CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

SET Y GAD SAS METROLOGY LABORATORY	**Fields of Calibration**
CARRERA 48 # 101A - 69 Bogotá, Colombia Mr. Steven Mesa Phone: 57 1 6019156316 E-mail: steven.mesa@setgad.com	Electromagnetics – DC/Low Frequency Time and Frequency Mechanical Electromagnetics – RF/Microwave Thermodynamic

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
AC RESISTANCE and CURRENT (20/E02)				
AC Current Source	5 mA to 10.0 mA	60 Hz	0.018 mA	Keithley 6221 & Fluke 8846A
	> 10.0 mA to 30.0 mA	60 Hz	0.092 mA	
	33 µA to < 330 µA	10 Hz to 45 Hz	0.16 % + 78 nA	Fluke 5522A
		45 Hz to 1 kHz	0.097 % + 78 nA	
		1 kHz to 5 kHz	0.23 % + 0.12 µA	
		5 kHz to 10 kHz	0.62 % + 0.16 µA	
		10 kHz to 30 kHz	1.2 % + 0.31 µA	
	0.33 mA to < 3.3 mA	10 Hz to 45 Hz	0.16 % + 0.12 µA	
		45 Hz to 1 kHz	0.078 % + 0.12 µA	
		1 kHz to 5 kHz	0.16 % + 0.16 µA	
		5 kHz to 10 kHz	0.39 % + 0.23 µA	
		10 kHz to 30 kHz	0.78 % + 0.47 µA	
	3.3 mA to < 33 mA	10 Hz to 45 Hz	0.14 % + 1.6 µA	
		45 Hz to 1 kHz	0.031 % + 1.6 µA	
		1 kHz to 5 kHz	0.062 % + 1.6 µA	
		5 kHz to 10 kHz	0.16 % + 2.3 µA	
		10 kHz to 30 kHz	0.31 % + 3.1 µA	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	33 mA to < 330 mA	10 Hz to 45 Hz	0.14 % + 16 µA	
		45 Hz to 1 kHz	0.031 % + 16 µA	
		1 kHz to 5 kHz	0.078 % + 39 µA	
		5 kHz to 10 kHz	0.16 % + 78 µA	
		10 kHz to 30 kHz	0.31 % + 0.16 mA	
	0.33 A to < 1.1 A	10 Hz to 45 Hz	0.14 % + 78 µA	
		45 Hz to 1 kHz	0.039 % + 78 µA	
		1 kHz to 5 kHz	0.47 % + 0.78 mA	
		5 kHz to 10 kHz	1.9 % + 3.9 mA	
	1.1 A to < 3 A	10 Hz to 45 Hz	0.14 % + 78 µA	
		45 Hz to 1 kHz	0.047 % + 78 µA	
		1 kHz to 5 kHz	0.47 % + 0.78 mA	
		5 kHz to 10 kHz	1.9 % + 3.9 mA	
	3 A to < 11 A	45 Hz to 100 Hz	0.047 % + 1.6 mA	
		100 Hz to 1 kHz	0.078 % + 1.6 mA	
		1 kHz to 5 kHz	2.3 % + 1.6 mA	
	11 A to 20.5 A	45 Hz to 100 Hz	0.093 % + 3.9 mA	
		100 Hz to 1 kHz	0.12 % + 3.9 mA	
		1 kHz to 5 kHz	2.3 % + 3.9 mA	
	9 µA to < 220 µA	10 Hz to 20 Hz	0.022 % + 16 nA	Fluke 5730A
		20 Hz to 40 Hz	0.014 % + 9.3 nA	
		40 Hz to 1 kHz	91 µA/A + 7.8 nA	
		1 kHz to 5 kHz	0.025 % + 12 nA	
		5 kHz to 10 kHz	0.085 % + 62 nA	
	0.22 mA to < 2.2 mA	10 Hz to 20 Hz	0.022 % + 39 nA	
		20 Hz to 40 Hz	0.014 % + 31 nA	
		40 Hz to 1 kHz	91 µA/A + 31 nA	
		1 kHz to 5 kHz	0.017 % + 0.10 µA	
		5 kHz to 10 kHz	0.085 % + 0.62 µA	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	2.2 mA to < 22 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.022 % + 0.39 µA 0.014 % + 0.31 µA 91 µA/A + 0.31 µA 0.017 % + 0.54 µA 0.085 % + 4.7 µA	
	22 mA to < 220 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.022 % + 3.9 µA 0.014 % + 3.1 µA 91 µA/A + 2.3 µA 0.017 % + 3.1 µA 0.085 % + 9.3 µA	
	0.22 A to 2.2 A	20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.022 % + 31 µA 0.036 % + 78 µA 0.054 % + 0.16 mA	
	2.2 A to 11 A	40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.031 % + 0.13 mA 0.066 % + 0.29 mA 0.26 % + 0.58 mA	Fluke 5730A/5725A
	0.22 A to < 2.0 A	10 Hz to 850 Hz 0.85 kHz to 6 kHz 6 kHz to 10 kHz	85 µA/A + 47 µA 0.040 % + 78 µA 1.6 % + 62 mA	Fluke 5730A/52120A
	2.0 A to < 20 A	10 Hz to 850 Hz 0.85 kHz to 6 kHz 6 kHz to 10 kHz	85 µA/A + 0.47 mA 0.040 % + 0.78 mA 6.6 % + 93 mA	
	20 A to 120 A	10 Hz to 850 Hz 0.85 kHz to 6 kHz 6 kHz to 10 kHz	85 µA/A + 2.8 mA 0.040 % + 4.7 mA 3.1 % + 0.70 A	
Closed Clamp Non-Toroidal	0.33 mA to < 3.3 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.65 % + 0.10 µA 0.78 % + 84 nA	Fluke 5730A/5522A and 5500A Coil

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	3.3 mA to < 33 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 1.4 µA 0.77 % + 0.82 µA	
	33 mA to < 330 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 14 µA 0.77 % + 8.2 µA	
	0.33 A to < 1.1 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 0.15 mA 0.77 % + 89 µA	
	1.1 A to < 3.0 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.44 % + 56 µA 0.78 % + 32 µA	
	3.0 A to < 11 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 1.8 mA 0.77 % + 1.1 mA	
	11 A to < 20.0 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.44 % + 1.5 mA 0.78 % + 1.0 mA	
	20.0 A to < 150 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 0.20 A 0.77 % + 0.20 A	
	150 A to 1025 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.43 % + 0.83 A 0.78 % + 0.82 A	
	0 A to 6000 A	10 Hz to 1 kHz 1 kHz to 3 kHz	0.61 % + 0.87 A 0.68 % + 1.1 A	Fluke 52120A/COIL 5730A/52120A and 6KA
	0 A to 1250 A	3 kHz to 6 kHz	1.2 % + 1.1 A	
	0 A to 650 A	6 kHz to 10 kHz	3.8 % + 0.57 A	
Current Clamp Toroidal	0.33 mA to < 3.3 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.22 % + 0.25 µA 0.61 % + 0.11 µA	Fluke 5730A/5522A and 5500A Coil

2024-12-13 through 2025-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	3.3 mA to < 33 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.21 % + 2.5 µA 0.61 % + 1.0 µA	
	33 mA to < 330 mA	45 Hz to 65 Hz 65 Hz to 440 Hz	0.21 % + 25 µA 0.61 % + 10 µA	
	0.33 A to < 1.1 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.20 % + 0.27 mA 0.61 % + 0.11 mA	
	1.1 A to < 3.0 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.22 % + 0.11 mA 0.61 % + 40 µA	
	3.0 A to < 11 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.20 % + 3.1 mA 0.61 % + 1.4 mA	
	11 A to < 20.0 A	45 Hz to 65 Hz 65 Hz to 440 Hz	0.23 % + 2.8 mA 0.62 % + 1.3 mA	
	20.0 A to < 150 A	45 Hz to 65 Hz 65 Hz to 100 Hz	0.21 % + 45 mA 0.61 % + 34 mA	
	150 A to 1025 A	45 Hz to 65 Hz 100 Hz to 440 Hz	0.20 % + 0.42 A 0.61 % + 0.30 A	
	0 A to 6000 A	10 Hz to 1 kHz 1 kHz to 3 kHz	0.61 % + 0.87 A 0.68 % + 1.1 A	Fluke 52120A/COIL 5730A/52120A and 6KA
	0 A to 1250 A	3 kHz to 6 kHz	1.2 % + 1.1 A	
	0 A to 650 A	6 kHz to 10 kHz	3.8 % + 0.57 A	
AC Current Measure note 4	0.1 A to 1 A > 1 A to 10 A > 10 A to 30 A	10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz	0.44 % + 22 mA 0.44 % + 22 mA 0.44 % + 22 mA	Fluke 8846A and Agilent 34330A

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	0.3 µA to 100 µA	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.27 % + 47 nA 0.12 % + 47 nA 0.27 % + 0.54 µA	Fluke 8846A
	> 0.1 mA to 1 mA	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.23 % + 0.31 µA 0.078 % + 0.31 µA 0.16 % + 1.9 µA	
	> 1 mA to 10 mA	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.27 % + 4.7 µA 0.12 % + 4.7 µA 0.27 % + 54 µA	
	>10 mA to 100 mA	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.23 % + 31 µA 0.078 % + 31 µA 0.16 % + 0.19 mA	
	>100 mA to 400 mA	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.23 % + 0.31 mA 0.078 % + 0.31 mA 0.16 % + 2.2 mA	
	> 0.4 A to 1 A	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.23 % + 0.31 mA 0.078 % + 0.31 mA 0.27 % + 5.4 mA	
	> 1 A to 3 A	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.27 % + 1.4 mA 0.12 % + 1.4 mA 0.27 % + 16 mA	
	> 3 A to 10 A	3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz	0.27 % + 4.7 mA 0.12 % + 4.7 mA 0.27 % + 54 mA	
	0.1 µA to 10 µA	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz	0.20 % + 2.5 nA 0.20 % + 2.5 nA 0.20 % + 2.5 nA	Fluke 8588A

