



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Precision Instrument Correction, Inc.

933 Mariner Street, Brea, CA 92821

(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 January 2009):

Dimensional, Electrical, Mechanical, Thermodynamic, Time and Frequency, Mass, Force, and Weighing Devices Calibration
(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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Expiration Date:</i>
January 16, 2003	September 14, 2017	September 30, 2019
<i>Accreditation No.:</i>	<i>Certificate No.:</i>	
59282	L17-401	

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.pjllabs.com



Certificate of Accreditation: Supplement

Precision Instrument Correction, Inc.

933 Mariner Street, Brea CA 92821

Contact Name: Laura Camacho Phone: 714-671-6018

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 Block ^F	0.01 in to 1 in	(5 + 0.42L) μ in	Grade 0 reference Gage Block Gage Block Comparator
	1 in to 2 in	(6 + 0.42L) μ in	
	2 in to 3 in	(8 + 0.42L) μ in	
	3 in to 4 in	(9 + 0.42L) μ in	
External Micrometers ^{FO}	0.05 in to 60 in (Resolution: 0.001 in)	(670 + 0.83L) μ in	Gage Blocks
	0.05 in to 60 in (Resolution: 0.000 1)	(77 + 4.6L) μ in	
	0.05 in to 60 in (Resolution 0.000 05 in)	(59 + 5.0L) μ in	
Micrometers Inside ^{FO}	0.05 in to 60 in (Resolution: 0.001 in)	(670 + 0.97L) μ in	Gage Blocks
	0.05 in to 60 in (Resolution: 0.000 1)	(82 + 4.2L) μ in	
	0.05 in to 60 in (Resolution 0.000 05 in)	(65 + 4.5L) μ in	
Micrometers Depth ^{FO}	0.05 in to 60 in (Resolution: 0.001 in)	670 μ in	Gage Blocks
	0.05 in to 60 in (Resolution: 0.000 1)	(82 + 3.0L) μ in	
	0.05 in to 60 in (Resolution 0.000 05 in)	(65 + 3.5L) μ in	
Length Bars/End Standard ^F	0.1 to 20 in	(19 + 0.42L) μ in	Grade 0 reference Gage Block LVDT with Amplifier
Cylindrical Plug Gages ^F	0.005 in to 10 in	(30 + 2.2L) μ in	Grade 0 reference Gage Block Super Micrometer
Cylindrical Ring Gages ^F	0.062 5 in to 10 in	(25 + 18L) μ in	
Thread Plug Major Diameter ^F	0.05 in to 4 in	(32 + 7.6L) μ in	
	4 in to 10 in	(32 + 2.2L) μ in	
Thread Plug Pitch Diameter ^F	0.05 in to 10 in	(100 + 7.5L) μ in	Grade 0 reference Gage Block Super Micrometer Master Wires
Thread Ring Gages ^F	0.05 in to 10 in	(100 + 6.5L) μ in	Grade 0 reference Gage Block Super Micrometer Set Thread Plug Gages
Digital Indicators ^{FO}	0.05 in to 4 in	38 μ in	Grade 0 Gage Blocks Indicator Calibrator



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Dial Indicators ^{FO}	0.05 in to 4 in	630 μ in	Grade 0 Gage Blocks Indicator Calibrator
Test Indicators ^{FO}	0.005 to 0.06 in (Resolution: 0.000 05 in)	47 μ in	Calibration Tester Grade 0 Gage Blocks
	0.005 to 0.06 in (Resolution: 0.000 1 in)	69 μ in	
	0.005 to 0.060 in (Resolution: 0.000 5 in)	300 μ in	
	0.005 to 0.06 in (Resolution: 0.001 in)	580 μ in	
Height Gages ^{FO}	0.1 to 60 in	(150 + 2.3L) μ in	Grade 0 reference Gage Block, Flatness Table
Heights Masters ^F	0.05 in to 24 in	(21 + 2.3L) μ in	Gage Block
Square/Parallel ^F	4 in to 48 in	(22 + 2.3L) μ in	LVDT with Amplifier
Angle Blocks ^F	0° to 45°	(190 + 2.3L) μ in	Square and Angle Blocks LVDT with Amplifier Flatness Table
	45° to 90°	(140 + 2.3L) μ in	
Protractors ^{FO}	0° to 90°	(660 + 2.3L) μ in	Angle Blocks
Optical Comparator ^{FO} X and Y Stage Movement	0.5 in to 12 in	(210 + 16L) μ in	Gage Blocks Glass Scale
Optical Comparator Angularity ^{FO}	0° to 360°	0.096°	Angle Blocks
Optical Comparator Squareness of Y axis to X axis ^{FO}	(12 in of Y axis travel or maximum Y axis travel if maximum is less than 12 in)	(200 + 16L) μ in	Gage Block Paralle/Angle Blocks
Optical Comparator Magnification ^{FO}	10X	0.02 %	Gage Blocks Glass Scale
	20X		
	31.25X		
	50X		
	100X		
Calipers ^{FO}	0.1 in to 60 in (Resolution: 0.001 in)	(759 + 1.6L) μ in	Gage Blocks
	0.1 in to 60 in (Resolution: 0.000 5 in)	(291 + 6.0L) μ in	Gage Blocks
Surface Plates Flatness ^{FO}	12 in to 114 in	(20 + 13D) μ in	Auto Collimator
Surface Plates Repeat Readings ^{FO}	0.002 in	50 μ in	Repeat O Meter W/indicator



