

I. Electrical DC/Low Frequency

| Parameters/Equipment | Range | Best Uncertainty ² (±) | Comments |
|----------------------|-----------------|-----------------------------------|---|
| DC Volts - Generate | 0 – 220 mV | 7.5 ppm + 0.4 μV | Fluke 5720A/03 ±(ppm of output + μV) |
| | 220 mV – 2.2 V | 5 ppm + 0.7 μV | |
| | 2.2 V - 11 V | 3.5 ppm + 2.5 μV | |
| | 11 – 22 V | 3.5 ppm + 4 μV | |
| | 22 V – 220 V | 5 ppm + 40 μV | |
| | 220 V – 1100 V | 6.5 ppm – 400 μV | |
| | 1.0 V | 2.5 ppm | Fluke 732A |
| | 1.018 V | 2.5 ppm | |
| | 10.0 V | 0.5 ppm | |
| 1100 V to 10 KV | 0.01 % | Fluke 410B/80E-10 | |
| DC Volts – Measure | 1 μV – 100 mV | 5 ppm + 3 ppm | HP 3458A/002 ±(ppm of rdg + ppm of range) (100 PLC) |
| | 100 mV – 1 V | 4 ppm + 0.3 ppm | |
| | 1 V – 10 V | 4 ppm + 0.05 ppm | |
| | 10 V – 100 V | 6 ppm + 0.3 ppm | |
| | 100 V – 1100 V | 6 ppm + 0.1 ppm | |
| | 11000 V – 10 kV | 0.01% | Fluke 80E-10/3458A |
| | 10 kV – 30 kV | 1% | Fluke 80K40/3458A |
| | 30 kV – 40 kV | 2% | |
| Electrostatic only | 1 KV – 40 kV | 1% | Sensitive Research ESH |

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| DC Current - Source | <p>1 μA – 220 μA</p> <p>220 μA – 2.2 mA</p> <p>2.2 mA – 22 mA</p> <p>22 mA – 220 mA</p> <p>220 mA – 2.2 A</p> <p>0 A – 10.9999 A</p> <p>11 A – 20.5 A</p> <p>20 A – 160 A</p> <p>20 to 1000A(Clamp-ons)</p> | <p>40 ppm + 6 nA</p> <p>35 ppm + 7 nA</p> <p>35 ppm + 40 nA</p> <p>45 ppm + 0.7 μA</p> <p>80 ppm + 12 μA</p> <p>500 ppm + 500 μA</p> <p>1000 ppm + 750 μA</p> <p>0.50% + 0.50A</p> | <p>Fluke 5720A/03 \pm(ppm of output + xA)</p> <p>Fluke 5520A \pm(ppm of output + μA)</p> <p>HP 6683A/ HP 3458A/ shunt</p> <p>Fluke 5520A/coil (% of output + Amps)</p> |
| DC Current - Measure | <p>100 nA</p> <p>1 μA</p> <p>10 μA</p> <p>100 μA</p> <p>1 mA</p> <p>10 mA</p> <p>100 mA</p> <p>1 A</p> <p>1 A – 1000A</p> | <p>30 ppm + 400 ppm</p> <p>20 ppm 40 ppm</p> <p>20 ppm + 10 ppm</p> <p>20 ppm + 8 ppm</p> <p>20 ppm + 5 ppm</p> <p>20 ppm + 5 ppm</p> <p>35 ppm + 5 ppm</p> <p>110 ppm 10 ppm</p> | <p>HP 3458A/002 \pm(ppm of rdg + ppm of range) (100 PLC)</p> <p>HP 3458A/002 w shunts</p> |

