



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Precision Measurement Inc.

634 Anchors Street NW, Fort Walton Beach, FL 32548

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

ISO/IEC 17025:2017 & Meets the Requirements of ANSI/NCSL Z540.3

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 Dimensional, Electrical, Mass, Force & Weighing, Mechanical and Thermodynamic (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:

Initial Accreditation Date:

March 2, 2016

Issue Date:

May 30, 2022

Expiration Date:

June 30, 2024

Tracy Szerszen
President

Accreditation No.:

76741

Certificate No.:

L22-404

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

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.pjilabs.com



Certificate of Accreditation: Supplement

Precision Measurement Inc.

634 Anchors Street NW, Fort Walton Beach, FL 32548
 Contact Name: David Haines Phone: 850-862-2200

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Gage Blocks ^F	0.05 in to 4 in	(2.5 + 1L) μ m	Mitutoyo Gauge Blocks BEI-81-00A/A Gage Block Comparator 33K6-4-1-1
Calipers Digital ^{FO} Resolution = 0.000 5 in	0.01 in to 24 in	(601 + 15L) μ m	Mitutoyo Gauge Blocks BEI-81-00A/A; 33K6-4-552-1
Calipers Vernier ^{FO} Resolution = 0.001	0.01 in to 24 in	(1 167 + 15L) μ m	8E-LGBS; 33K6-4-552-1
Micrometers Digital ^{FO} Resolution = 0.000 05 in	0.001 in to 6 in	(87 + 15L) μ m	Mitutoyo Gauge Blocks Optical Flats
Micrometers Vernier ^{FO} Resolution = 0.000 1 in	0.001 in to 6 in	(1 157 + 15L) μ m	BEI-81-00A/A 33K6-4-15-1
Pin gage ^F	0.001 in to 1 in	(13.5 + 4L) μ m	Pratt and Whitney Super Micrometer; 33K6-4-2-1
	1 in to 10 in	(24 + 4L) μ m	
Threaded Plug Gage ^F Major Diameter	0.05 in to 10 in, 5 TPI to 80 TPI	(24 + 4L) μ m	Pratt and Whitney Super Micrometer, 30HS; NA17-20MD-141
Threaded Plug Gage ^F Pitch Diameter	0.05 in to 10 in, 5 TPI to 80 TPI	(30.7 + 7 L) μ m	
Ring Gage – Plain ^F	0.05 in to 12 in	(41.5+1L) μ m	ULM; 33K6-4-2-1
Ring Gage, Threaded ^F Pitch Diameter Minor	0.5 in to 12 in	(45.5 + 1L) μ m	ULM; 33K6-4-2867-1
Crimpers: ^{FO} Die Check Crimp Height	0.011 in to 0.75 in	140 μ m	Pin Gauges, Crimp Height Micrometer; CP00414
	0.000 25 in to 1 in	350 μ m	
Film Gages (Plastic Shims) ^F	0.000 5 to 0.25	76 μ m	ULM; NA17-20MD-162
Height Gages ^{FO}	Up to 40 in	(158.5 + 1L) μ m	Gage blocks; 33K6-4-1626-1
Bore Gages: ^F Micrometer Type Indicator Type	0.25 in to 4 in	320 μ m	Cylindrical Rings, ULM; 33K6-4-992-1
	0.25 in to 12 in	(149.5 + 1L) μ m	
Dial Indicator ^F	Up to 4 in	(137.3 + 0.8L) μ m	Universal Length Machine ULM; 33K6-4-889-1
Digital Indicator ^F	Up to 4 in	(28.3 + 0.8L) μ m	Universal Length Machine ULM; 33K6-4-889-1
Test Indicator ^F	Up to 0.06 in	140 μ m	Universal Length Machine ULM; 33K6-4-889-1
Protractor, Digital ^F	Up to 360 °	0.72 ’	Indexing Table; 33K6-4-2949-1
Protractor, Analog ^F	Up to 360 °	5.9 ’	Indexing Table; 33K6-4-148-1
Angle Block ^F	Up to 90 °	3.4 ’	Indexing Table, Sine Bar, Gage Blocks; 33K6-4-2847-1
Angle Gauge ^F	Up to 90°	0.15 °	IMI, VOP I006P153



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Radius Gage ^F	Up to 4 in	18 μ m	IMI, VOP I006P153
Coating Thickness Meter ^{FO}	0.01 in to 0.06 in	76 μ m	Film Thickness Standards; DeFelsko 2535 manufacturer procedure
End Rods ^F	Up to 20 in	(41.5 + 1L) μ m	ULM; 33K6-4-369-1
Surface Plate – Flatness ^{FO}	10 in to 140 in D	(23.7 + 1.2D) μ m	Leveling Heads; NA17-20MD-14
Surface Plate – Repeatability ^{FO}	0.002 in	44 μ m	Repeat-O-Meter, Indicator; NA17-20MD-14

