Omega$ 13 M $\Omega$	
Resistance – Source <sup>1</sup> (Simulated)	(0 to 100) $\Omega$ (100 to 330) $\Omega$ (0.33 to 1) k $\Omega$ (1 to 3.3) k $\Omega$ (3.3 to 10) k $\Omega$ (10 to 33) k $\Omega$ (33 to 100) k $\Omega$ (100 to 330) k $\Omega$ (0.33 to 1) M $\Omega$	0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$ 0.1 m $\Omega$ / $\Omega$ + 50 m $\Omega$	Transmille Multiproduct Calibrator



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**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source <sup>1</sup> (Simulated)	(1 to 3.3) MΩ (3.3 to 10) MΩ (10 to 33) MΩ (33 to 100) MΩ (100 to 330) MΩ (0.33 to 1) GΩ	0.1 mΩ/Ω + 50 mΩ 0.1 mΩ/Ω + 50 Ω 0.1 mΩ/Ω + 2.5 kΩ 0.5 mΩ/Ω + 0.1 MΩ 1 mΩ/Ω + 0.1 MΩ 2 mΩ/Ω + 0.5 MΩ	Transmille Multiproduct Calibrator
Resistance – Measure <sup>1</sup>	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	37.8 μΩ/Ω + 10 μΩ 21.3 μΩ/Ω + 27 μΩ 17.3 μΩ/Ω + 67 μΩ 14.3 μΩ/Ω + 1.7 mΩ 18.7 μΩ/Ω + 3.3 mΩ 32.9 μΩ/Ω + 11 mΩ 24 μΩ/Ω + 0.9 Ω 46.1 μΩ/Ω – 21 Ω	Transmille 8.5 Digit Multimeter
Resistance – Measure <sup>1</sup> (Electrometer Function) 2-wire Configuration	50 V (5 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ 1 GΩ to 1 TΩ 100 V (8 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ 1 GΩ to 1 TΩ 150 V (12 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ 200 V (20 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ	2 kΩ 0.7 mΩ/Ω – 4.9 kΩ 2.8 mΩ/Ω – 218 kΩ 33 mΩ/Ω – 30.4 kΩ 2 kΩ 0.63 mΩ/Ω – 4.3 kΩ 2.8 mΩ/Ω – 224 kΩ 6 mΩ/Ω – 3.4 MΩ 19 kΩ 0.7 mΩ/Ω – 51 kΩ 3 mΩ/Ω – 2.9 MΩ 25.2 mΩ – 225.3 MΩ 19 kΩ 0.67 mΩ/Ω – 47 kΩ 2.8 mΩ/Ω – 2.2 MΩ 21.2 mΩ/Ω – 186 MΩ	Transmille 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
Resistance – Measure <sup>1</sup> (Electrometer Function) 2-wire Configuration	250 V (25 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ 300 V (30 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ 10 GΩ to 1 TΩ	19 kΩ 0.7 mΩ/Ω – 47 kΩ 2.8 mΩ/Ω – 2.2 MΩ 19.2 mΩ/Ω – 166 MΩ 19 kΩ 0.6 mΩ/Ω – 44.4 kΩ 2.8 mΩ/Ω – 2.2 MΩ 17 mΩ/Ω – 16.4 MΩ	Transmille 8.5 Digit Multimeter
Electrical Simulation of RTD Indicating Devices – Source (Passive) <sup>1</sup> 2-wire Configuration	Pt 100 -100 °C 0 °C 30 °C 60 °C 100 °C 200 °C 300 °C 800 °C	0.007 °C 0.011 °C 0.014 °C 0.015 °C 0.016 °C 0.02 °C 0.027 °C 0.074 °C	Transmille Multiproduct Calibrator
Electrical Simulation of RTD Indicating Devices – Measure <sup>1</sup> 4-wire Configuration Normal Current Mode Low Current Mode	Pt 100 (-100 to 0) °C (0 to 800) °C  (-100 to 0) °C (0 to 800) °C	0.002 % of reading + 0.003 °C 0.005 % of reading + 0.003 °C  0.005 % of reading + 0.007 °C 0.006 % of reading + 0.007 °C	Transmille Multiproduct Calibrator

