

FLUKE®

Calibration



**5730A High Performance
Multifunction Calibrator
Extended specifications**

General Specifications

Warm-Up Time..... Twice the time since last warmed up, to a maximum of 30 minutes.

System Installation..... Rack mount kits available.

Standard Interfaces..... IEEE-488, RS-232, USB 2.0 device, Ethernet, 5725A, 52120A, phase lock in (BNC), phase reference out (BNC).

Temperature Performance

Operating 0 °C to 50 °C

Calibration 15 °C to 35 °C

Storage..... -40 °C to 75 °C

Relative Humidity

Operating <80 % to 30 °C, <70 % to 40 °C, <40 % to 50 °C

Storage..... <95 %, non-condensing. A power stabilization period of four days may be required after extended storage at high temperature and humidity.

Safety IEC 61010-1: Overvoltage Category II, Pollution Degree 2

Operating Altitude..... 2000 m maximum

Guard Isolation 20 V

Electromagnetic Compatibility (EMC)

IEC 61326-1 (Controlled EM environment) IEC 61326-2-1; CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or use conductively coupled radio-frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

Emissions which exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object. The equipment may not meet the immunity requirements of 61326-1 when test leads and/or test probes are connected.

USA (FCC) 47 CFR 15 subpart B, this product is considered an exempt device per clause 15.103

Korea (KCC) Class A Equipment (Industrial Broadcasting & Communication Equipment)

This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.

Line Power

Line Voltage

5730A 100 V-120 V, 220 V- 240 V ±10 %

5725A 100 V, 110 V, 115 V, 120 V, 200 V, 220 V, 230 V, 240 V, ±10 %

Line Frequency 47 Hz-63 Hz

Maximum Power

5730A..... 300 VA

5725A..... 750 VA

Weight

5730A 27 kg (62 lb)

5725A 32 kg (70 lb)

Size

5730A

Height..... 17.8 cm (7 in), standard rack increment, plus 1.5 cm (0.6 in) for feet

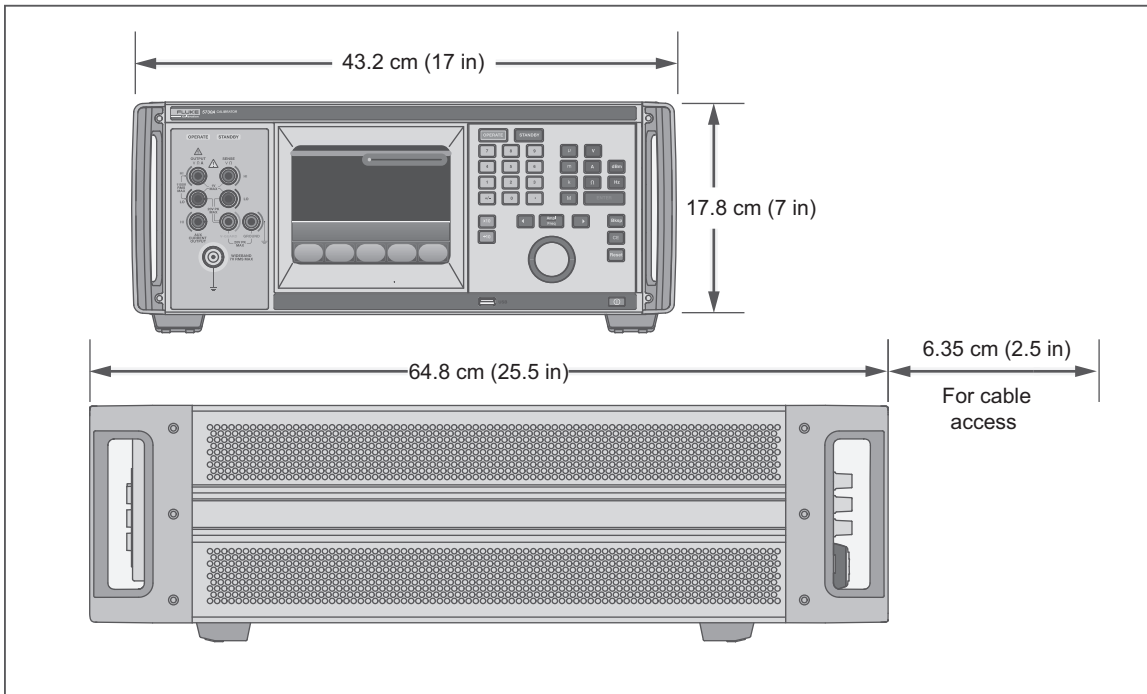
Width..... 43.2 cm (17 in), standard rack width

Depth..... 64.8 cm (25.5 in), overall; 59.4 cm (23.4 in), rack depth

5725A

Height..... 13.3 cm (5.25 in)

Width and Depth Both units project 5.1 cm (2 in) from rack front.



hhp002.eps

Figure 1-1. Product Dimensions

Artifact Calibration Standards Requirements

The following external standards are necessary to calibrate the 5730A to the listed specification. Each external standard used must have an uncertainty equal to or less than the listed uncertainty limit.

| Fluke Standard | Traceable Quantity | Nominal Value | Uncertainty Limit | 5730A Specifications Susceptible to Uncertainty Limit |
|----------------|--------------------|---------------|-------------------|---|
| 732B | Voltage | 10 V | 1.5 ppm | dc volts, ac volts, dc current, ac current |
| 742A-1 | Resistance | 1 Ω | 10 ppm | 1 Ω, 1.9 Ω |
| 742A-10k | Resistance | 10 kΩ | 2 ppm | ac current, dc current 10 Ω to 100 MΩ |

Electrical Specifications

The product specifications describe the Absolute Instrumental Uncertainty of the Product. The product specifications include stability, temperature, and humidity; within specified limits, linearity, line and load regulation, and the reference standard measurement uncertainty. The product specifications are provided at a 99 %, k=2.58, normally distributed and a 95 %, k=2, normally distributed level of confidence. Fluke Calibration guarantees product performance to the 99 % level of confidence.