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output DC Voltage ^{FO}	33 mV to 330 mV	5.5 μ V/V + 1 μ V	Fluke 5520A/SC600; 33K8-4-1131-1
	0.33 V to 3.3 V	4.2 μ V/V + 2 μ V	
	3.3 V to 33 V	5.6 μ V/V + 20 μ V	
	33 V to 330 V	6.4 μ V/V + 150 μ V	
	330 V to 1 000 V	2.3 μ V/V + 1.5 mV	
Equipment to Measure DC Voltage ^{FO}	Up to 120 mV	11 μ V/V + 1.121 μ V	HP 3458A; 33K8-4-551-1
	120 mV to 1.2 V	10 μ V/V + 3.23 μ V	
	1.2 V to 12 V	10 μ V/V + 28.99 μ V	
	12 V to 120 V	12 μ V/V + 563.47 μ V	
	120 V to 1 050 V	12 μ V/V + 7.65 mV	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
10 Hz to 45 Hz	1 mV to 33 mV	1 700 μ V/V + 6 μ V	
45 Hz to 10 kHz	1 mV to 33 mV	72.7 μ V/V + 6 μ V	
10 kHz to 20 kHz	1 mV to 33 mV	72.7 μ V/V + 6 μ V	
20 kHz to 50 kHz	1 mV to 33 mV	72.7 μ V/V + 6 μ V	
50 kHz to 100 kHz	1 mV to 33 mV	118.2 μ V/V + 12 μ V	
100 kHz to 500 kHz	1 mV to 33 mV	75.8 μ V/V + 50 μ V	



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Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
10 Hz to 45 Hz	33 mV to 330 mV	130.3 μ V/V + 8 μ V	
45 Hz to 10 kHz	33 mV to 330 mV	23 μ V/V + 8 μ V	
10 kHz to 20 kHz	33 mV to 330 mV	23 μ V/V + 8 μ V	
20 kHz to 50 kHz	33 mV to 330 mV	23 μ V/V + 8 μ V	
50 kHz to 100 kHz	33 mV to 330 mV	36.4 μ V/V + 32 μ V	
100 kHz to 500 kHz	33 mV to 330 mV	197 μ V/V + 70 μ V	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
10 Hz to 45 Hz	0.33 V to 3.3 V	121.2 μ V/V + 50 μ V	
45 Hz to 10 kHz	0.33 V to 3.3 V	19.1 μ V/V + 60 μ V	
10 kHz to 20 kHz	0.33 V to 3.3 V	21.2 μ V/V + 60 μ V	
20 kHz to 50 kHz	0.33 V to 3.3 V	33.3 μ V/V + 50 μ V	
50 kHz to 100 kHz	0.33 V to 3.3 V	54.5 μ V/V + 130 μ V	
100 kHz to 500 kHz	0.33 V to 3.3 V	512.2 μ V/V + 6 μ V	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
10 Hz to 45 Hz	3.3 V to 33 V	121.2 μ V/V + 650 μ V	
45 Hz to 10 kHz	3.3 V to 33 V	30.3 μ V/V + 600 μ V	
10 kHz to 20 kHz	3.3 V to 33 V	23.9 μ V/V + 600 μ V	
20 kHz to 50 kHz	3.3 V to 33 V	20.6 μ V/V + 600 μ V	
50 kHz to 100 kHz	3.3 V to 33 V	57.6 μ V/V + 1.6 mV	



