PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

Precision Measurements Corporation

553-E Pylon Drive, Raleigh, NC 27606

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2005

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

Calibration of Acoustic, Electronic Test Equipment, Temperature and Humidity Indicators, Pressure and Vacuum Gauges, Force and Tension Gauges, Linear Measurement Equipment, Scales and Laboratory Balances, Time and Frequency, Torque Gauges and Tachometers

(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President/Operations Manager

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
July 28, 2003	May 31, 2019	May 31, 2021

Accreditation No.:	*Certificate No.:*
59283	L19-261

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com

Certificate of Accreditation: Supplement

Precision Measurement Corporation
553-E Pylon Drive, Raleigh, NC 27606
Contact Name: Robert Hammerle Phone: 919-755-0382

Accreditation is granted to the facility to perform the following calibrations:

Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Sound Level [F]	Up to 120 dB @ 125 Hz to 4 kHz	2.2 dB	Extech 407736

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Calipers [F]	0.51 mm to 609.6 mm (0.02 in to 24 in)	(328.86 + 57.14L) µin	Mitutoyo Grade 2 Gage Block Set
Micrometers [F]	0.51 mm to 304.8 mm (0.02 in to 12 in)	(40.39 + 30.81L) µin	
Indicators [F]	0.51 mm to 304.8 mm (0.02 in to 2 in)	(247.68 +116.17L) µin	
Height Gages [F]	0.51 mm to 304.8 mm (0.02 in to 12 in)	(1 098.34 + 83.48L) µin	

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage [F]	Up to 329.999 9 mV	0.003 4 mV	Fluke 5500A/SC600
	330 mV to 3.299 999 V	0.000 15 V	
	3.3 V to 32.999 99 V	0.000 95 V	
	33 V to 329.999 9 V	0.002 5 V	
	100 V to 1 020 V	0.007 1 V	
Equipment to Output DC Voltage [F]	Up to 100 mV	0.003 1 mV	HP 3458A
	100 mV to 1 V	0.016 mV	
	1 V to 10 V	0.000 12 V	
	10 V to 100 V	0.001 7 V	
	100 V to 1 000 V	0.02 V	
	1 kV to 10 kV	0.22 % of reading	EIS High Voltage Divider & HP 3458A
	10 kV to 100 kV	0.22 % of reading	

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Equipment to Measure AC Voltage (At the listed frequencies)[F]			Fluke 5500A/SC600
10 Hz to 45 Hz	1 mV to 32.999 mV	0.14 mV	
45 Hz to 10 kHz	1 mV to 32.999 mV	0.047 mV	
10 kHz to 20 kHz	1 mV to 32.999 mV	0.054 mV	
20 kHz to 50 kHz	1 mV to 32.999 mV	0.11 mV	
50 kHz to 100 kHz	1 mV to 32.999 mV	0.16 mV	
100 kHz to 500 kHz	1 mV to 32.999 mV	0.44 mV	
Equipment to Measure AC Voltage (At the listed frequencies)[F]			
10 Hz to 45 Hz	0.33 V to 3.299 99 V	0.000 96 V	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	0.002 1 V	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	0.000 51 V	
20 kHz to 50 kHz	0.33 V to 3.299 99 V	0.000 89 V	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	0.008 4 V	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	0.005 1 V	
Equipment to Measure AC Voltage (At the listed frequencies)[F]			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	0.009 1 V	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	0.041 V	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.039 V	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	0.042 V	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	0.08 V	
Equipment to Measure AC Voltage (At the listed frequencies)[F]			
45 Hz to 1 kHz	33 V to 329.999 V	0.047 V	
1 kHz to 10 kHz	33 V to 329.999 V	0.53 V	
10 kHz to 20 kHz	33 V to 329.999 V	0.23 V	
Equipment to Measure AC Voltage (At the listed frequencies)[F]			
45 Hz to 1 kHz	330 V to 1 020 V	0.87 V	
1 kHz to 5 kHz	330 V to 1 020 V	0.85 V	
5 kHz to 10 kHz	330 V to 1 020 V	1.2 V	
Equipment to Measure AC Voltage (At the listed frequencies)[F]			Associated Research 473
@ 50/60 Hz	1 kV to 7.5 kV	2.2 % of reading	