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Glass Scale/Stage Micrometer ^{FO}	Up to 6 in	(260 + 13L) μ in	Microscope and Gage Block

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 Measure DC Current ^{FO}	220 μ A to 2.2 mA	48 μ A/A + 8 nA	Fluke 5700A
	2.2 mA to 22 mA	48 μ A/A + 78 nA	
	22 mA to 220 mA	57 μ A/A + 1 μ A	
	220 mA to 2.2 A	84 μ A/A + 23 μ A	Fluke 5500A
	0.33 A to 3.3 A	210 μ A/A + 27 μ A	
	3.3 A to 11 A	450 μ A/A + 340 μ A	
Equipment to Measure DC Current for Clamp Ammeters ^{FO}	20 A to 149.9 A	0.13 A + 0.2 % of output	Fluke 5502A/3 with 5500A Coil
	150 A to 1 050 A	0.12 A + 0.21 % of output	
Equipment to Output DC Current ^{FO}	10 nA to 100 nA	39 pA/A + 46 pA	HP 3458A
	100 nA to 1 μ A	25 pA/A + 46 pA	
	1 μ A to 10 μ A	25 pA/A + 115 pA	
	10 μ A to 100 μ A	23 pA/A + 1 pA	
	100 μ A to 1 mA	23 pA/A + 6 nA	
	1 mA to 10 mA	23 pA/A + 58 nA	
	10 mA to 100 mA	40 pA/A + 1 μ A	
	100 mA to 1 A	149 pA/A + 16 μ A	
Equipment to Measure DC Voltage ^{FO}	22 mV to 2.2 V	6 μ V/V + 1 μ V	Fluke 5700A
	2.2 V to 11 V	5 μ V/V + 3 μ V	
	11 V to 22 V	6 μ V/V + 1 μ V	
	22 V to 220 V	6 μ V/V + 78 μ V	
	220 V to 1 100 V	10 μ V/V + 468 μ V	
Equipment to Output DC Voltage ^{FO}	10 mV to 100 mV	6 μ V/V + 0.4 μ V	HP 3458A
	100 mV to 1 V	5 μ V/V + 0.4 μ V	
	1 V to 10 V	5 μ V/V + 0.6 μ V	
	10 V to 100 V	7 μ V/V + 59 μ V	
	100 V to 1 000 V	12 μ V/V + 128 μ V	



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Equipment to Measure AC Voltage at the listed frequencies ^{FO}			Fluke 5700A
20 Hz to 20 kHz	0.22 mV to 2.2 mV	4 μ V + 0.08 % of output	
20 kHz to 50 kHz	0.22 mV to 2.2 mV	4 μ V + 0.13 % of output	
50 kHz to 100 kHz	0.22 mV to 2.2 mV	7 μ V + 0.25 % of output	
100 kHz to 300 kHz	0.22 mV to 2.2 mV	12 μ V + 0.25 % of output	
300 kHz to 500 kHz	0.22 mV to 2.2 mV	23 μ V + 0.64 % of output	
500 kHz to 1 MHz	0.22 mV to 2.2 mV	31 μ V + 0.73 % of output	
Equipment to Measure AC Voltage at the listed frequencies ^{FO}			
20 Hz to 20 kHz	2.2 mV to 22 mV	5 μ V + 0.03 % of output	
20 kHz to 50 kHz	2.2 mV to 22 mV	5 μ V + 0.03 % of output	
50 kHz to 100 kHz	2.2 mV to 22 mV	6 μ V + 0.07 % of output	
100 kHz to 300 kHz	2.2 mV to 22 mV	12 μ V + 0.18 % of output	
300 kHz to 500 kHz	2.2 mV to 22 mV	23 μ V + 0.27 % of output	
500 kHz to 1 MHz	2.2 mV to 22 mV	31 μ V + 0.38 % of output	
Equipment to Measure AC Voltage at the listed frequencies ^{FO}			
20 Hz to 20 kHz	22 mV to 220 mV	8 μ V + 0.01 % of output	
20 kHz to 50 kHz	22 mV to 220 mV	8 μ V + 0.02 % of output	
50 kHz to 100 kHz	22 mV to 220 mV	24 μ V + 0.05 % of output	
100 kHz to 300 kHz	22 mV to 220 mV	24 μ V + 0.08 % of output	
300 kHz to 500 kHz	22 mV to 220 mV	32 μ V + 0.12 % of output	
500 kHz to 1 MHz	22 mV to 220 mV	78 μ V + 0.26 % of output	
Equipment to Measure AC Voltage at the listed frequencies ^{FO}			Fluke 5700A
20 Hz to 20 kHz	220 mV to 2.2 V	6 μ V + 0.005 % of output	
20 kHz to 50 kHz	220 mV to 2.2 V	16 μ V + 0.01 % of output	
50 kHz to 100 kHz	220 mV to 2.2 V	62 μ V + 0.01 % of output	
100 kHz to 300 kHz	220 mV to 2.2 V	118 μ V + 0.04 % of output	
300 kHz to 500 kHz	220 mV to 2.2 V	314 μ V + 0.09 % of output	
500 kHz to 1 MHz	220 mV to 2.2 V	785 μ V + 0.14 % of output	



