



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

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

This is to certify that

Wilmington Instrument Company, Inc.

332 North Fries Avenue

Wilmington, CA 90744

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

ISO/IEC 17025:2005

and national standards

ANSI/NCSL Z540-1-1994 (R2002) AND

ANSI/NCSL Z540.3-2006 (R2013)

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-1577

Certificate Number


ANAB Approval

Certificate Valid: 07/18/2018-10/27/2019

Version No. 003 Issued: 07/18/2018



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 April 2017).



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005,
ANSI/NCSL Z540-1-1994 (R2002) AND ANSI/NCSL Z540.3-2006 (R2013)**

Wilmington Instrument Company, Inc

332 North Fries Avenue
Wilmington, CA 90744
Emil Hazarian 310-834-1133

CALIBRATION

Valid to: **October 27, 2019**

Certificate Number: **AC-1577**

Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source	Up to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	8.2 μ V/V + 0.4 μ V 5.5 μ V/V + 0.7 μ V 3.5 μ V/V + 2.5 μ V 3.6 μ V/V + 4 μ V 5 μ V/V + 40 μ V 7 μ V/V + 0.4 mV	Fluke 5720A Multifunction Calibrator
DC Voltage - Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	11 μ V/V + 0.3 μ V 8.1 μ V/V + 0.3 μ V 8 μ V/V + 0.5 μ V 10 μ V/V + 30 μ V 10 μ V/V + 0.1 mV	HP 3458A Multimeter
DC Current - Source	Up to 220 μ A 220 μ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	42 μ A/A + 6 nA 36 μ A/A + 7 nA 36 μ A/A + 0.4 μ A 50 μ A/A + 0.7 μ A 82 μ A/A + 12 μ A	Fluke 5720A Multifunction Calibrator
DC Current - Source Clamp-On Only	(3 to 20) A	1.1 mA/A + 0.75 mA	Fluke 5520A Multifunction Calibrator
	(550 to 1 000) A	2.2 mA/A + 0.75 mA	Fluke 5520A Multifunction Calibrator with Coil