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Equipment to Output AC Voltage (At the listed frequencies)[F]			HP 3458A
1 Hz to 40 Hz	Up to 10 mV	0.025 mV	
40 Hz to 1 kHz	Up to 10 mV	0.015 mV	
1 kHz to 20 kHz	Up to 10 mV	0.015 mV	
20 kHz to 50 kHz	Up to 10 mV	0.023 mV	
50 kHz to 100 kHz	Up to 10 mV	0.062 mV	
100 kHz to 300 kHz	Up to 10 mV	0.41 mV	
Equipment to Output AC Voltage (At the listed frequencies)[F]			
1 Hz to 40 Hz	10 mV to 100 mV	0.16 mV	
40 Hz to 1 kHz	10 mV to 100 mV	0.043 mV	
1 kHz to 20 kHz	10 mV to 100 mV	0.045 mV	
20 kHz to 50 kHz	10 mV to 100 mV	0.098 mV	
50 kHz to 100 kHz	10 mV to 100 mV	0.26 mV	
100 kHz to 300 kHz	10 mV to 100 mV	0.42 mV	
300 kHz to 1 MHz	10 mV to 100 mV	1.4 mV	
Equipment to Output AC Voltage (At the listed frequencies)[F]			
1 Hz to 40 Hz	100 mV to 1 V	1.9 mV	
40 Hz to 1 kHz	100 mV to 1 V	1.2 mV	
1 kHz to 20 kHz	100 mV to 1 V	1.2 mV	
20 kHz to 50 kHz	100 mV to 1 V	1.3 mV	
50 kHz to 100 kHz	100 mV to 1 V	1.6 mV	
100 kHz to 300 kHz	100 mV to 1 V	3.6 mV	
300 kHz to 1 MHz	100 mV to 1 V	13 mV	
Equipment to Output AC Voltage (At the listed frequencies)[F]			
1 Hz to 40 Hz	1 V to 10 V	0.019 V	
40 Hz to 1 kHz	1 V to 10 V	0.012 V	
1 kHz to 20 kHz	1 V to 10 V	0.012 V	
20 kHz to 50 kHz	1 V to 10 V	0.013 V	
50 kHz to 100 kHz	1 V to 10 V	0.016 V	
100 kHz to 300 kHz	1 V to 10 V	0.037 V	
300 kHz to 1 MHz	1 V to 10 V	0.13 V	

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Equipment to Output AC Voltage (At the listed frequencies)[F]			HP 3458A
1 Hz to 40 Hz	10 V to 100 V	0.19 V	
40 Hz to 20 kHz	10 V to 100 V	0.12 V	
20 kHz to 50 kHz	10 V to 100 V	0.14 V	
50 kHz to 100 kHz	10 V to 100 V	0.22 V	
100 kHz to 300 kHz	10 V to 100 V	0.69 V	
300 kHz to 1 MHz	10 V to 100 V	3.4 V	
Equipment to Output AC Voltage (At the listed frequencies)[F]			
1 Hz to 40 Hz	100 V to 1000 V	1.1 V	
40 Hz to 1 kHz	100 V to 1000 V	0.46 V	
Equipment to Output AC Voltage (At the listed frequencies)[F]			EIS High Voltage Divider & HP 3458A
60 Hz	1 kV to 50 kV	0.75 % of reading	
Equipment to Measure DC Current [F]	Up to 3.299 99 mA	0.000 14 mA	Fluke 5500A/SC600
	3.3 mA to 32.999 9 mA	0.000 69 mA	
	33 mA to 329.999 mA	0.015 mA	
	330 mA to 2.199 99 A	0.22 mA	
	2.2 A to 11.0 A	0.001 9 A	
	11 A to 550 A	0.81 A	Fluke 5500A/SC600 & 5220A with Turn Coils
	550 A to 1 000 A	1.1 A	
Equipment to Output DC Current [F]	3 A to 20 A	0.54 A	GW Instek GDM-8034
	20 A to 200 A	3.8 A	A.W. Sperry DSA-2003
	200 A to 2 000 A	27 A	
	Up to 10 mA	0.001 5 mA	HP 3458A
	10 mA to 100 mA	0.017 mA	
	100 mA to 1.1 A	0.28 mA	
	1.1 A to 3 A	0.011 A	Keithly 2000
Equipment to Measure AC Current (At the listed frequencies)[F]			Fluke 5500A/SC600
10 Hz to 20 Hz	0.029 mA to 0.329 99 mA	0.001 3 mA	
20 Hz to 45 Hz	0.029 mA to 0.329 99 mA	0.000 42 mA	
45 Hz to 1 kHz	0.029 mA to 0.329 99 mA	0.000 54 mA	
1 kHz to 5 kHz	0.029 mA to 0.329 99 mA	0.000 3 mA	
5 kHz to 10 kHz	0.029 mA to 0.329 99 mA	0.000 59 mA	