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	> 10 µA to 100 µA	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	0.026 % + 5.0 nA 0.051 % + 5.0 nA 0.072 % + 5.0 nA 0.40 % + 10 nA	
	> 0.1 mA to 1 mA	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	0.026 % + 50 nA 0.051 % + 50 nA 0.072 % + 50 nA 0.40 % + 0.10 µA	
	> 1 mA to 10 mA	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz	0.026 % + 0.50 µA 0.051 % + 0.50 µA 0.072 % + 0.50 µA 0.40 % + 1.0 µA	
	>10 mA to 100 mA	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz	0.026 % + 5.0 µA 0.050 % + 5.0 µA 0.070 % + 5.0 µA	
	> 0.1 A to 1 A	1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz	0.026 % + 0.10 mA 0.051 % + 0.10 mA 0.071 % + 0.10 mA	
	> 1 A to 10 A	1 Hz to 2 kHz 2 Hz to 10 kHz	0.080 % + 0.50 mA 0.080 % + 0.50 mA	
	> 10 A to 30 A	1 Hz to 2 kHz 2 Hz to 10 kHz	0.080 % + 12 mA 0.12 % + 12 mA	
	> 10 A to 30 A	5 Hz to 10 Hz 10 Hz to 1 kHz	0.28 % + 68 mA 0.28 % + 68 mA	Fluke 8846A, Agilent 34330A
	10 µA to 1 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 55 Hz	0.017 % 82 µA/A + 0.10 nA 67 µA/A	Fluke 8588A and Fluke A40B

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		55 Hz to 400 Hz	67 µA/A	
		0.4 kHz to 1 kHz	67 µA/A	
		1 kHz to 10 kHz	84 µA/A	
		10 kHz to 20 kHz	86 µA/A	
		20 kHz to 30 kHz	91 µA/A	
		30 kHz to 50 kHz	0.016 %	
		50 kHz to 70 kHz	0.016 % + 0.35 nA	
		70 kHz to 100 kHz	0.016 % + 0.35 nA	
	1 mA to 10 mA	10 Hz to 20 Hz	0.016 % + 8.5 nA	
		20 Hz to 40 Hz	57 µA/A + 15 nA	
		40 Hz to 55 Hz	33 µA/A + 7.8 nA	
		55 Hz to 400 Hz	33 µA/A + 7.8 nA	
		0.4 kHz to 1 kHz	33 µA/A + 7.8 nA	
		1 kHz to 10 kHz	33 µA/A + 7.8 nA	
		10 kHz to 20 kHz	33 µA/A + 7.8 nA	
		20 kHz to 30 kHz	44 µA/A + 17 nA	
		30 kHz to 50 kHz	45 µA/A + 16 nA	
		50 kHz to 70 kHz	56 µA/A + 72 nA	
		70 kHz to 100 kHz	57 µA/A + 72 nA	
	10 mA to 20 mA	10 Hz to 20 Hz	0.015 % + 0.15 µA	
		20 Hz to 40 Hz	51 µA/A + 0.14 µA	
		40 Hz to 55 Hz	29 µA/A + 86 nA	
		55 Hz to 400 Hz	29 µA/A + 86 nA	
		0.4 kHz to 1 kHz	29 µA/A + 86 nA	
		1 kHz to 10 kHz	30 µA/A + 86 nA	
		10 kHz to 20 kHz	30 µA/A + 85 nA	
		20 kHz to 30 kHz	43 µA/A + 62 nA	
		30 kHz to 50 kHz	43 µA/A + 61 nA	
		50 kHz to 70 kHz	57 µA/A + 0.11 µA	
		70 kHz to 100 kHz	57 µA/A + 0.11 µA	
	20 mA to 50 mA	10 Hz to 20 Hz	0.015 % + 0.26 µA	
		20 Hz to 40 Hz	52 µA/A + 0.24 µA	

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		40 Hz to 55 Hz	28 µA/A + 0.15 µA	
		55 Hz to 400 Hz	28 µA/A + 0.15 µA	
		0.4 kHz to 1 kHz	28 µA/A + 0.15 µA	
		1 kHz to 10 kHz	29 µA/A + 0.15 µA	
		10 kHz to 20 kHz	29 µA/A + 0.15 µA	
		20 kHz to 30 kHz	42 µA/A + 0.11 µA	
		30 kHz to 50 kHz	42 µA/A + 0.11 µA	
		50 kHz to 70 kHz	57 µA/A + 0.19 µA	
		70 kHz to 100 kHz	58 µA/A + 0.19 µA	
	50 mA to 100 mA	10 Hz to 20 Hz	0.015 % + 0.77 µA	
		20 Hz to 40 Hz	50 µA/A + 0.70 µA	
		40 Hz to 55 Hz	27 µA/A + 0.45 µA	
		55 Hz to 400 Hz	27 µA/A + 0.45 µA	
		0.4 kHz to 1 kHz	27 µA/A + 0.45 µA	
		1 kHz to 10 kHz	27 µA/A + 0.45 µA	
		10 kHz to 20 kHz	28 µA/A + 0.44 µA	
		20 kHz to 30 kHz	41 µA/A + 0.32 µA	
		30 kHz to 50 kHz	43 µA/A + 0.31 µA	
		50 kHz to 70 kHz	57 µA/A + 0.55 µA	
		70 kHz to 100 kHz	57 µA/A + 0.55 µA	
	100 mA to 200 mA	10 Hz to 20 Hz	0.015 % + 1.5 µA	
		20 Hz to 40 Hz	52 µA/A + 1.4 µA	
		40 Hz to 55 Hz	30 µA/A + 0.85 µA	
		55 Hz to 400 Hz	30 µA/A + 0.85 µA	
		0.4 kHz to 1 kHz	30 µA/A + 0.85 µA	
		1 kHz to 10 kHz	30 µA/A + 0.85 µA	
		10 kHz to 20 kHz	30 µA/A + 0.84 µA	
		20 kHz to 30 kHz	43 µA/A + 0.61 µA	
		30 kHz to 50 kHz	44 µA/A + 0.61 µA	
		50 kHz to 70 kHz	57 µA/A + 1.1 µA	
		70 kHz to 100 kHz	57 µA/A + 1.1 µA	
	200 mA to 500 mA	10 Hz to 20 Hz	0.015 % + 2.5 µA	

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		20 Hz to 40 Hz	54 µA/A + 2.3 µA	
		40 Hz to 55 Hz	31 µA/A + 1.4 µA	
		55 Hz to 400 Hz	31 µA/A + 1.4 µA	
		0.4 kHz to 1 kHz	31 µA/A + 1.4 µA	
		1 kHz to 10 kHz	31 µA/A + 1.4 µA	
		10 kHz to 20 kHz	32 µA/A + 1.4 µA	
		20 kHz to 30 kHz	44 µA/A + 1.0 µA	
		30 kHz to 50 kHz	45 µA/A + 1.0 µA	
		50 kHz to 70 kHz	59 µA/A + 1.8 µA	
		70 kHz to 100 kHz	59 µA/A + 1.8 µA	
	0.5 A to 1 A	10 Hz to 20 Hz	0.015 % + 11 µA	
		20 Hz to 40 Hz	49 µA/A + 11 µA	
		40 Hz to 55 Hz	27 µA/A + 8.0 µA	
		55 Hz to 400 Hz	27 µA/A + 8.0 µA	
		0.4 kHz to 1 kHz	27 µA/A + 8.0 µA	
		1 kHz to 10 kHz	28 µA/A + 7.8 µA	
		10 kHz to 20 kHz	29 µA/A + 7.7 µA	
		20 kHz to 30 kHz	40 µA/A + 7.5 µA	
		30 kHz to 50 kHz	43 µA/A + 7.2 µA	
		50 kHz to 70 kHz	54 µA/A + 11 µA	
		70 kHz to 100 kHz	55 µA/A + 11 µA	
	1 A to 2 A	10 Hz to 20 Hz	0.015 % + 22 µA	
		20 Hz to 40 Hz	49 µA/A + 21 µA	
		40 Hz to 55 Hz	27 µA/A + 16 µA	
		55 Hz to 400 Hz	27 µA/A + 16 µA	
		0.4 kHz to 1 kHz	27 µA/A + 16 µA	
		1 kHz to 10 kHz	30 µA/A + 15 µA	
		10 kHz to 20 kHz	31 µA/A + 15 µA	
		20 kHz to 30 kHz	42 µA/A + 15 µA	
		30 kHz to 50 kHz	58 µA/A + 12 µA	
		50 kHz to 70 kHz	67 µA/A + 19 µA	
		70 kHz to 100 kHz	68 µA/A + 18 µA	

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	2 A to 5 A	10 Hz to 20 Hz	0.015 % + 40 µA	
		20 Hz to 40 Hz	55 µA/A + 38 µA	
		40 Hz to 55 Hz	34 µA/A + 29 µA	
		55 Hz to 400 Hz	34 µA/A + 29 µA	
		0.4 kHz to 1 kHz	34 µA/A + 29 µA	
		1 kHz to 10 kHz	36 µA/A + 29 µA	
		10 kHz to 20 kHz	43 µA/A + 25 µA	
		20 kHz to 30 kHz	52 µA/A + 27 µA	
		30 kHz to 50 kHz	82 µA/A + 28 µA	
		50 kHz to 70 kHz	89 µA/A + 30 µA	
		70 kHz to 100 kHz	90 µA/A + 29 µA	
	5 A to 10 A	10 Hz to 20 Hz	0.015 % + 0.11 mA	
		20 Hz to 40 Hz	58 µA/A + 94 µA	
		40 Hz to 55 Hz	42 µA/A + 61 µA	
		55 Hz to 400 Hz	42 µA/A + 61 µA	
		0.4 kHz to 1 kHz	42 µA/A + 61 µA	
		1 kHz to 10 kHz	63 µA/A + 45 µA	
		10 kHz to 20 kHz	68 µA/A + 42 µA	
		20 kHz to 30 kHz	74 µA/A + 48 µA	
		30 kHz to 50 kHz	0.011 % + 32 µA	
		50 kHz to 70 kHz	0.012 % + 59 µA	
		70 kHz to 100 kHz	0.013 % + 55 µA	
	10 A to 20 A	10 Hz to 20 Hz	0.015 % + 0.21 mA	
		20 Hz to 40 Hz	64 µA/A + 0.18 mA	
		40 Hz to 55 Hz	50 µA/A + 0.11 mA	
		55 Hz to 400 Hz	50 µA/A + 0.11 mA	
		0.4 kHz to 1 kHz	50 µA/A + 0.11 mA	
		1 kHz to 10 kHz	58 µA/A + 96 µA	
		10 kHz to 20 kHz	77 µA/A + 75 µA	
		20 kHz to 30 kHz	82 µA/A + 87 µA	
		30 kHz to 50 kHz	0.014 % + 54 µA	
		50 kHz to 70 kHz	0.014 % + 0.10 mA	
		70 kHz to 100 kHz	0.016 % + 92 µA	