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| AC Voltage – Source | | | Fluke 5720A/03 ±(ppm of output + xV) |
| 0.2 mV – 2.2 mV | 10 Hz – 20 Hz | 240 ppm + 4 μV | |
| | 20 Hz – 40 Hz | 90 ppm + 4 μV | |
| | 40 Hz – 20 kHz | 80 ppm + 4 μV | |
| | 20 kHz – 50 kHz | 200 ppm + 4 μV | |
| | 50 kHz – 100 kHz | 500 ppm + 5 μV | |
| | 100 kHz – 300 kHz | 1050 ppm + 10 μV | |
| | 300 kHz – 500 kHz | 1400 ppm + 20 μV | |
| | 500 kHz – 1 MHz | 2700 ppm + 20 μV | |
| 2.2 mV – 22 mV | 10 Hz – 20 Hz | 240 ppm + 4 μV | |
| | 20 Hz – 40 Hz | 90 ppm + 4 μV | |
| | 40 Hz – 20 kHz | 80 ppm + 4 μV | |
| | 20 kHz – 50 kHz | 200 ppm + 4 μV | |
| | 50 kHz – 100 kHz | 500 ppm + 5 μV | |
| | 100 kHz – 300 kHz | 1050 ppm + 10 μV | |
| | 300 kHz – 500 kHz | 1400 ppm + 20 μV | |
| | 500 kHz – 1 MHz | 2700 ppm + 20 μV | |
| 22 mV – 220 mV | 10 Hz – 20 Hz | 240 ppm + 4 μV | |
| | 20 Hz – 40 Hz | 90 ppm + 4 μV | |
| | 40 Hz – 20 kHz | 80 ppm + 4 μV | |
| | 20 kHz – 50 kHz | 200 ppm + 4 μV | |
| | 50 kHz – 100 kHz | 500 ppm + 5 μV | |
| | 100 kHz – 300 kHz | 1050 ppm + 10 μV | |
| | 300 kHz – 500 kHz | 1400 ppm + 20 μV | |
| | 500 kHz – 1 MHz | 2700 ppm + 20 μV | |
| 220 mV – 2.2 V | 10 Hz – 20 Hz | 240 ppm + 40 μV | |
| | 20 Hz – 40 Hz | 90 ppm + 15 μV | |
| | 40 Hz – 20 kHz | 45 ppm + 8 μV | |
| | 20 kHz – 50 kHz | 75 ppm + 10 μV | |
| | 50 kHz – 100 kHz | 110 ppm + 30 μV | |

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| 2.2 V – 22 V | 100 kHz – 300 kHz | 420 ppm+ 80 μ V | |
| | 300 kHz – 500 kHz | 1000 ppm + 200 μ V | |
| | 500 kHz – 1 MHz | 1700 ppm + 300 μ V | |
| | 10 Hz – 20 Hz | 240 ppm + 400 μ V | |
| | 20 Hz – 40 Hz | 90 ppm + 150 μ V | |
| | 40 Hz – 20 kHz | 45 ppm + 50 μ V | |
| | 20 kHz – 50 kHz | 75 ppm + 100 μ V | |
| | 50 kHz – 100 kHz | 100 ppm + 200 μ V | |
| | 100 kHz – 300 kHz | 275 ppm + 600 μ V | |
| 22 V – 220 V | 300 kHz – 500 kHz | 1000 ppm + 2000 μ V | |
| | 500 kHz – 1 MHz | 1500 ppm + 3200 μ V | |
| | 10 Hz – 20 Hz | 240 ppm + 4 mV | |
| | 20 Hz – 40 Hz | 90 ppm + 1.5 mV | |
| | 40 Hz – 20 kHz | 52 ppm + 0.6 mV | |
| | 20 kHz – 50 kHz | 80 ppm + 1 mV | |
| | 50 kHz – 100 kHz | 150 ppm + 2.5 mV | |
| | 100 kHz – 300 kHz | 900 ppm + 16 mV | |
| 220V – 1100 V | 300 kHz – 500 kHz | 4400 ppm+ 40mV | |
| | 500 kHz – 1 MHz | 8000 ppm + 80 mV | |
| | 15 Hz – 50 Hz | 300 ppm – 16 mV | |
| | 50 Hz – 1 kHz | 70 ppm – 3.5 mV | |