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source <sup>1</sup>	Up to 202 mV		Transmille Multiproduct Calibrator
	(10 to 45) Hz	0.8 mV/V + 15 μV	
	45 Hz to 1 kHz	0.16 mV/V + 15 μV	
	(1 to 20) kHz	200 μV/V + 28 μV	
	(20 to 100) kHz	1 mV/V + 40 μV	
	(100 to 500) kHz	4 mV/V + 0.1 mV	
	(0.2 to 2.02) V		
	(10 to 45) Hz	0.5 mV/V + 0.18 mV	
	45 Hz to 1 kHz	0.16 m V/V + 0.12 mV	
	(1 to 20) kHz	0.21 mV/V + 0.18 mV	
	(20 to 100) kHz	0.65 mV/V + 0.3 mV	
	100 kHz to 1 MHz	3 mV/V + 0.45 mV	
	(2 to 20.2) V		
	(10 to 45) Hz	0.5 mV/V + 1.6 mV	
	45 Hz to 1 kHz	0.16 mV/V + 1 mV	
	(1 to 20) kHz	0.21 mV/V + 1.6 mV	
(20 to 100) kHz	0.6 mV/V + 3 mV		
(20 to 202) V			
(10 to 45) Hz	0.5 mV/V + 20 mV		
45 Hz to 1 kHz	0.15 mV/V + 12 mV		
(1 to 10) kHz	0.2 mV/V + 16 mV		
(10 to 40) kHz	0.3 mV/V + 30 mV		
(40 to 100) kHz	2 mV/V + 50 mV		
(200 to 1 020) V			
(10 to 45) Hz	0.55 mV/V + 0.2 V		
45 Hz to 1 kHz	0.2 mV/V + 60 mV		
(1 to 20) kHz	0.25 mV/V + 0.12 V		
(20 to 100) kHz	0.3 mV/V + 0.2 V		
AC Voltage – Measure <sup>1</sup>	Up to 100 mV		Transmille 8.5 Digit Multimeter
	(10 to 40) Hz	0.8 mV/V + 15 μV	
	(40 to 200) Hz	0.3 mV/V + 9 μV	
	200 Hz to 1 kHz	0.3 mV/V + 8 μV	
	(1 to 2) kHz	0.3 mV/V + 8 μV	
	(2 to 20) kHz	0.4 mV/V + 10 μV	
	(20 to 100) kHz	0.9 mV/V + 50 μV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure <sup>1</sup>	Up to 105 mV		Transmille 8.5 Digit Multimeter
	(10 to 40) Hz	0.8 mV/V + 0.15 mV	
	(40 to 200) Hz	0.3 mV/V + 9 μV	
	200 Hz to 1 kHz	0.3 mV/V + 8 μV	
	(1 to 2) kHz	0.3 mV/V + 8 μV	
	(2 to 20) kHz	0.4 mV/V + 10 μV	
	(20 to 100) kHz	0.9 mV/V + 50 μV	
	(0.105 to 1.05) V		
	(10 to 40) Hz	0.6 mV/V + 0.15 mV	
	(40 to 200) Hz	0.3 mV/V + 60 μV	
	200 Hz to 1 kHz	0.2 mV/V + 60 μV	
	(1 to 2) kHz	0.2 mV/V + 60 μV	
	(2 to 20) kHz	0.4 mV/V + 0.1 mV	
	(20 to 100) kHz	0.9 mV/V + 0.5 mV	
	100 kHz to 1 MHz	15.6 mV/V + 25 mV	
	(1.05 to 10.5) V		
	(10 to 40) Hz	0.6 mV/V + 1.5 mV	
	(40 to 200) Hz	0.3 mV/V + 0.6 mV	
	200 Hz to 1 kHz	0.2 mV/V + 0.6 mV	
	(1 to 2) kHz	0.2 mV/V + 0.6 mV	
	(2 to 20) kHz	0.4 mV/V + 1 mV	
	(20 to 100) kHz	0.9 mV/V + 5 mV	
	(100 to 500) kHz	15.6 mV/V + 0.25 V	
	(10.5 to 105) V		
	(10 to 40) Hz	0.8 mV/V + 15 mV	
	(40 to 200) Hz	0.3 mV/V + 9 mV	
	200 Hz to 1 kHz	0.3 mV/V + 7 mV	
	(1 to 2) kHz	0.3 mV/V + 7 mV	
(2 to 20) kHz	0.5 mV/V + 10 mV		
(20 to 50) kHz	1.2 mV/V + 50 mV		
(105 to 1 050) V			
(10 to 40) Hz	0.8 mV/V + 0.15 V		
(40 to 200) Hz	0.3 mV/V + 90 mV		
200 Hz to 1 kHz	0.3 mV/V + 70 mV		
(1 to 2) kHz	0.3 mV/V + 70 mV		
(2 to 10) kHz	0.5 mV/V + 0.1 V		
DC Voltage – Source <sup>1</sup>	(0 to 202) mV	15 μV/V + 2 μV	Transmille Multiproduct Calibrator
	(0.2 to 2.02) V	9 μV/V + 2.5 μV	
	(2 to 20.2) V	8 μV/V + 24 μV	
	(20 to 202) V	12 μV/V + 0.24 mV	
	(200 to 1 025) V	12 μV/V + 2.4 mV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Measure <sup>1</sup>	(0 to 120) mV (0.12 to 1.2) V (1.2 to 12) V (12 to 120) V (120 to 1 050) V	9 $\mu$ V/V + 0.17 $\mu$ V 6.4 $\mu$ V/V + 0.6 $\mu$ V 6.8 $\mu$ V/V + 6 $\mu$ V 9.5 $\mu$ V/V + 80 $\mu$ V 9.5 $\mu$ V/V + 1.2 mV	Transmille 8.5 Digit Multimeter
Electrical Simulation of Thermocouple Indicators – Source <sup>1</sup>	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C Type E -250 to -100 °C -100 to -25 °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C Type J (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C Type K (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1 000 to 1 370) °C Type L (-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.89 0.78 0.65 0.66 0.38 0.33 0.39 0.56 0.59 0.13 0.12 0.15 0.18 0.28 0.14 0.12 0.17 0.23 0.33 0.19 0.14 0.24 0.31 0.41 0.39 0.4	Transmille Multiproduct Calibrator w/ Thermocouple Adapter

