

CALIBRATION LABORATORIES

NVLAP LAB CODE 201065-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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



2024-10-10 through 2024-12-31

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NVLAP-02S (REV. 2011-08-16)

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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 |
|---|-------------------|-------------------|--|-------------|
| | 33 mA to < 330 mA | 10 Hz to 45 Hz | 0.14 % + 16 µA | Fluke 5730A |
| | | 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 | |
| | | 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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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

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



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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 |
|---|---------------------|-----------------------------------|--|--|
| Current Clamp Toroidal | 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 | |
| | 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 |



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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|---|--|--|--|
| AC Current Measure ^{note 4} | 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 | |
| | 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 μ A to 100 μ A | 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 μ A | 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 μ A 0.078 % + 0.31 μ A 0.16 % + 1.9 μ A | |
| | > 1 mA to 10 mA | 3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz | 0.27 % + 4.7 μ A 0.12 % + 4.7 μ A 0.27 % + 54 μ A | |
| | >10 mA to 100 mA | 3 Hz to 10 Hz 10 Hz to 5 kHz 5 kHz to 10 kHz | 0.23 % + 31 μ A 0.078 % + 31 μ A 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 μ A to 10 μ A | 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 | |

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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|-----------------------------|--|--|--------------------------------|
| | > 10 μ A to 100 μ A | 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 μ A | |
| | > 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 μ A 0.051 % + 0.50 μ A 0.072 % + 0.50 μ A 0.40 % + 1.0 μ A | |
| | >10 mA to 100 mA | 1 Hz to 2 kHz 2 Hz to 10 kHz 10 kHz to 30 kHz | 0.026 % + 5.0 μ A 0.050 % + 5.0 μ A 0.070 % + 5.0 μ A | |
| | > 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 μ A to 1 mA | 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 55 Hz | 0.017 % 82 μ A/A + 0.10 nA 67 μ A/A | Fluke 8588A and Fluke A40B |



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|---|-------------------|-----------------------------|--|---------|
| | 1 mA to 10 mA | 55 Hz to 400 Hz | 67 μ A/A | |
| | | 0.4 kHz to 1 kHz | 67 μ A/A | |
| | | 1 kHz to 10 kHz | 84 μ A/A | |
| | | 10 kHz to 20 kHz | 86 μ A/A | |
| | | 20 kHz to 30 kHz | 91 μ A/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 | |
| | | 10 Hz to 20 Hz | 0.016 % + 8.5 nA | |
| | 20 Hz to 40 Hz | 57 μ A/A + 15 nA | | |
| | 40 Hz to 55 Hz | 33 μ A/A + 7.8 nA | | |
| | 55 Hz to 400 Hz | 33 μ A/A + 7.8 nA | | |
| | 0.4 kHz to 1 kHz | 33 μ A/A + 7.8 nA | | |
| | 1 kHz to 10 kHz | 33 μ A/A + 7.8 nA | | |
| | 10 kHz to 20 kHz | 33 μ A/A + 7.8 nA | | |
| | 20 kHz to 30 kHz | 44 μ A/A + 17 nA | | |
| | 30 kHz to 50 kHz | 45 μ A/A + 16 nA | | |
| | 50 kHz to 70 kHz | 56 μ A/A + 72 nA | | |
| | 70 kHz to 100 kHz | 57 μ A/A + 72 nA | | |
| | 10 mA to 20 mA | 10 Hz to 20 Hz | 0.015 % + 0.15 μ A | |
| | | 20 Hz to 40 Hz | 51 μ A/A + 0.14 μ A | |
| | | 40 Hz to 55 Hz | 29 μ A/A + 86 nA | |
| | | 55 Hz to 400 Hz | 29 μ A/A + 86 nA | |
| | | 0.4 kHz to 1 kHz | 29 μ A/A + 86 nA | |
| | | 1 kHz to 10 kHz | 30 μ A/A + 86 nA | |
| | | 10 kHz to 20 kHz | 30 μ A/A + 85 nA | |
| | | 20 kHz to 30 kHz | 43 μ A/A + 62 nA | |
| | | 30 kHz to 50 kHz | 43 μ A/A + 61 nA | |
| | 50 kHz to 70 kHz | 57 μ A/A + 0.11 μ A | | |
| | 70 kHz to 100 kHz | 57 μ A/A + 0.11 μ A | | |
| 20 mA to 50 mA | 10 Hz to 20 Hz | 0.015 % + 0.26 μ A | | |
| | 20 Hz to 40 Hz | 52 μ A/A + 0.24 μ A | | |