| AC Voltage - Measure | | | |
|----------------------|-------------------|-----------------|---|
| 3 μ V – 10 mV | 1 Hz – 40 Hz | 0.03% + 0.03% | HP 3458A/002 \pm (% of rdg + % of rng) (Synchronous Sub-sampled Mode) |
| | 40 Hz – 1 KHz | 0.02% + 0.011% | |
| | 1 KHz – 20 KHz | 0.03% + 0.011% | |
| | 20 KHz – 50 KHz | 0.1% + 0.002% | |
| | 50 KHz – 100 KHz | 0.5% + 0.011% | |
| | 100 KHz – 300 KHz | 4.0% + 0.02% | |
| 10 mV – 100 mV | 1 Hz – 40 Hz | 0.007% + 0.004% | |
| | 40 Hz – 1 KHz | 0.007% + 0.002% | |
| | 1 KHz – 20 KHz | 0.014% + 0.002% | |
| | 20 KHz – 50 KHz | 0.03% + 0.002% | |
| | 50 KHz – 100 KHz | 0.08% + 0.002% | |
| | 100 KHz – 300 KHz | 0.3% + 0.01% | |
| | 300 KHz – 1 MHz | 1% + 0.01% | |
| | 1 MHz – 2 MHz | 1.5% + 0.01% | |
| 100 mV – 1 V | 1 Hz – 40 Hz | 0.007% + 0.004% | |
| | 40 Hz – 1 KHz | 0.007% + 0.002% | |
| | 1 KHz – 20 KHz | 0.014% + 0.002% | |
| | 20 KHz – 50 KHz | 0.03% + 0.002% | |
| | 50 KHz – 100 KHz | 0.08% + 0.002% | |
| | 100 KHz – 300 KHz | 0.3% + 0.01% | |
| | 300 KHz – 1 MHz | 1% + 0.01% | |
| | 1 MHz – 2 MHz | 1.5% + 0.01% | |
| 1V – 10 V | 1 Hz – 40 Hz | 0.007% + 0.004% | |
| | 40 Hz – 1 KHz | 0.007% + 0.002% | |
| | 1 KHz – 20 KHz | 0.014% + 0.002% | |
| | 20 KHz – 50 KHz | 0.03% + 0.002% | |
| | 50 KHz – 100 KHz | 0.08% + 0.002% | |
| | 100 KHz – 300 KHz | 0.3% + 0.01% | |
| | 300 KHz – 1 MHz | 1% + 0.01% | |
| | 1 MHz – 2 MHz | 1.5% + 0.01% | |

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| 10 V – 100 V | 1 MHz – 2 MHz | 1.5% + 0.01% | | |
| | 1 Hz – 40 Hz | 0.02% + 0.004% | | |
| | 40 Hz – 1 KHz | 0.02% + 0.002% | | |
| | 1 KHz – 20 KHz | 0.02% + 0.002% | | |
| | 20 KHz – 50 KHz | 0.035% + 0.002% | | |
| | 50 KHz – 100 KHz | 0.12% + 0.002% | | |
| | 100 KHz – 300 KHz | 0.4% + 0.01% | | |
| | 300 KHz – 1 MHz | 1.5% + 0.01% | | |
| | 100 V – 1000 V | 1 Hz – 40 Hz | | 0.04% + 0.004% |
| | | 40 Hz – 1 KHz | | 0.04% + 0.002% |
| | | 1 KHz – 20 KHz | | 0.06% + 0.002% |
| | | 20 KHz – 50 KHz | | 0.12% + 0.002% |
| | | 50 KHz – 100 KHz | | 0.3% + 0.002% |
| | AC Voltage - Flatness Measure | | | |
| 1 V | 10 MHz | + 0.03% | Ballantine 1395B-1 | |
| 3 V | 10 MHz | -0.009% | Ballantine 1395A-3 | |
| | 30 MHz | +0.056% | | |
| | 50 MHz | +0.387% | | |
| | 70 MHz | +0.527% | | |
| | 100 MHz | -0.118% | | |
| AC Current - Source | | | | |
| 1 nA – 220 μA | 10 Hz – 20 Hz | 250 ppm + 16 nA | Fluke 5720A/03 ±(ppm of output + xA) | |
| | 20 Hz – 40 Hz | 160 ppm + 10 nA | | |
| | 40 Hz – 1 kHz | 120 ppm + 8 nA | | |
| | 1 kHz – 5 kHz | 280 ppm + 12 nA | | |
| | 5 kHz – 10 kHz | 1100 ppm + 65 nA | | |
| 220 μA – 2.2 mA | 10 Hz – 20 Hz | 250 ppm + 40 nA | | |