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Equipment to Measure AC Voltage at the listed frequencies ^{FO}			Fluke 5700A
20 Hz to 20 kHz	2.2 V to 22 V	119 μ V + 0.004 % of output	
20 kHz to 50 kHz	2.2 V to 22 V	157 μ V + 0.01 % of output	
50 kHz to 100 kHz	2.2 V to 22 V	0314 μ V + 0.01 % of output	
100 kHz to 300 kHz	2.2 V to 22 V	1 331 μ V + 0.03 % of output	
300 kHz to 500 kHz	2.2 V to 22 V	3 897 μ V + 0.09 % of output	
500 kHz to 1 MHz	2.2 V to 22 V	7 011 μ V + 0.13 % of output	
Equipment to Measure AC Voltage at the listed frequencies ^{FO}			
20 Hz to 40 Hz	22 V to 220 V	300 mV + 0.03 % of output	
40 Hz to 50 kHz	22 V to 220 V	1.4 mV + 0.03 % of output	
50 kHz to 100 kHz	22 V to 220 V	12 mV + 0.03 % of output	
Equipment to Measure AC Voltage at the listed frequencies ^{FO}			
50 Hz to 1 kHz	220 V to 1 100 V	3 mV + 0.02 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			HP 3458A
20 Hz to 100 Hz	0.1 mV to 10 mV	3 μ V + 0.04 % of output	
100 Hz to 50 kHz	0.1 mV to 10 mV	6 μ V + 0.1 % of output	
50 kHz to 100 kHz	0.1 mV to 10 mV	8 μ V + 0.04 % of output	
100 kHz to 300 kHz	0.1 mV to 10 mV	14 μ V + 5 % of output	
300 kHz to 1 MHz	0.1 mV to 10 mV	14 μ V + 2 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 100 Hz	10 mV to 100 mV	3 μ V + 0.01 % of output	
100 Hz to 1 kHz	10 mV to 100 mV	6 μ V + 1.2 % of output	
1 kHz to 50 kHz	10 mV to 100 mV	6 μ V + 0.02 % of output	
50 kHz to 100 kHz	10 mV to 100 mV	8 μ V + 1 % of output	



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Equipment to Output AC Voltage at the listed frequencies ^{FO}			HP 3458A
100 kHz to 300 kHz	10 mV to 100 mV	14 μ V + 0.4 % of output	
300 kHz to 500 kHz	10 mV to 100 mV	29 μ V + 0.4 % of output	
500 kHz to 1 MHz	10 mV to 100 mV	29 μ V + 1.4 % of output	
1 MHz to 2 MHz	10 mV to 100 mV	29 μ V + 2 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 40 Hz	100 mV to 300 mV	8 μ V + 0.04 % of output	
40 Hz to 1 kHz	100 mV to 300 mV	9 μ V + 0.04 % of output	
1 kHz to 50 kHz	100 mV to 300 mV	10 μ V + 0.01 % of output	
50 kHz to 100 kHz	100 mV to 300 mV	29 μ V + 0.3 % of output	
100 kHz to 300 kHz	100 mV to 300 mV	29 μ V + 0.1 % of output	
300 kHz to 500 kHz	100 mV to 300 mV	42 μ V + 0.1 % of output	
500 kHz to 1 MHz	100 mV to 300 mV	95 μ V + 0.5 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 40 Hz	300 mV to 1 V	48 μ V + 0.1 % of output	
40 Hz to 1 kHz	300 mV to 1 V	29 μ V + 0.1 % of output	
1 kHz to 50 kHz	300 mV to 1 V	19 μ V + 0.1 % of output	
50 kHz to 100 kHz	300 mV to 1 V	81 μ V + 0.1 % of output	
100 kHz to 300 kHz	300 mV to 1 V	151 μ V + 0.4 % of output	
300 kHz to 1 MHz	300 mV to 1 V	407 μ V + 1 % of output	
1 MHz to 2 MHz	300 mV to 1 V	988 μ V + 2 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 100 kHz	1 V to 3 V	504 μ V + 0.1 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 40 Hz	3 V to 10 V	476 μ V + 0.06 % of output	
40 Hz to 20 kHz	3 V to 10 V	70 μ V + 0.06 % of output	
20 kHz to 50 kHz	3 V to 10 V	186 μ V + 0.07 % of output	
50 kHz to 100 kHz	3 V to 10 V	407 μ V + 0.1 % of output	
100 kHz to 300 kHz	3 V to 10 V	1 741 μ V + 0.4 % of output	
300 kHz to 1 MHz	3 V to 10 V	4 977 μ V + 1 % of output	
1 MHz to 2 MHz	3 V to 10 V	9 832 μ V + 1.5 % of output	