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

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

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NVLAP-02S (REV. 2011-08-16)

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 | |
|---|-------------------|-------------------|--|---------|-------------------|
| | 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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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks | | |
|---|--|-------------------|--|---------|-------------------|-------------------------|
| | 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 | | | |
| | AC Current Measure <small>Note 11</small> | 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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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

| 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 (0.1 Ω Increments) | 0.054 % + 1.1 Ω | |
| | 10 MΩ to 100 MΩ | 0.29 % - 7.4 Ω | |
| | 100 MΩ to 1 GΩ | 0.29 % + 11 kΩ | |
| | 1 GΩ to 10 GΩ (10 MΩ Increments) | 0.55 % - 5.0 MΩ | |
| | 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 | Fluke 5730A | |
| 100 MΩ | 1.2 kΩ | | |
| 1 GΩ | 26 kΩ | | |
| 10 GΩ | 0.51 MΩ | | |
| 0.0 Ω | 4.0 μΩ | | |
| 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 |
|---|--------------------|--|-------------|
| Variable Resistance – Source | 100 Ω | 0.85 mΩ | Fluke 5522A |
| | 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 | |
| | 0 Ω to < 11 Ω | 31 μΩ/Ω + 0.78 mΩ | |
| | 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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| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|--|--|--|---|
| Resistive Simulation of Temperature Probes ^{Note 7} | > 1 kΩ to 10 kΩ | 78 μΩ/Ω + 78 mΩ | Fluke 8588A |
| | > 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 | |
| | > 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 | | |
| Fluke 8588A - HV | > 1 MΩ to 10 MΩ | 15 μΩ/Ω + 10 Ω | |
| | > 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 | |
| Fluke 8846A | 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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| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks | |
|---|---------------------------|--|-------------------|----------------------|
| Resistive Simulation of Cardiac Output at: ^{Note 8} 0 °C and 2 °C Injectate | 2.5 L/min (14.50 kΩ) | 0.0033 L/min (1.9 Ω) | Fluke 8846A | |
| | 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 | Fluke 5730A | |
| | 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 | | |
| | 0.22 mA to < 2.2 mA | 27 μA/A + 6.2 nA | | |
| | 2.2 mA to < 22 mA | 27 μA/A + 39 nA | Fluke 5730A/5725A | |
| | 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/52120A | | |
| 0.22 A to < 2.0 A | 0.012 % + 0.16 mA | | | |
| 2.0 A to < 20 A | 0.012 % + 1.6 mA | | | |