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| 2.2 mA – 22 mA | 20 Hz – 40 Hz | 160 ppm + 35 nA | |
| | 40 Hz – 1 kHz | 120 ppm + 35 nA | |
| | 1 kHz – 5 kHz | 200 ppm + 110 nA | |
| | 5 kHz – 10 kHz | 1100 ppm + 650 nA | |
| | 10 Hz – 20 Hz | 250 ppm + 400 nA | |
| | 20 Hz – 40 Hz | 160 ppm + 350 nA | |
| | 40 Hz – 1 kHz | 120 ppm + 350 nA | |
| | 1 kHz – 5 kHz | 200 ppm + 550 nA | |
| | 5 kHz – 10 kHz | 1100 ppm + 5000 nA | |
| | 22 mA – 220 mA | 10 Hz – 20 Hz | |
| 20 Hz – 40 Hz | | 160 ppm + 3.5 uA | |
| 40 Hz – 1 kHz | | 120 ppm + 2.5 uA | |
| 1 kHz – 5 kHz | | 200 ppm + 3.5 uA | |
| 5 kHz – 10 kHz | | 1100 ppm + 10 uA | |
| 220 mA – 2.2 A | 20 Hz – 1 kHz | 260 ppm + 36 uA | |
| | 1 kHz – 5 kHz | 450 ppm + 80 uA | |
| | 5 kHz – 10 kHz | 7000 ppm + 160 uA | |
| 2.2 A – 3 A | 40 Hz – 1 kHz | 0.06% + 1000 uA | Fluke 5520A ±(% of output + uA) |
| 3 A – 11 A | 40 Hz – 1 kHz | 3% - 2000 uA | |
| 11 A – 20 A | 40 Hz – 1 kHz | 3% + 3000 uA | |
| 20 – 1000 A (Clamp-ons) | 45 Hz – 65 Hz | 0.56% + 0.70 A | Fluke 5520A/coil (% of output + Amps) |
| | 65 Hz – 440 Hz | 1.0% + 0.9 A | |
| AC Current - Measure | | | |
| 10 uA – 100 uA | 10 Hz – 20 Hz | 0.4% + 0.02 % | HP 3458A/02 ±(% of rdg + % of mg) |
| | 20 Hz – 45 Hz | 0.15% + 0.02 % | |
| | 45 Hz – 100 Hz | 0.06% + 0.023 % | |
| | 100 Hz – 1kHz | 0.06% + 0.02 % | |

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| 100 μ A – 1 mA | 10 Hz – 20 Hz | 0.4% + 0.02 % | |
| | 20 Hz – 45 Hz | 0.15% + 0.02 % | |
| | 45 Hz – 100 Hz | 0.06% + 0.02 % | |
| | 100 Hz – 5kHz | 0.03% + 0.02 % | |
| | 5 kHz – 20 kHz | 0.06% + 0.02 % | |
| | 20 kHz – 50 kHz | 0.4 % + 0.04 % | |
| | 50 kHz – 100 kHz | 0.55 % + 0.15 % | |
| 1 mA – 10 mA | 10 Hz – 20 Hz | 0.4% + 0.02 % | |
| | 20 Hz – 45 Hz | 0.15% + 0.02 % | |
| | 45 Hz – 100 Hz | 0.06% + 0.02 % | |
| | 100 Hz – 5kHz | 0.03% + 0.02 % | |
| | 5 kHz – 20 kHz | 0.06% + 0.02 % | |
| | 20 kHz – 50 kHz | 0.4 % + 0.04 % | |
| | 50 kHz – 100 kHz | 0.55 % + 0.15 % | |
| 10 mA – 100 mA | 10 Hz – 20 Hz | 0.4% + 0.02 % | |
| | 20 Hz – 45 Hz | 0.15% + 0.02 % | |
| | 45 Hz – 100 Hz | 0.06% + 0.02 % | |
| | 100 Hz – 5kHz | 0.03% + 0.02 % | |
| | 5 kHz – 20 kHz | 0.06% + 0.02 % | |
| | 20 kHz – 50 kHz | 0.4 % + 0.04 % | |
| | 50 kHz – 100 kHz | 0.55 % + 0.15 % | |
| 100 mA – 1 A | 10 Hz – 20 Hz | 0.4% + 0.02% | |
| | 20 Hz – 45 Hz | 0.16% + 0.02% | |
| | 45 Hz – 100 Hz | 0.08% + 0.02 % | |
| | 100 Hz – 5kHz | 0.1 % + 0.02 % | |
| | 5 kHz – 20 kHz | 0.3 % + 0.02 % | |
| | 20 kHz – 50 kHz | 1 % + 0.04 % | |