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Equipment to Output AC Voltage at the listed frequencies ^{FO}			HP 3458A
20 Hz to 40 Hz	10 V to 100 V	5 mV + 0.1 % of output	
40 Hz to 1 kHz	10 V to 100 V	1 mV + 0.1 % of output	
1 kHz to 20 kHz	10 V to 100 V	4 mV + 0.1 % of output	
20 kHz to 50 kHz	10 V to 100 V	9 mV + 0.1 % of output	
50 kHz to 100 kHz	10 V to 100 V	104 mV + 0.2 % of output	
Equipment to Output AC Voltage at the listed frequencies ^{FO}			
20 Hz to 40 Hz	100 V to 700 V	9 mV + 0.1 % of output	
40 Hz to 1 kHz	100 V to 700 V	19 mV + 0.1 % of output	
1 kHz to 50 kHz	100 V to 700 V	4 mV + 0.1 % of output	
50 kHz to 100 kHz	100 V to 700 V	4 mV + 0.3 % of output	
Equipment to Measure AC Current for Clamp Ammeters at the listed frequencies ^{FO}			Fluke 5502A/3 with 5500A Coil
45 Hz to 65 Hz	20 A to 149.9 A	0.12 A + 0.2 % of output	
65 Hz to 440 Hz	150 A to 1 050 A	0.11 A + 0.21 % of output	
Equipment to Measure AC Current for Clamp Ammeters at the listed frequencies ^{FO}			
45 Hz to 65 Hz	20 A to 149.9 A	0.11 A + 0.25 % of output	
65 Hz to 440 Hz	150 A to 1 050 A	0.11 A + 0.25 % of output	
Equipment to Measure AC Current at the listed frequencies ^{FO}			Fluke 5700A
20 Hz to 100 Hz	22 μ A to 220 μ A	8 nA + 0.01 % of output	
100 Hz to 1 kHz	22 μ A to 220 μ A	16 nA + 0.01 % of output	
1 kHz to 5 kHz	22 μ A to 220 μ A	39 nA + 0.01 % of output	
5 kHz to 10 kHz	22 μ A to 220 μ A	139 nA + 0.2 % of output	
Equipment to Measure AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	220 μ A to 2.2 mA	16 nA + 0.01 % of output	
100 Hz to 1 kHz	220 μ A to 2.2 mA	31 nA + 0.01 % of output	
1 kHz to 5 kHz	220 μ A to 2.2 mA	405 nA + 0.05 % of output	
5 kHz to 10 kHz	220 μ A to 2.2 mA	904 nA + 0.14 % of output	



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Equipment to Measure AC Current at the listed frequencies ^{FO}			Fluke 5700A
20 Hz to 100 Hz	2.2 mA to 22 mA	156 nA + 0.01 % of output	
100 Hz to 1 kHz	2.2 mA to 22 mA	311 nA + 0.01 % of output	
1 kHz to 5 kHz	2.2 mA to 22 mA	3 909 nA + 0.05 % of output	
5 kHz to 10 kHz	2.2 mA to 22 mA	7 850 nA + 0.14 % of output	
Equipment to Measure AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	22 mA to 220 mA	2 μ A + 0.02 % of output	
100 Hz to 1 kHz	22 mA to 220 mA	3 μ A + 0.02 % of output	
1 kHz to 5 kHz	22 mA to 220 mA	39 μ A + 0.05 % of output	
5 kHz to 10 kHz	22 mA to 220 mA	78 μ A + 0.14 % of output	
Equipment to Measure AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	220 mA to 2.2 A	16 μ A + 0.06 % of output	
100 Hz to 1 kHz	220 mA to 2.2 A	31 μ A + 0.06 % of output	
1 kHz to 5 kHz	220 mA to 2.2 A	78 μ A + 0.07 % of output	
5 kHz to 10 kHz	220 mA to 2.2 A	156 μ A + 0.8 % of output	
Equipment to Measure AC Current at the listed frequencies ^{FO}			Fluke 5500A
20 Hz to 1 kHz	0.33 A to 3.0 A	13 μ A + 0.14 % of output	
1 kHz to 30 kHz	0.33 A to 3.0 A	13 μ A + 0.92 % of output +	
Equipment to Measure AC Current at the listed frequencies ^{FO}			
20 Hz to 1 kHz	3 A to 11 A	0.06 mA + 0.29 % of output	
1 kHz to 30 kHz	3 A to 11 A	0.06 mA + 2 % of output	
Equipment to Output AC Current at the listed frequencies ^{FO}			HP 3458A
20 Hz to 100 Hz	10 μ A to 100 μ A	13 nA + 0.1 % of output	
100 Hz to 1 kHz	10 μ A to 100 μ A	16 nA + + 0.1 % of output	
1 kHz to 5 kHz	10 μ A to 100 μ A	39 nA + 0.1 % of output	
Equipment to Output AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	100 μ A to 1 mA	20 nA + 0.1 % of output	
100 Hz to 1 kHz	100 μ A to 1 mA	31 nA + 0.04 % of output	
1 kHz to 5 kHz	100 μ A to 1 mA	405 nA + 0.04 % of output	
5 kHz to 10 kHz	100 μ A to 1 mA	904 nA + 0.1 % of output	