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| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|--------------------------|--|--|
| Current Clamp Non-Toroidal | 20 A to 100 A | 0.012 % + 9.3 mA | Fluke 5730A/5522A and 5500A Coil |
| | 0.33 mA to < 3.3 mA | 0.39 % + 0.16 μ A | |
| | 3.3 mA to < 33 mA | 0.38 % + 1.6 μ A | |
| | 33 mA to < 330 mA | 0.38 % + 16 μ A | |
| | 0.33 A to < 1.1 A | 0.38 % + 0.17 mA | |
| | 1.1 A to < 3.0 A | 0.39 % + 63 μ A | |
| | 3.0 A to < 11.0 A | 0.38 % + 2.1 mA | |
| | 11.0 A to < 20.0 A | 0.40 % + 1.9 mA | |
| Current Clamp Toroidal | 20.0 A to < 150 A | 0.36 % + 0.21 A | Fluke 5730A/52120A and 52120A/COIL 6KA |
| | 150 A to 1025 A | 0.39 % + 0.60 A | |
| | 0 A to 5000 A | 0.60 % + 0.79 A | |
| | 0.33 mA to < 3.3 mA | 0.38 % + 0.14 μ A | |
| | 3.3 mA to < 33 mA | 0.38 % + 1.4 μ A | |
| | 33 mA to < 330 mA | 0.38 % + 14 μ A | |
| | 0.33 A to < 1.1 A | 0.38 % + 0.16 mA | |
| | 1.1 A to < 3.0 A | 0.39 % + 56 μ A | |
| DC Current Measure ^{note 4} | 3.0 A to < 11.0 A | 0.38 % + 1.7 mA | Fluke 5730A/52120A and 52120A/COIL 6KA |
| | 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 | |
| | 0 μ A to 100 μ A | 0.039 % + 20 nA | |
| | > 0.1 mA to 1.0 mA | 0.039 % + 39 nA | |
| | > 1.0 mA to 10.0 mA | 0.039 % + 1.6 μ A | |
| > 10 mA to 100 mA | 0.039 % + 3.9 μ A | | |
| > 100 mA to 400 mA | 0.039 % + 16 μ A | Fluke 8846A | |
| > 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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|---|---------------------|--|-----------------------------|
| | > 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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| 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 $\mu\text{V/V} + 2.7 \mu\text{V}$ 19 $\mu\text{V/V} + 5.5 \mu\text{V}$ 19 $\mu\text{V/V} + 39 \mu\text{V}$ 29 $\mu\text{V/V} + 0.47 \text{ mV}$ 32 $\mu\text{V/V} + 7.8 \text{ mV}$ | 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 |
| Electrical Simulation of Blood Pressure ^{Note 9} | 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 $\mu\text{V/V} + 0.25 \mu\text{V}$ 2.8 $\mu\text{V/V} + 0.33 \mu\text{V}$ 2.8 $\mu\text{V/V} + 0.52 \mu\text{V}$ 4.1 $\mu\text{V/V} + 30 \mu\text{V}$ 4.3 $\mu\text{V/V} + 0.51 \text{ mV}$ | Fluke 8588A |
| | -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 $\mu\text{V/V} + 0.79 \mu\text{V}$ 8.5 $\mu\text{V/V} + 1.6 \mu\text{V}$ 9.3 $\mu\text{V/V} + 16 \mu\text{V}$ 14 $\mu\text{V/V} + 0.12 \text{ mV}$ 14 $\mu\text{V/V} + 1.2 \text{ mV}$ | 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 $\mu\text{V/V} + 0.39 \mu\text{V}$ 3.1 $\mu\text{V/V} + 0.62 \mu\text{V}$ 2.3 $\mu\text{V/V} + 2.3 \mu\text{V}$ 2.3 $\mu\text{V/V} + 3.9 \mu\text{V}$ 3.1 $\mu\text{V/V} + 39 \mu\text{V}$ 4.7 $\mu\text{V/V} + 0.39 \text{ mV}$ | 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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| 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 | Fluke 5730A |