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Equipment to Measure AC Current (At the listed frequencies)[F]			Fluke 5500A/SC600
10 Hz to 20 Hz	0.33 mA to 3.299 9 mA	0.001 2 mA	
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	0.002 7 mA	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.003 2 mA	
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	0.004 9 mA	
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	0.011 mA	
Equipment to Measure AC Current (At the listed frequencies)[F]			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	0.013 mA	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	0.007 9 mA	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.026 mA	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	0.045 mA	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	0.11 mA	
Equipment to Measure AC Current (At the listed frequencies)[F]			
10 Hz to 20 Hz	33 mA to 329.99 mA	0.97 mA	
20 Hz to 45 Hz	33 mA to 329.99 mA	0.35 mA	
45 Hz to 1 kHz	33 mA to 329.99 mA	0.061 mA	
1 kHz to 5 kHz	33 mA to 329.99 mA	0.64 mA	
5 kHz to 10 kHz	33 mA to 329.99 mA	1.2 mA	
Equipment to Measure AC Current (At the listed frequencies)[F]			
10 Hz to 45 Hz	0.33 A to 2.199 99 A	0.004 6 A	
45 Hz to 1 kHz	0.33 A to 2.199 99 A	0.001 4 A	
1 kHz to 5 kHz	0.33 A to 2.199 99 A	0.025 A	
Equipment to Measure AC Current (At the listed frequencies)[F]			
45 Hz to 65 Hz	2.2 A to 11 A	0.003 4 A	
65 Hz to 500 Hz	2.2 A to 11 A	0.02 A	
500 Hz to 1 kHz	2.2 A to 11 A	0.038 A	
Equipment to Measure AC Current (At the listed frequencies)[F]			Fluke 5500A/SC600 & 5220A with Turn Coils
30 Hz to 440 Hz	11 A to 40 A	1.1 A	
30 Hz to 440 Hz	40 A to 200 A	1.3 A	
30 Hz to 440 Hz	200 A to 1 000 A	2.1 A	