The relative specifications are provided for enhanced accuracy applications. The specifications apply when range constants are adjusted (see "Range Calibration"). To Calculate an enhanced absolute specification from the relative accuracy specification, it is necessary to combine the uncertainty of your external standards with the pertinent relative specifications.

Specifications are valid after allowing a warm-up period of 30 minutes, or twice the time the Product has been turned off.
DC Voltage Specifications

5730A DC Voltage Specifications

| Range | Resolution | Absolute / ±5 °C from calibration temperature | | | | Relative ±1 °C | |
|-----------------------------------|------------|---|-----------|-----------|-----------|----------------|-----------|
| | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| ±(ppm output ^[1] + μV) | | | | | | | |
| 99 % Confidence Level | | | | | | | |
| 220 mV | 10 nV | 5 + 0.5 | 7 + 0.5 | 8 + 0.5 | 9 + 0.5 | 2 + 0.4 | 2.5 + 0.4 |
| 2.2 V | 100 nV | 3.5 + 0.8 | 4 + 0.8 | 4.5 + 0.8 | 6 + 0.8 | 2 + 0.8 | 2.5 + 0.8 |
| 11 V | 1 μV | 2.5 + 3 | 3 + 3 | 3.5 + 3 | 4 + 3 | 1 + 3 | 1.5 + 3 |
| 22 V | 1 μV | 2.5 + 5 | 3 + 5 | 3.5 + 5 | 4 + 5 | 1 + 5 | 1.5 + 5 |
| 220 V | 10 μV | 3.5 + 50 | 4 + 50 | 5 + 50 | 6 + 50 | 2 + 50 | 2.5 + 50 |
| 1100 V | 100 μV | 5 + 500 | 6 + 500 | 7 + 500 | 8 + 500 | 2.5 + 400 | 3 + 400 |
| 95 % Confidence Level | | | | | | | |
| 220 mV | 10 nV | 4 + 0.4 | 6 + 0.4 | 6.5 + 0.4 | 7.5 + 0.4 | 1.6 + 0.4 | 2 + 0.4 |
| 2.2 V | 100 nV | 3 + 0.7 | 3.5 + 0.7 | 4 + 0.7 | 5 + 0.7 | 1.6 + 0.7 | 2 + 0.7 |
| 11 V | 1 μV | 2 + 2.5 | 2.5 + 2.5 | 3 + 2.5 | 3.5 + 2.5 | 0.8 + 2.5 | 1.2 + 2.5 |
| 22 V | 1 μV | 2 + 4 | 2.5 + 4 | 3 + 4 | 3.5 + 4 | 0.8 + 4 | 1.2 + 4 |
| 220 V | 10 μV | 3 + 40 | 3.5 + 40 | 4 + 40 | 5 + 40 | 1.6 + 40 | 2 + 40 |
| 1100 V | 100 μV | 4 + 400 | 4.5 + 400 | 6 + 400 | 6.5 + 400 | 2 + 400 | 2.4 + 400 |

Notes:
Perform the DC Zero calibration every 30 days. In addition, perform the DC Zero calibration after powering up the unit the first time after unpacking following a shipment or if exposed to an environmental change of greater than 5 °C.
1. For radiated EMI fields >400 MHz and <500 MHz, add 1 ppm.

DC Voltage Secondary Performance Specifications and Operating Characteristics

| Range | Stability ^[1] ±1 °C 24 Hours | Temperature Coefficient Adder ^[2] | | Linearity ±1 °C | Noise | |
|--------|--|--|-----------------------------|-----------------|-----------------------------------|------------------------------------|
| | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | Bandwidth 0.1 - 10 Hz pk-pk | Bandwidth 10 - 10 kHz RMS |
| | | ±(ppm output + μV) / °C | | | μV | |
| 220 mV | 0.3 + 0.3 | 0.4 + 0.1 | 1.5 + 0.5 | 1 + 0.2 | 0.15 + 0.1 | 5 |
| 2.2 V | 0.3 + 1 | 0.3 + 0.1 | 1.5 + 2 | 1 + 0.6 | 0.15 + 0.4 | 15 |
| 11 V | 0.3 + 2.5 | 0.15 + 0.2 | 1 + 1.5 | 0.3 + 2 | 0.15 + 2 | 50 |
| 22 V | 0.4 + 5 | 0.2 + 0.4 | 1.5 + 3 | 0.3 + 4 | 0.15 + 4 | 50 |
| 220 V | 0.5 + 40 | 0.3 + 5 | 1.5 + 40 | 1 + 40 | 0.15 + 60 | 150 |
| 1100 V | 0.5 + 200 | 0.5 + 10 | 3 + 200 | 1 + 200 | 0.15 + 300 | 500 |

Notes:
1. Stability specifications are included in the absolute specification values in the primary specification tables.
2. Temperature coefficient is an adder to accuracy specifications that does not apply unless operating more than ±5 °C from calibration temperature.