| | 0.22 mV to < 2.2 mV | 10 Hz to 20 Hz | 0.021 % + 3.9 μV | |
| | | 20 Hz to 40 Hz | 81 μV/V + 3.9 μV | |
| | | 40 Hz to 20 kHz | 70 μV/V + 3.9 μV | |
| | | 20 kHz to 50 kHz | 0.018 % + 3.9 μV | |
| | | 50 kHz to 100 kHz | 0.042 % + 4.7 μV | |
| | | 100 kHz to 300 kHz | 0.093 % + 9.3 μV | |
| | | 300 kHz to 500 kHz | 0.12 % + 19 μV | |
| | 2.2 mV to < 22 mV | 500 kHz to 1 MHz | 0.24 % + 19 μV | |
| | | 10 Hz to 20 Hz | 0.021 % + 3.9 μV | |
| | | 20 Hz to 40 Hz | 81 μV/V + 3.9 μV | |
| | | 40 Hz to 20 kHz | 70 μV/V + 3.9 μV | |
| 22 V to < 220 mV | 20 kHz to 50 kHz | 0.018 % + 3.9 μV | | |
| | 50 kHz to 100 kHz | 0.042 % + 4.7 μV | | |
| | 100 kHz to 300 kHz | 0.093 % + 9.3 μV | | |
| | 300 kHz to 500 kHz | 0.12 % + 19 μV | | |
| | 500 kHz to 1 MHz | 0.24 % + 19 μV | | |
| | 10 Hz to 20 Hz | 0.021 % + 12 μV | | |
| | 20 Hz to 40 Hz | 81 μV/V + 6.2 μV | | |
| 0.22 V to < 2.2 V | 40 Hz to 20 kHz | 51 μV/V + 6.2 μV | | |
| | 20 kHz to 50 kHz | 0.011 % + 6.2 μV | | |
| | 50 kHz to 100 kHz | 0.029 % + 16 μV | | |
| | 100 kHz to 300 kHz | 0.054 % + 19 μV | | |
| | 300 kHz to 500 kHz | 0.12 % + 23 μV | | |
| | 500 kHz to 1 MHz | 0.22 % + 47 μV | | |
| | 10 Hz to 20 Hz | 0.021 % + 39 μV | | |
| | 20 Hz to 40 Hz | 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 |
|---|--------------------|------------------------|--|------------------|
| | 2.2 V to < 22 V | 40 Hz to 20 kHz | 36 μ V/V + 7.8 μ V | |
| | | 20 kHz to 50 kHz | 60 μ V/V + 9.3 μ V | |
| | | 50 kHz to 100 kHz | 75 μ V/V + 31 μ V | |
| | | 100 kHz to 300 kHz | 0.029 % + 78 μ V | |
| | | 300 kHz to 500 kHz | 0.085 % + 0.19 mV | |
| | | 500 kHz to 1 MHz | 0.14 % + 0.31 mV | |
| | | 10 Hz to 20 Hz | 0.021 % + 0.39 mV | |
| | 22 V to < 220 V | 20 Hz to 40 Hz | 78 μ V/V + 0.16 mV | |
| | | 40 Hz to 20 kHz | 36 μ V/V + 54 μ V | |
| | | 20 kHz to 50 kHz | 60 μ V/V + 93 μ V | |
| | | 50 kHz to 100 kHz | 75 μ V/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 | |
| | 220 V to 1100 V | 10 Hz to 20 Hz | 0.021 % + 3.9 mV | |
| 20 Hz to 40 Hz | | 78 μ V/V + 1.6 mV | | |
| 220 V to 750 V | 40 Hz to 20 kHz | 47 μ V/V + 0.54 mV | Fluke 5730A/5725A | |
| | 20 kHz to 50 kHz | 74 μ V/V + 0.93 mV | | |
| 220 V to 1100 V | 50 kHz to 100 kHz | 0.013 % + 2.3 mV | | |
| | 100 kHz to 300 kHz | 0.078 % + 16 mV | | |
| 220 V to 750 V | 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 μ V/V + 3.1 mV | | |
| | 30 kHz to 50 kHz | 0.028 % + 8.5 mV | | |
| 220 V to 1100 V | 50 kHz to 100 kHz | 0.10 % + 35 mV | | |
| | 40 Hz to 1 kHz | 62 μ V/V + 3.1 mV | | |
| | 1 kHz to 20 kHz | 97 μ V/V + 4.7 mV | | |
| | | 20 kHz to 30 kHz | | 0.028 % + 8.5 mV |