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Equipment to Output AC Current (At the listed frequencies)[F]			HP 3458A
10 Hz to 20 Hz	Up to 100 µA	0.49 uA	
20 Hz to 45 Hz	Up to 100 µA	0.23 uA	
45 Hz to 1 kHz	Up to 100 µA	0.12 uA	
Equipment to Output AC Current (At the listed frequencies)[F]			
10 Hz to 20 Hz	0.1 mA to 1 mA	0.017 mA	
20 Hz to 45 Hz	0.1 mA to 1 mA	0.008 6 mA	
45 Hz to 1 kHz	0.1 mA to 1 mA	0.000 6 mA	
Equipment to Output AC Current (At the listed frequencies)[F]			HP 3458A
10 Hz to 20 Hz	1 mA to 10 mA	0.046 mA	
20 Hz to 45 Hz	1 mA to 10 mA	0.02 mA	
45 Hz to 1 kHz	1 mA to 10 mA	0.006 4 mA	
Equipment to Output AC Current (At the listed frequencies)[F]			
10 Hz to 20 Hz	10 mA to 100 mA	0.46 mA	
20 Hz to 45 Hz	10 mA to 100 mA	0.20 mA	
45 Hz to 1 kHz	10 mA to 100 mA	0.067 mA	
Equipment to Output AC Current (At the listed frequencies)[F]			
10 Hz to 20 Hz	100 mA to 1.05 A	4.5 mA	
20 Hz to 45 Hz	100 mA to 1.05 A	2.3 mA	
45 Hz to 100 Hz	100 mA to 1.05 A	1.9 mA	
100 Hz to 5 kHz	100 mA to 1.05 A	2.3 mA	
Equipment to Output AC Current (At the listed frequencies)[F]			
10 Hz to 5 kHz	1.05 A to 3 A	0.021 A	Keithly 2000
40 Hz to 500 Hz	3 A to 20 A	0.64 A	GW Instek GDM-8034
@ 50/60 Hz	20 A to 200 A	3.8 A	A.W. Sperry DSA-2003
@ 50/60 Hz	200 A to 2 000 A	32 A	

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Equipment to Measure Capacitance 50 Hz to 1 000 Hz [F]	0.33 nF to 0.499 9 nF	0.013 nF	Fluke 5500A/SC600
	0.5 nF to 1.099 9 nF	0.016 nF	
	1.1 nF to 3.299 9 nF	0.016 nF	
	3.3 nF to 10.999 nF	0.064 nF	
	11 nF to 32.999 nF	0.18 nF	
	33 nF to 109.99 nF	0.22 nF	
	110 nF to 329.99 nF	1.3 nF	
Equipment to Measure Capacitance 50 Hz to 1 [F]000 Hz [F]	0.33 µF to 1.099 9 µF	0.003 2 µF	
	1.1 µF to 3.299 9 µF	0.018 µF	
Equipment to Measure Capacitance 50 to 400 Hz [F]	3.3 µF to 10.999 µF	0.025 µF	
	11 µF to 32.999 µF	0.19 µF	
Equipment to Measure Capacitance 50 to 200 Hz [F]	33 µF to 109.99 µF	0.29 µF	
Equipment to Measure Capacitance 50 to 100 Hz [F]	110 µF to 329.99 µF	3 µF	
	330 µF to 1.1 mF	3.7 µF	
Oscilloscopes - Squarewave Signal 50 Ω @ 1 kHz [F]	1 mV to 6.6 Vp-p	0.038 V	
Oscilloscopes - Squarewave Signal 1 MΩ @ 1 kHz [F]	1 mV to 130 Vp-p	0.3 V	
Leveled Sine Wave Amplitude (50 kHz ref) [F]	50 kHz reference	0.054 V	
	50 kHz to 100 MHz	0.054 V	
	100 MHz to 300 MHz	0.073 V	
	300 MHz to 600 MHz	0.086 V	
Leveled Sine Wave Flatness (50 kHz ref) [F]	50 kHz to 100 MHz	0.016 V	
	100 MHz to 300 MHz	0.029 V	
	300 MHz to 600 MHz	0.073 V	

