



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Wilmington Instrument Company, Inc.
332 North Fries Avenue
Wilmington, CA 90744

Fulfills the requirements of

ISO/IEC 17025:2017

and national standards

ANSI/NCSL Z540-1-1994 (R2002) and
ANSI/NCSL Z540.3-2006 (R2013)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 27 October 2021

Certificate Number: AC-1577



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,
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, 2021**

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 $\mu\text{V/V} + 0.4 \mu\text{V}$ 5.5 $\mu\text{V/V} + 0.7 \mu\text{V}$ 3.5 $\mu\text{V/V} + 2.5 \mu\text{V}$ 3.6 $\mu\text{V/V} + 4 \mu\text{V}$ 5 $\mu\text{V/V} + 40 \mu\text{V}$ 7 $\mu\text{V/V} + 0.4 \text{mV}$	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 $\mu\text{V/V} + 0.3 \mu\text{V}$ 8.1 $\mu\text{V/V} + 0.3 \mu\text{V}$ 8 $\mu\text{V/V} + 0.5 \mu\text{V}$ 10 $\mu\text{V/V} + 30 \mu\text{V}$ 10 $\mu\text{V/V} + 0.1 \text{mV}$	HP 3458A Multimeter
DC Current - Source	Up to 220 μA 220 μA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	42 $\mu\text{A/A} + 6 \text{nA}$ 36 $\mu\text{A/A} + 7 \text{nA}$ 36 $\mu\text{A/A} + 0.4 \mu\text{A}$ 50 $\mu\text{A/A} + 0.7 \mu\text{A}$ 82 $\mu\text{A/A} + 12 \mu\text{A}$	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
DC Current - Measure	100 nA to 1 μA (1 to 10) μA (10 to 100) μA 100 μA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1A	23 $\mu\text{A/A} + 40 \text{pA}$ 24 $\mu\text{A/A} + 0.1 \text{nA}$ 21 $\mu\text{A/A} + 0.8 \text{nA}$ 21 $\mu\text{A/A} + 5 \text{nA}$ 21 $\mu\text{A/A} + 50 \text{nA}$ 35 $\mu\text{A/A} + 0.5 \mu\text{A}$ 0.11 mA/A + 10 μA	HP 3458A Multimeter



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Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance- Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ 330 kΩ to 1.1 MΩ 1.1 MΩ to 3.3 MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ 330 MΩ to 1.1GΩ	42 μΩ/Ω + 1 mΩ 30 μΩ/Ω + 1.5 mΩ 28 μΩ/Ω + 1.4 mΩ 29 μΩ/Ω + 2 mΩ 28 μΩ/Ω + 2 mΩ 29 μΩ/Ω + 20 mΩ 29 μΩ/Ω + 20 mΩ 29 μΩ/Ω + 0.2 Ω 30 μΩ/Ω + 0.2 Ω 33 μΩ/Ω + 2 Ω 42 μΩ/Ω + 2 Ω 64 μΩ/Ω + 30 Ω 0.14 mΩ/Ω + 50 Ω 0.27 mΩ/Ω + 2.5 kΩ 0.5 mΩ/Ω + 3 kΩ 36 mΩ/Ω + 0.1 MΩ 0.12 Ω/Ω + 0.5 MΩ	Fluke 5520A Multifunction Calibrator
DC Resistance - Source Fixed Values	1, 1.9 Ω 1.9, 10 Ω 10, 100 Ω 100 Ω, 1 kΩ 1, 10 kΩ 10, 100 kΩ 100 kΩ, 1 MΩ 1, 10 MΩ 10, 19 MΩ 19, 100 MΩ	0.11 mΩ/Ω 24 μΩ/Ω 11 μΩ/Ω 8.8 μΩ/Ω 9.6 μΩ/Ω 12 μΩ/Ω 27 μΩ/Ω 43 μΩ/Ω 52 μΩ/Ω 0.12 mΩ/Ω	Fluke 5720A Multifunction Calibrator
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