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| 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 | 0.27 % + 31 µV | Fluke 8846A |
| | | 10 Hz to 20 kHz | 0.047 % + 31 µV | |
| | | 20 kHz to 50 kHz | 0.093 % + 39 µV | |
| | | 50 kHz to 100 kHz | 0.47 % + 62 µV | |
| | | 100 kHz to 300 kHz | 3.1 % + 0.39 mV | |
| | > 0.1 V to 1.0 V | 5 Hz to 10 Hz | 0.27 % + 0.23 mV | |
| 10 Hz to 20 kHz | | 0.047 % + 0.23 mV | | |
| 20 kHz to 50 kHz | | 0.093 % + 0.39 mV | | |
| 50 kHz to 100 kHz | | 0.47 % + 0.62 mV | | |
| 100 kHz to 300 kHz | | 3.1 % + 3.9 mV | | |
| > 1.0 V to 10 V | 5 Hz to 10 Hz | 0.27 % + 2.3 mV | | |
| | 10 Hz to 20 kHz | 0.047 % + 2.3 mV | | |
| | 20 kHz to 50 kHz | 0.093 % + 3.9 mV | | |
| | 50 kHz to 100 kHz | 0.47 % + 6.2 mV | | |
| | 100 kHz to 300 kHz | 3.1 % + 39 mV | | |
| > 10 V to 100 V | 5 Hz to 10 Hz | 0.27 % + 23 mV | | |
| | 10 Hz to 20 kHz | 0.047 % + 23 mV | | |
| | 20 kHz to 50 kHz | 0.093 % + 39 mV | | |
| | 50 kHz to 100 kHz | 0.47 % + 62 mV | | |
| | 100 kHz to 300 kHz | 3.1 % + 0.39 V | | |
| > 100 V to 1000 V | 5 Hz to 10 Hz | 0.27 % + 0.17 V | | |
| | 10 Hz to 20 kHz | 0.047 % + 0.17 V | | |
| | 20 kHz to 50 kHz | 0.093 % + 0.29 V | | |
| | 50 kHz to 100 kHz | 0.47 % + 0.47 V | | |
| | 100 kHz to 300 kHz | 3.1 % + 2.9 V | | |
| > 1 kV to 10 kV 10 kV to 40 kV | 50/60 Hz | 3.9 % + 3.6 µV | Fluke 8846A and Fluke 80K-40 | |
| | 50/60 Hz | 3.9 % + 2.9 µV | | |