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators – Source <sup>1</sup>	Type N		Transmille Multiproduct Calibrator w/ Thermocouple Adapter
	(-200 to -100) °C	0.51	
	(-100 to -25) °C	0.25	
	(-25 to 120) °C	0.2	
	(120 to 410) °C	0.19	
	(410 to 1 300) °C	0.19	
	Type R		
	(0 to 250) °C	0.98	
	(250 to 1 000) °C	0.53	
	(1 000 to 1 760) °C	0.62	
	Type S		
	(0 to 250) °C	0.98	
	(250 to 1 000) °C	0.53	
	(1 000 to 1 760) °C	0.62	
	Type T		
(-250 to -150) °C	0.72		
(-150 to 0) °C	0.13		
(0 to 120) °C	0.12		
(120 to 400) °C	0.14		
Type U			
(-200 to 0) °C	0.5		
(0 to 600) °C	0.36		
Electrical Simulation of Thermocouple Indicators – Measure <sup>1</sup>	Type B		Transmille 8.5 Digit Multimeter
	(300 to 500) °C	0.3 °C	
	(500 to 1 820) °C	0.18 °C	
	Type E		
	(0 to 800) °C	0.07 °C	
	Type J		
	(-210 to 1 200) °C	0.11 °C	
	Type K		
	(-140 to 1 340) °C	0.11 °C	
	Type N		
	(-200 to 1 300) °C	0.11 °C	
Type R			
(-50 to 600) °C	0.59 °C		
(600 to 1 760) °C	0.22 °C		
Type S			
(0 to 1 760) °C	0.18 °C		
Type T			
(-200 to 400) °C	0.11 °C		



### Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Measure <sup>1</sup>	(-10 to 20) °C (20 to 250) °C	0.03 °C 0.031 °C	Isotech Precision Thermometer w/ PRT Probe

### Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source/Measure <sup>1</sup>	(1 to 100) Hz 100 Hz to 1.05 GHz	20 nHz/Hz + 1.5 µHz 50 nHz/Hz	Transmille GPS Frequency Standard, Agilent Universal Counter
Non-contact Tachometers <sup>1</sup> (Photo)	(240 to 60 000) rpm	0.005 % of reading	Transmille Multiproduct Calibrator w/ Optical Tachometer Adaptor
Timers and Stopwatches <sup>1</sup>	1 ms to 86 000 s	10 µs/s + 50 ms	Agilent Universal Counter, Transmille GPS Frequency Standard

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 Laboratory is only capable of determining the mass of a weight for OIML Class M1 and below.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2931.



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