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Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
45 Hz to 1 kHz	33 V to 330 V	28.2 μ V/V + 2 mV	
1 kHz to 10 kHz	33 V to 330 V	27.9 μ V/V + 6 mV	
10 kHz to 20 kHz	33 V to 330 V	25.2 μ V/V + 6 mV	
20 kHz to 50 kHz	33 V to 330 V	78.8 μ V/V + 6 mV	
50 kHz to 100 kHz	33 V to 330 V	48.5 μ V/V + 50 mV	
Equipment to Output AC Voltage (at the listed frequencies) ^{FO}			
45 Hz to 1 kHz	330 V to 1 020 V	25.5 μ V/V + 10 mV	
1 kHz to 5 kHz	330 V to 1 020 V	25.5 μ V/V + 10 mV	
5 kHz to 10 kHz	330 V to 1 020 V	27.5 μ V/V + 10 mV	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			HP 3458A; 33K8-4-551-1
1 Hz to 40 Hz	Up to 12 mV	0.302 μ V/mV + 5.8 μ V	
40 Hz to 1 kHz	Up to 12 mV	0.202 μ V/mV + 3.9 μ V	
1 kHz to 20 kHz	Up to 12 mV	0.302 μ V/mV + 3.9 μ V	
20 kHz to 50 kHz	Up to 12 mV	1 μ V/mV + 3.9 μ V	
50 kHz to 100 kHz	Up to 12 mV	5 μ V/mV + 3.9 μ V	
100 kHz to 300 kHz	Up to 12 mV	40 μ V/mV + 4.8 μ V	
300 kHz to 1 MHz	Up to 12 mV	12 μ V/mV + 7.8 μ V	
1 MHz to 4 MHz	Up to 12 mV	70 μ V/mV + 9.8 μ V	
4 MHz to 8 MHz	Up to 12 mV	200 μ V/mV + 10.8 μ V	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	12 mV to 120 mV	0.072 μ V/mV + 9.71 μ V	
40 Hz to 1 kHz	12 mV to 120 mV	0.072 μ V/mV + 7.71 μ V	
1 kHz to 20 kHz	12 mV to 120 mV	0.142 μ V/mV + 7.71 μ V	
20 kHz to 50 kHz	12 mV to 120 mV	0.302 μ V/mV + 7.71 μ V	
50 kHz to 100 kHz	12 mV to 120 mV	0.802 μ V/mV + 7.71 μ V	
100 kHz to 300 kHz	12 mV to 120 mV	3 μ V/mV + 15.71 μ V	
300 kHz to 1 MHz	12 mV to 120 mV	10 μ V/mV + 15.71 μ V	
1 MHz to 2 MHz	12 mV to 120 mV	15 μ V/mV + 15.71 μ V	
2 MHz to 4 MHz	12 mV to 120 mV	40 μ V/mV + 75.71 μ V	
4 MHz to 8 MHz	12 mV to 120 mV	40 μ V/mV + 85.71 μ V	
8 MHz to 10 MHz	12 mV to 120 mV	150 μ V/mV + 105.71 μ V	



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Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			HP 3458A; 33K8-4-551-1
1 Hz to 40 Hz	120 mV to 1.2 V	72 μ V/V + 90 μ V	
40 Hz to 1 kHz	120 mV to 1.2 V	72 μ V/V + 70 μ V	
1 kHz to 20 kHz	120 mV to 1.2 V	142 μ V/V + 70 μ V	
20 kHz to 50 kHz	120 mV to 1.2 V	302 μ V/V + 70 μ V	
50 kHz to 100 kHz	120 mV to 1.2 V	802 μ V/V + 70 μ V	
100 kHz to 300 kHz	120 mV to 1.2 V	3 mV/V + 150 μ V	
300 kHz to 1 MHz	120 mV to 1.2 V	10 mV/V + 150 μ V	
1 MHz to 2 MHz	120 mV to 1.2 V	15 mV/V + 150 μ V	
2 MHz to 4 MHz	120 mV to 1.2 V	40 mV/V + 0.75 mV	
4 MHz to 8 MHz	120 mV to 1.2 V	40 mV/V + 0.85 mV	
8 MHz to 10 MHz	120 mV to 1.2 V	150 mV/V + 1.05 mV	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	1.2 V to 12 V	72 μ V/V + 892 μ V	
40 Hz to 1 kHz	1.2 V to 12 V	72 μ V/V + 692 μ V	
1 kHz to 20 kHz	1.2 V to 12 V	142 μ V/V + 692 μ V	
20 kHz to 50 kHz	1.2 V to 12 V	302 μ V/V + 692 μ V	
50 kHz to 100 kHz	1.2 V to 12 V	802 μ V/V + 692 μ V	
100 kHz to 300 kHz	1.2 V to 12 V	3 mV/V + 1.5 mV	
300 kHz to 1 MHz	1.2 V to 12 V	10 mV/V + 1.52 mV	
1 MHz to 2 MHz	1.2 V to 12 V	15 mV/V + 1.5 mV	
2 MHz to 4 MHz	1.2 V to 12 V	40 mV/V + 7.5 mV	
4 MHz to 8 MHz	1.2 V to 12 V	40 mV/V + 8.5 mV	
8 MHz to 10 MHz	1.2 V to 12 V	150 mV/V + 10.5 mV	
Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			
1 Hz to 40 Hz	12 V to 120 V	202 μ V/V + 12.4 mV	
40 Hz to 1 kHz	12 V to 120 V	202 μ V/V + 10.4 mV	
1 kHz to 20 kHz	12 V to 120 V	202 μ V/V + 10.4 mV	
20 kHz to 50 kHz	12 V to 120 V	352 μ V/V + 10.4 mV	
50 kHz to 100 kHz	12 V to 120 V	1.2 mV/V + 10.4 mV	
100 kHz to 300 kHz	12 V to 120 V	4 mV/V + 18.4 mV	
300 kHz to 1 MHz	12 V to 120 V	15 mV/V + 18.4 mV	