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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 | |

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

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| 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 % | | |

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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|--------------------|--------------------|--|---------|
| | > 2.2 V to 7 V | 500 kHz to 1 MHz | 0.070 % | |
| | | 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 | | |

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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|--------------------|--------------------|--|---------|
| Fluke 5790B/50 | > 220 V to 700 V | 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 | |
| | | 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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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks | | |
|---|--------------------|---------------------|--|---------|----------------------|---------------------|
| | > 7 mV to 22 mV | 2 MHz to 10 MHz | 0.41 % + 5.4 μ V | | | |
| | | 10 MHz to 20 MHz | 0.45 % + 5.2 μ V | | | |
| | | 20 MHz to 30 MHz | 0.48 % + 5.1 μ V | | | |
| | | 30 MHz to 50 MHz | 0.54 % + 4.8 μ V | | | |
| | > 22 mV to 70 mV | 10 Hz to 30 Hz | 10 Hz to 30 Hz | | 0.40 % + 9.9 μ V | |
| | | | 30 Hz to 120 Hz | | 0.39 % + 10 μ V | |
| | | | 120 Hz to 1.2 kHz | | 0.39 % + 10 μ V | |
| | | | 1.2 kHz to 120 kHz | | 0.39 % + 10 μ V | |
| | | | 120 kHz to 500 kHz | | 0.39 % + 10 μ V | |
| | | | 500 kHz to 1.2 MHz | | 0.39 % + 10 μ V | |
| | | | 1.2 MHz to 2 MHz | | 0.39 % + 10 μ V | |
| | | 2 MHz to 10 MHz | 2 MHz to 10 MHz | | 0.40 % + 9.9 μ V | |
| | | | 10 MHz to 20 MHz | | 0.41 % + 9.7 μ V | |
| | | | 20 MHz to 30 MHz | | 0.48 % + 8.7 μ V | |
| | | | 30 MHz to 50 MHz | | 0.60 % + 7.2 μ V | |
| | | | 10 Hz to 30 Hz | | 10 Hz to 30 Hz | 0.40 % + 23 μ V |
| | | | | | 30 Hz to 120 Hz | 0.39 % + 23 μ V |
| | 120 Hz to 1.2 kHz | 0.39 % + 23 μ V | | | | |
| | 1.2 kHz to 120 kHz | 0.39 % + 23 μ V | | | | |
| | 120 kHz to 500 kHz | 0.39 % + 23 μ V | | | | |
| | 500 kHz to 1.2 MHz | 500 kHz to 1.2 MHz | 0.39 % + 23 μ V | | | |
| 1.2 MHz to 2 MHz | | 0.39 % + 23 μ V | | | | |
| 2 MHz to 10 MHz | | 0.40 % + 23 μ V | | | | |
| 10 MHz to 20 MHz | | 0.40 % + 23 μ V | | | | |
| 20 MHz to 30 MHz | | 0.47 % + 20 μ V | | | | |
| 30 MHz to 50 MHz | | 0.60 % + 16 μ V | | | | |
| > 70 mV to 220 mV | | 10 Hz to 30 Hz | 0.32 % + 61 μ V | | | |
| | 30 Hz to 120 Hz | 0.31 % + 62 μ V | | | | |
| | 120 Hz to 1.2 kHz | 0.31 % + 62 μ V | | | | |
| | 1.2 kHz to 120 kHz | 0.31 % + 62 μ V | | | | |
| | 120 kHz to 500 kHz | 0.31 % + 62 μ V | | | | |



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| Measured Parameter or Device Calibrated | Range | Frequency Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|--------------------|--------------------|--|---------|
| | > 220 mV to 700 mV | 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 | |
| | | > 700 mV to 2.2 V | 10 Hz to 30 Hz | |
| | 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 | | |
| | > 2.2 V to 7 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 | | |

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

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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 |
|---|---------------------|-----------------|--|-------------|
| Capacitance – Measure | 100 nF to < 1000 nF | 100 Hz to 1 kHz | 0.019 % + 43 pF | Fluke 8588A |
| | 0.1 nF to 1.0 nF | 10 Hz to 10 kHz | 0.10 % + 1.0 pF | |
| | > 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 | |

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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 |
|---|-----------------|------------------------------------|--|---|
| | 10 mF to 100 mF | 12 Hz to 100 Hz 100 Hz to 1 kHz | 0.41 % - 31 μ F 0.16 % - 12 μ F | Charge technique using DC current source and sampling DMM |
| | 200 μ F | DC 54 μ A | 0.046 % | |
| | 300 μ F | DC 80 μ A | 0.046 % | |
| | 330 μ F | DC 90 μ A | 0.046 % | |
| | 700 μ F | DC 180 μ A | 0.046 % | |
| | 1 mF | DC 90.0 μ A | 0.046 % | |
| | 1.09 mF | DC 270.0 μ A | 0.046 % | |
| | 1.1 mF | DC 270.0 μ A | 0.046 % | |
| | 1.21 mF | DC 219.9 μ A | 0.046 % | |
| | 2 mF | DC 540.0 μ A | 0.046 % | |
| | 3 mF | DC 800.0 μ A | 0.046 % | |
| | 3.3 mF | DC 900.0 μ A | 0.046 % | |
| | 10 mF | DC 2.1999 mA | 0.046 % | |
| | 10.9 mF | DC 2.7 mA | 0.046 % | |
| | 12.1 mF | DC 5.5 mA | 0.046 % | |
| | 20 mF | DC 5.4 mA | 0.046 % | |
| | 30 mF | DC 8.0 mA | 0.046 % | |
| | 33 mF | DC 9.0 mA | 0.046 % | |
| | 100 mF | DC 45 mA | 0.046 % | |
| | 110 mF | DC 27 mA | 0.046 % | |
| LF INDUCTANCE (20/E11) | | | | |
| Inductance – Measure | 15 μ H | 1 kHz | 61 nH | IET 1689 |
| | 100 μ H | 1 kHz | 81 nH | |
| | 121 μ H | 1 kHz | 86 nH | |
| | 1 mH | 1 kHz | 0.29 μ H | |
| | 1.21 mH | 110 Hz | 2.1 μ H | |
| | 2 mH | 110 Hz | 2.5 μ H | |