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current - Measure	100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1A	23 μ A/A + 40 pA 24 μ A/A + 0.1 nA 21 μ A/A + 0.8 nA 21 μ A/A + 5 nA 21 μ A/A + 50 nA 35 μ A/A + 0.5 μ A 0.11 mA/A + 10 μ A	HP 3458A Multimeter
DC Resistance- Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω 1.1 M Ω to 3.3 M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω 330 M Ω to 1.1G Ω	42 $\mu\Omega/\Omega$ + 1 m Ω 30 $\mu\Omega/\Omega$ + 1.5 m Ω 28 $\mu\Omega/\Omega$ + 1.4 m Ω 29 $\mu\Omega/\Omega$ + 2 m Ω 28 $\mu\Omega/\Omega$ + 2 m Ω 29 $\mu\Omega/\Omega$ + 20 m Ω 29 $\mu\Omega/\Omega$ + 20 m Ω 29 $\mu\Omega/\Omega$ + 0.2 Ω 30 $\mu\Omega/\Omega$ + 0.2 Ω 33 $\mu\Omega/\Omega$ + 2 Ω 42 $\mu\Omega/\Omega$ + 2 Ω 64 $\mu\Omega/\Omega$ + 30 Ω 0.14 m Ω/Ω + 50 Ω 0.27 m Ω/Ω + 2.5 k Ω 0.5 m Ω/Ω + 3 k Ω 36 m Ω/Ω + 0.1 M Ω 0.12 Ω/Ω + 0.5 M Ω	Fluke 5520A Multifunction Calibrator
DC Resistance - Source Fixed Values	1, 1.9 Ω 1.9, 10 Ω 10, 100 Ω 100 Ω , 1 k Ω 1, 10 k Ω 10, 100 k Ω 100 k Ω , 1 M Ω 1, 10 M Ω 10, 19 M Ω 19, 100 M Ω	0.11 m Ω/Ω 24 $\mu\Omega/\Omega$ 11 $\mu\Omega/\Omega$ 8.8 $\mu\Omega/\Omega$ 9.6 $\mu\Omega/\Omega$ 12 $\mu\Omega/\Omega$ 27 $\mu\Omega/\Omega$ 43 $\mu\Omega/\Omega$ 52 $\mu\Omega/\Omega$ 0.12 m Ω/Ω	Fluke 5720A Multifunction Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance - Measure	(1 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	18 μΩ/Ω + 50 μΩ 13 μΩ/Ω + 0.5 mΩ 11 μΩ/Ω + 500 μΩ 11 μΩ/Ω + 5 mΩ 11 μΩ/Ω + 50 mΩ 18 μΩ/Ω + 2 Ω 56 μΩ/Ω + 0.1 kΩ 0.52 mΩ/Ω + 1 kΩ 5.4 mΩ/Ω + 10 kΩ	HP 3458A Multimeter
AC Voltage - Source	Up to 2.2 mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (2.2 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (22 to 220) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.39 mV/V + 4 μV 0.32 mV/V + 4 μV 0.32 mV/V + 4 μV 0.37 mV/V + 4 μV 0.59 mV/V + 5 μV 1.1 mV/V + 10 μV 1.4 mV/V + 20 μV 2.7 mV/V + 20 μV 0.26 mV/V + 4 μV 0.21 mV/V + 4 μV 90 μV/V + 4 μV 0.21 mV/V + 4 μV 0.55 mV/V + 5 μV 1.1 mV/V + 10 μV 1.5 mV/V + 20 μV 2.7 mV/V + 20 μV 0.25 mV/V + 12 μV 0.1 mV/V + 7 μV 0.1 mV/V + 7 μV 0.21 mV/V + 7 μV 0.5 mV/V + 17 μV 0.91 mV/V + 20 μV 1.4 mV/V + 25 μV 2.7 mV/V + 45 μV	Fluke 5720A Multifunction Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	220 mV to 2.2 V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.24 mV/V + 40 μV 90 μV/V + 15 μV 50 μV/V + 8 μV 77 μV/V + 10 μV 0.12 mV/V + 30 μV 0.42 mV/V + 80 μV 1 mV/V + 0.2 mV 1.7 mV/V + 0.3 mV	Fluke 5720A Multifunction Calibrator
	(2.2 to 22) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.26 mV/V + 0.4 mV 96 μV/V + 0.15 mV 59 μV/V + 50 μV 86 μV/V + 0.1 mV 0.11 mV/V + 0.2 mV 0.28 mV/V + 0.6 mV 1 mV/V + 2 mV 1.6 mV/V + 3.2 mV	
AC Voltage - Source Wideband Amplitude 30 Hz to 500 kHz	(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 (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.25 mV/V + 4 mV 0.1 mV/V + 1.5 mV 64 μV/V + 0.6 mV 91 μV/V + 1 mV 0.19 mV/V + 2.5 mV 0.91 mV/V + 16 mV 4.4 mV/V + 40 mV 8.0 mV/V + 80 mV	Fluke 5720A Multifunction Calibrator
	220 V to 1.1 kV (15 to 50) Hz (50 Hz to 1 kHz)	0.28 mV/V + 16 mV 77 μV/V + 3.5 mV	
	300 μV to 1.1 mV (1.1 to 3) mV (3 to 11) mV (11 to 33) mV (33 to 110) mV (110 to 330) mV 330 mV to 1.1 V (1.1 to 3.5) V	8.3 mV/V + 2 μV 7.3 mV/V + 3 μV 7.1 mV/V + 8 μV 6.1 mV/V + 16 μV 6.1 mV/V + 40 μV 5.2 mV/V + 0.1 mV 5.1 mV/V + 0.4 mV 4 mV/V + 0.5 mV	