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Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	Up to 2.2 mV		Fluke 5720A Multifunction Calibrator
	(10 to 20) Hz	0.39 mV/V + 4 μV	
	(20 to 40) Hz	0.32 mV/V + 4 μV	
	40 Hz to 20 kHz	0.32 mV/V + 4 μV	
	(20 to 50) kHz	0.37 mV/V + 4 μV	
	(50 to 100) kHz	0.59 mV/V + 5 μV	
	(100 to 300) kHz	1.1 mV/V + 10 μV	
	(300 to 500) kHz	1.4 mV/V + 20 μV	
	500 kHz to 1 MHz	2.7 mV/V + 20 μV	
	(2.2 to 22) mV		
	(10 to 20) Hz	0.26 mV/V + 4 μV	
	(20 to 40) Hz	0.21 mV/V + 4 μV	
	40 Hz to 20 kHz	90 μV/V + 4 μV	
	(20 to 50) kHz	0.21 mV/V + 4 μV	
	(50 to 100) kHz	0.55 mV/V + 5 μV	
	(100 to 300) kHz	1.1 mV/V + 10 μV	
	(300 to 500) kHz	1.5 mV/V + 20 μV	
	500 kHz to 1 MHz	2.7 mV/V + 20 μV	
	(22 to 220) mV		
	(10 to 20) Hz	0.25 mV/V + 12 μV	
	(20 to 40) Hz	0.1 mV/V + 7 μV	
	40 Hz to 20 kHz	0.1 mV/V + 7 μV	
	(20 to 50) kHz	0.21 mV/V + 7 μV	
	(50 to 100) kHz	0.5 mV/V + 17 μV	
(100 to 300) kHz	0.91 mV/V + 20 μV		
(300 to 500) kHz	1.4 mV/V + 25 μV		
500 kHz to 1 MHz	2.7 mV/V + 45 μV		
220 mV to 2.2 V			
(10 to 20) Hz	0.24 mV/V + 40 μV		
(20 to 40) Hz	90 μV/V + 15 μV		
40 Hz to 20 kHz	50 μV/V + 8 μV		
(20 to 50) kHz	77 μV/V + 10 μV		
(50 to 100) kHz	0.12 mV/V + 30 μV		
(100 to 300) kHz	0.42 mV/V + 80 μV		
(300 to 500) kHz	1 mV/V + 0.2 mV		
500 kHz to 1 MHz	1.7 mV/V + 0.3 mV		



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Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	(2.2 to 22) V		Fluke 5720A Multifunction Calibrator
	(10 to 20) Hz	0.26 mV/V + 0.4 mV	
	(20 to 40) Hz	96 μV/V + 0.15 mV	
	40 Hz to 20 kHz	59 μV/V + 50 μV	
	(20 to 50) kHz	86 μV/V + 0.1 mV	
	(50 to 100) kHz	0.11 mV/V + 0.2 mV	
	(100 to 300) kHz	0.28 mV/V + 0.6 mV	
	(300 to 500) kHz	1 mV/V + 2 mV	
	500 kHz to 1 MHz	1.6 mV/V + 3.2 mV	
	(22 to 220) V		
	(10 to 20) Hz	0.25 mV/V + 4 mV	
	(20 to 40) Hz	0.1 mV/V + 1.5 mV	
	40 Hz to 20 kHz	64 μV/V + 0.6 mV	
	(20 to 50) kHz	91 μV/V + 1 mV	
(50 to 100) kHz	0.19 mV/V + 2.5 mV		
(100 to 300) kHz	0.91 mV/V + 16 mV		
(300 to 500) kHz	4.4 mV/V + 40 mV		
500 kHz to 1 MHz	8 mV/V + 80 mV		
AC Voltage - Source Wideband Amplitude 30 Hz to 500 kHz	220 V to 1.1 kV		Fluke 5720A Multifunction Calibrator
	(15 to 50) Hz	0.28 mV/V + 16 mV	
	(50 Hz to 1 kHz)	77 μV/V + 3.5 mV	
	300 μV to 1.1 mV	8.3 mV/V + 2 μV	
	(1.1 to 3) mV	7.3 mV/V + 3 μV	
	(3 to 11) mV	7.1 mV/V + 8 μV	
AC Voltage - Source Wideband Flatness	(11 to 33) mV	6.1 mV/V + 16 μV	Fluke 5720A Multifunction Calibrator
	(33 to 110) mV	6.1 mV/V + 40 μV	
	(110 to 330) mV	5.2 mV/V + 0.1 mV	
	330 mV to 1.1 V	5.1 mV/V + 0.4 mV	
	(1.1 to 3.5) V	4 mV/V + 0.5 mV	
	Up to 1.1 mV		
	(10 to 30) Hz	3 mV/V	
	(30 to 120) Hz	1.2 mV/V	
	120 Hz to 1.2 kHz	1.1 mV/V	
	(1.2 to 12) kHz	1.1 mV/V	
	(12 to 120) kHz	1.1 mV/V	
120 kHz to 1.2 MHz	2.4 mV/V + 3 μV		
(1.2 to 2) MHz	2.3 mV/V + 3 μV		
(2 to 10) MHz	4.1 mV/V + 3 μV		
(10 to 20) MHz	6.2 mV/V + 3 μV		
(20 to 30) MHz	17 mV + 15 μV		