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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 μ H | |
| | 5 mH | 110 Hz | 3.9 μ H | |
| | 10 mH | 110 Hz | 6.2 μ H | |
| | 12 mH | 110 Hz | 7.1 μ H | |
| | 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 |
| | | @ 45 Hz to 100 Hz | 0.63 % + 0.69 W | Fluke 5522A/ 5500A/Coil |
| | | @ 45 Hz to 100 Hz | 0.90 % + 10 W | Fluke 5522A/ 5730A/52120A and 52120A/COIL 6KA |

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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 | 0.079 ° | Fluke 5522A |
| | | 65 Hz to 500 Hz | 0.19 ° | |
| | | 500 Hz to 1 kHz | 0.39 ° | |
| | | 1 kHz to 5 kHz | 1.9 ° | |
| | | 5 kHz to 10 kHz | 3.9 ° | |
| | | 10 kHz to 30 kHz | 7.8 ° | |
| Phase – Measure | 0 ° to 360 ° | 5 Hz to 2 kHz 2 kHz to 5 kHz | 0.015 ° 0.067 ° | Clarke Hess 6000A |

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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 |
|---|-------|-------------------|--|---------|
| | | 5 kHz to 10 kHz | 0.067 ° | |
| | | 10 kHz to 50 kHz | 0.067 ° | |
| | | 50 kHz to 100 kHz | 0.067 ° | |
| | | 100 kHz to 1 MHz | 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 |
| 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 |

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|----------------------|--|---|
| WEIGHING INSTRUMENTS (20/M16) | | | |
| Balance / Scale Calibration Field calibrations Available <small>Note 4</small> | 0.0 g to 6.1 g | 0.00060 % | OIML Class E2 Mass |
| | 0.0 to 21 g | 0.00020 % | |
| | 0.0 to 300 g | 0.000074 % | |
| | 0.0 g to 1000 g | 0.00021 % | OIML Class F1 Mass |
| | 0.0 g to 10 kg | 0.0018 % | OIML Class M1 Mass |
| | 0.0 g to 30 kg | 0.0012 % | |
| | 0.0 g to 100 kg | 0.0084 % | |
| | 0.0 g to 250 kg | 0.0068 % | |
| 0.0 g to 500 kg | 0.0084 % | | |
| THERMODYNAMIC | | | |
| HUMIDITY (20/T02) | | | |
| Relative Humidity | 10 % RH to < 80 % RH | 0.81 % RH | Environmental Chamber |
| | > 80 % RH to 90 % RH | 0.86 % RH | |
| THERMOMETERS, DIGITAL and ANALOG (20/T03) | | | |
| Temperature – Source ^{Note 4} | -80 °C to < -40.0 °C | 0.0052 °C | Fluke 5628 w/ 1586A and precision baths and Dry Block |
| | -40 °C to < -20.0 °C | 0.0043 °C | |
| | -20 °C to < 0.0 °C | 0.0040 °C | |
| | 0.0 °C | 0.0040 °C | |
| | > 0.0 °C to 50 °C | 0.0054 °C | |
| | > 50 °C to 100 °C | 0.0072 °C | |
| | > 100 °C to 150 °C | 0.0088 °C | |
| | > 150 °C to 200 °C | 0.0092 °C | |
| | > 200 °C to 250 °C | 0.0091 °C | |
| | > 250 °C to 300 °C | 0.0099 °C | |
| | > 300 °C to 400 °C | 0.014 °C | |
| | > 400 °C to 600 °C | 0.013 °C | |
| > 600 °C to 660.323 °C | 0.017 °C | | |