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source Wideband Flatness	Up to 1.1 mV (10 to 30) Hz (30 to 120) Hz 120 Hz to 1.2 kHz (1.2 to 12) kHz (12 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz (2 to 10) MHz (10 to 20) MHz (20 to 30) MHz	3 mV/V 1.2 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 2.4 mV/V + 3 μV 2.3 mV/V + 3 μV 4.1 mV/V + 3 μV 6.2 mV/V + 3 μV 17 mV + 15 μV	Fluke 5720A Multifunction Calibrator
AC Voltage - Source Wideband Flatness	(1.1 to 3) mV (10 to 30) Hz (30 to 120) Hz 120 Hz to 1.2 kHz (1.2 to 12) kHz (12 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz (2 to 10) MHz (10 to 20) MHz (3 to 3.5) mV (10 to 30) Hz (30 to 120) Hz 120 Hz to 1.2 kHz (1.2 to 12) kHz (12 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz (2 to 10) MHz (10 to 20) MHz	3 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V + 3 μV 1.2 mV/V + 3 μV 3.3 mV/V + 3 μV 5.3 mV/V + 3 μV 3.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V + 3 μV 1.1 mV/V + 3 μV 2.4 mV/V + 3 μV 4.9 mV/V + 3 μV	Fluke 5720A Multifunction Calibrator
AC Voltage – Measure	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.31 mV/V + 3 μV 0.22 mV/V + 1.1 μV 0.33 mV/V + 1.1 μV 1.1 mV/V + 1.1 μV 5.1 mV/V + 1.1 μV 40 mV/V + 2 μV	HP 3458A Multimeter



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure	(10 to 100) mV		HP 3458A Multimeter
	(1 to 40) Hz	87 μ V/V + 4 μ V	
	40 Hz to 1 kHz	87 μ V/V + 2 μ V	
	(1 to 20) kHz	0.15 mV/V + 2 μ V	
	(20 to 50) kHz	0.31 mV/V + 2 μ V	
	(50 to 100) kHz	0.84 mV/V + 2 μ V	
	(100 to 300) kHz	3.1 mV/V + 10 μ V	
	300 kHz to 1 MHz	11 mV/V + 10 μ V	
	(1 to 2) MHz	15 mV/V + 10 μ V	
	100 mV to 1 V		
	(1 to 40) Hz	77 μ V/V + 40 μ V	
	40 Hz to 1 kHz	77 μ V/V + 20 μ V	
	(1 to 20) kHz	0.15 mV/V + 20 μ V	
	(20 to 50) kHz	0.31 mV/V + 20 μ V	
	(50 to 100) kHz	0.81 mV/V + 20 μ V	
	(100 to 300) kHz	3 mV/V + 0.1 mV	
	300 kHz to 1 MHz	10 mV/V + 0.1 mV	
	(1 to 2) MHz	15 mV/V + 0.1 mV	
	(1 to 10) V		
	(1 to 40) Hz	82 μ V/V + 0.4 mV	
	40 Hz to 1 kHz	77 μ V/V + 0.2 mV	
	(1 to 20) kHz	0.15 mV/V + 0.2 mV	
	(20 to 50) kHz	0.31 mV/V + 0.2 mV	
	(50 to 100) kHz	0.81 mV/V + 0.2 mV	
	(100 to 300) kHz	3 mV/V + 1 mV	
	300 kHz to 1 MHz	10 mV/V + 1 mV	
	(1 to 2) MHz	15 mV/V + 1 mV	
(10 to 100) V			
(1 to 40) Hz	0.21 mV/V + 4 mV		
40 Hz to 1 kHz	0.21 mV/V + 2 mV		
(1 to 20) kHz	0.21 mV/V + 2 mV		
(20 to 50) kHz	0.36 mV/V + 2 mV		
(50 to 100) kHz	1.2 mV/V + 2 mV		
(100 to 300) kHz	4 mV/V + 10 mV		
300 kHz to 1 MHz	15 mV/V + 10 mV		