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Equipment to Measure AC Voltage (at the listed frequencies) ^{FO}			HP 3458A; 33K8-4-551-1
1 Hz to 40 Hz	120 V to 700 V	402 μ V/V + 117.1 mV	
40 Hz to 1 kHz	120 V to 700 V	402 μ V/V + 97.1 mV	
1 kHz to 20 kHz	120 V to 700 V	602 μ V/V + 97.1 mV	
20 kHz to 50 kHz	120 V to 700 V	1.2 mV/V + 97.1 mV	
50 kHz to 100 kHz	120 V to 700 V	3 mV/V + 97.1 mV	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
45 Hz to 1 000 Hz	29 μ A to 330 μ A	697 μ A/A + 0.1 μ A	
1 kHz to 5 kHz	29 μ A to 330 μ A	1 500 μ A/A + 0.2 μ A	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	0.33 mA to 3.3 mA	757.6 μ A/A + .1 μ A	
1 kHz to 5 kHz	0.33 mA to 3.3 mA	757.6 μ A/A + .2 μ A	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	3.3 mA to 33 mA	757.6 μ A/A + 2 μ A	
1 kHz to 5 kHz	3.3 mA to 33 mA	878.8 μ A/A + 2 μ A	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	33 mA to 330 mA	1.1 mA/A + 20 μ A	
1 kHz to 5 kHz	33 mA to 330 mA	4.2 mA/A + 50 μ A	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	0.33 A to 1.1 A	745.5 μ A/A + 100 μ A	
1 kHz to 5 kHz	0.33 A to 1.1 A	4.1 mA/A + 1 mA	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	1.1 A to 3 A	933.3 μ A/A + 100 μ A	
1 kHz to 5 kHz	1.1 A to 3 A	966.7 μ A/A + 1 mA	
Equipment to Output AC Current (at the listed frequencies) ^{FO}			
45 Hz to 1 000 Hz	3 A to 11 A	281.8 μ A/A + 2 mA	
1 kHz to 5 kHz	3 A to 11 A	1.5 mA/A + 2 mA	



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Equipment to Output AC Current (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
45 Hz to 1 000 Hz	11 A to 20.5 A	4.8 mA/A + 5 mA	
1 kHz to 5 kHz	11 A to 20.5 A	4.8 mA/A + 5 mA	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			HP 3458A; 33K8-4-551-1
10 Hz to 20 Hz	Up to 120 μ A	4 nA/ μ A + 62 nA	
20 Hz to 45 Hz	Up to 120 μ A	1.5 nA/ μ A + 62 nA	
45 Hz to 100 Hz	Up to 120 μ A	0.602 nA/ μ A + 62 nA	
100 Hz to 1 kHz	Up to 120 μ A	0.602 nA/ μ A + 62 nA	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	120 μ A to 1.2 mA	4 μ A/mA + 321 nA	
20 Hz to 45 Hz	120 μ A to 1.2 mA	1.5 μ A/mA + 321 nA	
45 Hz to 100 Hz	120 μ A to 1.2 mA	0.602 μ A/mA + 321 nA	
100 Hz to 5 kHz	120 μ A to 1.2 mA	0.302 μ A/mA + 321 nA	
5 kHz to 20 kHz	120 μ A to 1.2 mA	0.602 μ A/mA + 321 nA	
20 kHz to 50 kHz	120 μ A to 1.2 mA	4 μ A/mA + 521 nA	
50 kHz to 100 kHz	120 μ A to 1.2 mA	5.5 μ A/mA + 1.621 mA	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	1.2 mA to 12 mA	4 μ A/mA + 3.91 μ A	
20 Hz to 45 Hz	1.2 mA to 12 mA	1.5 μ A/mA + 3.91 μ A	
45 Hz to 100 Hz	1.2 mA to 12 mA	0.605 μ A/mA + 3.91 μ A	
100 Hz to 5 kHz	1.2 mA to 12 mA	0.305 μ A/mA + 3.91 μ A	
5 kHz to 20 kHz	1.2 mA to 12 mA	0.605 μ A/mA + 3.91 μ A	
20 kHz to 50 kHz	1.2 mA to 12 mA	4 μ A/mA + 5.91 μ A	
50 kHz to 100 kHz	1.2 mA to 12 mA	5.5 μ A/mA + 16.91 μ A	