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	20 A to 50 A	10 Hz to 20 Hz	0.016 % + 0.38 mA	
		20 Hz to 40 Hz	76 µA/A + 0.30 mA	
		40 Hz to 55 Hz	63 µA/A + 0.19 mA	
		55 Hz to 400 Hz	63 µA/A + 0.19 mA	
		0.4 kHz to 1 kHz	63 µA/A + 0.19 mA	
		1 kHz to 10 kHz	86 µA/A + 0.14 mA	
		10 kHz to 20 kHz	97 µA/A + 0.13 mA	
		20 kHz to 30 kHz	0.010 % + 0.15 mA	
		30 kHz to 50 kHz	0.018 % + 89 µA	
		50 kHz to 70 kHz	0.018 % + 0.16 mA	
		70 kHz to 100 kHz	0.021 % + 0.14 mA	
	50 A to 100 A	10 Hz to 20 Hz	0.016 % + 1.0 mA	
		20 Hz to 40 Hz	86 µA/A + 0.70 mA	
		40 Hz to 55 Hz	76 µA/A + 0.38 mA	
		55 Hz to 400 Hz	76 µA/A + 0.38 mA	
		0.4 kHz to 1 kHz	76 µA/A + 0.38 mA	
		1 kHz to 10 kHz	98 µA/A + 0.30 mA	
		10 kHz to 20 kHz	0.013 % + 0.24 mA	
		20 kHz to 30 kHz	0.013 % + 0.29 mA	
		30 kHz to 50 kHz	0.022 % + 0.17 mA	
		50 kHz to 70 kHz	0.023 % + 0.32 mA	
		70 kHz to 100 kHz	0.025 % + 0.30 mA	
AC Current Measure Note 11	0.1 mA to 300 mA	@ 510 kHz Nominal	0.58 % - 77 µA	Pearson Current Monitor
	300 mA to 3.0 A	@ 510 kHz Nominal	0.59 % - 0.27 mA	
	3.0 A to 7.0 A	@ 510 kHz Nominal	0.64 % - 4.2 mA	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
DC RESISTANCE and CURRENT (20/E05)			
Resistance – Source	0.1 Ω to 1 Ω	0.011 % + 2.4 mΩ	Decade Resistors
	1 Ω to 10 Ω	0.036 % + 2.1 mΩ	
	10 Ω to 100 Ω	0.048 % + 1.4 mΩ	
	100 Ω to 1 kΩ	0.047 % + 6.7 mΩ	
	1 kΩ to 10 kΩ	0.047 % + 67 mΩ	
	10 kΩ to 100 kΩ	0.047 % + 0.67 Ω	
	100 kΩ to 1 MΩ	0.054 % + 1.1 Ω	
	(0.1 Ω Increments)		
	10 MΩ to 100 MΩ	0.29 % - 7.4 Ω	
	100 MΩ to 1 GΩ	0.29 % + 11 kΩ	
	1 GΩ to 10 GΩ	0.55 % - 5.0 MΩ	
	(10 MΩ Increments)		
	1 Ω	0.49 µΩ	IET LABS - SRL
	10 Ω	3.5 µΩ	
	25 Ω	6.0 µΩ	
	100 Ω	28 µΩ	
	200 Ω	50 µΩ	
	400 Ω	0.10 mΩ	
	1 kΩ	5.8 mΩ	
	10 kΩ	6.3 mΩ	
	100 kΩ	49 mΩ	
	1 MΩ	5.8 Ω	
	10 MΩ	12 Ω	
	100 MΩ	1.2 kΩ	
	1 GΩ	26 kΩ	
	10 GΩ	0.51 MΩ	
	0.0 Ω	4.0 µΩ	Fluke 5730A
	1.0 Ω	74 µΩ	
	1.9 Ω	0.14 mΩ	
	10 Ω	0.19 mΩ	
	19 Ω	0.37 mΩ	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	100 Ω	0.85 mΩ	
	190 Ω	1.6 mΩ	
	1.0 kΩ	5.6 mΩ	
	1.9 kΩ	11 mΩ	
	10 kΩ	54 mΩ	
	19 kΩ	0.10 Ω	
	100 kΩ	0.62 Ω	
	190 kΩ	1.5 Ω	
	1.0 MΩ	11 Ω	
	1.9 MΩ	25 Ω	
	10 MΩ	0.29 kΩ	
	19 MΩ	0.69 kΩ	
	100 MΩ	8.5 kΩ	
Variable Resistance – Source	0 Ω to < 11 Ω	31 μΩ/Ω + 0.78 mΩ	Fluke 5522A
	11 Ω to < 33 Ω	23 μΩ/Ω + 1.2 mΩ	
	33 to < 110 Ω	22 μΩ/Ω + 1.1 mΩ	
	110 to < 330 Ω	22 μΩ/Ω + 1.6 mΩ	
	330 Ω to < 1.1 kΩ	22 μΩ/Ω + 1.6 mΩ	
	1.1 kΩ to < 3.3 kΩ	22 μΩ/Ω + 16 mΩ	
	3.3 kΩ to < 11 kΩ	22 μΩ/Ω + 16 mΩ	
	11 kΩ to < 33 kΩ	22 μΩ/Ω + 0.16 Ω	
	33 kΩ to < 110 kΩ	22 μΩ/Ω + 0.16 Ω	
	110 kΩ to < 330 kΩ	25 μΩ/Ω + 1.6 Ω	
	330 kΩ to < 1.1 MΩ	25 μΩ/Ω + 1.6 Ω	
	1.1 MΩ to < 3.3 MΩ	47 μΩ/Ω + 23 Ω	
	3.3 MΩ to < 11 MΩ	0.010 % + 39 Ω	
	11 MΩ to < 33 MΩ	0.019 % + 1.9 kΩ	
	33 MΩ to < 110 MΩ	0.039 % + 2.3 kΩ	
	110 MΩ to < 330 MΩ	0.23 % + 78 kΩ	
	330 MΩ to 1.1 GΩ	1.2 % + 0.39 MΩ	
Resistance Measure Note 4	0 Ω to 10 Ω	78 μΩ/Ω + 2.3 mΩ	Fluke 8846A
	> 10 Ω to 100 Ω	78 μΩ/Ω + 3.1 mΩ	
	> 100 Ω to 1 kΩ	78 μΩ/Ω + 7.8 mΩ	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	> 1 kΩ to 10 kΩ	78 μΩ/Ω + 78 mΩ	
	> 10 kΩ to 100 kΩ	78 μΩ/Ω + 0.78 Ω	
	> 100 kΩ to 1 MΩ	78 μΩ/Ω + 7.8 Ω	
	> 1 MΩ to 10 MΩ	0.031 % + 78 Ω	
	> 10 MΩ to 100 MΩ	0.62 % + 7.8 kΩ	
	> 100 MΩ to 1 GΩ	0.78 % + 78 kΩ	
	0 Ω to 1.0 Ω	11 μΩ/Ω + 4.0 μΩ	Fluke 8588A
	> 1.0 Ω to 10 Ω	7.7 μΩ/Ω + 14 μΩ	
	> 10 Ω to 100 Ω	7.1 μΩ/Ω + 47 μΩ	
	> 100 Ω to 1 kΩ	7.1 μΩ/Ω + 0.47 mΩ	
	> 1 kΩ to 10 kΩ	7.1 μΩ/Ω + 4.7 mΩ	
	> 10 kΩ to 100 kΩ	7.3 μΩ/Ω + 47 mΩ	
	> 100 kΩ to 1 MΩ	8.2 μΩ/Ω + 1.0 Ω	
	> 1 MΩ to 10 MΩ	11 μΩ/Ω + 0.10 kΩ	
	> 10 MΩ to 100 MΩ	39 μΩ/Ω + 10 kΩ	
	> 100 MΩ to 1 GΩ	0.051 % + 1.0 MΩ	
	> 1 MΩ to 10 MΩ	15 μΩ/Ω + 10 Ω	Fluke 8588A - HV
	> 10 MΩ to 100 MΩ	60 μΩ/Ω + 1.0 kΩ	
	> 100 MΩ to 1 GΩ	0.015 % + 0.10 MΩ	
	> 1 GΩ to 10 GΩ	0.052 % + 10 MΩ	
Resistive Simulation of Temperature Probes Note 7			Fluke 8846A
YSI 400	20 °C to 44 °C (2.814 kΩ to 1.023 kΩ)	0.0077 % + 0.0034 °C 0.0077 % + 78 mΩ	
YSI 700T1	20 °C to 44 °C (7.496 kΩ to 2.726 kΩ)	0.0078 % + 0.0013 °C (0.0078 % + 78 mΩ)	
YSI 700T2	20 °C to 44 °C (37.30 kΩ to 13.80 kΩ)	0.0078 % + 0.0025 °C (0.0078 % + 0.78 Ω)	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
Resistive Simulation of Cardiac Output at: Note 8			Fluke 8846A
0 °C and 2 °C Injectate	2.5 L/min (14.50 kΩ)	0.0033 L/min (1.9 Ω)	
	3.0 L/min (14.47 kΩ)	0.0039 L/min (1.9 Ω)	
	5.0 L/min (14.350 kΩ)	0.0066 L/min (1.9 Ω)	
	7.0 L/min (14.395 kΩ)	0.0092 L/min (1.9 Ω)	
	10.0 L/min (14.2448 kΩ)	0.013 L/min (1.9 Ω)	
24 °C and 20 °C Injectate	2.5 L/min (14.30 kΩ)	0.0025 L/min (3.7 Ω)	
	3.0 L/min (14.50 kΩ)	0.0029 L/min (3.7 Ω)	
	5.0 L/min (14.2235 kΩ)	0.0049 L/min (3.7 Ω)	
	7.0 L/min (14.50 kΩ)	0.0069 L/min (3.7 Ω)	
	10.0 L/min (14.1414 kΩ)	0.0098 L/min (3.7 Ω)	
DC Current Source	0.0 µA to < 330 µA	0.012 % + 16 nA	Fluke 5522A
	0.33 mA to < 3.3 mA	77 µA/A + 39 nA	
	3.3 mA to < 33 mA	77 µA/A + 0.20 µA	
	33 mA to < 330 mA	77 µA/A + 2.0 µA	
	0.33 A to < 1.1 A	0.015 % + 31 µA	
	1.1 A to < 3 A	0.029 % + 31 µA	
	3.0 A to < 11 A	0.039 % + 0.39 mA	
	11 A to 20.5 A	0.078 % + 0.58 mA	
	0.0 µA to < 220 µA	33 µA/A + 5.4 nA	Fluke 5730A
	0.22 mA to < 2.2 mA	27 µA/A + 6.2 nA	
	2.2 mA to < 22 mA	27 µA/A + 39 nA	
	22 mA to < 100 mA	35 µA/A + 0.62 µA	
	100 mA to < 220 mA	35 µA/A + 0.62 µA	
	0.22 A to < 1.0 A	54 µA/A + 12 µA	
	1.0 A to 2.2 A	54 µA/A + 12 µA	
	2.2 A to 11 A	0.026 % + 0.37 mA	Fluke 5730A/5725A
	0.22 A to < 2.0 A	0.012 % + 0.16 mA	Fluke 5730A/52120A
	2.0 A to < 20 A	0.012 % + 1.6 mA	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	20 A to 100 A	0.012 % + 9.3 mA	
Current Clamp Non-Toroidal	0.33 mA to < 3.3 mA	0.39 % + 0.16 µA	Fluke 5730A/5522A and 5500A Coil
	3.3 mA to < 33 mA	0.38 % + 1.6 µA	
	33 mA to < 330 mA	0.38 % + 16 µA	
	0.33 A to < 1.1 A	0.38 % + 0.17 mA	
	1.1 A to < 3.0 A	0.39 % + 63 µA	
	3.0 A to < 11.0 A	0.38 % + 2.1 mA	
	11.0 A to < 20.0 A	0.40 % + 1.9 mA	
	20.0 A to < 150 A	0.36 % + 0.21 A	
	150 A to 1025 A	0.39 % + 0.60 A	
	0 A to 5000 A	0.60 % + 0.79 A	Fluke 5730A/52120A and 52120A/COIL 6KA
Current Clamp Toroidal	0.33 mA to < 3.3 mA	0.38 % + 0.14 µA	Fluke 5730A/5522A and 5500A Coil
	3.3 mA to < 33 mA	0.38 % + 1.4 µA	
	33 mA to < 330 mA	0.38 % + 14 µA	
	0.33 A to < 1.1 A	0.38 % + 0.16 mA	
	1.1 A to < 3.0 A	0.39 % + 56 µA	
	3.0 A to < 11.0 A	0.38 % + 1.7 mA	
	11.0 A to < 20.0 A	0.39 % + 0.71 mA	
	20.0 A to < 150 A	0.39 % + 0.12 A	
	150 A to 1025 A	0.38 % + 0.57 A	
	0 A to 5000 A	0.60 % + 0.79 A	Fluke 5730A/52120A and 52120A/COIL 6KA
DC Current Measure note 4	0 µA to 100 µA	0.039 % + 20 nA	Fluke 8846A
	> 0.1 mA to 1.0 mA	0.039 % + 39 nA	
	> 1.0 mA to 10.0 mA	0.039 % + 1.6 µA	
	> 10 mA to 100 mA	0.039 % + 3.9 µA	
	> 100 mA to 400 mA	0.039 % + 16 µA	
	> 0.4 A to 1.0 A	0.039 % + 0.16 mA	
	> 1.0 A to 3.0 A	0.078 % + 0.47 mA	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	> 3.0 A to 10 A	0.12 % + 0.62 mA	
	> 10.0 A to 30 A	0.37 % - 6.8 mA	Fluke 8846A, Agilent 34330A
	0.1 µA to < 220 µA	3.9 µA/A + 0.78 nA	Fluke 8588A and IET SRL
	0.22 mA to < 2.2 mA	3.1 µA/A + 6.8 nA	
	2.2 mA to < 22 mA	3.9 µA/A + 39 nA	
	22 mA to < 100 mA	6.1 µA/A + 0.26 µA	
	0 µA to 10 µA	24 µA/A + 0.40 nA	Fluke 8588A
	> 10 µA to 100 µA	8.5 µA/A + 0.39 nA	
	> 0.1 mA to 1.0 mA	7.8 µA/A + 3.9 nA	
	> 1.0 mA to 10.0 mA	8.5 µA/A + 39 nA	
	> 10 mA to 100 mA	33 µA/A + 1.0 µA	
	> 0.1 A to 1.0 A	0.010 % + 0.10 mA	
	> 1.0 A to 10 A	0.017 % + 0.40 mA	
	> 10 A to 30 A	0.049 % + 4.4 mA	
	10 µA to 1 mA	3.2 µA/A + 63 nA	Fluke 5790B and Fluke A40B
	> 1 mA to 10 mA	15 µA/A + 57 nA	
	> 10 mA to 20 mA	18 µA/A + 55 nA	
	> 20 mA to 50 mA	18 µA/A + 97 nA	
	> 50 mA to 100 mA	18 µA/A + 0.22 µA	
	> 100 mA to 200 mA	18 µA/A + 0.43 µA	
	> 200 mA to 500 mA	19 µA/A + 0.88 µA	
	> 0.5 A to 1 A	4.8 µA/A + 62 µA	
	> 1 A to 2 A	8.6 µA/A + 60 µA	
	> 2 A to 5 A	14 µA/A + 59 µA	
	> 5 A to 10 A	22 µA/A + 59 µA	
	> 10 A to 20 A	23 µA/A + 93 µA	
	> 20 A to 50 A	29 µA/A + 0.19 mA	
	> 50 A to 100 A	33 µA/A + 0.33 mA	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
DC VOLTAGE (20/E06)			
DC Voltage Measure note 4	0 mV to 100 mV > 0.1 V to 1.0 V > 1.0 V to 10.0 V > 10 V to 100 V > 100 V to 1000 V	29 µV/V + 2.7 µV 19 µV/V + 5.5 µV 19 µV/V + 39 µV 29 µV/V + 0.47 mV 32 µV/V + 7.8 mV	Keithley 2700 Fluke 8846A
	> 1 kV to 10 kV > 10 kV to 40 kV	1.6 % 0.78 % + 3.5 µV	Fluke 8846A and Fluke 80K-40
	0 mV to 100 mV > 0.1 V to 1.0 V > 1.0 V to 10.0 V > 10 V to 100 V > 100 V to 1000 V	4.7 µV/V + 0.25 µV 2.8 µV/V + 0.33 µV 2.8 µV/V + 0.52 µV 4.1 µV/V + 30 µV 4.3 µV/V + 0.51 mV	Fluke 8588A
Electrical Simulation of Blood Pressure Note 9	-10 mmHg to 400 mmHg (-0.5 mV to 20 mV)	0.057 % + 0.054 mmHg (0.057 % + 2.7 µV)	Conversion Factor is 20 mmHg/mV at 10 VDC Exciter Voltage (Power Supply and Voltage Meter)
DC Voltage Source	0 mV to < 330 mV 0.33 V to < 3.3 V 3.3 V to < 33 V 33 V to < 330 V 330 V to 1020 V	15 µV/V + 0.79 µV 8.5 µV/V + 1.6 µV 9.3 µV/V + 16 µV 14 µV/V + 0.12 mV 14 µV/V + 1.2 mV	Fluke 5522A
	0 mV to < 220 mV 0.22 V to < 2.2 V 2.2 V to < 11 V 11 V to < 22 V 22 V to < 220 V 220 V to 1100 V	5.4 µV/V + 0.39 µV 3.1 µV/V + 0.62 µV 2.3 µV/V + 2.3 µV 2.3 µV/V + 3.9 µV 3.1 µV/V + 39 µV 4.7 µV/V + 0.39 mV	Fluke 5730A