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure	(100 to 700) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.42 mV/V + 40 mV 0.42 mV/V + 20 mV 0.62 mV/V + 20 mV 1.2 mV/V + 20 mV 3 mV/V + 20 mV	HP 3458A Multimeter
AC Current - Source	Up to 330 μ A (10 to 20) Hz (20 to 45) Hz (45 Hz to 1 kHz) (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 330 μ A to 3.3 mA (10 to 20) Hz (20 to 45) Hz (45 Hz to 1 kHz) (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 330 mA to 1.1A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	2 mA/A + 0.1 μ A 1.5 mA/A + 0.1 μ A 1.5 mA/A + 0.1 μ A 3 mA/A + 0.15 μ A 8.2 mA/A + 0.2 μ A 16 mA/A + 0.4 μ A 2 mA/A + 0.15 μ A 1.3 mA/A + 0.15 μ A 1 mA/A + 0.15 μ A 2 mA/A + 0.2 μ A 5 mA/A + 0.3 μ A 10 mA/A + 0.6 μ A 1.8 mA/A + 2 μ A 0.91 mA/A + 2 μ A 0.43 mA/A + 2 μ A 0.82 mA/A + 2 μ A 2 mA/A + 3 μ A 4.2 mA/A + 4 mA 1.8 mA/A + 20 μ A 0.94 mA/A + 20 μ A 0.43 mA/A + 20 μ A 1 mA/A + 50 μ A 2 mA/A + 0.1 mA 4.2 mA/A + 0.2 mA 1.8 mA/A + 0.1 mA 0.51mA/A + 0.1 mA 6 mA/A + 1 mA 26 mA/A + 5 mA	Fluke 5520A Multifunction Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source	(1.1 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	1.8 mA/A + 0.1 mA 0.67 mA/A + 0.1 mA 6.3 mA/A + 1 mA 25 mA/A + 5 mA 0.66 mA/A + 2 mA 1.1 mA/A + 2 mA 30 mA/A + 2 mA 1.2 mA/A + 5 mA 1.5 mA/A + 5 mA 30 mA/A + 5 mA	Fluke 5520A Multifunction Calibrator
AC Current - Source	(20.5 to 1 000) A (45 to 65) Hz	25 mA/A + 5 mA	Fluke 5520A Multifunction Calibrator with Coil
AC Current - Source	(10 to 220) μ A (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 220 μ A to 2.2 mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.26 mA/A + 16 nA 0.17 mA/A + 10 nA 0.14 mA/A + 8 nA 0.32 mA/A + 12 nA 1.4 mA/A + 65 nA 0.26 mA/A + 40 nA 0.16 mA/A + 35 nA 0.12 mA/A + 35 nA 0.21 mA/A + 0.11 μ A 1.1 mA/A + 0.65 μ A 0.26 mA/A + 0.4 μ A 0.17 mA/A + 0.35 μ A 0.12 mA/A + 0.35 μ A 0.21 mA/A + 0.55 μ A 1.1 mA/A + 5 μ A 0.26 mA/A + 4 μ A 0.17 mA/A + 3.5 μ A 0.13 mA/A + 2.5 μ A 0.21 mA/A + 3.5 μ A 1.1 mA/A + 10 μ A	Fluke 5720A Multifunction Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source	220 mA to 2.2 A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.26 mA/A + 35 μ A 0.46 mA/A + 80 μ A 7.3 mA/A + 0.16 mA	Fluke 5720A Multifunction Calibrator
Capacitance - Source	190 pF to 3.3 nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF 330 nF to 1.1 μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F	5.7 mF/F + 10 pF 3 mF/F + 10 pF 2.8 mF/F + 0.1 nF 2.7 mF/F + 0.3 nF 2.8 mF/F + 1 nF 2.7 mF/F + 3 nF 2.7 mF/F + 10 nF 4.2 mF/F + 30 nF	Fluke 5520A Multifunction Calibrator
Capacitance - Source	(33 to 110) μ F (110 to 330) μ F 330 μ F to 1.1 mF (1.1 to 3.3) mF	4.8 mF/F + 0.1 μ F 6.1 mF/F + 0.3 μ F 4.7 mF/F + 1 μ F 4.5 mF/F + 3 μ F	Fluke 5520A Multifunction Calibrator
Phase - Source	(0 to 179.9) $^{\circ}$ (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.16 $^{\circ}$ 0.28 $^{\circ}$ 0.52 $^{\circ}$ 2.5 $^{\circ}$ 5 $^{\circ}$ 10 $^{\circ}$	Fluke 5520A Multifunction Calibrator
AC Power - Source (45 to 65) Hz; PF = 1	100 W 1 kW 10 kW 20.9 kW	0.46 W 4.6 W 42 W 88 W	Fluke 5520A Multifunction Calibrator
Oscilloscopes Amplitude DC Signal 50 Ω Load 1 M Ω Load Amplitude Square Wave 50 Ω Load 1 M Ω Load	(0 to 6.6) V 10 Hz to 10 kHz (0 to 130) V 10 Hz to 10 kHz 1 mV to 6.6 V (10 Hz to 10 kHz) 1 mV to 130 V p-p (10 Hz to 10 kHz)	2.6 mV/V + 40 μ V 0.5 mV/V + 40 μ V 3.2 mV/V + 40 μ V 1.1 mV/V + 40 μ V	Fluke 5520A SC1100 Multifunction Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes Leveled Sine Wave Flatness (Relative to 50 kHz)	5 mV to 5.5 V 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	15 mV/V + 0.1 mV 20 mV/V + 0.1 mV 40 mV/V + 0.1 mV	Fluke 5520A SC1100 Multifunction Calibrator
Time Mark into 50 Ω ²	5 mV to 3.5 V (600 to 1 100) MHz	52 mV/V + 0.1 mV	
Edge Spec into 50Ω Load: Rise Time Amplitude (P to P) Frequency	50 ms to 5 s 20 ms to 100 ns (20 to 50) ns 10 ns (1 to 5) ns	(25 + 1 000t) μs/s 2.5 μs/s 2.5 μs/s 2.5 μs/s	
	≤350 ps 5 mV to 2.5 V 1 kHz to 10 MHz	+0 / -133 ps 20 mV/V + 0.2 mV 2.5 μs/s of setting	
Electrical Simulation of Thermocouple Indicators	Type E (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C Type J (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C Type K (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C	0.5 °C 0.2 °C 0.2 °C 0.2 °C 0.3 °C 0.3 °C 0.2 °C 0.2 °C 0.2 °C 0.3 °C 0.3 °C 0.2 °C 0.2 °C 0.2 °C 0.3 °C 0.4 °C	Fluke 5520A Multifunction Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators	Type R		Fluke 5520A Multifunction Calibrator
	(0 to 250) °C	0.6 °C	
	(250 to 400) °C	0.4 °C	
	(400 to 1 000) °C	0.4 °C	
	(1 000 to 1 767) °C	0.4 °C	
	Type S		
	(0 to 250) °C	0.5 °C	
	(250 to 1 000) °C	0.4 °C	
	(1 000 to 1 400) °C	0.4 °C	
	(1 400 to 1 767) °C	0.5 °C	
	Type T		
	(-250 to -150) °C	0.7 °C	
	(-150 to 0) °C	0.3 °C	
(0 to 120) °C	0.2 °C		
(120 to 400) °C	0.2 °C		
Electrical Simulation of RTD Indicators	Pt 385 (100 Ω)		Fluke 5520A Multifunction Calibrator
	(-200 to 0) °C	0.06 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 300) °C	0.09 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.2 °C	
	(630 to 800) °C	0.3 °C	
	Pt 385 (200 Ω)		
	(-200 to 100) °C	0.05 °C	
	(100 to 260) °C	0.06 °C	
	(260 to 300) °C	0.2 °C	
	(300 to 400) °C	0.2 °C	
	(400 to 600) °C	0.2 °C	
	(600 to 630) °C	0.2 °C	
	Pt 385 (500 Ω)		
	(-200 to -80) °C	0.05 °C	
	(-80 to 100) °C	0.06 °C	
	(100 to 260) °C	0.06 °C	
	(260 to 400) °C	0.08 °C	
(400 to 600) °C	0.09 °C		
(600 to 630) °C	0.2 °C		



Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicators	Pt 385 (1 000 Ω)		Fluke 5520A Multifunction Calibrator
	(-200 to 0) °C	0.04 °C	
	(0 to 100) °C	0.05 °C	
	(100 to 260) °C	0.06 °C	
	(260 to 300) °C	0.06 °C	
	(300 to 600) °C	0.07 °C	
	(600 to 630) °C	0.3 °C	
	Pt 3916 (100 Ω)		
	(-190 to -80) °C	0.05 °C	
	(-80 to 0) °C	0.06 °C	
	(0 to 100) °C	0.07 °C	
	(100 to 260) °C	0.08 °C	
	(260 to 300) °C	0.09 °C	
	(300 to 400) °C	0.1 °C	
(400 to 600) °C	0.1 °C		
(600 to 630) °C	0.3 °C		
Electrical Simulation of RTD Indicators	Pt 3926 (100 Ω)		Fluke 5520A Multifunction Calibrator
	(-200 to 0) °C	0.06 °C	
	(0 to 100) °C	0.08 °C	
	(100 to 300) °C	0.1 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.2 °C	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure-Hydraulic	(50 to 300) psi	0.04 psi	Ruska 2400 Piston Gage, Additel 681 Pressure Gage, Additel 949 Calibration Pump
	(300 to 500) psi	0.05 psi	
	(500 to 1 000) psi	0.15 psi	
	(1 000 to 2 000) psi	0.24 psi	
	(2 000 to 5 000) psi	0.53 psi	
	(5 000 to 10 000) psi	1.1 psi	
Pressure - Pneumatic	(10 000 to 36 000) psi	13 psi	Pressurements P3025-3 Deadweight Tester
	(5 to 30) in Hg	0.007 in Hg	
	(10 to 100) psi	0.01 psi	
	(100 to 300) psi	0.03 psi	
	(300 to 400) psi	0.04 psi	
	(400 to 500) psi	0.05 psi	