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Equipment to Measure AC Current (at the listed frequencies) ^{FO}			HP 3458A; 33K8-4-551-1
10 Hz to 20 Hz	12 mA to 120 mA	4 μ A/mA + 40.1 μ A	
20 Hz to 45 Hz	12 mA to 120 mA	1.5 μ A/mA + 40.1 μ A	
45 Hz to 100 Hz	12 mA to 120 mA	0.605 μ A/mA + 40.1 μ A	
100 Hz to 5 kHz	12 mA to 120 mA	0.305 μ A/mA + 40.1 μ A	
5 kHz to 20 kHz	12 mA to 120 mA	0.605 μ A/mA + 40.1 μ A	
20 kHz to 50 kHz	12 mA to 120 mA	4 μ A/mA + 60.1 μ A	
50 kHz to 100 kHz	12 mA to 120 mA	5.5 μ A/mA + 170.1 μ A	
Equipment to Measure AC Current (at the listed frequencies) ^{FO}			
10 Hz to 20 Hz	120 mA to 1.2 A	4 mA/A + 410 μ A	
20 Hz to 45 Hz	120 mA to 1.2 A	1.6 mA/A + 410 μ A	
45 Hz to 100 Hz	120 mA to 1.2 A	0.805 mA/A + 410 μ A	
100 Hz to 5 kHz	120 mA to 1.2 A	1 mA/A + 410 μ A	
5 kHz to 20 kHz	120 mA to 1.2 A	3 mA/A + 410 μ A	
20 kHz to 50 kHz	120 mA to 1.2 A	10 mA/A + 610 μ A	
Equipment to Measure DC Current ^{FO}	0 nA to 120 nA	35 μ A/A + 0.268 nA	
	120 nA to 1.2 μ A	25 μ A/A + 0.272 nA	
	1.2 μ A to 12 μ A	25 μ A/A + 0.463 nA	
	12 μ A to 120 μ A	25 μ A/A + 2.708 nA	
	120 μ A to 1.2 mA	25 μ A/A + 21 nA	
	1.2 mA to 12 mA	25 μ A/A + 213 nA	
	12 mA to 120 mA	40 μ A/A + 2.84 μ A	
	120 mA to 1.05 A	115 μ A/A + 59 μ A	
Equipment to Output DC Current ^{FO}	33 μ A to 330 μ A	3.6 μ A/A + 0.02 μ A	Fluke 5520A/SC600; 33K8-4-1131-1
	0.33 mA to 3.3 mA	15.2 mA/A + 0.05 μ A	
	3.3 mA to 33 mA	14.2 mA/A + 0.25 μ A	
	33 mA to 330 mA	757.6 μ A/A + 2.5 μ A	
	330 mA to 1.1 A	200 μ A/A + 64 μ A	
	1.1 A to 3 A	380 μ A/A + 290 μ A	
	3 A to 11 A	0.5 mA/A + 1.3 mA	
	11 A to 20 A	1 mA/A + 2.46 mA	