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Equipment to Output AC Current at the listed frequencies ^{FO}			HP 3458A
20 Hz to 100 Hz	1 mA to 10 mA	0.2 μ A + 0.1 % of output	
100 Hz to 1 kHz	1 mA to 10 mA	0.3 μ A + 0.04 % of output	
1 kHz to 5 kHz	1 mA to 10 mA	4 μ A + 0.04 % of output	
5k Hz to 10k Hz	1 mA to 10 mA	8 μ A + 0.1 % of output	
Equipment to Output AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	10 mA to 100 mA	2 μ A + 0.1 % of output	
100 Hz to 1 kHz	10 mA to 100 mA	4 μ A + 0.04 % of output	
1 kHz to 5 kHz	10 mA to 100 mA	39 μ A + 0.04 % of output	
5 kHz to 10 kHz	10 mA to 100 mA	78 μ A + 0.1 % of output	
Equipment to Output AC Current at the listed frequencies ^{FO}			
20 Hz to 100 Hz	100 mA to 1 A	16 μ A + 0.1 % of output	
100 Hz to 1 kHz	100 mA to 1 A	39 μ A + 0.1 % of output	
1 kHz to 5 kHz	100 mA to 1 A	78 μ A + 0.1 % of output	
5 kHz to 10 kHz	100 mA to 1 A	156 μ A + 0.4 % of output	
Equipment to Measure Resistance ^{FO}			Fluke 5700A
	0.1 Ω to 1 Ω	96 $\mu\Omega/\Omega$ + 86 $\mu\Omega$	
	1 Ω to 1.9 Ω	91 $\mu\Omega/\Omega$ + 85 $\mu\Omega$	
	1.9 Ω to 19 Ω	31 $\mu\Omega/\Omega$ + 26 $\mu\Omega$	
	19 Ω to 190 Ω	16 $\mu\Omega/\Omega$ + 16 $\mu\Omega$	
	190 Ω to 19 k Ω	12 $\mu\Omega/\Omega$ + 12 $\mu\Omega$	
	19 k Ω to 190 k Ω	14 $\mu\Omega/\Omega$ + 12 $\mu\Omega$	
	190 k Ω to 1 M Ω	19 $\mu\Omega/\Omega$ + 18 $\mu\Omega$	
	1 M Ω to 1.9 M Ω	143 $\mu\Omega/\Omega$ + 19 $\mu\Omega$	
	1.9 M Ω to 10 M Ω	135 $\mu\Omega/\Omega$ + 36 $\mu\Omega$	
	10 M Ω to 19 M Ω	69 $\mu\Omega/\Omega$ + 43 $\mu\Omega$	
	19 M Ω to 100 M Ω	178 $\mu\Omega/\Omega$ + 102 $\mu\Omega$	
	33 M Ω to 330 M Ω	6 k Ω + 0.6 % of output	Fluke 5500A
Equipment to Output Resistance ^{FO}			HP 3458A
	0.1 Ω to 1 Ω	40 $\mu\Omega/\Omega$ + 6 $\mu\Omega$	
	1 Ω to 10 Ω	18 $\mu\Omega/\Omega$ + 6 $\mu\Omega$	
	10 Ω to 100 Ω	14 $\mu\Omega/\Omega$ + 2 $\mu\Omega$	
	100 Ω to 1 k Ω	12 $\mu\Omega/\Omega$ + 1 $\mu\Omega$	
	1 k Ω to 10 k Ω	12 $\mu\Omega/\Omega$ + 1 $\mu\Omega$	



Certificate of Accreditation: Supplement

Precision Instrument Correction, Inc.