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| DC Resistance - Source | | | |
| Variable | 0 – 10.9999 Ω | 40 ppm + 0.001 Ω | Fluke 5520A ±(ppm of output + floor) with-in 12 hrs & 1°C since zero cal |
| | 11 – 32.9999 Ω | 30 ppm + 0.0015 Ω | |
| | 33 – 109.9999 Ω | 28 ppm + 0.0014 Ω | |
| | 110 – 329.9999 kΩ | 28 ppm + 0.002 Ω | |
| | 330 – 1.099999 kΩ | 28 ppm + 0.002 Ω | |
| | 1.1 – 3.299999 kΩ | 28 ppm + 0.02 Ω | |
| | 3.3 – 10.99999 kMΩ | 28 ppm + 0.02 Ω | |
| | 11 – 32.99999 kΩ | 28 ppm + 0.2 Ω | |
| | 33 – 109.9999 kΩ | 28 ppm + 0.2 Ω | |
| | 110 – 329.9999 kΩ | 32 ppm + 2 Ω | |
| | 330 – 1.099999 MΩ | 32 ppm + 2 Ω | |
| | 1.1 – 3.299999 MΩ | 60 ppm 30 Ω | |
| | 3.3 – 10.99999 MΩ | 130 ppm + 50 Ω | |
| | 11 – 32.99999 MΩ | 250 ppm + 2500 Ω | |
| | 33 – 109.9999 MΩ | 500 ppm + 3000 Ω | |
| | 110 – 329.9999 MΩ | 3000 ppm + 100000 Ω | |
| 330 – 1100 MΩ | 15000 ppm + 500000 Ω | | |
| Source – Fixed | 0.001 Ω | ± 20 ppm | L&N 4223 |
| | 0.01 Ω | ± 12 ppm | L&N 4222 |
| | 0.1 Ω | ± 9 ppm | L&N 4221 |
| | 1 Ω | 95 ppm | Fluke 5720A/03 ±(ppm of characterized value) |
| | 1.9 Ω | 95 ppm | |
| | 10 Ω | 23 ppm | |
| | 19 Ω | 23 ppm | |
| | 100 Ω | 10 ppm | |
| | 190 Ω | 10 ppm | |
| | 1 kΩ | 8.5 ppm | |
| | 1.9 kΩ | 8.5 ppm | |
| | 10 kΩ | 8.5 ppm | |
| | 19 kΩ | 8.5 ppm | |
| 100 kΩ | 11 ppm | | |

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| 1 k Ω | 2 MHz | 0.15% | |
| | 3 MHz | 0.20 % | |
| | 4 MHz | 0.25% | |
| | 5 MHz | 0.4% | |
| | 10 MHz | 1.0% | |
| | 13 MHz | 1.5% | |
| | 100 kHz | 0.12% | |
| | 1 MHz | 0.08% | |
| | 2 MHz | 0.10% | |
| | 3 MHz | 0.10 % | |
| | 4 MHz | 0.15% | |
| | 5 MHz | 0.15% | |
| | 10 MHz | 0.4% | |
| | 13 MHz | 0.6% | |
| 10 k Ω | 100 kHz | 0.08% | |
| | 1 MHz | 0.08% | |
| 100 k Ω | 100 kHz | 0.08% | |
| | 1 MHz | 0.1.2% | |
| Capacitance - Source | | | Fluke 5520A \pm (% of output + floor) |
| Variable | 0.19 – 0.3999 nF | 0.5 + 0.01 nF | |
| | 0.4 – 1.0999 nF | 0.5 + 0.01 nF | |
| | 1.1 – 3.2999 nF | 0.5 + 0.01 nF | |
| | 3.3 nF – 10.9999 nF | 0.25 + 0.01 nF | |
| | 11 nF – 32.9999 nF | 0.25 + 0.1 nF | |
| | 33 nF – 109.999 nF | 0.25 + 0.1 nF | |
| | 110 nF – 329.999 nF | 0.25 + 0.3 nF | |
| | 0.33 μ F – 1.09999 μ F | 0.25 + 1 nF | |
| | 1.1 μ - 3.29999 μ F | 0.25 + 3 nF | |
| | 3.3 μ F – 10.9999 μ F | 0.25 + 10 nF | |

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| Fixed | 11 μF – 32.9999 μF | 0.40 + 30 nF | HP 1638XX \pm (% of actual value) |
| | 33 μF – 109.9999 μF | 0.45 + 100 nF | |
| | 110 μF – 329.999 μF | 0.45 + 300 nF | |
| | 0.33 μF – 1.09999 mF | 0.45 + 1 μF | |
| | 1.1 mF – 3.29999 mF | 0.45 + 3 μF | |
| | 3.3 mF – 10.9999 mF | 0.45 + 10 μF | |
| | 11 mF – 32.9999 mF | 0.75 + 30 μF | |
| | 33 mF – 110 mF | 1.1 + 100 μF | |
| 1 pF | 100 Hz – 1 kHz | 0.01% | |
| | 1 kHz – 1 MHz | 0.05% | |
| | 1 – 2 MHz | 0.06% | |
| | 2 – 3 MHz | 0.10% | |
| | 3 – 4 MHz | 0.20% | |
| | 4 – 5 MHz | 0.3% | |
| | 5 – 10 MHz | 1.0% | |
| | 10 – 13 MHz | 1.5% | |
| 10 pF, 100 pF | 100 Hz – 1 kHz | 0.01% | |
| | 1 kHz – 1 MHz | 0.025% | |
| | 1 – 2 MHz | 0.025% | |
| | 2 – 3 MHz | 0.03% | |
| | 3 – 4 MHz | 0.04% | |
| | 4 – 5 MHz | 0.06% | |
| | 5 – 10 MHz | 0.15% | |
| | 10 – 13 MHz | 0.2% | |
| 1000 pF | 100 Hz – 1 kHz | 0.01% | |
| | 1 kHz – 1 MHz | 0.05% | |
| | 1 – 2 MHz | 0.06% | |
| | 2 – 3 MHz | 0.10% | |
| | 3 – 4 MHz | 0.15% | |