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Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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 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	Fluke 5720A Multifunction Calibrator
	(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	3.1 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	
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 (10 to 100) 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 300 kHz to 1 MHz (1 to 2) MHz	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 87 μV/V + 4 μV 87 μV/V + 2 μV 0.15 mV/V + 2 μV 0.31 mV/V + 2 μV 0.84 mV/V + 2 μV 3.1 mV/V + 10 μV 11 mV/V + 10 μV 15 mV/V + 10 μV	HP 3458A Multimeter



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Electrical – DC/Low Frequency

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AC Voltage - Measure	100 mV to 1 V		HP 3458A Multimeter
	(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		
(100 to 700) V			
(1 to 40) Hz	0.42 mV/V + 40 mV		
40 Hz to 1 kHz	0.42 mV/V + 20 mV		
(1 to 20) kHz	0.62 mV/V + 20 mV		
(20 to 50) kHz	1.2 mV/V + 20 mV		
(50 to 100) kHz	3 mV/V + 20 mV		
AC Current - Source	Up to 330 μ A		Fluke 5520A Multifunction Calibrator
	(10 to 20) Hz	2 mA/A + 0.1 μ A	
	(20 to 45) Hz	1.5 mA/A + 0.1 μ A	
	(45 Hz to 1 kHz)	1.5 mA/A + 0.1 μ A	
	(1 to 5) kHz	3 mA/A + 0.15 μ A	
	(5 to 10) kHz	8.2 mA/A + 0.2 μ A	
(10 to 30) kHz	16 mA/A + 0.4 μ A		



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Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source	330 μ A to 3.3 mA		Fluke 5520A Multifunction Calibrator
	(10 to 20) Hz	2 mA/A + 0.15 μ A	
	(20 to 45) Hz	1.3 mA/A + 0.15 μ A	
	(45 Hz to 1 kHz)	1 mA/A + 0.15 μ A	
	(1 to 5) kHz	2 mA/A + 0.2 μ A	
	(5 to 10) kHz	5 mA/A + 0.3 μ A	
	(10 to 30) kHz	10 mA/A + 0.6 μ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	1.8 mA/A + 2 μ A	
	(20 to 45) Hz	0.91 mA/A + 2 μ A	
	45 Hz to 1 kHz	0.43 mA/A + 2 μ A	
	(1 to 5) kHz	0.82 mA/A + 2 μ A	
	(5 to 10) kHz	2 mA/A + 3 μ A	
	(10 to 30) kHz	4.2 mA/A + 4 mA	
	(33 to 330) mA		
	(10 to 20) Hz	1.8 mA/A + 20 μ A	
	(20 to 45) Hz	0.94 mA/A + 20 μ A	
	45 Hz to 1 kHz	0.43 mA/A + 20 μ A	
	(1 to 5) kHz	1 mA/A + 50 μ A	
	(5 to 10) kHz	2 mA/A + 0.1 mA	
	(10 to 30) kHz	4.2 mA/A + 0.2 mA	
	330 mA to 1.1A		
	(10 to 45) Hz	1.8 mA/A + 0.1 mA	
	45 Hz to 1 kHz	0.51mA/A + 0.1 mA	
(1 to 5) kHz	6 mA/A + 1 mA		
(5 to 10) kHz	26 mA/A + 5 mA		
(1.1 to 3) A			
(10 to 45) Hz	1.8 mA/A + 0.1 mA		
45 Hz to 1 kHz	0.67 mA/A + 0.1 mA		
(1 to 5) kHz	6.3 mA/A + 1 mA		
(5 to 10) kHz	25 mA/A + 5 mA		
(3 to 11) A			
(45 to 100) Hz	0.66 mA/A + 2 mA		
100 Hz to 1 kHz	1.1 mA/A + 2 mA		
(1 to 5) kHz	30 mA/A + 2 mA		
(11 to 20.5) A			
(45 to 100) Hz	1.2 mA/A + 5 mA		
100 Hz to 1 kHz	1.5 mA/A + 5 mA		
(1 to 5) kHz	30 mA/A + 5 mA		
AC Current - Source	(20.5 to 1 000) A (45 to 65) Hz	25 mA/A + 5 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
AC Current - Source	(10 to 220) μ A		Fluke 5720A Multifunction Calibrator
	(10 to 20) Hz	0.26 mA/A + 16 nA	
	(20 to 40) Hz	0.17 mA/A + 10 nA	
	40 Hz to 1 kHz	0.14 mA/A + 8 nA	
	(1 to 5) kHz	0.32 mA/A + 12 nA	
	(5 to 10) kHz	1.4 mA/A + 65 nA	
	220 μ A to 2.2 mA		
	(10 to 20) Hz	0.26 mA/A + 40 nA	
	(20 to 40) Hz	0.16 mA/A + 35 nA	
	40 Hz to 1 kHz	0.12 mA/A + 35 nA	
	(1 to 5) kHz	0.21 mA/A + 0.11 μ A	
	(5 to 10) kHz	1.1 mA/A + 0.65 μ A	
	(2.2 to 22) mA		
	(10 to 20) Hz	0.26 mA/A + 0.4 μ A	
	(20 to 40) Hz	0.17 mA/A + 0.35 μ A	
	40 Hz to 1 kHz	0.12 mA/A + 0.35 μ A	
	(1 to 5) kHz	0.21 mA/A + 0.55 μ A	
	(5 to 10) kHz	1.1 mA/A + 5 μ A	
	(22 to 220) mA		
	(10 to 20) Hz	0.26 mA/A + 4 μ A	
(20 to 40) Hz	0.17 mA/A + 3.5 μ A		
40 Hz to 1 kHz	0.13 mA/A + 2.5 μ A		
(1 to 5) kHz	0.21 mA/A + 3.5 μ A		
(5 to 10) kHz	1.1 mA/A + 10 μ A		
220 mA to 2.2 A			
20 Hz to 1 kHz	0.26 mA/A + 35 μ A		
(1 to 5) kHz	0.46 mA/A + 80 μ A		
(5 to 10) kHz	7.3 mA/A + 0.16 mA		
Capacitance - Source	190 pF to 3.3 nF	5.7 mF/F + 10 pF	Fluke 5520A Multifunction Calibrator
	(3.3 to 11) nF	3 mF/F + 10 pF	
	(11 to 110) nF	2.8 mF/F + 0.1 nF	
	(110 to 330) nF	2.7 mF/F + 0.3 nF	
	330 nF to 1.1 μ F	2.8 mF/F + 1 nF	
	(1.1 to 3.3) μ F	2.7 mF/F + 3 nF	
	(3.3 to 11) μ F	2.7 mF/F + 10 nF	
	(11 to 33) μ F	4.2 mF/F + 30 nF	
	(33 to 110) μ F	4.8 mF/F + 0.1 μ F	
	(110 to 330) μ F	6.1 mF/F + 0.3 μ F	
	330 μ F to 1.1 mF	4.7 mF/F + 1 μ F	
	(1.1 to 3.3) mF	4.5 mF/F + 3 μ F	