933 Mariner Street, Brea CA 92821

Contact Name: Laura Camacho Phone: 714-671-6018

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 Resistance ^{FO}	10 k Ω to 100 k Ω	12 $\mu\Omega/\Omega$ + 1 $\mu\Omega$	HP 3458A
	100 k Ω to 1 M Ω	19 $\mu\Omega/\Omega$ + 3 $\mu\Omega$	
	1 M Ω to 10 M Ω	135 $\mu\Omega/\Omega$ + 14 $\mu\Omega$	
	10 M Ω to 100 M Ω	602 $\mu\Omega/\Omega$ + 33 $\mu\Omega$	
	100 M Ω to 1 G Ω	5 783 $\mu\Omega/\Omega$ + 291 $\mu\Omega$	
Equipment to Measure Capacitance ^{FO}	0.33 nF to 0.6 nF	3.9 pF + 3.68 % of output	Fluke 5500A
	0.6 nF to 3.0 nF	7.8 pF + 1.12 % of output	
	3.0 nF to 12 nF	7.8 pF + 1.2 % of output	
	12 nF to 300 nF	78 pF + 0.22 % of output	
	0.3 μ F to 1.09 μ F	0.78 nF + 0.56 % of output	
	1.09 μ F to 3.3 μ F	0.78 nF + 0.37 % of output	
	3.3 μ F to 10.9 μ F	7.7 nF + 1.78 % of output	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B ^{FO}	600 $^{\circ}$ C to 800 $^{\circ}$ C	0.53 $^{\circ}$ C	Electrical Simulation of Thermocouple Output Multiproduct - Calibrator (Fluke 5500A)
	800 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.51 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 550 $^{\circ}$ C	0.49 $^{\circ}$ C	
	1 500 $^{\circ}$ C to 1 820 $^{\circ}$ C	0.49 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C ^{FO}	0 $^{\circ}$ C to 150 $^{\circ}$ C	0.46 $^{\circ}$ C	
	150 $^{\circ}$ C to 650 $^{\circ}$ C	0.4 $^{\circ}$ C	
	650 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.47 $^{\circ}$ C	
	1 000 $^{\circ}$ C to 1 800 $^{\circ}$ C	0.61 $^{\circ}$ C	
	1 800 $^{\circ}$ C to 2 316 $^{\circ}$ C	0.86 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E ^{FO}	-250 $^{\circ}$ C to -100 $^{\circ}$ C	0.62 $^{\circ}$ C	
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	0.4 $^{\circ}$ C	
	-25 $^{\circ}$ C to 350 $^{\circ}$ C	0.4 $^{\circ}$ C	
	350 $^{\circ}$ C to 650 $^{\circ}$ C	0.41 $^{\circ}$ C	
	650 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.43 $^{\circ}$ C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J ^{FO}	-210 $^{\circ}$ C to -100 $^{\circ}$ C	0.46 $^{\circ}$ C	
	-100 $^{\circ}$ C to -30 $^{\circ}$ C	0.4 $^{\circ}$ C	
	-30 $^{\circ}$ C to 150 $^{\circ}$ C	0.39 $^{\circ}$ C	
	150 $^{\circ}$ C to 760 $^{\circ}$ C	0.4 $^{\circ}$ C	
	760 $^{\circ}$ C to 1 200 $^{\circ}$ C	0.43 $^{\circ}$ C	



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Electrical

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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K ^{FO}	-200 °C to -100 °C	0.5 °C	Electrical Simulation of Thermocouple Output Multiproduct - Calibrator (Fluke 5500A)
	-100 °C to -25 °C	0.41 °C	
	-25 °C to 120 °C	0.4 °C	
	120 °C to 1 000 °C	0.45 °C	
	1 000 °C to 1 372 °C	0.55 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N ^{FO}	-200 °C to -100 °C	0.55 °C	
	-100 °C to -25 °C	0.43 °C	
	-25 °C to 120 °C	0.42 °C	
	120 °C to 410 °C	0.42 °C	
	410 °C to 1 300 °C	0.44 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R ^{FO}	0 °C to 250 °C	0.68 °C	
	250 °C to 400 °C	0.52 °C	
	400 °C to 1 000 °C	0.51 °C	
	1 000 °C to 1 767 °C	0.56 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S ^{FO}	0 °C to 250 °C	0.4 °C	
	250 °C to 1 000 °C	0.27 °C	
	1 000 °C to 1 400 °C	0.49 °C	
	1 400 °C to 1 767 °C	0.52 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -150 °C	0.71 °C	
	-150 °C to 0 °C	0.44 °C	
	0 °C to 120 °C	0.4 °C	
	120 °C to 400 °C	0.4 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type U ^{FO}	-200 °C to 0 °C	0.66 °C	
	0 °C to 600 °C	0.47 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 385, 100 Ω ^{FO}	-200 °C to 0 °C	0.04 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 300 °C	0.07 °C	
	300 °C to 400 °C	0.08 °C	
	400 °C to 630 °C	0.09 °C	
	630 °C to 800 °C	0.18 °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 used with RTD Type Pt 3916, 100 Ω ^{FO}	-200 °C to 0 °C	0.04 °C	Electrical Simulation of Thermocouple Output Multiproduct - Calibrator (Fluke 5500A)
	0 °C to 100 °C	0.06 °C	
	100 °C to 300 °C	0.06 °C	
	300 °C to 400 °C	0.07 °C	
	400 °C to 630 °C	0.09 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 3926, 100 Ω ^{FO}	-200 °C to 0 °C	0.04 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 300 °C	0.07 °C	
	300 °C to 400 °C	0.08 °C	
	400 °C to 630 °C	0.09 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 385, 500 Ω ^{FO}	-200 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 300 °C	0.06 °C	
	300 °C to 400 °C	0.06 °C	
	400 °C to 630 °C	0.08 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Pt 385, 1 000 Ω ^{FO}	-200 °C to 0 °C	0.02 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 400 °C	0.06 °C	
	400 °C to 600 °C	0.06 °C	
	600 °C to 630 °C	0.18 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Ni 120, 120 Ω ^{FO}	-80 °C to 0 °C	0.08 °C	
	-0 °C to 100 °C	0.06 °C	
	100 °C to 260 °C	0.04 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Ni 120, 120 μ ^{FO}	-80 °C to 0 °C	0.08 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 260 °C	0.04 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Type Ni 120, 120 ^{FO}	-100 °C to 200 °C	0.1 °C	