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| | 4 – 5 MHz | 0.2% | GenRad 1417 |
| | 5 – 10 MHz | 0.5% | |
| | 10 – 13 MHz | 0.7% | |
| 10 nF | 0.12 KHz | 0.025% | |
| | 1 kHz | 0.01% | |
| | 10 kHz | 0.025% | |
| | 100 kHz | 0.05% | |
| 100 nF | 0.12 kHz | 0.025% | |
| | 1 kHz | 0.01% | |
| | 10 kHz | 0.025% | |
| | 100 kHz | 0.05% | |
| 1 μ F | 0.12 kHz | 0.04% | |
| | 1 kHz | 0.01% | |
| | 10 kHz | 0.04% | |
| | 100 kHz | 0.1% | |
| 10 μ F | 100 & 120 Hz | 0.02% | |
| | 1 kHz | 0.04% | |
| 100 μ F | 100 & 120 Hz | 0.02% | |
| | 1 kHz | 0.04% | |
| 1 mF | 100 & 120 Hz | 0.02% | |
| | 1 kHz | 0.06% | |
| 10 mF | 100 & 120 Hz | 0.03% | |
| | 1 kHz | 0.2% | |
| 100 mF | 100 & 120 Hz | 0.1% | |

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| 1 F | 100 & 120 Hz | 0.25% | |
| Inductance - Source | 100 μ H - 1mH 1 mH – 10 mH 10 mH – 100 mH 100 mH – 1 H 1 H – 10 H | $\pm 2\%$ $\pm 2\%$ $\pm 1.6\%$ $\pm 0.8\%$ $\pm 0.8\%$ | GenRad 1491G $\pm(\%$ of dialed value) |
| DC Power - Source | 33 mV – 1020 V 0.33 – 330 mA 33 mV – 1020 V 330 mA – 3 A 33 mV – 1020 V 3 – 20.5 A | ± 0.023 W ± 0.022 W ± 0.07 W | Fluke 5520A $\pm(\%$ of watts output) |
| Oscilloscopes Amplitude 0 V to ± 6.6 V 0 V to ± 130 V ± 1 mV to ± 6.6 Vp-p ± 1 mV to ± 130 Vp-p | DC - 50 Ω DC - 1 M Ω Square Wave - 50 Ω 10 Hz – 10 kHz Square Wave – 1 M Ω 10 Hz – 10 kHz | 0.25% + 40 μ V 0.05% + 40 μ V 0.25% + 40 μ V 0.1% + 40 μ V | Fluke 5520A w/ SC1100 $\pm(\%$ of output + floor) |
| Edge Characteristics 5 mV – 2.5 V | 1 KHz – 10 MHz <2 MHz: ≤ 300 ps >2 MHz: ≥ 350 ps | + 0 ps/ -100 ps | Fluke 5520A w/SC1100 $\pm(\%$ of output + floor) |
| Leveled Sine wave Amplitude 5 mV to 5.5 Vp-p Flatness Relative to | 50 kHz Reference 50 kHz – 100 MHz 100 MHz – 300 MHz | N/A 1.5% + 100 μ V 2% + 100 μ V | Fluke 5520A w/ SC1100 $\pm(\%$ of output + floor) |

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| 50 KHz | 300 MHz – 600 MHz 600 MHz – 1100 MHz | 4% + 100 μ V 5% + 100 μ V | |
| Time Markers into 50 Ω | 5 S – 50 mS 20 mS – 100 nS 50 nS – 20 nS 10 nS 5 nS – 1 nS | 25 ppm + t*1000 ppm 2.5 ppm 2.5 ppm 2.5 ppm 2.5 ppm | Fluke 5520A w/SC1100 \pm (% of output + floor) (t is the time in seconds) |
| RTD – Simulation Pt 385, 100 Ω | -200°C to -80°C -80°C to 0°C 0°C to 100°C 100°C to 300°C 300°C to 400°C 400°C to 630°C 630°C to 800°C | 0.05 0.05 0.07 0.09 0.10 0.12 0.23 | Fluke 5520A (\pm °C) |
| Pt 3926, 100 Ω | -200°C to -80°C -80°C to 0°C 0°C to 100°C 100°C to 300°C 300°C to 400°C 400°C to 630°C | 0.05 0.05 0.07 0.09 0.10 0.12 | |
| Pt 3916, 100 Ω | -200°C to -190°C -190°C to -80°C -80°C to 0°C 0°C to 100°C 100°C to 260°C 260°C to 300°C 300°C to 400°C 400°C to 600°C 600°C to 630°C | 0.25 0.04 0.05 0.06 0.07 0.08 0.09 0.10 0.23 | |