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty [Note 3,5]	Remarks
LF AC VOLTAGE (20/E09)				
AC Voltage – Source	0 mV to < 33 mV	10 Hz to 45 Hz	0.062 % + 4.7 µV	Fluke 5522A
		45 Hz to 10 kHz	0.012 % + 4.7 µV	
		10 kHz to 20 kHz	0.016 % + 4.7 µV	
		20 kHz to 50 kHz	0.078 % + 4.7 µV	
		50 kHz to 100 kHz	0.27 % + 9.3 µV	
		100 kHz to 500 kHz	0.62 % + 39 µV	
	33 mV to < 330 mV	10 Hz to 45 Hz	0.023 % + 6.2 µV	
		45 Hz to 10 kHz	0.011 % + 6.2 µV	
		10 kHz to 20 kHz	0.012 % + 6.2 µV	
		20 kHz to 50 kHz	0.027 % + 6.2 µV	
		50 kHz to 100 kHz	0.062 % + 25 µV	
		100 kHz to 500 kHz	0.16 % + 54 µV	
	0.33 V to < 3.3 V	10 Hz to 45 Hz	0.023 % + 39 µV	
		45 Hz to 10 kHz	0.012 % + 47 µV	
		10 kHz to 20 kHz	0.015 % + 47 µV	
		20 kHz to 50 kHz	0.023 % + 39 µV	
		50 kHz to 100 kHz	0.054 % + 97 µV	
		100 kHz to 500 kHz	0.19 % + 0.47 mV	
	3.3 V to < 33 V	10 Hz to 45 Hz	0.023 % + 0.50 mV	
		45 Hz to 10 kHz	0.012 % + 0.47 mV	
		10 kHz to 20 kHz	0.019 % + 0.47 mV	
		20 kHz to 50 kHz	0.027 % + 0.47 mV	
		50 kHz to 100 kHz	0.070 % + 1.2 mV	
	33 V to < 330 V	45 Hz to 1 kHz	0.015 % + 1.6 mV	
		1 kHz to 10 kHz	0.016 % + 4.7 mV	
		10 kHz to 20 kHz	0.019 % + 4.7 mV	
		20 kHz to 50 kHz	0.023 % + 4.7 mV	
		50 kHz to 100 kHz	0.16 % + 39 mV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	330 V to 1020 V	45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.023 % + 7.8 mV 0.019 % + 7.8 mV 0.023 % + 7.8 mV	
	0.22 mV to < 2.2 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.021 % + 3.9 µV 81 µV/V + 3.9 µV 70 µV/V + 3.9 µV 0.018 % + 3.9 µV 0.042 % + 4.7 µV 0.093 % + 9.3 µV 0.12 % + 19 µV 0.24 % + 19 µV	Fluke 5730A
	2.2 mV to < 22 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.021 % + 3.9 µV 81 µV/V + 3.9 µV 70 µV/V + 3.9 µV 0.018 % + 3.9 µV 0.042 % + 4.7 µV 0.093 % + 9.3 µV 0.12 % + 19 µV 0.24 % + 19 µV	
	22 V to < 220 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz	0.021 % + 12 µV 81 µV/V + 6.2 µV 51 µV/V + 6.2 µV 0.011 % + 6.2 µV 0.029 % + 16 µV 0.054 % + 19 µV 0.12 % + 23 µV 0.22 % + 47 µV	
	0.22 V to < 2.2 V	10 Hz to 20 Hz 20 Hz to 40 Hz	0.021 % + 39 µV 78 µV/V + 16 µV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		40 Hz to 20 kHz	36 µV/V + 7.8 µV	
		20 kHz to 50 kHz	60 µV/V + 9.3 µV	
		50 kHz to 100 kHz	75 µV/V + 31 µV	
		100 kHz to 300 kHz	0.029 % + 78 µV	
		300 kHz to 500 kHz	0.085 % + 0.19 mV	
		500 kHz to 1 MHz	0.14 % + 0.31 mV	
	2.2 V to < 22 V	10 Hz to 20 Hz	0.021 % + 0.39 mV	
		20 Hz to 40 Hz	78 µV/V + 0.16 mV	
		40 Hz to 20 kHz	36 µV/V + 54 µV	
		20 kHz to 50 kHz	60 µV/V + 93 µV	
		50 kHz to 100 kHz	75 µV/V + 0.19 mV	
		100 kHz to 300 kHz	0.022 % + 0.62 mV	
		300 kHz to 500 kHz	0.085 % + 1.9 mV	
		500 kHz to 1 MHz	0.12 % + 3.1 mV	
	22 V to < 220 V	10 Hz to 20 Hz	0.021 % + 3.9 mV	
		20 Hz to 40 Hz	78 µV/V + 1.6 mV	
		40 Hz to 20 kHz	47 µV/V + 0.54 mV	
		20 kHz to 50 kHz	74 µV/V + 0.93 mV	
		50 kHz to 100 kHz	0.013 % + 2.3 mV	
		100 kHz to 300 kHz	0.078 % + 16 mV	
		300 kHz to 500 kHz	0.40 % + 39 mV	
		500 kHz to 1 MHz	0.70 % + 78 mV	
	220 V to 1100 V	15 Hz to 50 Hz	0.025 % + 16 mV	
		50 Hz to 1 kHz	58 µV/V + 3.1 mV	
	220 V to 750 V	30 kHz to 50 kHz	0.028 % + 8.5 mV	Fluke
		50 kHz to 100 kHz	0.10 % + 35 mV	5730A/5725A
	220 V to 1100 V	40 Hz to 1 kHz	62 µV/V + 3.1 mV	
		1 kHz to 20 kHz	97 µV/V + 4.7 mV	
		20 kHz to 30 kHz	0.028 % + 8.5 mV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
AC Voltage - Measure note 4	5.0 mV	60 Hz	0.037 mV	Keithley 2700
	0.1 mV to 0.1 V	5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.27 % + 31 µV 0.047 % + 31 µV 0.093 % + 39 µV 0.47 % + 62 µV 3.1 % + 0.39 mV	Fluke 8846A
	> 0.1 V to 1.0 V	5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.27 % + 0.23 mV 0.047 % + 0.23 mV 0.093 % + 0.39 mV 0.47 % + 0.62 mV 3.1 % + 3.9 mV	
	> 1.0 V to 10 V	5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.27 % + 2.3 mV 0.047 % + 2.3 mV 0.093 % + 3.9 mV 0.47 % + 6.2 mV 3.1 % + 39 mV	
	> 10 V to 100 V	5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.27 % + 23 mV 0.047 % + 23 mV 0.093 % + 39 mV 0.47 % + 62 mV 3.1 % + 0.39 V	
	> 100 V to 1000 V	5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.27 % + 0.17 V 0.047 % + 0.17 V 0.093 % + 0.29 V 0.47 % + 0.47 V 3.1 % + 2.9 V	
	> 1 kV to 10 kV 10 kV to 40 kV	50/60 Hz 50/60 Hz	3.9 % + 3.6 µV 3.9 % + 2.9 µV	Fluke 8846A and Fluke 80K-40

