



# CERTIFICATE OF ACCREDITATION

## ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

### **International Process Solutions**

**1300 Industrial Rd. Suite 22**

**San Carlos, CA 94070**

has been assessed by ANAB  
and meets the requirements of international standard

### **ISO/IEC 17025:2005**

and national standard

### **ANSI/NCSL Z540-1-1994**

while demonstrating technical competence in the field of

### **CALIBRATION**

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1400

Certificate Number

  
ANAB Approval

Certificate Valid: 06/20/2017-06/22/2019  
Version No. 003 Issued: 06/20/2017



This laboratory 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 (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005 AND ANSI/NCSL Z540-1-1994 (R2002)

International Process Solutions

1300 Industrial Road
San Carlos, CA 94070
Thomas Main 650-595-7890 ext. 105
tmain@ips-us.com

CALIBRATION

Valid to: June 22, 2019

Certificate Number: AC-1400

Electrical – DC/Low Frequency

Table with 4 columns: Parameter / Equipment, Range, Expanded Uncertainty of Measurement (+/-), Reference Standard, Method and/or Equipment. Rows include DC Voltage - Source, DC Current - Source, and AC Voltage - Source.



Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage - Source	(2.2 to 22) mV		Fluke 5700A Series II
	(10 to 20) Hz	1.2 mV/V + 6 μV	
	(20 to 40) Hz	0.49 mV/V + 6 μV	
	40 Hz to 20 kHz	0.26 mV/V + 6 μV	
	(20 to 50) kHz	0.84 V/V + 6 μV	
	(50 to 100) kHz	1.9 mV/V + 8 μV	
	(100 to 300) kHz	2.6 mV/V + 15 μV	
	(300 to 500) kHz	3.6 mV/V + 30 μV	
	500 kHz to 1 MHz	9.6 mV/V + 40 μV	
	(22 to 220) mV		
	(10 to 20) Hz	1.2 mV/V + 16 μV	
	(20 to 40) Hz	0.48 mV/V + 10 μV	
	40 Hz to 20 kHz	0.22 mV/V + 10 μV	
	(20 to 50) kHz	0.72 mV/V + 10 μV	
	(50 to 100) kHz	1.8 mV/V + 30 μV	
	(100 to 300) kHz	2.2 mV/V + 30 μV	
	(300 to 500) kHz	3.6 mV/V + 40 μV	
	500 kHz to 1 MHz	7.2 mV/V + 0.1 mV	
	220 mV to 2.2 V		
	(10 to 20) Hz	5.1 mV/V + 0.1 mV	
	(20 to 40) Hz	5 mV/V + 30 μV	
	40 Hz to 20 kHz	5 mV/V + 7 μV	
	(20 to 50) kHz	5 mV/V + 20 μV	
	(50 to 100) kHz	5 mV/V + 80 μV	
(100 to 300) kHz	5.1 mV/V + 0.15 mV		
(300 to 500) kHz	5.5 mV/V + 0.4 mV		
500 kHz to 1 MHz	6.9 mV/V + 1 mV		
(2.2 to 22) V			
(10 to 20) Hz	1.3 mV/V + 1 mV		
(20 to 40) Hz	0.58 mV/V + 0.3 mV		
40 Hz to 20 kHz	0.49 mV/V + 70 μV		
(20 to 50) kHz	0.54 mV/V + 0.2 mV		
(50 to 100) kHz	0.72 mV/V + 0.4 mV		
(100 to 300) kHz	1.3 mV/V + 1.7 mV		
(300 to 500) kHz	2.8 mV/V + 5 mV		
500 kHz to 1 MHz	6.1 mV/V + 9 mV		



Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage - Source	(22 to 220) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz 2.2 V to 1.1 kV (15 to 50) Hz 50 Hz to 1 kHz	1.3 mV/V + 10 mV 0.58 mV/V + 3 mV 0.49 mV/V + 1 mV 0.68 mV/V + 4 mV 1.3 mV/V + 10 mV 0.92 mV/V + 20 mV 0.18 mV/V + 4 mV	Fluke 5700A Series II
AC Current - Source	(9 to 220) $\mu$ A 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 220 $\mu$ A to 2.2 mA 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz (2.2 to 22) mA 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz (22 to 220) mA 10 to 20 Hz 20 to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 22 mA to 2.2A 20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	1.6 mA/A + 30 nA 0.84 mA/A + 25 nA 0.32 mA/A + 20 nA 1.4 mA/A + 50 nA 3.6 mA/A + 0.1 $\mu$ A 1.6 mA/A + 50 nA 0.84 mA/A + 40 nA 0.32 mA/A + 40 nA 1.4 mA/A + 0.5 $\mu$ A 3.6 mA/A + 1 $\mu$ A 1.6 mA/A + 0.5 $\mu$ A 0.84 mA/A + 0.4 $\mu$ A 0.32 mA/A + 0.4 $\mu$ A 1.4 mA/A + 5 $\mu$ A 3.6 mA/A + 10 $\mu$ A 1.6 mA/A + 5 $\mu$ A 0.84 mA/A + 4 $\mu$ A 0.32 mA/A + 4 $\mu$ A 1.4 mA/A + 50 $\mu$ A 3.6 mA/A + 0.1 mA 6.1 mA/A + 40 $\mu$ A 6.2 mA/A + 0.1 mA 21 mA/A + 0.2 mA	Fluke 5700A Series II



Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance - Source	1 Ω	0.23 mΩ	Fluke 5700A Series II
	1.9 Ω	0.42 mΩ	
	10 Ω	0.67 mΩ	
	19 Ω	1.3 mΩ	
	100 Ω	4 mΩ	
	190 Ω	7.6 mΩ	
	1 kΩ	30 mΩ	
	1.9 kΩ	57 mΩ	
	10 kΩ	0.28 Ω	
	19 kΩ	0.53 Ω	
	100 kΩ	3.2 Ω	
190 kΩ	6.1 Ω		
Resistance - Source	1 MΩ	46 Ω	Fluke 5700A Series II
	1.9 MΩ	93 Ω	
	10 MΩ	0.94 kΩ	
	19 MΩ	2.1 kΩ	
	100 MΩ	27 kΩ	
DC Voltage - Measure	(10 to 100) mV	18 μV/V + 0.3 μV	HP 3458A Opt 002
	100 mV to 1 V	18 μV/V + 0.3 μV	
	(1 to 10) V	12 μV/V + 0.5 μV	
	(10 to 100) V	17 μV/V + 30 μV	
	100 V to 1 kV	17 μV/V + 0.1 mV	
AC Voltage - Measure	(1 to 10) mV		HP 3458A Opt 002
	1 Hz to 1 kHz	4 μV/V + 1.1 μV	
	(1 to 20) kHz	6 μV/V + 1.1 μV	
	(20 to 100) kHz	0.1 mV/V + 1.1 μV	
	(100 to 300) kHz	0.8 mV/V + 2 μV	
	300 kHz to 1MHz	0.24 mV/V + 5 μV	
	(1 to 4) MHz	1.4 mV/V + 7 μV	
	(10 to 100) mV		
	1 Hz to 1 kHz	0.16 mV/V + 2 μV	
	(1 to 20) kHz	0.29 mV/V + 2 μV	
	(20 to 100) kHz	1.6 mV/V + 2 μV	
	(100 to 300) kHz	0.66 mV/V + 10 μV	
	300 kHz to 1MHz	4 mV/V + 50 μV	
	(1 to 4) MHz	8 mV/V + 70 μV	
	(4 to 8) MHz	8 mV/V + 80 μV	
(8 to 10) MHz	30 mV/V + 0.1 mV		



Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
AC Voltage - Measure	100 mV to 1V		HP 3458A Opt 002
	1 Hz to 1 kHz	0.19 mV/V + 0.4 mV	
	(1 to 20) kHz	0.18 mV/V + 0.4 mV	
	(20 to 50) kHz	0.16 mV/V + 0.4 mV	
	(50 to 100) kHz	0.16 mV/V + 0.2 mV	
	(1 to 10) V	0.29 mV/V + 0.2 mV	
	10 Hz	0.61 mV/V + 0.2 mV	
	(10 to 20) Hz	1.6 mV/V + 0.2 mV	
	(20 to 40) Hz	6 mV/V + 1 mV	
	40 Hz to 1 kHz	20 mV/V + 1 mV	
	(1 to 20) kHz	20 mV/V + 1 mV	
	(20 to 50) kHz		
	(50 to 100) kHz	0.41 mV/V + 2 mV	
	(100 to 300) kHz	0.41 mV/V + 2 mV	
	(300 to 500) kHz	0.71 mV/V + 2 mV	
	500 kHz to 1 MHz	2.4 mV/V + 2 mV	
	(10 to 100) V		
	1 kHz	81 mV/V + 20 mV	
	(1 to 20) kHz		
	(20 to 50) kHz	0.3 mV/V + 4 mV	
(50 to 100) kHz	10 mV/V + 0.2 V		
100 V to 1 kV			
1 kHz	8 mV/V + 2 mV		
ANALOG, 1V	0.41 mV/V + 1 mV		
50 kHz	3.1 mV/V + 4 mV		
1 MHz	0.1 V/V + 0.2 V		
ANALOG, 10V			
10 Hz	0.16 mV/V + 20 μV		
(10 to 500) Hz	0.29 mV/V + 20 μV		
50 kHz	0.61 mV/V + 20 μV		
1 MHz	1.6 mV/V + 20 μV		
Resistance - Measure	4 wire:		HP 3458A Opt 002
	Up to 10 Ω	35 μΩ/Ω + 10 μΩ	
	(10 to 100) Ω	27 μΩ/Ω + 0.1 mΩ	
	100 Ω to 1 kΩ	15 μΩ/Ω + 0.1 mΩ	
	(1 to 10) kΩ	15 μΩ/Ω + 1 mΩ	
	(10 to 100) kΩ	15 μΩ/Ω + 10 mΩ	
	100 kΩ to 1 MΩ	21 μΩ/Ω + 1 Ω	
	(1 to 10) MΩ	55 μΩ/Ω + 20 Ω	
	2 wire:		
	(10 to 100) MΩ	0.15 mΩ/Ω + 20 Ω	



**Electrical – DC/Low Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current - Measure	100 $\mu$ A 100 $\mu$ A to 1mA (1 to 10) mA (10 to 100) mA 1 mA to 1 A	34 $\mu$ A/A + 0.1 nA 30 $\mu$ A/A + 1 nA 30 $\mu$ A/A + 10 nA 39 $\mu$ A/A + 0.1 $\mu$ A 47 $\mu$ A/A + 2 $\mu$ A	HP 3458A Opt 002
AC Current - Measure Up to 1 kHz	(5 to 100) $\mu$ A 100 $\mu$ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	1.2 mA/A + 30 nA 0.63 mA/A + 0.2 $\mu$ A 0.63 mA/A + 2 $\mu$ A 0.63 mA/A + 20 $\mu$ A 2 mA/A + 0.2 mA	HP 3458A Opt 002

**Length – Dimensional Metrology**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Outside Diameter (Pin and Plug Gages)	(0.01 in to 0.25) in	25 $\mu$ in	Mitutoyo Laser Scan Micrometer LSM-6100
	(0.25 in to 1) in	76 $\mu$ in	Measurement Heads

**Thermodynamic**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Temperature	(-196 to 0) $^{\circ}$ C (0 to 300) $^{\circ}$ C	0.04 $^{\circ}$ C 0.05 $^{\circ}$ C	GE Sensing Intelligent Probe 5690L
Relative Humidity @ 10 $^{\circ}$ C	10 %RH 30 %RH 50 %RH 70 %RH 80 %RH	0.19 %RH 0.5 %RH 0.8 %RH 1.1 %RH 1.2 %RH	Thunder Scientific RH/Temp Chamber 2500
Relative Humidity @ 21.11 $^{\circ}$ C	10 %RH 30 %RH 50 %RH 70 %RH 80 %RH	0.18 %RH 0.48 %RH 0.75 %RH 1 %RH 1.2 %RH	





**Thermodynamic**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Relative Humidity @ 50 °C	10 %RH	0.17 %RH	
	30 %RH	0.56 %RH	
	50 %RH	0.66 %RH	
	70 %RH	0.88 %RH	
	80 %RH	0.99 %RH	

**Time and Frequency**

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency - Measure	1 Hz 10 MHz	1 mHz/Hz 0.23 µHz/Hz	HP 3458A Opt 002

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. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1400.



Vice President