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| Pt 385, 200 Ω | -200°C to -80°C | 0.04 | |
| | -80°C to 0°C | 0.04 | |
| | 0°C to 100°C | 0.04 | |
| | 100°C to 260°C | 0.05 | |
| | 260°C to 300°C | 0.12 | |
| | 300°C to 400°C | 0.13 | |
| | 400°C to 600°C | 0.14 | |
| | 600°C to 630°C | 0.16 | |
| Pt 385, 500 Ω | -200°C to -80°C | 0.04 | |
| | -80°C to 0°C | 0.05 | |
| | 0°C to 100°C | 0.05 | |
| | 100°C to 260°C | 0.06 | |
| | 260°C to 300°C | 0.08 | |
| | 300°C to 400°C | 0.08 | |
| | 400°C to 600°C | 0.09 | |
| | 600°C to 630°C | 0.11 | |
| Pt 385, 1000 Ω | -200°C to -80°C | 0.03 | |
| | -80°C to 0°C | 0.03 | |
| | 0°C to 100°C | 0.04 | |
| | 100°C to 260°C | 0.05 | |
| | 260°C to 300°C | 0.06 | |
| | 300°C to 400°C | 0.07 | |
| | 400°C to 600°C | 0.07 | |
| | 600°C to 630°C | 0.23 | |
| PtNi 385, 120 Ω | -80°C to 100°C | 0.08 | |
| | 100°C to 260°C | 0.08 | |
| | -100°C to 260°C | 0.14 | |
| Cu 427, 10 Ω | -100°C to 260°C | 0.3 | |

II. Electrical High Frequency

| | | | |
|--|--|--|---------------------------------|
| RF Power - Measure 50 MHz 50Ω only 1 GHz 50Ω only | 1 mW @ 50 MHz 1 mW @ 1 GHz | 0.58% 0.47% | HP 432A w/HP478A H76 |
| Phase Modulation Measure Carrier Frequency: 150 kHz – 10 MHz 10 MHz – 26.5 GHz | 200 Hz – 10 kHz 200 Hz – 20 kHz | 4% of rdg. + 1 dgt. 3% of rdg. + 1 dgt. | HP 8902A HP 8902A and 11793A |
| Amplitude Modulation Generate 1 KHz 30% Modulation DC to 10 KHz 0% to 90% Modulation | 10 MHz to 40 GHz 10 MHz to 40 GHz | 5% 5% = 0.25 dB | HP83640A |
| Amplitude Modulation Measure Rate: 50 Hz – 10 kHz Depths: 5 % - 99% Rate: 20 Hz – 10 kHz Depths: 5 % - 99% Rate: 50 Hz – 50 kHz Depths: 5 % - 99% Rate: 20 Hz – 100 kHz Depths: 5 % - 99% Rate: 50 Hz – 10 kHz Depths: 5 % - 99% Rate: 50 Hz – 10 kHz Depths: 5 % - 99% | 150 kHz – 10 MHz 150 kHz – 10 MHz 10 MHz – 1.3 GHz 10 MHz – 1.3 GHz 1.3 MHz – 26.5 GHz 1.3 MHz – 26.5 GHz | 2 % of Rdg. + 1 dgt. 3 % of Rdg. + 1 dgt. 1 % of Rdg. + 1 dgt. 3 % of Rdg. + 1 dgt. 1.5 % of Rdg. + 1 dgt. 3 % of Rdg. + 1 dgt. | HP 8902A HP 8902A and 11793A |