Minimum Output 0 V for all ranges, except 100 V for 1100 V range

Maximum Load 50 mA for 2.2 V through 220 V ranges; 20 mA for 1100 V range;
50 Ω output impedance on 220 mV range; all ranges <1000 pF,
>25 Ω

Load Regulation <(0.2 ppm of output + 0.1 ppm of range), full load to no load

Line Regulation <0.1 ppm change, ±10 % of selected nominal line

Settling Time 3 seconds to full specification; + 1 second for range or polarity
change; + 1 second for 1100 V range

Overshoot<5 %

Common Mode Rejection140 dB, DC to 400 Hz

Remote SensingAvailable 0 V to ±1100 V, on 2.2 V through 1100 V ranges

AC Voltage Specifications

5730A AC Voltage Specifications: 99 % Confidence Level

| Range | Resolution | Frequency (Hz) | Absolute / ±5 °C from calibration temperature | | | | Relative ±1 °C | |
|--------------------|------------|----------------|---|------------|------------|------------|----------------|------------|
| | | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| ±(ppm output + μV) | | | | | | | | |
| 2.2 mV | 1 nV | 10 - 20 | 250 + 5 | 270 + 5 | 290 + 5 | 300 + 5 | 250 + 5 | 270 + 5 |
| | | 20 - 40 | 100 + 5 | 105 + 5 | 110 + 5 | 115 + 5 | 100 + 5 | 105 + 5 |
| | | 40 - 20 k | 85 + 5 | 90 + 5 | 95 + 5 | 100 + 5 | 60 + 5 | 65 + 5 |
| | | 20 k - 50 k | 220 + 5 | 230 + 5 | 240 + 5 | 250 + 5 | 85 + 5 | 95 + 5 |
| | | 50 k - 100 k | 500 + 6 | 540 + 6 | 570 + 6 | 600 + 6 | 200 + 6 | 220 + 6 |
| | | 100 k - 300 k | 1000 + 12 | 1200 + 12 | 1250 + 12 | 1300 + 12 | 350 + 12 | 400 + 12 |
| | | 300 k - 500 k | 1400 + 25 | 1500 + 25 | 1600 + 25 | 1700 + 25 | 800 + 25 | 1000 + 25 |
| 500 k - 1 M | 2900 + 25 | 3100 + 25 | 3250 + 25 | 3400 + 25 | 2700 + 25 | 3000 + 25 | | |
| 22 mV | 10 nV | 10 - 20 | 250 + 5 | 270 + 5 | 290 + 5 | 300 + 5 | 250 + 5 | 270 + 5 |
| | | 20 - 40 | 100 + 5 | 105 + 5 | 110 + 5 | 115 + 5 | 100 + 5 | 105 + 5 |
| | | 40 - 20 k | 85 + 5 | 90 + 5 | 95 + 5 | 100 + 5 | 60 + 5 | 65 + 5 |
| | | 20 k - 50 k | 220 + 5 | 230 + 5 | 240 + 5 | 250 + 5 | 85 + 5 | 95 + 5 |
| | | 50 k - 100 k | 500 + 6 | 540 + 6 | 570 + 6 | 600 + 6 | 200 + 6 | 220 + 6 |
| | | 100 k - 300 k | 1000 + 12 | 1200 + 12 | 1250 + 12 | 1300 + 12 | 350 + 12 | 400 + 12 |
| | | 300 k - 500 k | 1400 + 25 | 1500 + 25 | 1600 + 25 | 1700 + 25 | 800 + 25 | 1000 + 25 |
| 500 k - 1 M | 2900 + 25 | 3100 + 25 | 3250 + 25 | 3400 + 25 | 2700 + 25 | 3000 + 25 | | |
| 220 mV | 100 nV | 10 - 20 | 250 + 15 | 270 + 15 | 290 + 15 | 300 + 15 | 250 + 15 | 270 + 15 |
| | | 20 - 40 | 100 + 8 | 105 + 8 | 110 + 8 | 115 + 8 | 100 + 8 | 105 + 8 |
| | | 40 - 20 k | 65 + 8 | 66 + 8 | 67 + 8 | 70 + 8 | 60 + 8 | 65 + 8 |
| | | 20 k - 50 k | 135 + 8 | 140 + 8 | 145 + 8 | 150 + 8 | 85 + 8 | 95 + 8 |
| | | 50 k - 100 k | 370 + 20 | 380 + 20 | 390 + 20 | 400 + 20 | 200 + 20 | 220 + 20 |
| | | 100 k - 300 k | 650 + 25 | 700 + 25 | 750 + 25 | 800 + 25 | 350 + 25 | 400 + 25 |
| | | 300 k - 500 k | 1400 + 30 | 1500 + 30 | 1600 + 30 | 1700 + 30 | 800 + 30 | 1000 + 30 |
| 500 k - 1 M | 2700 + 60 | 2900 + 60 | 3100 + 60 | 3300 + 60 | 2600 + 60 | 2800 + 60 | | |
| 2.2 V | 1 μV | 10 - 20 | 250 + 50 | 270 + 50 | 290 + 50 | 300 + 50 | 250 + 50 | 270 + 50 |
| | | 20 - 40 | 95 + 20 | 100 + 20 | 105 + 20 | 110 + 20 | 95 + 20 | 100 + 20 |
| | | 40 - 20 k | 45 + 10 | 46 + 10 | 47 + 10 | 48 + 10 | 30 + 10 | 40 + 10 |
| | | 20 k - 50 k | 75 + 12 | 77 + 12 | 78 + 12 | 80 + 12 | 70 + 12 | 75 + 12 |
| | | 50 k - 100 k | 95 + 40 | 97 + 40 | 98 + 40 | 100 + 40 | 100 + 40 | 105 + 40 |
| | | 100 k - 300 k | 350 + 100 | 370 + 100 | 380 + 100 | 400 + 100 | 270 + 100 | 290 + 100 |
| | | 300 k - 500 k | 1000 + 250 | 1100 + 250 | 1150 + 250 | 1200 + 250 | 900 + 250 | 1000 + 250 |
| 500 k - 1 M | 1600 + 400 | 1800 + 400 | 1900 + 400 | 2000 + 400 | 1200 + 400 | 1300 + 400 | | |