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Equipment to Measure Resistance [F]	Up to 10.99 Ω	0.008 6 Ω	Fluke 5500A/SC600
	11 Ω to 32.999 Ω	0.018 Ω	
	33 Ω to 109.999 Ω	0.02 Ω	
	110 Ω to 329.999 Ω	0.053 Ω	
	330 Ω to 1.099 99 kΩ	0.17 Ω	
	1.1 kΩ to 3.299 99 kΩ	0.000 53 kΩ	
	3.3 kΩ to 10.999 9 kΩ	0.001 7 kΩ	
	11 kΩ to 32.999 kΩ	0.001 7 kΩ	
	33 kΩ to 109.999 kΩ	0.014 kΩ	
	110 kΩ to 329.999 kΩ	0.036 kΩ	
	330 kΩ to 1.099 99 MΩ	0.23 kΩ	
	1.1 MΩ to 3.299 99 MΩ	0.000 41 MΩ	
	3.3 MΩ to 10.999 9 MΩ	0.009 2 MΩ	
	11 MΩ to 32.999 9 MΩ	0.032 MΩ	
	33 MΩ to 109.999 MΩ	0.36 MΩ	
	110 MΩ to 330 MΩ	1.7 MΩ	
Equipment to Output Resistance [F]	Up to 100 Ω	0.004 4 Ω	HP 3458A
	100 Ω to 1 kΩ	0.032 Ω	
	1 kΩ to 10 kΩ	0.000 32 kΩ	
	10 kΩ to 100 kΩ	0.003 6 kΩ	
	100 kΩ to 1 MΩ	0.049 kΩ	
	1 MΩ to 10 MΩ	0.001 1 MΩ	
	10 MΩ to 100 MΩ	0.058 MΩ	
Equipment to Measure Inductance 100 Hz and 1 kHz [F]	0.2 µH	0.000 49 µH	General Radio Standard Inductance Set
	2.5 µH	0.006 2 µH	
	10 µH	0.025 µH	
	50 µH	0.13 µH	
	200 µH	0.49 µH	
	500 µH	1.3 µH	
	20 mH	0.049 mH	
	50 mH	0.13 mH	
	100 mH	0.25 mH	
	1 H	0.002 5 H	
	2 H	0.004 9 H	
	5 H	0.013 H	

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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E [F]	-250 °C to -100 °C	0.73 °C	Electrical Simulation of Thermocouple Output Fluke 5500A/SC600
	-100 °C to -25 °C	0.34 °C	
	-25 °C to 350 °C	0.32 °C	
	350 °C to 650 °C	0.34 °C	
	650 °C to 1 000 °C	0.25 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J [F]	-210 °C to -100 °C	0.42 °C	
	-100 °C to -30 °C	0.36 °C	
	-30 °C to 150 °C	0.20 °C	
	150 °C to 760 °C	0.21 °C	
	760 °C to 1 200 °C	0.27 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K [F]	-200 °C to -100 °C	0.48 °C	
	-100 °C to -25 °C	0.37 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 1 000 °C	0.39 °C	
	1 000 °C to 1 372 °C	0.43 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R [F]	0 °C to 250 °C	0.89 °C	
	250 °C to 400 °C	0.61 °C	
	400 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 767 °C	0.64 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S [F]	0 °C to 250 °C	0.71 °C	
	250 °C to 1 000 °C	0.64 °C	
	1 000 °C to 1 400 °C	0.78 °C	
	1 400 °C to 1 767 °C	0.98 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T [F]	-250 °C to -150 °C	0.65 °C	
	-150 °C to 0 °C	0.39 °C	
	0 °C to 120 °C	0.20 °C	
	120 °C to 400 °C	0.20 °C	

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Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 385, 100 Ω [F]	-200 °C to -80 °C	0.14 °C	Electrical Simulation of RTD Output Fluke 5500A/SC600
	-80 °C to 0 °C	0.12 °C	
	0 °C to 100 °C	0.13 °C	
	100 °C to 300 °C	0.21 °C	
	300 °C to 400 °C	0.34 °C	
	400 °C to 630 °C	0.69 °C	
	630 °C to 800 °C	1.20 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 3926, 100 Ω [F]	-200 °C to -80 °C	0.49 °C	
	-80 °C to 0 °C	0.12 °C	
	0 °C to 100 °C	0.33 °C	
	100 °C to 300 °C	1.40 °C	
	300 °C to 400 °C	0.28 °C	
	400 °C to 630 °C	0.31 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 3916, 100 Ω [F]	-200 °C to -190 °C	0.41 °C	
	-190 °C to -80 °C	0.06 °C	
	-80 °C to 0 °C	0.12 °C	
	0 °C to 100 °C	0.14 °C	
	100 °C to 260 °C	0.22 °C	
	260 °C to 300 °C	0.28 °C	
	300 °C to 400 °C	0.28 °C	
	400 °C to 600 °C	0.28 °C	
	600 °C to 630 °C	0.50 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 385, 200 Ω [F]	-200 °C to -80 °C	0.13 °C	
	-80 °C to 0 °C	0.11 °C	
	0 °C to 100 °C	0.09 °C	
	100 °C to 260 °C	0.17 °C	
	260 °C to 300 °C	0.29 °C	
	300 °C to 400 °C	0.35 °C	
	400 °C to 600 °C	0.64 °C	
	600 °C to 630 °C	0.88 °C	