Electrical – DC/Low Frequency

Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Phase - Source	(0 to 179.9) ° (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 ° 0.28 ° 0.52 ° 2.5 ° 5 ° 10 °	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 MΩ Load Amplitude Square Wave 50 Ω Load 1 MΩ 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 μV 0.5 mV/V + 40 μV 3.2 mV/V + 40 μV 1.1 mV/V + 40 μV	Fluke 5520A SC1100 Multifunction Calibrator
Oscilloscopes Leveled Sine Wave Flatness (Relative to 50 kHz) Time Mark into 50 Ω ² Edge Spec into 50Ω Load: Rise Time Amplitude (P to P) Frequency	5 mV to 5.5 V 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 5 mV to 3.5 V (600 to 1 100) MHz 50 ms to 5 s 20 ms to 100 ns (20 to 50) ns 10 ns (1 to 5) ns ≤350 ps 5 mV to 2.5 V 1 kHz to 10 MHz	15 mV/V + 0.1 mV 20 mV/V + 0.1 mV 40 mV/V + 0.1 mV 52 mV/V + 0.1 mV (25 + 1 000t) μs/s 2.5 μs/s 2.5 μs/s 2.5 μs/s +0 / -133 ps 20 mV/V + 0.2 mV 2.5 μs/s of setting	Fluke 5520A SC1100 Multifunction Calibrator



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Electrical – DC/Low Frequency

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



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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 (200 Ω)		Fluke 5520A Multifunction Calibrator
	(-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	
	Pt 385 (1 000 Ω)		
	(-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		
Pt 3926 (100 Ω)			
(-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 (10 000 to 36 000) psi	1.1 psi 13 psi	
Pressure - Pneumatic	(5 to 30) in Hg	0.007 in Hg	Pressurements P3025-3 Deadweight Tester
	(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	
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 °C	0.012 °C	Fluke 5628 PRT probe Fluke TPW 5901D-G Hart Scientific 7380 Bath Hart Scientific 6022 Bath Fluke 9144 Well Hart 2560 Indicator
	-80 °C	0.016 °C	
	0 °C	0.008 °C	
	100 °C	0.018 °C	
	150 °C	0.012 °C	
	200 °C	0.019 °C	
	300 °C	0.31 °C	
	400 °C	0.34 °C	
	500 °C	0.39 °C	
600 °C	0.47 °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 (500 to 600) °C	0.04 °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 μ Hz/Hz + 5 μ Hz	Praecis CFR GPS Receiver Fluke 5520A SC1100 Multifunction Calibrator
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.



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