| | | | | | | | | |
|---|--------|---------------|-------------|-------------|-------------|--------------|-------------|-------------|
| 22 V | 10 µV | 10 - 20 | 250 + 500 | 270 + 500 | 290 + 500 | 300 + 500 | 250 + 500 | 270 + 500 |
| | | 20 - 40 | 95 + 200 | 100 + 200 | 105 + 200 | 110 + 200 | 95 + 200 | 100 + 200 |
| | | 40 - 20 k | 45 + 70 | 46 + 70 | 47 + 70 | 48 + 70 | 30 + 70 | 40 + 70 |
| | | 20 k - 50 k | 75 + 120 | 77 + 120 | 78 + 120 | 80 + 120 | 70 + 120 | 75 + 120 |
| | | 50 k - 100 k | 95 + 250 | 97 + 250 | 98 + 250 | 100 + 250 | 100 + 250 | 105 + 250 |
| | | 100 k - 300 k | 285 + 800 | 290 + 800 | 295 + 800 | 300 + 800 | 270 + 800 | 290 + 800 |
| | | 300 k - 500 k | 1000 + 2500 | 1100 + 2500 | 1150 + 2500 | 1200 + 2500 | 900 + 2500 | 1000 + 2500 |
| | | 500 k - 1 M | 1500 + 4000 | 1600 + 4000 | 1700 + 4000 | 1800 + 4000 | 1300 + 4000 | 1400 + 4000 |
| ±(ppm output + mV) | | | | | | | | |
| 220 V ^[2] | 100 µV | 10 - 20 | 250 + 5 | 270 + 5 | 290 + 5 | 300 + 5 | 250 + 5 | 270 + 5 |
| | | 20 - 40 | 95 + 2 | 100 + 2 | 105 + 2 | 110 + 2 | 95 + 2 | 100 + 2 |
| | | 40 - 20 k | 57 + 0.7 | 60 + 0.7 | 62 + 0.7 | 65 + 0.7 | 45 + 0.7 | 50 + 0.7 |
| | | 20 k - 50 k | 90 + 1.2 | 95 + 1.2 | 97 + 1.2 | 100 + 1.2 | 75 + 1.2 | 80 + 1.2 |
| | | 50 k - 100 k | 160 + 3 | 170 + 3 | 175 + 3 | 180 + 3 | 140 + 3 | 150 + 3 |
| | | 100 k - 300 k | 900 + 20 | 1000 + 20 | 1050 + 20 | 1100 + 20 | 600 + 20 | 700 + 20 |
| | | 300 k - 500 k | 5000 + 50 | 5200 + 50 | 5300 + 50 | 5400 + 50 | 4500 + 50 | 4700 + 50 |
| | | 500 k - 1 M | 8000 + 100 | 9000 + 100 | 9500 + 100 | 10,000 + 100 | 8000 + 100 | 8500 + 100 |
| 1100 V ^[1] | 1 mV | 15 - 50 | 300 + 20 | 320 + 20 | 340 + 20 | 360 + 20 | 300 + 20 | 320 + 20 |
| | | 50 - 1 k | 70 + 4 | 75 + 4 | 80 + 4 | 85 + 4 | 50 + 4 | 55 + 4 |
| 5725A Amplifier: | | | | | | | | |
| 1100 V | 1 mV | 40 - 1 k | 75 + 4 | 80 + 4 | 85 + 4 | 90 + 4 | 50 + 4 | 55 + 4 |
| | | 1 k - 20 k | 105 + 6 | 125 + 6 | 135 + 6 | 165 + 6 | 85 + 6 | 105 + 6 |
| | | 20 k - 30 k | 230 + 11 | 360 + 11 | 440 + 11 | 600 + 11 | 160 + 11 | 320 + 11 |
| 750 V | | 30 k - 50 k | 230 + 11 | 360 + 11 | 440 + 11 | 600 + 11 | 160 + 11 | 320 + 11 |
| | | 50 k - 100 k | 600 + 45 | 1300 + 45 | 1600 + 45 | 2300 + 45 | 380 + 45 | 1200 + 45 |
| Notes: | | | | | | | | |
| 1. Maximum output 250 V from 15-50 Hz. | | | | | | | | |
| 2. See Volt-Hertz capability in Figure A. | | | | | | | | |