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Equipment to Output DC Current Resistance ^{FO}	1 Ω to 11 Ω	12.7 $\mu\Omega/\Omega$ + 1 m Ω	Fluke 5520A/SC600; 33K8-4-1131-1	
	11 Ω to 33 Ω	30.3 $\mu\Omega/\Omega$ + 1.5 m Ω		
	33 Ω to 110 Ω	11.8 $\mu\Omega/\Omega$ + 1.4 m Ω		
	110 Ω to 330 Ω	7.6 $\mu\Omega/\Omega$ + 2 m Ω		
	0.33 k Ω to 1.1 k Ω	9.6 $\mu\Omega/\Omega$ + 2 m Ω		
	1.1 k Ω to 3.3 k Ω	7.9 $\mu\Omega/\Omega$ + 20 m Ω		
	3.3 k Ω to 11 k Ω	7.5 $\mu\Omega/\Omega$ + 20 m Ω		
	11 k Ω to 33 k Ω	4.8 $\mu\Omega/\Omega$ + 200 m Ω		
	33 k Ω to 110 k Ω	2.3 $\mu\Omega/\Omega$ + 200 m Ω		
	110 k Ω to 330 k Ω	14.2 $\mu\Omega/\Omega$ + 2 Ω		
	0.33 M Ω to 1.1 M Ω	11.8 $\mu\Omega/\Omega$ + 2 Ω		
	1.1 M Ω to 3.3 M Ω	60.6 $\mu\Omega/\Omega$ + 30 Ω		
	3.3 M Ω to 11 M Ω	42.7 $\mu\Omega/\Omega$ + 50 Ω		
	11 M Ω to 33 M Ω	363.6 $\mu\Omega/\Omega$ + 2.5 k Ω		
	33 M Ω to 110 M Ω	35.5 $\mu\Omega/\Omega$ + 3 k Ω		
110 M Ω to 330 M Ω	293.9 $\mu\Omega/\Omega$ + 100 k Ω			
0.33 G Ω to 1.1 G Ω	5.4 m Ω/Ω + 500 k Ω			
Equipment to Measure Resistance ^{FO}	0 Ω to 12 Ω	18 $\mu\Omega/\Omega$ + 334 $\mu\Omega$	HP 3458A; 33K8-4-551-1	
	12 Ω to 120 Ω	15 $\mu\Omega/\Omega$ + 1 384 $\mu\Omega$		
	120 Ω to 1.2 k Ω	13 $\mu\Omega/\Omega$ + 8 500 $\mu\Omega$		
	1.2 k Ω to 12 k Ω	13 $\mu\Omega/\Omega$ + 102.8 m Ω		
	12 k Ω to 120 k Ω	13 $\mu\Omega/\Omega$ + 1.47 Ω		
	120 k Ω to 1.2 M Ω	18 $\mu\Omega/\Omega$ + 10 Ω		
	1.2 M Ω to 12 M Ω	53 $\mu\Omega/\Omega$ + 267 Ω		
	12 M Ω to 120 M Ω	503 $\mu\Omega/\Omega$ + 25.491 k Ω		
120 M Ω to 1.2 G Ω	5 003 $\mu\Omega/\Omega$ + 5.104 M Ω			
Equipment to Output Capacitance (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1	
	10 Hz to 10 kHz	0.19 nF to 0.399 9 nF		7.5 mF/F + 0.01 nF
	10 Hz to 10 kHz	0.4 nF to 1.099 9 nF		127.4 mF/F + 0.01 nF
	10 Hz to 3 kHz	1.1 nF to 3.299 9 nF		7.9 mF/F + 0.01 nF
	10 Hz to 1 kHz	3.3 nF to 10.999 9 nF		12.7 mF/F + 0.01 nF
	10 Hz to 1 kHz	11 nF to 32.999 9 nF		7.9 mF/F + 0.1 nF
	10 Hz to 1 kHz	33 nF to 109.999 nF		1.5 mF/F + 0.1 nF
	10 Hz to 1 kHz	110 nF to 329.999 nF		848.7 μ F/F + 0.3 nF



Certificate of Accreditation: Supplement

Precision Measurement Inc.

