



CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board
11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

International Process Solutions
1300 Industrial Road, Suite 22
San Carlos, CA 94070

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

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

while demonstrating technical competence in the field of

CALIBRATION

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

AC-1400
Certificate Number


ANAB Approval

Certificate Valid Through: 06/22/2021
Version No. 005 Issued: 05/07/2019



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017 AND ANSI/NCSL Z540-1-1994 (R2002)

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CALIBRATION

Valid to: June 22, 2021

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.





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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 Multi Product Calibrator
	(10 to 20) Hz	1.2 mV/V + 6 μ V	
	(20 to 40) Hz	0.49 mV/V + 6 μ V	
	40 Hz to 20 kHz	0.26 mV/V + 6 μ V	
	(20 to 50) kHz	0.84 V/V + 6 μ V	
	(50 to 100) kHz	1.9 mV/V + 8 μ V	
	(100 to 300) kHz	2.6 mV/V + 15 μ V	
	(300 to 500) kHz	3.6 mV/V + 30 μ V	
	500 kHz to 1 MHz	9.6 mV/V + 40 μ V	
	(22 to 220) mV		
	(10 to 20) Hz	1.2 mV/V + 16 μ V	
	(20 to 40) Hz	0.48 mV/V + 10 μ V	
	40 Hz to 20 kHz	0.22 mV/V + 10 μ V	
	(20 to 50) kHz	0.72 mV/V + 10 μ V	
	(50 to 100) kHz	1.8 mV/V + 30 μ V	
	(100 to 300) kHz	2.2 mV/V + 30 μ V	
	(300 to 500) kHz	3.6 mV/V + 40 μ V	
	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 μ V	
	40 Hz to 20 kHz	5 mV/V + 7 μ V	
	(20 to 50) kHz	5 mV/V + 20 μ V	
	(50 to 100) kHz	5 mV/V + 80 μ V	
	(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 μ V		
(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		



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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 Multi Product Calibrator
AC Current - Source	(9 to 220) μ 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 μ 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 μ 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 μ A 3.6 mA/A + 1 μ A 1.6 mA/A + 0.5 μ A 0.84 mA/A + 0.4 μ A 0.32 mA/A + 0.4 μ A 1.4 mA/A + 5 μ A 3.6 mA/A + 10 μ A 1.6 mA/A + 5 μ A 0.84 mA/A + 4 μ A 0.32 mA/A + 4 μ A 1.4 mA/A + 50 μ A 3.6 mA/A + 0.1 mA 6.1 mA/A + 40 μ A 6.2 mA/A + 0.1 mA 21 mA/A + 0.2 mA	Fluke 5700A Series II Multi Product Calibrator



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Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance - Source	1 Ω	0.23 m Ω	Fluke 5700A Series II Multi Product Calibrator
	1.9 Ω	0.42 m Ω	
	10 Ω	0.67 m Ω	
	19 Ω	1.3 m Ω	
	100 Ω	4 m Ω	
	190 Ω	7.6 m Ω	
	1 k Ω	30 m Ω	
	1.9 k Ω	57 m Ω	
	10 k Ω	0.28 Ω	
	19 k Ω	0.53 Ω	
	100 k Ω	3.2 Ω	
	190 k Ω	6.1 Ω	
	1 M Ω	46 Ω	
	1.9 M Ω	93 Ω	
	10 M Ω	0.94 k Ω	
19 M Ω	2.1 k Ω		
100 M Ω	27 k Ω		
DC Voltage - Measure	(10 to 100) mV	18 μ V/V + 0.3 μ V	HP 3458A Opt 002 Multimeter
	100 mV to 1 V	18 μ V/V + 0.3 μ V	
	(1 to 10) V	12 μ V/V + 0.5 μ V	
	(10 to 100) V	17 μ V/V + 30 μ V	
	100 V to 1 kV	17 μ V/V + 0.1 mV	
AC Voltage - Measure	(1 to 10) mV		HP 3458A Opt 002 Multimeter
	1 Hz to 1 kHz	4 μ V/V + 1.1 μ V	
	(1 to 20) kHz	6 μ V/V + 1.1 μ V	
	(20 to 100) kHz	0.1 mV/V + 1.1 μ V	
	(100 to 300) kHz	0.8 mV/V + 2 μ V	
	300 kHz to 1MHz	0.24 mV/V + 5 μ V	
	(1 to 4) MHz	1.4 mV/V + 7 μ V	
	(10 to 100) mV		
	1 Hz to 1 kHz	0.16 mV/V + 2 μ V	
	(1 to 20) kHz	0.29 mV/V + 2 μ V	
	(20 to 100) kHz	1.6 mV/V + 2 μ V	
	(100 to 300) kHz	0.66 mV/V + 10 μ V	
	300 kHz to 1MHz	4 mV/V + 50 μ V	
	(1 to 4) MHz	8 mV/V + 70 μ V	
	(4 to 8) MHz	8 mV/V + 80 μ V	
(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 Multimeter
	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:	
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 μ A 100 μ A to 1mA (1 to 10) mA (10 to 100) mA 1 mA to 1 A	34 μ A/A + 0.1 nA 30 μ A/A + 1 nA 30 μ A/A + 10 nA 39 μ A/A + 0.1 μ A 47 μ A/A + 2 μ A	HP 3458A Opt 002 Multimeter
AC Current - Measure Up to 1 kHz	(5 to 100) μ A 100 μ 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 μ A 0.63 mA/A + 2 μ A 0.63 mA/A + 20 μ A 2 mA/A + 0.2 mA	HP 3458A Opt 002 Multimeter

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 μ m	Mitutoyo Laser Scan Micrometer LSM-6100
	(0.25 in to 1) in	76 μ m	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	



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Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Relative Humidity @ 50 °C	10 %RH	0.17 %RH	Thunder Scientific RH/Temp Chamber 2500
	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 Multimeter

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