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools	20 lbf-in to 2 000 lbf-ft	0.04 % of reading	AKO Torque System

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature - Source	(-196 to -80) °C	0.02 °C	Hart 7380, 6022 Temperature Baths Hart 5628 PRT/Hart 2560 Indicator
	(-80 to 0) °C	0.03 °C	
	(0 to 100) °C	0.01 °C	
	(100 to 200) °C	0.02 °C	
	(200 to 300) °C	0.02 °C	
	(300 to 400) °C	0.61 °C	
	(400 to 500) °C	0.71 °C	
Temperature – Measure ¹	(-200 to -80) °C	0.01 °C	Hart 5628 PRT/Hart 2560 Indicator
	(-80 to 0) °C	0.01 °C	
	(0 to 100) °C	0.01 °C	
	(100 to 200) °C	0.02 °C	
	(200 to 400) °C	0.02 °C	
	(400 to 500) °C	0.04 °C	
	(500 to 600) °C	0.05 °C	
Temperature – Measure ¹	(-200 to -80) °C	0.01 °C	Hart 5628 PRT/Hart 1502 Indicator
	(-80 to 0) °C	0.01 °C	
	(0 to 100) °C	0.01 °C	
	(100 to 200) °C	0.02 °C	
	(200 to 300) °C	0.03 °C	
	(300 to 400) °C	0.03 °C	
	(400 to 500) °C	0.04 °C	
(500 to 600) °C	0.05 °C		

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency - Source	10 MHz (locked) 1 Hz to 2 MHz	10 ⁻¹¹ Hz 2.6 µHz/Hz + 5 µHz	Praecis CFR GPS Receiver Fluke 5520A SC1100 Multifunction Calibrator

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency - Measure	1 Hz to 225 MHz	2.6 μ Hz/Hz + 5 μ Hz	Praecis CFR GPS Receiver, HP Universal Counter 53131A

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. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. t = time in seconds.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1577.



Vice President