634 Anchors Street NW, Fort Walton Beach, FL 32548
 Contact Name: David Haines Phone: 850-862-2200

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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output Capacitance (at the listed frequencies) ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
10 Hz to 600 Hz	0.33 μ F to 1.099 99 μ F	127.4 μ F/F + 1 nF	
10 Hz to 300 Hz	1.1 μ F to 3.299 99 μ F	6.1 mF/F + 3 nF	
10 Hz to 150 Hz	3.3 μ F to 10.999 9 μ F	1 mF/F + 10 nF	
10 Hz to 120 Hz	11 μ F to 32.999 9 μ F	606.2 μ F/F + 30 nF	
10 Hz to 80 Hz	33 μ F to 109.999 μ F	1.5 mF/F + 0.1 μ F	
0 Hz to 50 Hz	110 μ F to 329.999 μ F	1.6 mF/F + 0.1 μ F	
0 Hz to 20Hz	0.33 mF to 1.099 99 mF	1.1 mF/F + 1 μ F	
0 Hz to 6 Hz	1.1 mF to 3.299 9 mF	363.7 μ F/F + 3 μ F	
0 Hz to 2 Hz	3.3 mF to 10.999 9 mF	1.1 mF/F + 10 μ F	
0 Hz to 0.6 Hz	11 mF to 32.999 9 mF	3.6 mF/F + 30 μ F	
0 Hz to 0.2 Hz	33 mF to 110 mF	1.1 mF/F + 100 μ F	
Temperature Calibration, Indication, and Control Equipment use the Thermocouple Type E ^{FO}	-250 $^{\circ}$ C to -100 $^{\circ}$ C	2.1 x 10 ⁻¹ $^{\circ}$ C	Fluke 5520A/SC600; 33K5-4-562-1; Electrical Simulation of Thermocouple Output
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	1.9 x 10 ⁻¹ $^{\circ}$ C	
	-25 $^{\circ}$ C to 350 $^{\circ}$ C	1.9 x 10 ⁻¹ $^{\circ}$ C	
	350 $^{\circ}$ C to 650 $^{\circ}$ C	1.9 x 10 ⁻¹ $^{\circ}$ C	
	650 $^{\circ}$ C to 1 000 $^{\circ}$ C	1.9 x 10 ⁻¹ $^{\circ}$ C	
Temperature Calibration, Indication, and Control Equipment use the Thermocouple Type J ^{FO}	-210 $^{\circ}$ C to -100 $^{\circ}$ C	2.2 x 10 ⁻¹ $^{\circ}$ C	
	-100 $^{\circ}$ C to -30 $^{\circ}$ C	2.2 x 10 ⁻¹ $^{\circ}$ C	
	-30 $^{\circ}$ C to 150 $^{\circ}$ C	2.0 x 10 ⁻¹ $^{\circ}$ C	
	150 $^{\circ}$ C to 760 $^{\circ}$ C	1.9 x 10 ⁻¹ $^{\circ}$ C	
	760 $^{\circ}$ C to 1 200 $^{\circ}$ C	1.8 x 10 ⁻¹ $^{\circ}$ C	
Temperature Calibration, Indication, and Control Equipment use the Thermocouple Type K ^{FO}	-200 $^{\circ}$ C to -100 $^{\circ}$ C	4.5 x 10 ⁻¹ $^{\circ}$ C	
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	1.8 x 10 ⁻¹ $^{\circ}$ C	
	-25 $^{\circ}$ C to 120 $^{\circ}$ C	1.7 x 10 ⁻¹ $^{\circ}$ C	
	120 $^{\circ}$ C to 1 000 $^{\circ}$ C	1.7 x 10 ⁻¹ $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 372 $^{\circ}$ C	2.0 x 10 ⁻¹ $^{\circ}$ C	
Temperature Calibration, Indication, and Control Equipment use the Thermocouple Type S ^{FO}	0 $^{\circ}$ C to 250 $^{\circ}$ C	1.2 $^{\circ}$ C	
	250 $^{\circ}$ C to 1 000 $^{\circ}$ C	1.2 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 400 $^{\circ}$ C	1.4 $^{\circ}$ C	
	1 400 $^{\circ}$ C to 1 767 $^{\circ}$ C	1.3 $^{\circ}$ C	



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Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication, and Control Equipment use the Thermocouple Type T ^{FO}	-250 °C to -150 °C	2.2×10^{-1} °C	Fluke 5520A/SC600; 33K5-4-562-1; Electrical Simulation of Thermocouple Output
	-150 °C to 0 °C	1.3×10^{-1} °C	
	0 °C to 120 °C	1.3×10^{-1} °C	
	120 °C to 400 °C	1.8×10^{-1} °C	
Equipment to Output Phase Angle at the listed frequencies ^{FO}			Fluke 5520A/SC600; 33K8-4-1131-1
10 Hz to 65 Hz	3 V / 0.5 V at 0 °	7.2×10^{-2} °	
65 Hz to 500 Hz	3 V / 0.5 V at 0 °	7.4×10^{-2} °	
500 Hz to 1 kHz	3 V / 0.5 V at 0 °	7.5×10^{-2} °	
1 kHz to 5 kHz	3 V / 0.5 V at 0 °	8.5×10^{-2} °	
5 kHz to 10 kHz	3 V / 0.5 V at 0 °	8.5×10^{-2} °	
10 kHz to 30 kHz	3 V / 0.5 V at 0 °	2.2×10^{-1} °	
Oscilloscopes			Fluke 5520A/SC600; 33K3-4-3368-1
Level Sine Amp ^{FO} 50 kHz ref to 600 MHz	10 mV (p-p) to 5 V (p-p)	1.7×10^{-3} V (p-p)	
DC Signal Level ^{FO}	1 mV to 6.6 V	5.8×10^{-3} VDC	
	6.6 V to 130 V	2.6×10^{-5} VDC	
Time Marker Output ^{FO} (into 50 Ω)	2 ns to 20 ms	8.8×10^{-6} ms	
	50 ms to 5 s	5.9×10^{-6} s	
Square Wave – Generate ^{FO} (into 50 Ω)	1 mV to 6.6 V (p-p) (0.01 kHz to 10 kHz)	2.5×10^{-3} V (p-p)	
Square Wave – Generate ^{FO} (into 1 M Ω)	1 mV (p-p) to 130 V (p-p) (0.01 kHz to 1 kHz)	4.3×10^{-2} V (p-p)	
	1 mV (p-p) to 130 V (p-p) (1 kHz to 10 kHz)	3.8×10^{-3} V (p-p)	
Equipment to Output Frequency ^{FO}	0.01 Hz to 119.99 Hz	$2.5 \mu\text{Hz}/\text{Hz} + 195 \mu\text{Hz}$	Fluke 5520A/SC600; 33K8-4-1131-1
	120 Hz to 1 199.9 Hz	$2.5 \mu\text{Hz}/\text{Hz} + 245 \mu\text{Hz}$	
	1.2 kHz to 11.999 kHz	$2.5 \mu\text{Hz}/\text{Hz} + 1 185 \mu\text{Hz}$	
	12 kHz to 119.999 kHz	$2.5 \mu\text{Hz}/\text{Hz} + 11 \text{mHz}$	
	120 kHz to 1 199.9 kHz	$2.5 \mu\text{Hz}/\text{Hz} + 45 \text{mHz}$	
	1.2 MHz to 2 MHz	$2.5 \mu\text{Hz}/\text{Hz} + 45 \text{mHz}$	