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Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	> 1.0 mV to 10 mV	1 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz	0.025 % + 1.1 µV 0.033 % + 1.1 µV 0.034 % + 1.1 µV 0.30 % + 0.78 µV 1.0 % + 3.9 µV 2.0 % + 3.9 µV	Fluke 8588A
	> 10 V to 100 mV	1 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz	68 µV/V + 0.50 µV 0.011 % + 0.50 µV 0.021 % + 1.0 µV 0.051 % + 5.0 µV 0.20 % + 31 µV 1.0 % + 0.10 mV	
	> 0.1 V to 1.0 V	1 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz	64 µV/V + 5.0 µV 0.011 % + 5.0 µV 0.021 % + 10 µV 0.051 % + 50 µV 0.20 % + 0.31 mV 0.10 % + 1.0 mV	
	> 1.0 V to 10 V	1 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 1 MHz	64 µV/V + 50 µV 0.011 % + 50 µV 0.021 % + 0.10 mV 0.051 % + 0.50 mV 0.20 % + 3.1 mV 0.10 % + 10 mV	
	> 10 V to 100 V	1 Hz to 2 kHz 2 kHz to 10 kHz 10 kHz to 30 kHz 30 kHz to 100 kHz 100 kHz to 300 kHz	70 µV/V + 0.50 mV 90 µV/V + 0.50 mV 0.021 % + 1.0 mV 0.051 % + 5.0 mV 0.35 % + 47 mV	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		300 kHz to 1 MHz	1.0 % + 0.50 V	
	> 100 V to 1000 V	1 Hz to 2 kHz	90 µV/V + 25 mV	
		2 kHz to 10 kHz	90 µV/V + 25 mV	
		10 kHz to 30 kHz	0.021 % + 25 mV	
		30 kHz to 100 kHz	0.051 % + 0.10 V	
	0.1 mV to 2.2 mV	10 Hz to 20 Hz	0.13 % + 1.0 µV	Fluke 5790B
		20 Hz to 40 Hz	0.057 % + 1.0 µV	
		40 Hz to 20 kHz	0.033 % + 1.0 µV	
		20 kHz to 50 kHz	0.063 % + 1.6 µV	
		50 kHz to 100 kHz	0.093 % + 1.9 µV	
		100 kHz to 300 kHz	1.8 % + 3.1 µV	
		300 kHz to 500 kHz	1.9 % + 6.2 µV	
		500 kHz to 1 MHz	2.7 % + 6.2 µV	
	> 2.2 mV to 7 mV	10 Hz to 20 Hz	0.066 % + 1.0 µV	
		20 Hz to 40 Hz	0.029 % + 1.0 µV	
		40 Hz to 20 kHz	0.016 % + 1.0 µV	
		20 kHz to 50 kHz	0.031 % + 1.6 µV	
		50 kHz to 100 kHz	0.047 % + 1.9 µV	
		100 kHz to 300 kHz	0.093 % + 3.1 µV	
		300 kHz to 500 kHz	0.10 % + 6.2 µV	
		500 kHz to 1 MHz	0.18 % + 6.2 µV	
	> 7 mV to 22 mV	10 Hz to 20 Hz	0.022 % + 1.0 µV	
		20 Hz to 40 Hz	0.015 % + 1.0 µV	
		40 Hz to 20 kHz	85 µV/V + 1.0 µV	
		20 kHz to 50 kHz	0.016 % + 1.6 µV	
		50 kHz to 100 kHz	0.024 % + 1.9 µV	
		100 kHz to 300 kHz	0.063 % + 3.1 µV	
		300 kHz to 500 kHz	0.069 % + 6.2 µV	
		500 kHz to 1 MHz	0.13 % + 6.2 µV	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	> 22 mV to 70 mV	10 Hz to 20 Hz	0.019 % + 1.2 µV	
		20 Hz to 40 Hz	93 µV/V + 1.2 µV	
		40 Hz to 20 kHz	50 µV/V + 1.2 µV	
		20 kHz to 50 kHz	0.010 % + 1.6 µV	
		50 kHz to 100 kHz	0.020 % + 1.9 µV	
		100 kHz to 300 kHz	0.040 % + 3.1 µV	
		300 kHz to 500 kHz	0.052 % + 6.2 µV	
		500 kHz to 1 MHz	0.085 % + 6.2 µV	
	> 70 mV to 220 mV	10 Hz to 20 Hz	0.016 % + 1.2 µV	
		20 Hz to 40 Hz	66 µV/V + 1.2 µV	
		40 Hz to 20 kHz	29 µV/V + 1.2 µV	
		20 kHz to 50 kHz	53 µV/V + 1.6 µV	
		50 kHz to 100 kHz	0.012 % + 1.9 µV	
		100 kHz to 300 kHz	0.019 % + 3.1 µV	
		300 kHz to 500 kHz	0.029 % + 6.2 µV	
		500 kHz to 1 MHz	0.078 % + 6.2 µV	
	> 220 mV to 700 mV	10 Hz to 20 Hz	0.016 % + 1.2 µV	
		20 Hz to 40 Hz	59 µV/V + 1.2 µV	
		40 Hz to 20 kHz	26 µV/V + 1.2 µV	
		20 kHz to 50 kHz	40 µV/V + 1.6 µV	
		50 kHz to 100 kHz	61 µV/V + 1.9 µV	
		100 kHz to 300 kHz	0.014 % + 3.1 µV	
		300 kHz to 500 kHz	0.023 % + 6.2 µV	
		500 kHz to 1 MHz	0.074 % + 6.2 µV	
	> 700 mV to 2.2 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	51 µV/V	
		40 Hz to 20 kHz	19 µV/V	
		20 kHz to 50 kHz	36 µV/V	
		50 kHz to 100 kHz	55 µV/V	
		100 kHz to 300 kHz	0.012 %	
		300 kHz to 500 kHz	0.020 %	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		500 kHz to 1 MHz	0.070 %	
	> 2.2 V to 7 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	52 µV/V	
		40 Hz to 20 kHz	19 µV/V	
		20 kHz to 50 kHz	37 µV/V	
		50 kHz to 100 kHz	63 µV/V	
		100 kHz to 300 kHz	0.015 %	
		300 kHz to 500 kHz	0.031 %	
		500 kHz to 1 MHz	0.093 %	
	> 7 V to 22 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	52 µV/V	
		40 Hz to 20 kHz	21 µV/V	
		20 kHz to 50 kHz	37 µV/V	
		50 kHz to 100 kHz	63 µV/V	
		100 kHz to 300 kHz	0.015 %	
		300 kHz to 500 kHz	0.031 %	
		500 kHz to 1 MHz	0.093 %	
	> 22 V to 70 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	53 µV/V	
		40 Hz to 20 kHz	25 µV/V	
		20 kHz to 50 kHz	44 µV/V	
		50 kHz to 100 kHz	73 µV/V	
		100 kHz to 300 kHz	0.016 %	
		300 kHz to 500 kHz	0.032 %	
		500 kHz to 1 MHz	0.093 %	
	> 70 V to 220 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	53 µV/V	
		40 Hz to 20 kHz	24 µV/V	
		20 kHz to 50 kHz	53 µV/V	
		50 kHz to 100 kHz	76 µV/V	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		100 kHz to 300 kHz	0.016 %	
		300 kHz to 500 kHz	0.039 %	
	> 220 V to 700 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	77 µV/V + 0.13 µV	
		40 Hz to 20 kHz	32 µV/V + 0.31 µV	
		20 kHz to 50 kHz	0.010 %	
		50 kHz to 100 kHz	0.039 %	
	> 700 V to 1000 V	10 Hz to 20 Hz	0.016 %	
		20 Hz to 40 Hz	77 µV/V	
		40 Hz to 20 kHz	29 µV/V + 0.14 µV	
		20 kHz to 50 kHz	0.010 %	
		50 kHz to 100 kHz	0.039 %	
	0.1 mV to 2.2 mV	10 Hz to 30 Hz	0.47 % + 1.2 µV	Fluke 5790B/50
		30 Hz to 120 Hz	0.47 % + 1.2 µV	
		120 Hz to 1.2 kHz	0.47 % + 1.2 µV	
		1.2 kHz to 120 kHz	0.47 % + 1.2 µV	
		120 kHz to 500 kHz	0.46 % + 1.4 µV	
		500 kHz to 1.2 MHz	0.46 % + 1.4 µV	
		1.2 MHz to 2 MHz	0.46 % + 1.4 µV	
		2 MHz to 10 MHz	0.48 % + 1.4 µV	
		10 MHz to 20 MHz	0.52 % + 1.4 µV	
		20 MHz to 30 MHz	0.71 % + 1.9 µV	
		30 MHz to 50 MHz	0.90 % + 1.9 µV	
	> 2.2 mV to 7 mV	10 Hz to 30 Hz	0.39 % + 5.4 µV	
		30 Hz to 120 Hz	0.39 % + 5.4 µV	