5730A AC Voltage Specifications: 95 % Confidence Level

| Range | Resolution | Frequency (Hz) | Absolute / ±5 °C from calibration temperature | | | | Relative ±1 °C | |
|--------|------------|----------------|---|------------|------------|------------|----------------|------------|
| | | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| | | | ±(ppm output + µV) | | | | | |
| 2.2 mV | 1 nV | 10 - 20 | 200 + 4 | 220 + 4 | 230 + 4 | 240 + 4 | 200 + 4 | 220 + 4 |
| | | 20 - 40 | 80 + 4 | 85 + 4 | 87 + 4 | 90 + 4 | 80 + 4 | 85 + 4 |
| | | 40 - 20 k | 70 + 4 | 75 + 4 | 77 + 4 | 80 + 4 | 50 + 4 | 55 + 4 |
| | | 20 k - 50 k | 170 + 4 | 180 + 4 | 190 + 4 | 200 + 4 | 70 + 4 | 80 + 4 |
| | | 50 k - 100 k | 400 + 5 | 460 + 5 | 480 + 5 | 500 + 5 | 160 + 5 | 180 + 5 |
| | | 100 k - 300 k | 800 + 10 | 900 + 10 | 1000 + 10 | 1050 + 10 | 280 + 10 | 320 + 10 |
| | | 300 k - 500 k | 1100 + 20 | 1200 + 20 | 1300 + 20 | 1400 + 20 | 650 + 20 | 800 + 20 |
| | | 500 k - 1 M | 2400 + 20 | 2500 + 20 | 2600 + 20 | 2700 + 20 | 2100 + 20 | 2400 + 20 |
| 22 mV | 10 nV | 10 - 20 | 200 + 4 | 220 + 4 | 230 + 4 | 240 + 4 | 200 + 4 | 220 + 4 |
| | | 20 - 40 | 80 + 4 | 85 + 4 | 87 + 4 | 90 + 4 | 80 + 4 | 85 + 4 |
| | | 40 - 20 k | 70 + 4 | 75 + 4 | 77 + 4 | 80 + 4 | 50 + 4 | 55 + 4 |
| | | 20 k - 50 k | 170 + 4 | 180 + 4 | 190 + 4 | 200 + 4 | 70 + 4 | 80 + 4 |
| | | 50 k - 100 k | 400 + 5 | 460 + 5 | 480 + 5 | 500 + 5 | 160 + 5 | 180 + 5 |
| | | 100 k - 300 k | 800 + 10 | 900 + 10 | 1000 + 10 | 1050 + 10 | 280 + 10 | 320 + 10 |
| | | 300 k - 500 k | 1100 + 20 | 1200 + 20 | 1300 + 20 | 1400 + 20 | 650 + 20 | 800 + 20 |
| | | 500 k - 1 M | 2400 + 20 | 2500 + 20 | 2600 + 20 | 2700 + 20 | 2100 + 20 | 2400 + 20 |
| 220 mV | 100 nV | 10 - 20 | 200 + 12 | 220 + 12 | 230 + 12 | 240 + 12 | 200 + 12 | 220 + 12 |
| | | 20 - 40 | 80 + 7 | 85 + 7 | 87 + 7 | 90 + 7 | 80 + 7 | 85 + 7 |
| | | 40 - 20 k | 54 + 7 | 55 + 7 | 56 + 7 | 57 + 7 | 50 + 7 | 55 + 7 |
| | | 20 k - 50 k | 105 + 7 | 110 + 7 | 115 + 7 | 120 + 7 | 70 + 7 | 80 + 7 |
| | | 50 k - 100 k | 296 + 17 | 298 + 17 | 303 + 17 | 310 + 17 | 160 + 17 | 180 + 17 |
| | | 100 k - 300 k | 535 + 20 | 583 + 20 | 600 + 20 | 655 + 20 | 280 + 20 | 320 + 20 |
| | | 300 k - 500 k | 1100 + 25 | 1200 + 25 | 1300 + 25 | 1400 + 25 | 650 + 25 | 800 + 25 |
| | | 500 k - 1 M | 2400 + 45 | 2500 + 45 | 2600 + 45 | 2700 + 45 | 2100 + 45 | 2400 + 45 |
| 2.2 V | 1 µV | 10 - 20 | 200 + 40 | 220 + 40 | 230 + 40 | 240 + 40 | 200 + 40 | 220 + 40 |
| | | 20 - 40 | 75 + 15 | 80 + 15 | 85 + 15 | 90 + 15 | 75 + 15 | 80 + 15 |
| | | 40 - 20 k | 37 + 8 | 39 + 8 | 40 + 8 | 42 + 8 | 25 + 8 | 35 + 8 |
| | | 20 k - 50 k | 61 + 10 | 63 + 10 | 65 + 10 | 67 + 10 | 55 + 10 | 60 + 10 |
| | | 50 k - 100 k | 79 + 30 | 81 + 30 | 82 + 30 | 85 + 30 | 80 + 30 | 85 + 30 |
| | | 100 k - 300 k | 276 + 80 | 300 + 80 | 314 + 80 | 336 + 80 | 230 + 80 | 250 + 80 |
| | | 300 k - 500 k | 800 + 200 | 900 + 200 | 950 + 200 | 1000 + 200 | 700 + 200 | 800 + 200 |
| | | 500 k - 1 M | 1300 + 300 | 1500 + 300 | 1600 + 300 | 1700 + 300 | 1000 + 300 | 1100 + 300 |