Certificate of Accreditation: Supplement

Precision Measurement Corporation
553-E Pylon Drive, Raleigh, NC 27606
Contact Name: Robert Hammerle Phone: 919-755-0382

Accreditation is granted to the facility to perform the following calibrations:

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 385, 500 Ω [F]	-200 °C to -80 °C	0.13 °C	Electrical Simulation of RTD Output Fluke 5500A/SC600
	-80 °C to 0 °C	0.12 °C	
	0 °C to 100 °C	0.12 °C	
	100 °C to 260 °C	0.18 °C	
	260 °C to 300 °C	0.28 °C	
	300 °C to 400 °C	0.31 °C	
	400 °C to 600 °C	0.63 °C	
	600 °C to 630 °C	0.87 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Pt 385, 1 000 Ω [F]	-200 °C to -80 °C	0.13 °C	
	-80 °C to 0 °C	0.11 °C	
	0 °C to 100 °C	0.11 °C	
	100 °C to 260 °C	0.17 °C	
	260 °C to 300 °C	0.27 °C	
	300 °C to 400 °C	0.33 °C	
	400 °C to 600 °C	0.65 °C	
	600 °C to 630 °C	0.89 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type PtNi 385, 120 Ω (Ni 120) [F]	-80 °C to 0 °C	0.15 °C	
	0 °C to 100 °C	0.18 °C	
	100 °C to 260 °C	0.28 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Indicators / Detectors Type Cu 427, 10 Ω [F]	-100 °C to 260 °C	0.4 °C	
RF Power (At the listed frequencies) [FO]			Agilent EPM-441A w/ 8481A
10 MHz to 18 GHz	1 µW to 0.1 W (-30 dBm to 20 dBm)	0.001 1 W (0.36 dB)	
50 MHz to 18 GHz	0.1 nW to 0.01 mW (-70 dBm to -20 dBm)	0.001 2 W (0.71 dB)	
50 MHz to 26.5 GHz	1 µW to 0.1 W (-30 dBm to 20 dBm)	0.001 1 W (0.36 dB)	
50 MHz to 50 GHz	1 µW to 0.1 W (-30 dBm to 20 dBm)	0.001 1 W (0.36 dB)	

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Accreditation is granted to the facility to perform the following calibrations:

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Microbalances [F]	1 mg to 5 000 mg Resolution = 0.000 05 g	$(5.89 \times 10^{-2} + 2.19 \times 10^{-6}$ Wt) mg	Class 1 Weights
Analytical Balances [F]	0.001 g to 200 g Resolution = 0.0001 g	$(1.2 \times 10^{-3} + 6.81 \times 10^{-7}$ Wt) mg	
Top Loading Balances [F]	0.1 g to 1 000 g Resolution = 0.01 g	$(11.55 + 3.56 \times 10^{-7}$ Wt) mg	
	1 g to 15 000 g Resolution = 0.5 g	$(81.65 + 7.0 \times 10^{-7}$ Wt) mg	
Platform Scales [F]	2 lb to 200 lb Resolution = 0.01 lb	$(1.63 \times 10^{-2} + 6.04 \times 10^{-5}$ Wt) lb	Class F Weights