		120 Hz to 1.2 kHz	0.39 % + 5.4 µV	
		1.2 kHz to 120 kHz	0.39 % + 5.4 µV	
		120 kHz to 500 kHz	0.39 % + 5.5 µV	
		500 kHz to 1.2 MHz	0.39 % + 5.5 µV	
		1.2 MHz to 2 MHz	0.39 % + 5.5 µV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		2 MHz to 10 MHz	0.41 % + 5.4 µV	
		10 MHz to 20 MHz	0.45 % + 5.2 µV	
		20 MHz to 30 MHz	0.48 % + 5.1 µV	
		30 MHz to 50 MHz	0.54 % + 4.8 µV	
	> 7 mV to 22 mV	10 Hz to 30 Hz	0.40 % + 9.9 µV	
		30 Hz to 120 Hz	0.39 % + 10 µV	
		120 Hz to 1.2 kHz	0.39 % + 10 µV	
		1.2 kHz to 120 kHz	0.39 % + 10 µV	
		120 kHz to 500 kHz	0.39 % + 10 µV	
		500 kHz to 1.2 MHz	0.39 % + 10 µV	
		1.2 MHz to 2 MHz	0.39 % + 10 µV	
		2 MHz to 10 MHz	0.40 % + 9.9 µV	
		10 MHz to 20 MHz	0.41 % + 9.7 µV	
		20 MHz to 30 MHz	0.48 % + 8.7 µV	
		30 MHz to 50 MHz	0.60 % + 7.2 µV	
	> 22 mV to 70 mV	10 Hz to 30 Hz	0.40 % + 23 µV	
		30 Hz to 120 Hz	0.39 % + 23 µV	
		120 Hz to 1.2 kHz	0.39 % + 23 µV	
		1.2 kHz to 120 kHz	0.39 % + 23 µV	
		120 kHz to 500 kHz	0.39 % + 23 µV	
		500 kHz to 1.2 MHz	0.39 % + 23 µV	
		1.2 MHz to 2 MHz	0.39 % + 23 µV	
		2 MHz to 10 MHz	0.40 % + 23 µV	
		10 MHz to 20 MHz	0.40 % + 23 µV	
		20 MHz to 30 MHz	0.47 % + 20 µV	
		30 MHz to 50 MHz	0.60 % + 16 µV	
	> 70 mV to 220 mV	10 Hz to 30 Hz	0.32 % + 61 µV	
		30 Hz to 120 Hz	0.31 % + 62 µV	
		120 Hz to 1.2 kHz	0.31 % + 62 µV	
		1.2 kHz to 120 kHz	0.31 % + 62 µV	
		120 kHz to 500 kHz	0.31 % + 62 µV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		500 kHz to 1.2 MHz	0.31 % + 62 µV	
		1.2 MHz to 2 MHz	0.31 % + 62 µV	
		2 MHz to 10 MHz	0.32 % + 61 µV	
		10 MHz to 20 MHz	0.33 % + 59 µV	
		20 MHz to 30 MHz	0.41 % + 50 µV	
		30 MHz to 50 MHz	0.56 % + 38 µV	
	> 220 mV to 700 mV	10 Hz to 30 Hz	0.32 % + 0.23 mV	
		30 Hz to 120 Hz	0.31 % + 0.23 mV	
		120 Hz to 1.2 kHz	0.31 % + 0.23 mV	
		1.2 kHz to 120 kHz	0.31 % + 0.23 mV	
		120 kHz to 500 kHz	0.31 % + 0.23 mV	
		500 kHz to 1.2 MHz	0.31 % + 0.23 mV	
		1.2 MHz to 2 MHz	0.31 % + 0.23 mV	
		2 MHz to 10 MHz	0.32 % + 0.23 mV	
		10 MHz to 20 MHz	0.33 % + 0.22 mV	
		20 MHz to 30 MHz	0.41 % + 0.19 mV	
		30 MHz to 50 MHz	0.56 % + 0.15 mV	
	> 700 mV to 2.2 V	10 Hz to 30 Hz	0.28 % + 0.30 mV	
		30 Hz to 120 Hz	0.27 % + 0.31 mV	
		120 Hz to 1.2 kHz	0.27 % + 0.31 mV	
		1.2 kHz to 120 kHz	0.27 % + 0.31 mV	
		120 kHz to 500 kHz	0.27 % + 0.31 mV	
		500 kHz to 1.2 MHz	0.27 % + 0.31 mV	
		1.2 MHz to 2 MHz	0.27 % + 0.31 mV	
		2 MHz to 10 MHz	0.28 % + 0.30 mV	
		10 MHz to 20 MHz	0.30 % + 0.29 mV	
		20 MHz to 30 MHz	0.38 % + 0.23 mV	
		30 MHz to 50 MHz	0.54 % + 0.17 mV	
	> 2.2 V to 7 V	10 Hz to 30 Hz	0.28 % + 0.60 mV	
		30 Hz to 120 Hz	0.27 % + 0.62 mV	
		120 Hz to 1.2 kHz	0.27 % + 0.62 mV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		1.2 kHz to 120 kHz	0.27 % + 0.62 mV	
		120 kHz to 500 kHz	0.27 % + 0.62 mV	
		500 kHz to 1.2 MHz	0.27 % + 0.62 mV	
		1.2 MHz to 2 MHz	0.27 % + 0.62 mV	
		2 MHz to 10 MHz	0.28 % + 0.60 mV	
		10 MHz to 20 MHz	0.30 % + 0.58 mV	
		20 MHz to 30 MHz	0.38 % + 0.45 mV	
		30 MHz to 50 MHz	0.54 % + 0.33 mV	
LF CAPACITANCE (20/E10)				
Capacitance – Source	220 pF to < 400 pF	10 Hz to 10 kHz	0.39 % + 7.8 pF	Fluke 5522A
	0.4 nF to < 1.1 nF	10 Hz to 10 kHz	0.39 % + 7.8 pF	
	1.1 nF to < 3.3 nF	10 Hz to 3 kHz	0.39 % + 7.8 pF	
	3.3 nF to < 11 nF	10 Hz to 1 kHz	0.19 % + 7.8 pF	
	11 nF to < 33 nF	10 Hz to 1 kHz	0.19 % + 7.8 pF	
	33 nF to < 110 nF	10 Hz to 1 kHz	0.19 % + 7.8 pF	
	110 nF to < 330 nF	10 Hz to 1 kHz	0.19 % + 23 pF	
	0.33 µF to < 1.1 µF	10 Hz to 600 Hz	0.19 % + 0.78 nF	
	1.1 µF to < 3.3 µF	10 Hz to 300 Hz	0.19 % + 2.3 nF	
	3.3 µF to < 11 µF	10 Hz to 150 Hz	0.19 % + 7.8 nF	
	11 µF to < 33 µF	10 Hz to 120 Hz	0.31 % + 23 nF	
	33 µF to < 110 µF	10 Hz to 80 Hz	0.35 % + 78 nF	
	110 µF to < 330 µF	DC to 50 Hz	0.35 % + 0.23 µF	
	0.33 mF to < 1.1 mF	DC to 20 Hz	0.35 % + 0.78 µF	
	1.1 mF to < 3.3 mF	DC to 2 Hz	0.35 % + 2.3 µF	
	3.3 mF to < 11 mF	DC to 6 Hz	0.35 % + 7.8 µF	
	11 mF to < 33 mF	DC to 0.6 Hz	0.58 % + 23 µF	
	33 mF to 110 mF	DC to 0.2 Hz	0.85 % + 78 µF	
Capacitance – Source	50 pF to < 100 pF	100 Hz to 1 kHz	0.012 % + 46 fF	IET Decade
	100 pF to < 1000 pF	100 Hz to 1 kHz	0.018 % + 59 fF	
	1 nF to < 10 nF	100 Hz to 1 kHz	0.019 % + 0.42 pF	
	10 nF to < 100 nF	100 Hz to 1 kHz	0.019 % + 4.3 pF	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	100 nF to < 1000 nF	100 Hz to 1 kHz	0.019 % + 43 pF	
Capacitance – Measure	0.1 nF to 1.0 nF	10 Hz to 10 kHz	0.10 % + 1.0 pF	Fluke 8588A
	> 1.0 nF to 10 nF	10 Hz to 1 kHz	0.061 % + 2.0 pF	
	> 10 nF to 100 nF	10 Hz to 1 kHz	0.041 % + 10 pF	
	> 0.1 µF to 1.0 µF	10 Hz to 600 Hz	0.041 % + 0.10 nF	
	> 1.0 µF to 10 µF	10 Hz to 150 Hz	0.041 % + 1.0 nF	
	> 10 µF to 100 µF	10 Hz to 80 Hz	0.060 % + 10 nF	
	> 0.1 mF to 1.0 mF	DC to 20 Hz	0.061 % + 0.10 µF	
	> 1.0 mF to 10 mF	DC to 6 Hz	0.070 % + 1.0 µF	
	> 10 mF to 100 mF	DC to 0.2 Hz	0.070 % + 10 µF	
Capacitance – Measure	0.001 pF to 400 pF	12 Hz to 1 kHz	0.012 % + 46 fF	IET 1689
	400 pF to 10 nF	12 Hz to 100 Hz	0.10 % + 0.41 fF	
		100 Hz to 1 kHz	0.046 % + 0.11 fF	
	10 nF to 400 nF	12 Hz to 100 Hz	0.10 % + 0.22 fF	
		100 Hz to 1 kHz	0.046 % + 0.51 fF	
	400 nF to 25 µF	12 Hz to 100 Hz	0.10 % + 1.2 pF	
		100 Hz to 1 kHz	0.046 % + 0.13 pF	
	25 µF to 100 µF	12 Hz to 100 Hz	0.47 % - 92 nF	
		100 Hz to 1 kHz	0.18 % - 35 nF	
	100 µF to 1 mF	12 Hz to 100 Hz	0.012 % + 1.5 µF	
		100 Hz to 1 kHz	0.012 % + 0.55 µF	
	1 mF to 10 mF	12 Hz to 100 Hz	0.098 % + 0.62 µF	
		100 Hz to 1 kHz	0.044 % + 0.23 µF	