| | | | | | | | | |
|---|--------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 22 V | 10 μV | 10 - 20 | 200 + 400 | 220 + 400 | 230 + 400 | 240 + 400 | 200 + 400 | 220 + 400 |
| | | 20 - 40 | 75 + 150 | 80 + 150 | 85 + 150 | 90 + 150 | 75 + 150 | 80 + 150 |
| | | 40 - 20k | 37 + 50 | 39 + 50 | 40 + 50 | 42 + 50 | 25 + 50 | 35 + 50 |
| | | 20k - 50k | 61 + 100 | 63 + 100 | 65 + 100 | 67 + 100 | 55 + 100 | 60 + 100 |
| | | 50k - 100k | 78 + 200 | 80 + 200 | 81 + 200 | 83 + 200 | 80 + 200 | 85 + 200 |
| | | 100k - 300k | 238 + 600 | 243 + 600 | 249 + 600 | 254 + 600 | 250 + 600 | 270 + 600 |
| | | 300k - 500k | 800 + 2000 | 900 + 2000 | 900 + 2000 | 1000 + 2000 | 700 + 2000 | 800 + 2000 |
| | | 500k - 1M | 1200 + 3200 | 1300 + 3200 | 1400 + 3200 | 1500 + 3200 | 1100 + 3200 | 1200 + 3200 |
| ±(ppm output + mV) | | | | | | | | |
| 220 V ^[2] | 100 μV | 10 - 20 | 200 + 4 | 220 + 4 | 230 + 4 | 240 + 4 | 200 + 4 | 220 + 4 |
| | | 20 - 40 | 75 + 1.5 | 80 + 1.5 | 85 + 1.5 | 90 + 1.5 | 75 + 1.5 | 80 + 1.5 |
| | | 40 - 20 k | 45 + 0.6 | 47 + 0.6 | 50 + 0.6 | 52 + 0.6 | 35 + 0.6 | 40 + 0.6 |
| | | 20 k - 50 k | 70 + 1 | 75 + 1 | 77 + 1 | 80 + 1 | 60 + 1 | 65 + 1 |
| | | 50 k - 100 k | 120 + 2.5 | 130 + 2.5 | 140 + 2.5 | 150 + 2.5 | 110 + 2.5 | 120 + 2.5 |
| | | 100 k - 300 k | 700 + 16 | 800 + 16 | 850 + 16 | 900 + 16 | 500 + 16 | 600 + 16 |
| | | 300 k - 500 k | 4000 + 40 | 4200 + 40 | 4300 + 40 | 4400 + 40 | 3600 + 40 | 3800 + 40 |
| | | 500 k - 1 M | 6000 + 80 | 7000 + 80 | 7500 + 80 | 8000 + 80 | 6500 + 80 | 7000 + 80 |
| 1100 V ^[1] | 1 mV | 15 - 50 | 240 + 16 | 260 + 16 | 280 + 16 | 300 + 16 | 240 + 16 | 260 + 16 |
| | | 50 - 1 k | 55 + 3.5 | 60 + 3.5 | 65 + 3.5 | 70 + 3.5 | 40 + 3.5 | 45 + 3.5 |
| 5725A Amplifier: | | | | | | | | |
| 1100 V | 1 mV | 40 - 1 k | 75 + 4 | 80 + 4 | 85 + 4 | 90 + 4 | 50 + 4 | 55 + 4 |
| | | 1 k - 20 k | 105 + 6 | 125 + 6 | 135 + 6 | 165 + 6 | 85 + 6 | 105 + 6 |
| | | 20 k - 30 k | 230 + 11 | 360 + 11 | 440 + 11 | 600 + 11 | 160 + 11 | 320 + 11 |
| 750 V | | 30 k - 50 k | 230 + 11 | 360 + 11 | 440 + 11 | 600 + 11 | 160 + 11 | 320 + 11 |
| | | 50 k - 100 k | 600 + 45 | 1300 + 45 | 1600 + 45 | 2300 + 45 | 380 + 45 | 1200 + 45 |
| Notes: | | | | | | | | |
| 1. Maximum output 250 V from 15-50 Hz. | | | | | | | | |
| 2. See Volt-Hertz capability in Figure A. | | | | | | | | |

AC Voltage Secondary Performance Specifications and Operating Characteristics

| Range | Frequency (Hz) | Stability ±1 °C ^[1] 24 Hours | Temperature Coefficient | | Output Impedance (Ω) | Maximum Distortion Bandwidth 10 Hz-10 MHz |
|-------------|----------------|--|-------------------------|-----------------------------|---------------------------------------|--|
| | | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | |
| | | ±μV | ±μV / °C | | ±(% output + μV) | |
| 2.2 mV | 10 - 20 | 5 | 0.05 | 0.05 | 50 | 0.05 + 10 |
| | 20 - 40 | 5 | 0.05 | 0.05 | | 0.035 + 10 |
| | 40 - 20 k | 2 | 0.05 | 0.05 | | 0.035 + 10 |
| | 20 k - 50 k | 2 | 0.1 | 0.1 | | 0.035 + 10 |
| | 50 k - 100 k | 3 | 0.2 | 0.2 | | 0.035 + 30 |
| | 100 k - 300 k | 3 | 0.3 | 0.3 | | 0.3 + 30 |
| | 300 k - 500 k | 5 | 0.4 | 0.4 | | 0.3 + 30 |
| 500 k - 1 M | 5 | 0.5 | 0.5 | 2 + 50 | | |
| 22 mV | 10 - 20 | 5 | 0.2 | 0.3 | 50 | 0.05 + 11 |
| | 20 - 40 | 5 | 0.2 | 0.3 | | 0.035 + 11 |
| | 40 - 20 k | 2 | 0.2 | 0.3 | | 0.035 + 11 |
| | 20 k - 50 k | 2 | 0.4 | 0.5 | | 0.035 + 11 |
| | 50 k - 100 k | 3 | 0.5 | 0.5 | | 0.035 + 30 |
| | 100 k - 300 k | 5 | 0.6 | 0.6 | | 0.3 + 30 |
| | 300 k - 500 k | 10 | 1 | 1 | | 0.3 + 30 |
| 500 k - 1 M | 15 | 1 | 1 | 2 + 30 | | |
| | | ±(ppm output + μV) | ±(ppm output μV) / °C | | | |
| 220 mV | 10 - 20 | 150 + 20 | 2 + 1 | 2 + 1 | 50 | 0.05 + 16 |
| | 20 - 40 | 80 + 15 | 2 + 1 | 2 + 1 | | 0.035 + 16 |
| | 40 - 20 k | 12 + 2 | 2 + 1 | 2 + 1 | | 0.035 + 16 |
| | 20 k - 50 k | 10 + 2 | 15 + 2 | 15 + 2 | | 0.035 + 16 |
| | 50 k - 100 k | 10 + 2 | 15 + 4 | 15 + 4 | | 0.035 + 30 |
| | 100 k - 300 k | 20 + 4 | 80 + 5 | 80 + 5 | | 0.3 + 30 |
| | 300 k - 500 k | 100 + 10 | 80 + 5 | 80 + 5 | | 0.3 + 30 |
| 500 k - 1 M | 200 + 20 | 80 + 5 | 80 + 5 | 1 + 30 | | |
| | | | | | Load Regulation ±(ppm output + μV) | |
| 2.2 V | 10 - 20 | 150 + 20 | 50 + 10 | 50 + 10 | 10 + 2 | 0.05 + 80 |
| | 20 - 40 | 80 + 15 | 15 + 5 | 15 + 5 | 10 + 2 | 0.035 + 80 |
| | 40 - 20 k | 12 + 4 | 2 + 1 | 5 + 2 | 10 + 4 | 0.035 + 80 |
| | 20 k - 50 k | 15 + 5 | 10 + 2 | 15 + 4 | 30 + 10 | 0.035 + 80 |
| | 50 k - 100 k | 15 + 5 | 10 + 4 | 20 + 4 | 120 + 16 | 0.035 + 110 |
| | 100 k - 300 k | 30 + 10 | 80 + 15 | 80 + 15 | 300 ppm | 0.3 + 110 |
| | 300 k - 500 k | 70 + 20 | 80 + 40 | 80 + 40 | 600 ppm | 0.5 + 110 |
| 500 k - 1 M | 150 + 50 | 80 + 100 | 80 + 100 | 1200 ppm | 1 + 110 | |