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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
Indirect Verification of Rockwell Hardness Testers HRA ^{FO}	20 HRA to 66 HRA	0.59 HRA	ASTM E18 and calibrated Rockwell Hardness Test Blocks
	66 HRA to 79 HRA	1.5 HRA	
	79 HRA to 84 HRA	0.61 HRA	
Indirect Verification of Rockwell Hardness Testers HRB ^{FO}	40 HRB to 59 HRB	0.60 HRB	
	60 HRB to 79 HRB	0.52 HRB	
	80 HRB to 100 HRB	0.52 HRB	
Indirect Verification of Rockwell Hardness Testers HRC ^{FO}	20 HRC to 31 HRC	0.51 HRC	
	31 HRC to 55 HRC	0.54 HRC	
	56 HRC to 65 HRC	0.52 HRC	
Indirect Verification of Rockwell Hardness Testers HREW ^{FO}	70 HREW to 80 HREW	0.52 HREW	
	80 HREW to 91 HREW	0.52 HREW	
	91 HREW to 150 HREW	0.52 HREW	
Indirect Verification of Rockwell Hardness Testers HR15N ^{FO}	70 HR15N to 77 HR15N	0.52 HR15N	
	77 HR15N to 88 HR15N	0.79 HR15N	
	89 HR15N to 92 HR15N	0.65 HR15N	
Indirect Verification of Rockwell Hardness Testers HR30N ^{FO}	42 HR30N to 50 HR30N	0.65 HR30N	
	51 HR30N to 73 HR30N	0.56 HR30N	
	74 HR30N to 82 HR30N	0.67 HR30N	
Indirect Verification of Rockwell Hardness Testers HR45N ^{FO}	20 HR45N to 32 HR45N	1.6 HR45T	
	32 HR45N to 62 HR45N	1.1 HR45T	
	62 HR45N to 72 HR45N	1.1 HR45T	
Indirect Verification of Rockwell Hardness Testers HR15T ^{FO}	74 HR15T to 80 HR15T	1.2 HR15T	
	81 HR15T to 86 HR15T	1.6 HR15T	
	87 HR15T to 93 HR15T	1.6 HR15T	
Indirect Verification of Rockwell Hardness Testers HR30T ^{FO}	43 HR30T to 57 HR30T	1.2 HR30T	
	57 HR30T to 70 HR30T	1.2 HR30T	
	70 HR30T to 83 HR30T	1.2 HR30T	
Indirect Verification of Rockwell Hardness Testers HR45T ^{FO}	13 HR45T to 33HR45T	1.6 HR45T	
	33 HR45T to 53HR45T	1.1 HR45T	
	53 HR45T to 73HR45T	1.1 HR45T	



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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
Pressure Source/Measure ^{FO}	0.2 psi to 15 psi	33 μ psi/psi + 0.000 05 psi	Ruska 2465, 2460 and 2481-700
	2 psi to 600 psi	59 μ psi/psi + 0.003 5 psi	
	100 psi to 3 000 psi	0.1 psi + 0.011 % of reading	
	1 000 psi to 30 000 psi	1.1 psi + 0.012 % of reading	
	0.000 1 psia to 17 psia	0.002 7 psia + 0.005 5 % of reading	Mensor 14500A
Torque Measure ^F	20 ozf·in to 80 ozf·in	0.6 ozf·in	Mountz BMX80Z BMX80Z50i BMX80250i BMX500F BMX1500F
	10 lbf·in to 50 lbf·in	0.4 lbf·in	
	50 lbf·in to 250 lbf·in	2 lbf·in	
	250 lbf·in to 500 lbf·in	4 lbf·in	
	50 lbf·ft to 1 500 lbf·ft	12 lbf·ft	
Torque Source ^F	10 lbf·in to 50 lbf·in	0.001 5 lbf·in + 0.095 % of reading	Torque Wheel/Arm 5" & 10" Class F Weights
	50 lbf·in to 250 lbf·in	0.011 lbf·in - 0.12 % of reading	
	250 lbf·in to 500 lbf·in	0.05 lbf·in + 0.096 % of reading	
	50 lbf·ft to 250 lbf·ft	0.003 8 lbf·ft + 0.091 % of reading	