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	10 mF to 100 mF	12 Hz to 100 Hz 100 Hz to 1 kHz	0.41 % - 31 µF 0.16 % - 12 µF	
	200 µF 300 µF 330 µF 700 µF 1 mF 1.09 mF 1.1 mF 1.21 mF 2 mF 3 mF 3.3 mF 10 mF 10.9 mF 12.1 mF 20 mF 30 mF 33 mF 100 mF 110 mF	DC 54 µA DC 80 µA DC 90 µA DC 180 µA DC 90.0 µA DC 270.0 µA DC 270.0 µA DC 219.9 µA DC 540.0 µA DC 800.0 µA DC 900.0 µA DC 2.1999 mA DC 2.7 mA DC 5.5 mA DC 5.4 mA DC 8.0 mA DC 9.0 mA DC 45 mA DC 27 mA	0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 % 0.046 %	Charge technique using DC current source and sampling DMM
LF INDUCTANCE (20/E11)				
Inductance – Measure	15 µH 100 µH 121 µH 1 mH 1.21 mH 2 mH	1 kHz 1 kHz 1 kHz 1 kHz 110 Hz 110 Hz	61 nH 81 nH 86 nH 0.29 µH 2.1 µH 2.5 µH	IET 1689

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
	3 mH	110 Hz	3.0 µH	
	5 mH	110 Hz	3.9 µH	
	10 mH	110 Hz	6.2 µH	
	12 mH	110 Hz	7.1 µH	
	121 mH	12 Hz	0.13 mH	
	1 H	12 Hz	1.0 mH	
	1.21 H	12 Hz	1.2 mH	
	10 H	12 Hz	8.1 mH	
	12.1 H	100 Hz	5.7 mH	
	12.1 H	12 Hz	9.8 mH	
	100 H	100 Hz	48 mH	
	100 H	12 Hz	81 mH	
LF POWER/ENERGY (20/E12)				
AC Power Measurement Note 11	1 W to 500 W	@ 510 kHz	0.39 %	Power dissipation in load resistance
AC Power Measurement Note 4, 11	1 W to 400 W	@ 510 kHz	0.88 % + 0.83 W	Fluke QA-ES
AC Power – Source	0.01 mW to 20 kW (3.3 mA to 20 A; 3 mV to 1000 V)	@ 45 Hz to 100 Hz	0.14 %	Fluke 5522A
	66 W to 1000 kW (2 A to 1000 A; 0.333 V to 1020 V)	@ 45 Hz to 100 Hz	0.63 % + 0.69 W	Fluke 5522A/ 5500A/Coil
	33 W to 6000 kW (100 A to 6000.0 A; 0.33 V to 1000 V)	@ 45 Hz to 100 Hz	0.90 % + 10 W	Fluke 5522A/ 5730A/52120A and 52120A/COIL 6KA

2024-12-13 through 2025-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
LF POWER/ENERGY (20/E12)			
LF Energy	0.1 J to 360 J	0.28 % + 0.080 J	Fluke 7000DP Gold
LF Energy Note 4	10 J to 360 J	0.21 % + 0.57 J	Fluke 7000DP
Energy (Watt-Hour) 50 Hz to 60 Hz	1 Wh to 3.63 Wh 3.63 Wh to 60 kWh	0.15 % + 50 mWh 0.24 % + 3.1 Wh	Fluke 5522A, Stopwatch
DC Power Source	0.01 mW to 20 kW (3.3 mA to 20 A; 3 mV to 1000 V)	0.080 %	Fluke 5522A
	6.6 W to 100 kW (20 A to 100.0 A; 0.333 V to 1000 V)	0.099 % + 0.27 kW	Fluke 5522A/ 5500A/Coil
	33 W to 5000 kW (100 A to 5000 A; 0.333 V to 1000 V)	0.90 % + 60 W	Fluke 5522A/ 5730A/52120A and 52120A/COIL 6KA

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
LF PHASE (20/E15)				
Phase – Source 0.65 V to 330 V	0 ° to 180 °	10 Hz to 65 Hz 65 Hz to 500 Hz 500 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	0.079 ° 0.19 ° 0.39 ° 1.9 ° 3.9 ° 7.8 °	Fluke 5522A
Phase – Measure	0 ° to 360 °	5 Hz to 2 kHz 2 kHz to 5 kHz	0.015 ° 0.067 °	Clarke Hess 6000A

2024-12-13 through 2025-12-31
Effective dates

For the National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 201065-0**

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5	Remarks
		5 kHz to 10 kHz 10 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 1 MHz	0.067 ° 0.067 ° 0.067 ° 0.046 °	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
TIME & FREQUENCY			
FREQUENCY DISSEMINATION (20/F01)			
Frequency – Measure	0.1 Hz to 100 Hz 100 Hz to 12 GHz	0.17 µHz/Hz 0.16 µHz/Hz	Agilent 53131A and GPS system
Simulation of Heart Rate (beat per minute) Note 10	0.1 Hz to 6.0 Hz (6 BPM to 360 BPM)	0.37 mHz (0.022 BPM)	60 BPM/Hz
Simulation of Heart Rate (beat per minute) Note 4, 10	0.1 Hz to 6.0 Hz (6 BPM to 360 BPM)	9.8 mHz (0.58 BPM)	FLUKE ProSim
Simulation of Respiration Rate Note 10 (respirations per minute)	0.1 Hz to 2.0 Hz (6 to 120 Resp/Min)	0.37 mHz (0.022 Resp/min)	60 Res/min per Hz
Simulation of Respiration Rate Note 4, 10 (respirations per minute)	0.1 Hz to 2.0 Hz (6 to 120 Resp/Min)	9.8 mHz (0.58 Resp/min)	FLUKE ProSim
Frequency – Source	0.01 Hz to 1.0 kHz >1.0 kHz to 1.0 MHz >1 MHz to 600 MHz	0.16 µHz/Hz 0.18 µHz/Hz 0.18 µHz/Hz	Fluke 5522A Fluke 5522A / SC600
Optical Speed – Source	0.6 RPM to 100000 RPM	0.00014 % + 0.058 RPM	Fluke 5522A, Pacman
Optical Speed – Measure	0.6 RPM to 100000 RPM	0.00024 % + 0.082 RPM	Optical Tachometer