| | | | | | | |
|-------------|---------------|--------------------|--------------------|----------------|--------------------|---------------|
| 22 V | 10 - 20 | 150 + 20 | 50 + 100 | 50 + 100 | 10 + 20 | 0.05 + 700 |
| | 20 - 40 | 80 + 15 | 15 + 30 | 15 + 40 | 10 + 20 | 0.035 + 700 |
| | 40 - 20 k | 12 + 8 | 2 + 10 | 4 + 15 | 10 + 30 | 0.035 + 700 |
| | 20 k - 50 k | 15 + 10 | 10 + 20 | 20 + 20 | 30 + 50 | 0.035 + 700 |
| | 50 k - 100 k | 15 + 10 | 10 + 40 | 20 + 40 | 80 + 80 | 0.05 + 800 |
| | 100 k - 300 k | 30 + 15 | 80 + 150 | 80 + 150 | 100 + 700 | 0.3 + 800 |
| | 300 k - 500 k | 70 + 100 | 80 + 300 | 80 + 300 | 200 + 1100 | 0.3 + 800 |
| 500 k - 1 M | 150 + 100 | 80 + 500 | 80 + 500 | 600 + 3000 | 2 + 800 | |
| 220 V | 10 - 20 | 150 + 200 | 50 + 1000 | 50 + 1000 | 10 + 200 | 0.05 + 10,000 |
| | 20 - 40 | 80 + 150 | 15 + 300 | 15 + 300 | 10 + 200 | 0.05 + 10,000 |
| | 40 - 20 k | 12 + 80 | 2 + 80 | 4 + 80 | 10 + 300 | 0.05 + 10,000 |
| | 20 k - 50 k | 15 + 100 | 10 + 100 | 20 + 100 | 30 + .600 | 0.05 + 10,000 |
| | 50 k - 100 k | 15 + 100 | 10 + 500 | 20 + 500 | 80 + 3,000 | 0.2 + 50,000 |
| | 100 k - 300 k | 30 + 400 | 80 + 600 | 80 + 600 | 250 + 25,000 | 1.5 + 50,000 |
| | 300 k - 500 k | 100 + 10,000 | 80 + 800 | 80 + 800 | 500 + 50,000 | 1.5 + 50,000 |
| 500 k - 1 M | 200 + 20,000 | 80 + 1000 | 80 + 1000 | 1000 + 110,000 | 3.5 + 100,000 | |
| | | ±(ppm output + mV) | ±(ppm output) / °C | | ±(ppm output + mV) | ±(% output) |
| 1100 V | 15 - 50 | 150 + 0.5 | 50 | 50 | 10 + 2 | 0.15 |
| | 50 - 1 k | 20 + 0.5 | 2 | 5 | 10 + 1 | 0.07 |

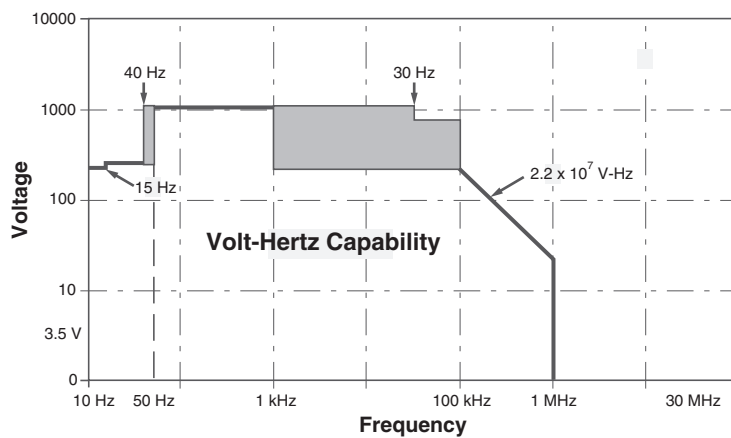


Figure A.