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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 OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Balance/Scales ^F	0.001 g to 60 g	63 μ g	Rice Lake Class 2 weights; 33K6-4-3356-1
	60 g to 220 g	0.70 mg	
	220 g to 1 kg	12 mg	
	1 kg to 25 kg	120 mg	
Mass/Weights ^F NIST Handbook 105-1 (Class F)	1 mg to 60 g	52 μ g	Radwag AS60/220.R2; 33K6-4-3607-1
	60 g to 200 g	150 μ g	Radwag AS60/220.R2; 33K6-4-3607-1
	200 g to 1 000 g	12 mg	Radwag PS1 000.R1; 33K6-4-3607-1
	1 000 g to 25 kg	120 mg	Radwag APP25/2C; 33K6-4-3607-1
Force Gage - Compression ^{FO}	0.03 lbf to 50 lbf	0.01 lbf	Weights Class F, Load Cells; 33K6-4-433-1, 33K6-4-3196-1
	>50 lbf to 1 000 lbf	0.21 lbf	
	>1 000 lbf to 10 000 lbf	11 lbf	
	>10 000 lbf to 25 000 lbf	55 lbf	
Force Gage - Tension ^{FO}	0.03 lbf to 50 lbf	0.01 lbf	Weights Class F, Load Cells; 33K6-4-433-1, 33K6-4-3196-1
	>50 lbf to 1 000 lbf	0.78 lbf	
	> 1 000 lbf to 10 000 lbf	11 lbf	
	>10 000 lbf to 20 000 lbf	54 lbf	



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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 (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Vacuum Gauge ^{FO}	0 inHg to -29.5 inHg	0.13 inHg	Crystal Digital Test Gauge 33K6-4-1792-1
Pressure Gauge ^{FO}	10 psi to 100 psi	0.02 psi	Additel Pressure Standards; 33K6-4-314-1, 33K6-4-427-1
	30 psi to 300 psi	0.05 psi	
	200 psi to 2 000 psi	0.43 psi	
	1 000 psi to 10 000 psi	2.52 psi	
Torque Wrench/Driver –Tools ^F	40 ozf•in to 400 ozf•in	0.87 ozf•in	CDI Torque System, AKO System; 33K6-4-2193-1, 33K6-4-3015-1, 33K6-4-3108-1
	5 lbf•in to 50 lbf•in	0.2 lbf•in	
	15 lbf•in to 150 lbf•in	0.55 lbf•in	
	40 lbf•in to 400 lbf•in	0.76 lbf•in	
	25 lbf•in to 250 lbf•ft	0.07 lbf•ft	
	200 lbf•ft to 1 000 lbf•ft	0.07 lbf•ft	
Torque Analyzers/Calibrators ^F	40 ozf•in to 400 ozf•in	0.87 ozf•in	Class F weights with 2.5 in wheel 5 in wheel 10 in arm 20 in arm 24 in arm; 33K6-4-3176-1
	5 lbf•in to 50 lbf•in	0.2 lbf•in	
	15 lbf•in to 150 lbf•in	0.55 lbf•in	
	40 lbf•in to 400 lbf•in	0.76 lbf•in	
	20 lbf•in to 250 lbf•ft	0.07 lbf•ft	
	200 lbf•ft to 1 000 lbf•ft	0.12 lbf•ft	

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Measuring Devices/Sensors ^{FO}	40 °F to 125 °F	0.17 °F	Vaisala MI70/HMP77B Votsch VT7010; 33K5-4-84-1
	125 °F to 356 °F	0.24°F	Vaisala MI70/HMP77B; 33K5-4-42-1
Relative Humidity Measuring Devices ^F	20 % RH to 90 % RH	0.86 % RH	Vaisala MI70/HMP77B Votsch VT7010; 33K5-4-84-1



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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 presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer^{FO} would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
5. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.
6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement. The term D represents diagonal length in inches or millimeters as appropriate to the uncertainty statement.