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
Humidity ^{FO}	Up to 40 % RH	1.2 % RH	Vaisala M170/HMP77
	40 % RH to 98 % RH	1.3 % RH	
Oven/Chamber Temperature Uniformity Measure ^{FO}	32 °F to 2 400 °F	1.2 °F + 0.41 % of reading	Fluke 1586A w/ Type K Thermocouple
	-112 °F to 1 400 °F	2.4 °F + 0.088 % of reading	Fluke 1586A w/ Type J Thermocouple
Temperature Source ^{FO}	-80 °C to 0 °C	0.06 °C	Kaye 4007, w/ PRT 8167-25
	0 °C to 100 °C	0.07 °C	
	100 °C to 420 °C	0.06 °C + 0.014 % of reading	Hart 9122A w/ PRT 8167-25
Temperature Measure ^{FO}	-196 °C to 0.01 °C	0.021 °C + 0.003 1 % of reading	Fluke 1586A with PRT 8167-25
	0.01 °C to 420 °C	0.021 °C + 0.007 4 % of reading	



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Time & Frequency

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
Stop Watches/Timer ^{FO}	1 s to 86 400 s	0.063 s	Direct Comparison using Photo Totalize Method NIST 960-12
Equipment to Measure Frequency ^{FO}	1 Hz to 40 Hz	0.02 Hz	Fluke 5500A
	40 Hz to 300 kHz	5 Hz	
	300 kHz to 1 MHz	0.4 kHz	
	1 MHz to 100 MHz	2 kHz	HP 8648A
	100 MHz to 500 MHz	0.01 MHz	
	500 MHz to 1 GHz	0.02 MHz	

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
Force Compression ^{FO}	0.01 lbf to 5 lbf	0.000 2 lbf	ASTM Class 1 Weights
	5 lbf to 10 lbf	0.11 lbf	
	10 lbf to 100 lbf	0.12 lbf	NIST Class F Weights
	100 lbf to 1 000 lbf	0.21 % of applied force	Load Cell with Indicator
	1 000 lbf to 10 000 lbf	0.6 % of applied force	
Force Tension ^{FO}	0.01 lbf to 5 lbf	0.000 2 lbf	ASTM Class 1 Weights
	5 lbf to 10 lbf	0.11 lbf	NIST Class F Weights
	10 lbf to 100 lbf	0.12 lbf	
	100 lbf to 200 lbf	0.09 % of applied force	Load Cell with Indicator
	200 lbf to 300 lbf	0.07 % of applied force	
	300 lbf to 1 000 lbf	0.06 % of applied force	
Class F Weights and Non Classified Weights ^F	1 g	0.02 mg	Comparison Method using Class 1 Standard Weights and Balances: Sartorius MC 5
	2 g	0.02 mg	
	3 g	0.02 mg	
	5 g	0.02 mg	
	10 g	0.02 mg	
	20 g	0.02 mg	AND HR-202E
	30 g	0.02 mg	
	50 g	0.03 mg	
	100 g	0.05 mg	
	200 g	0.18 mg	



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Mass, Force and Weighing Devices

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Class F Weights and Non Classified Weights ^F	300 g	2.7 mg	Sartorius LC12015	
	500 g	2.8 mg		
	1 kg	2.8 mg		
		2 kg	65 mg	Sartorius E5500S
		3 kg	66 mg	
		5 kg	65 mg	
		10 kg	200 mg	
		20 kg	440 mg	Mettler PM34-K
30 kg		970 mg		
Electronic Balances ^{FO}	1 g to 5 g	0.025 mg	Class 1 Standard Weights	
	5 g to 10 g	0.05 mg		
	10 g to 20 g	0.07 mg		
Electronic Balances ^{FO}	20 g to 30 g	0.08 mg		
	30 g to 50 g	0.12 mg		
	50 g to 100 g	0.25 mg		
Weighing Scales ^{FO}	100 g to 1 000 g	$(1 \times 10^{-3} + 2.2 \times 10^{-6}Wt) \text{ g}$	Class 1 Standard Weights	
	1 000 g to 5 000 g	$(1.2 \times 10^{-1} + 2 \times 10^{-7}Wt) \text{ g}$		
	5 kg to 30 kg	$(1.5 \times 10^{-2} + 1.2 \times 10^{-4}Wt) \text{ g}$	Class F Standard Weights	

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.



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

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
7. The term "X" preceded by a number represents the number of times a lense system magnifies an image relative to its actual size. CMC stated as "% of magnification" represents the CMC of magnification expressed as a percentage of the total magnification.
8. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
9. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.