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Tachometers/rpm – Non Contact [F]	0.524 rad/s to 1.047 rad/s (5 rpm to 9.999 9 rpm)	0.000 22 rad/s (0.002 1 rpm)	Monarch Instrument TACH-4A
	1.047 rad/s to 10.472 rad/s (10 rpm to 99.999 rpm)	0.002 2 rad/s (0.021 rpm)	
	10.472 rad/s to 104.72 rad/s (100 rpm to 999.99 rpm)	0.022 rad/s (0.21 rpm)	
	104.72 rad/s to 1 047.2 rad/s (1 000 rpm to 9 999.9 rpm)	0.22 rad/s (2.1 rpm)	
	1 047.2 rad/s to 10 472 rad/s (10 000 rpm to 99 999 rpm)	2.2 rad/s (21 rpm)	
	10 472 rad/s to 52 360 rad/s (100 000 rpm to 500 000 rpm)	2.3 rad/s (22 rpm)	
Pressure Source/ Measure [F]	0 Pa to 206.8 kPa (0 psi to 30 psi)	0.22 kPa (0.011 psi)	Beta 320
	206.8 kPa to 2.068 MPa (30 psi to 300 psi)	0.76 kPa (0.11 psi)	Beta 321A
	2.068 MPa to 20.684 MPa (300 psi to 3 000 psi)	7.6 kPa (1.1 psi)	
	20.684 MPa to 68.948 MPa (3 000 psi to 10 000 psi)	43.4 kPa (6.3 psi)	Fluke 700G31
Torque Devices [F]	1.13 N·m to 11.3 N·m (10 lbf·in to 100 lbf·in)	0.43 lbf·in	Chatillon TSD 100 IN-LB
	34 N·m to 339 N·m (25 lbf·ft to 250 lbf·ft)	1.8 lbf·ft	Armstrong 64-646
	339 N·m to 813.5 N·m (250 lbf·ft to 600 lbf·ft)	21 lbf·ft	Sweeney 72
	813.5 N·m to 1 355.8 N·m (600 lbf·ft to 1 000 lbf·ft)	35 lbf·ft	

Certificate of Accreditation: Supplement

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Accreditation is granted to the facility to perform the following calibrations:

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Vacuum Source / Measure [F]	Up to 101.592 kPa (0 in/Hg to 30 in/Hg)	119 Pa (0.035 in/Hg)	Meriam M202-AI0038
Force Source/ Measure [F]	2.224 kN to 44.482 kN (500 lb to 10 000 lb)	33.4 N (7.5 lb)	Omega LCCA-10K
	444.822 N to 2.224 kN (100 lb to 500 lb)	4.4 N (0.99 lb)	Mark-10 M5-500
Tension Source/ Measure [F]	2.224 kN to 44.482 kN (500 lb to 10 000 lb)	33.4 N (7.5 lb)	Omega LCCA-10K
	444.822 N to 2.224 kN (100 lb to 500 lb)	4.4 N (0.99 lb)	Mark-10 M5-500

Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output Frequency [F]	10 MHz to 50 GHz	0.1 % of reading	HP 83650B Opt. 001, 002, 006, 008
Equipment to Measure Frequency [F]	10 Hz to 40 GHz	0.000 002 9 % of reading	Anritsu MF2414B

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Relative Humidity @ 25 °C [F]	11.30 %	1.1 %	Saturated Aqueous Salt Solutions
	22.51 %	1.1 %	
	32.78 %	1.1 %	
	43.16 %	1.1 %	
	75.29 %	1.1 %	
	93.58 %	1.2 %	
	97.3 %	1.2 %	
Equipment to Output Relative Humidity [F]	0 % RH to 95 % RH	2.3 %	Oakton 35612-00
	95 % RH to 100 % RH	3.2 %	

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Accreditation is granted to the facility to perform the following calibrations:

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.

3. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer^{F} would mean that the laboratory performs this calibration at its fixed location.

4. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.

5. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.