| | | | |
|---|-------------------|-----------------------|-----------------------|
| Frequency Modulation Measure | | | |
| Modulation Rate: | | | |
| 20 Hz – 10 KHz | 250 KHz to 10 MHz | 2 % of Rdg. + 1 dgt. | HP 8902A |
| 50 Hz – 100 KHz | 10 MHz to 1.3 GHz | 1 % of Rdg. + 1 dgt | |
| 20 Hz – 200 KHz | 10 MHz to 1.3 GHz | 5 % of Rdg. + 1 dgt | |
| 50 Hz – 100 KHz | 1.3 to 26.5 GHz | 1 % of Rdg. + 1 dgt | HP 8902A and 11793A |
| 20 Hz – 200 KHz | 1.3 to 26.5 GHz | 5 % of Rdg. + 1 dgt | |
| Frequency Modulation Generate | | | |
| 100 KHz to 8 MHz | 10 KHz to 40 GHz | 10% | HP83640A |
| Distortion - Measure | | | |
| 50 mV – 300 V | 20 Hz to 20 KHz | 1.0 dB | HP 8903B |
| | 20 Hz to 100 KHz | 2.0 dB | |
| Frequency – Measure | .0001 – 5 GHz | 1 parts in 10^{-12} | Agilent 53132A opt 05 |
| Stanford Research FS700 as time base | 10 Hz – 26.5 GHz | 1 parts in 10^{-12} | HP 5351A |

III. Time and Frequency

| | | | |
|-----------------------------|--------|-----------------------|-------------------------|
| Frequency Source/Measure | 10 MHz | 1 parts in 10^{-12} | Stanford Research FS700 |
|-----------------------------|--------|-----------------------|-------------------------|

IV. Thermodynamics

| | | | |
|---|------------------------------|--------------------|--|
| Temperature – Direct Measurement | -200 to 100°C 100 to 400C | 0.027C 0.042°C | Hart 1502/Burns RTD |
| Temperature – Source Zero Point Dry Well | 0.0°C | ±0.02C | Hart 9101 |
| Dry Well Heat Block | Ambient to 300°C | 0.027°C | Monitored with Hart 9140 w/Hart 1502/Burns RTD |
| Glycol/Water Bath | -20°C to 100°C | 0.027°C | |
| Temperature – Source Infrared | @ 100°C @ 500°C | ± 0.5°C ± 0.8°C | Hart 9132 |

V. Physical/ Dimensional

| | | | |
|-----------------------|--|---|--|
| Micrometers | 0 to 20 in | 0.00012 in. | Gage Blocks Grade 2 |
| Calipers | 0 to 20 in | 0.00012 in | Gage Blocks Grade 2 |
| Height Gages | 0 to 20 in | 0.00012 in | Gage Blocks Grade 2 |
| Depth Gages | 0 to 24 in | 0.00012 in | Gage Blocks Grade 2 |
| Pins/Plugs | | 0.000034 in. | Supermic/Gage Blocks |
| Indicators | 0 to 2 in | Fed Grade 2 specs. | Gage Blocks Grade 2 |
| Pressure Pneumatic | -14.7 to -3.0 psig 0 to 315 psia 0 to 100 psig 100 to 1000 psig | ± 0.025% ±0.05% + ±0.0012% ±0.04% ±0.04% | Druck DPI605 (% of rdg + of rdg per °F) Druck DPI510 (of indicated value from 25% to 100% F.S.) Druck DPI 605 |

| | | | |
|---|--|---|--|
| Hydraulic | 1001 to 10,000 psig | $\pm 0.085\% + \pm 0.0012\%$ | with Transducer (% of rdg + of rdg per °F) |
| Torque - Measure | 1 in/oz to 16 in/oz 16 in/oz to 160 in/oz 5 to 50 ft/Lbs 50 to 500 ft/Lbs | $\pm 1\%$ of F.S. $\pm .25\%$ of rdg ± 1 cnt (20 to 100%) $\pm .5\%$ of rdg ± 1 cnt (10 to 20%) $\pm 0.25\%$ of F.S. $\pm 0.25\%$ of F.S. | Mountz S-100 BTSX 16Z Transducer BTSX 160Z Transducer BTSX 160Z Transducer BMX500 F Transducer |
| Torque - Source | | ASTM E 617 | 4" torque wheel/weights 40" torque arm/weights |
| Force | 0 to 350 Kg | ASTM E 617 | F Class weights |
| Humidity – Source Humidity - Measure | 11.3 % RH 25% RH 75 % RH 11.3% RH 25% RH 75% RH | $\pm 2\%$ $\pm 1\%$ $\pm 1\%$ $\pm 2\%$ $\pm 2\%$ $\pm 2\%$ | General Eastern C-1 Vaisala HMD70U |
| Pipettes Volumetric Colorimetric | 11 μ L – 200 mL .5 μ L – 10 μ L | NCCLS 18P Inaccuracy < 1% Imprecision < 0.5% CV | Gravimetric (Balances) Artel PCS2 |