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|---|------------------------|--|---|
| Temperature –Measure ^{Note 4} | -80 °C to < -60.0 °C | 0.0043 °C | Fluke 5698 w/ 1595A and precision baths and Dry Block |
| | -60 °C to < -40.0 °C | 0.0033 °C | |
| | -40 °C to < -20.0 °C | 0.0032 °C | |
| | -20 °C to ≤ 0.0 °C | 0.0030 °C | |
| | 0.0 °C | 0.0029 °C | |
| | > 0.0 °C to 50 °C | 0.0032 °C | |
| | > 50 °C to 100 °C | 0.0053 °C | |
| | > 100 °C to 150 °C | 0.0064 °C | |
| | > 150 °C to 200 °C | 0.0064 °C | |
| | > 200 °C to 250 °C | 0.0066 °C | |
| | > 250 °C to 300 °C | 0.0072 °C | |
| | > 300 °C to 400 °C | 0.0097 °C | |
| | > 400 °C to 500 °C | 0.0099 °C | |
| | > 500 °C to 600 °C | 0.0099 °C | |
| > 600 °C to 660.323 °C | 0.013 °C | | |
| Temperature | -196 °C to < 0 °C | 0.0079 °C | Fluke 5628 w/ 1586A |
| | 0.0 °C to 50 °C | 0.0079 °C | |
| | > 150 °C to 300 °C | 0.0093 °C | |
| | > 300 °C to 600 °C | 0.012 °C | |
| | > 600 °C to 660 °C | 0.015 °C | |
| Temperature | 2 °C to < 10 °C | 0.064 °C | Environmental Chamber |
| | 10 °C to 40 °C | 0.055 °C | |
| | > 40 °C to 50 °C | 0.072 °C | |
| IR Temperature | -20 °C to 0 °C | 0.99 °C | Fluke 1586A and black plate |
| | > 0 °C to 100 °C | 0.45 % + 0.65 °C | |
| | > 100 °C to 500 °C | 0.96 % | |
| 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 | 0.0040 °C | Fluke 5698 w/ 1595A and precision baths and |
| | -38.83 °C to < 0.01 °C | 0.0030 °C | |



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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks |
|--|--|---|---|
| | > 0.01 °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 | 0.0032 °C 0.0049 °C 0.0045 °C 0.0097 °C 0.010 °C | Dry Block |
| PRESSURE (20/T05) | | | |
| Vacuum – Measure Field Calibrations Available <small>Note 4</small> | -15 psi to < 0 psi -2 psi to < -1 psi -1 psi to < 0 psi -10 psi to < 0 psi | -0.0043 % - 0.000022 psi -0.0012 % + 0.0000056 psi -0.00051 % + 0.000012 psi -0.0016 % + 0.00039 psi | Mensor Vacuum Sensor Fluke 2700G |
| Gage Pressure – Measure Field Calibrations Available <small>Note 4</small> | 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 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 psi to 10 psi 0 psi to 100 psi -3 inH2O to 3 inH2O 0 inH2O to 300 inH2O -30 cmH2O to 30 cmH2O -150 mmHg to 150 cmH2O | 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 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 0.0010 psi 0.010 psi 0.00042 inH2O 0.010 inH2O 0.0013 cmH2O 0.0059 cmH2O | Mensor Pressure Controller Fluke 2700G Heise HQS-2 Heise HQS-1 |



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| Measured Parameter or Device Calibrated | Range | Expanded Uncertainty ^{Note 3,5} | Remarks | |
|---|----------------------|--|------------------------|----------------------------|
| Absolute Pressure | -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 % | | |
| | Barometric 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 | | |
| Barometric Pressure | 85 psia to 110 psia | 0.0016 psia | Mensor Barometer | |
| | 110 psia to 160 psia | 0.0023 psia | | |
| | | | | |
| END | | | | |

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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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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.

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