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
STOPWATCHES & TIMERS (20/F05)			
Stopwatches & Timers	1 s to 24 hour 1 s to 7 d	0.037 s 0.069 s	NIST SP 960-12 Counter/Generator Method
MECHANICAL			
FLOW RATE (20/M05)			
Volume Flow	0 > SLM to < 5 SLM 5 SLM to 100 SLM	0.11 % + 0.060 mSLM 0.20 % + 1.1 mSLM	DHI Molbloc
Air Velocity	0.05 m/s to < 4.0 m/s 4.0 m/s to < 8.0 m/s 8.0 m/s to < 12 m/s 12 m/s to < 16 m/s 16 m/s to 20 m/s	0.070 m/sec 0.081 m/sec 0.13 m/sec 0.24 m/sec 0.25 m/sec	TESTO 435-2
Liquid Flow – Source	0.0 mL to 5.0 mL/h 5.0 mL to 25 mL/h 25 mL to 1000 mL/h	0.061 % + 9.3 µL/h 0.15 % + 5.0 µL/h 0.16 % + 1.1 µL/h	HARVARD PUMP
MASS DETERMINATION (20/M08)			
Metric	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g	6.6 µg 6.6 µg 6.6 µg 8.3 µg 10 µg 13 µg 16 µg 20 µg 26 µg 33 µg 40 µg 53 µg 66 µg 83 µg 0.10 mg	OIML Class E2

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	100 g 200 g 500 g 1 kg 2 kg 5 mg to 12 kg 5 kg 10 kg 20 kg	0.16 mg 0.33 mg 0.83 mg 1.6 mg 3.3 mg 0.00053 % + 0.2 mg 26 mg 53 mg 0.10 g	 OIML Class F1
ACOUSTIC (20/M10)			
Sound Level Meters	94 dB, 1 kHz 114 dB, 1 kHz	1.1 dB 0.86 dB	Center 326 Sound Level Calibrator
VOLUME and DENSITY (20/M12)			
Volume	1.0 µL to 10 µL 10 µL to 100 µL 0.1 mL to 1.0 mL 1.0 mL to 10 mL 10 mL to 100 mL 100 mL to 1.0 L 1.0 L to 6.0 L	6.8 nL 7.3 nL 26 nL 27 µL 67 µL 6.3 µL/L + 28 µL 1.6 µL/L + 27 µL	Gravimetric Method
Volume – Gas Flow Analyzers	20 µL to 100 mL 100 mL to 1000 mL 1000 mL to 3000 mL	0.059 % + 20 µL 0.082 % + 15 µL 0.096 % - 0.12 mL	Syringe
WEIGHING INSTRUMENTS (20/M16)			
Balance / Scale Calibration Field calibrations Available Note 4	0.0 g to 6.1 g 0.0 to 21 g 0.0 to 300 g 0.0 g to 1000 g	0.00060 % 0.00020 % 0.000074 % 0.00021 %	OIML Class E2 Mass OIML Class F1 Mass

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	0.0 g to 10 kg 0.0 g to 30 kg 0.0 g to 100 kg 0.0 g to 250 kg 0.0 g to 500 kg	0.0018 % 0.0012 % 0.0084 % 0.0068 % 0.0084 %	OIML Class M1 Mass
THERMODYNAMIC			
HUMIDITY (20/T02)			
Relative Humidity	10 % RH to < 80 % RH > 80 % RH to 90 % RH	0.81 % RH 0.86 % RH	Environmental Chamber
THERMOMETERS, DIGITAL and ANALOG (20/T03)			
Temperature – Source Note 4	-80 °C to < -40.0 °C -40 °C to < -20.0 °C -20 °C to < 0.0 °C 0.0 °C > 0.0 °C to 50 °C > 50 °C to 100 °C > 100 °C to 150 °C > 150 °C to 200 °C > 200 °C to 250 °C > 250 °C to 300 °C > 300 °C to 400 °C > 400 °C to 600 °C > 600 °C to 660.323 °C	0.0052 °C 0.0043 °C 0.0040 °C 0.0040 °C 0.0054 °C 0.0072 °C 0.0088 °C 0.0092 °C 0.0091 °C 0.0099 °C 0.014 °C 0.013 °C 0.017 °C	Fluke 5628 w/ 1586A and precision baths and Dry Block
	-80 °C to < -60.0 °C -60 °C to < -40.0 °C -40 °C to < -20.0 °C -20 °C to ≤ 0.0 °C 0.0 °C > 0.0 °C to 50 °C > 50 °C to 100 °C > 100 °C to 150 °C	0.0043 °C 0.0033 °C 0.0032 °C 0.0030 °C 0.0029 °C 0.0032 °C 0.0053 °C 0.0064 °C	Fluke 5698 w/ 1595A and precision baths and Dry Block

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	> 150 °C to 200 °C > 200 °C to 250 °C > 250 °C to 300 °C > 300 °C to 400 °C > 400 °C to 500 °C > 500 °C to 600 °C > 600 °C to 660.323 °C	0.0064 °C 0.0066 °C 0.0072 °C 0.0097 °C 0.0099 °C 0.0099 °C 0.013 °C	
Temperature –Measure Note 4	-196 °C to < 0 °C 0.0 °C to 50 °C > 150 °C to 300 °C > 300 °C to 600 °C > 600 °C to 660 °C	0.0079 ºC 0.0079 ºC 0.0093 ºC 0.012 ºC 0.015 ºC	Fluke 5628 w/ 1586A
Temperature	2 °C to < 10 °C 10 °C to 40 °C > 40 °C to 50 °C	0.064 °C 0.055 °C 0.072 °C	Environmental Chamber
IR Temperature	-20 °C to 0 °C > 0 °C to 100 °C > 100 °C to 500 °C	0.99 °C 0.45 % + 0.65 °C 0.96 %	Fluke 1586A and black plate
RESISTANCE THERMOMETRY (20/T07)			
Calibration by Fixed Point	0.01 °C	0.0011 °C (1.1 mK)	Fluke 5901D-Q
Calibration by Comparison	-80 °C to < -38.83 °C -38. 83 °C to < 0.01 °C > 0.01 °C to 29.76 °C > 29.76 °C to 156.60 °C > 156.60 °C to 231.93 °C > 231.93 °C to 419.53 °C > 419.53 °C to < 660.32 °C	0.0040 °C 0.0030 °C 0.0032 °C 0.0049 °C 0.0045 °C 0.0097 °C 0.010 °C	Fluke 5698 w/ 1595A and precision baths and Dry Block

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
PRESSURE (20/T05)			
Vacuum – Measure Field Calibrations Available Note 4	-15 psi to < 0 psi -2 psi to < -1 psi -1 psi to < 0 psi	-0.0043 % - 0.000022 psi -0.0012 % + 0.0000056 psi -0.00051 % + 0.000012 psi	Mensor Vacuum Sensor
	-10 psi to < 0 psi	-0.0016 % + 0.00039 psi	Fluke 2700G
Gage Pressure – Measure Field Calibrations Available Note 4	0 psi to 1 psi > 1 psi to 2 psi > 2 psi to 10 psi > 10 psi to 15 psi > 15 psi to 50 psi > 50 psi to 75 psi > 75 psi to 100 psi > 100 psi to 150 psi	0.00067 % + 0.000012 psi 0.0012 % + 0.0000071 psi 0.0012 % + 0.000041 psi 0.0013 % + 0.000036 psi 0.0016 % - 0.000014 psi 0.00088 % + 0.00035 psi 0.0019 % - 0.00024 psi 0.0013 % + 0.00036 psi	Mensor Pressure Controller
	0 psi to 15 psi 0 psi to 30 psi 0 psi to 300 psi 0 psi to 500 psi 0 psi to 5000 psi 0 psi to 10000 psi	0.0038 % + 0.00039 psi 0.00027 % + 0.00092 psi 0.011 % - 0.0021 psi 0.0017 % + 0.027 psi 0.0021 % + 0.057 psi 0.0053 % + 0.33 psi	Fluke 2700G
	0 psi to 10 psi 0 psi to 100 psi	0.0010 psi 0.010 psi	Heise HQS-2
	-3 inH2O to 3 inH2O 0 inH2O to 300 inH2O -30 cmH2O to 30 cmH2O -150 mmHg to 150 cmH2O	0.00042 inH2O 0.010 inH2O 0.0013 cmH2O 0.0059 cmH2O	Heise HQS-1

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3,5	Remarks
	-14.5 psi to 0 psi	0.0040 %	Fluke DWT P3000 Series
	0 psi to 14.5 psi	0.0031 %	
	0 psi to 2000 psi	0.00344 %	
	0 psi to 500 psi	0.00374 %	
	0 psi to 10000 psi	0.0034 %	
Absolute Pressure	0.10 psia to 8 psia	0.00027 psia	Mensor Pressure Controller
	8 psia to 9 psia	0.00026 psia	
	9 psia to 12 psia	0.00026 psia	
	12 psia to 20 psia	0.00031 psia	
	20 psia to 25 psia	0.00034 psia	
	25 psia to 60 psia	0.00083 psia	
	60 psia to 85 psia	0.0010 psia	
	85 psia to 110 psia	0.0016 psia	
	110 psia to 160 psia	0.0023 psia	
Barometric Pressure	7 psia to 12 psia	0.00027 psia	Mensor Barometer
	12 psia to 17 psia	0.00028 psia	
END			

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of $k = 2$. However, laboratories may report a coverage factor different than $k = 2$ to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).
Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.
Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.
Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions.* However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.5 of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: Simulation of YSI thermistor probe's output at specified temperature points. This is a resistive measurement, temperature values provided at physiological values for the customer's convenience.

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Notes
Note 8: Simulation of Baxter Edwards, 93a-131-7f type catheter, Abbott and Utah catheters at selected liters per minute (L/min) values at two injectate temperature levels. This is a resistive measurement, L/min values provided at physiological values for the customer's convenience. **Note 9:** Simulation of a transducer output using the expected conversion factor of 20 mmHg per mV at an exciter voltage of 10 VDC. Although this is an electrical measurement in mV, the mmHg values are shown for the convenience of the customer at physiological values. The uncertainty is given in a range that relates nearly linear to the range shown in the range column. **Note 10:** This is a simple conversion to physiological values for the convenience of the customer. Many of the devices calibrated by the lab indicate heart rate per minute (Lat/min) and respirations per minute (Resp/min). It should be noted that Lat/min stands for "latido por minuto" which is the Spanish translation of beat per minute. **Note 11:** Measurement associated with measurement of electrosurgical analyzers only.