| 5725A Amplifier: | | | | | | | |
|------------------|----------------|---|----------------------------------|--------------------------------|--------------------------------|---|---------|
| Range | Frequency (Hz) | Stability ±1 °C ^[1] 24 Hours | Temperature Coefficient Adder | | Load Regulation ^[2] | Distortion Bandwidth 10 Hz -10 MHz ±(% output) | |
| | | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | 150 pF | 1000 pF |
| | | ±(ppm output + mV) | ±(ppm output) / °C | | ±(ppm output + mV) | | |
| 1100 V | 40 - 1 k | 10 + .5 | 5 | 5 | 10 + 1 | 0.10 | 0.10 |
| | 1 k - 20 k | 15 + 2 | 5 | 5 | 90 + 6 | 0.10 | 0.15 |
| | 20 k - 50 k | 40 + 2 | 10 | 10 | 275 + 11 | 0.30 | 0.30 |
| | 50 k - 100 k | 130 + 2 | 30 | 30 | 500 + 30 | 0.40 | 0.40 |

Notes:
 1. Stability specifications are included in Absolute specification values for the primary specifications.
 2. The 5725A will drive up to 1000 pF of load capacitance. Absolute specifications include loads to 300 pF and 150 pF as shown under "Load Limits." For capacitances up to the maximum of 1000 pF, add "Load Regulation."

| Voltage Range | Maximum Current Limits | Load Limits |
|----------------------|------------------------|------------------------|
| 2.2 V ^[2] | | |
| 22 V | 50 mA, 0 °C-40 °C | >50 Ω, |
| 220 V | 20 mA, 40 °C-50 °C | 1000 pF |
| 1100 V | 6 mA | 600 pF |
| 5725A Amplifier: | | |
| 1100 V | 40 Hz-5 kHz | 50 mA |
| | 5 kHz-30 kHz | 70 mA |
| | 30 kHz-100 kHz | 70 mA ^[3] |
| | | 1000 pF ^[1] |
| | | 300 pF |
| | | 150 pF |

Notes:
 1. The 5725A will drive up to 1000 pF of load capacitance. Absolute specifications include loads to 300 pF and 150 pF as shown under "Load Limits." For capacitances up to the maximum of 1000 pF, add "Load Regulation."
 2. 2.2 V Range, 100 kHz-1.2 MHz only: Absolute specifications cover loads to 10 mA or 1000 pF. For higher loads, load regulation is added.
 3. Applies from 0 °C to 40 °C.

Output Display FormatsVoltage or dBm, dBm reference 600 Ω.
Minimum Output10 % on each range
External SenseApplicable for 2.2 V, 22 V, 220 V, and 1100 V ranges; 5730A
 < 100 kHz, 5725A <30 kHz. Specifications are the same as
 internal sense.

Settling Time to Published Specifications

| Frequency (Hz) | Settling Time (seconds) |
|----------------|-------------------------|
| 10-120 | 7 |
| >120 | 5 |

Notes:
 Plus 1 second for amplitude or frequency range change
 Plus 2 seconds for 5730A 1100 V range
 Plus 4 seconds for 5725A 1100 V range

Overshoot.....< 10 %
Common Mode Rejection 140 dB, dc to 400 Hz

Frequency

Ranges (Hz)10.000 - 119.99
 0.1200 k - 1.1999 k
 1.200 k - 11.999 k
 12.00 k - 119.99 k
 120.0 k - 1.1999 M
Absolute Specification±0.0025 %
Resolution.....11.999 counts

Phase Lock (Selectable Rear Panel BNC Input)

Phase Specification (except 1100 V range) >30 Hz: $\pm 1^\circ + 0.05^\circ/\text{kHz}$, <30 Hz: $\pm 3^\circ$
 Input Voltage 1 V to 10 V rms sine wave (do not exceed 1 V for mV ranges)
 Frequency Range 10 Hz to 1.1999 MHz
 Lock Range $\pm 2\%$ of frequency
 Lock-In Time..... Larger of 10/frequency or 10 msec

Phase Reference (Selectable Rear Panel BNC Output)

Range..... $\pm 180^\circ$
 Phase Absolute Specification (except 1100 V range) $\pm 1^\circ$ at quadrature points ($0^\circ, \pm 90^\circ, \pm 180^\circ$)
 elsewhere $\pm 2^\circ$
 Stability..... $\pm 0.1^\circ$
 Resolution..... 1°
 Output Level..... 2.5 V rms ± 0.2 V
 Frequency Range 50 Hz to 1 kHz, usable 10 Hz to 1.1999 MHz

Resistance Specifications

5730A Resistance Specifications

| Nominal Value (Ω) | Absolute Specification of Characterized Value $\pm 5^\circ\text{C}$ from calibration temperature ^[1] | | | | Relative $\pm 1^\circ\text{C}$ | |
|---|--|----------------|----------------|----------------|--------------------------------|----------------|
| | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| | $\pm\text{ppm}$ | | | | | |
| 99 % Confidence Level | | | | | | |
| 0 | 50 $\mu\Omega$ | 50 $\mu\Omega$ | 50 $\mu\Omega$ | 50 $\mu\Omega$ | 50 $\mu\Omega$ | 50 $\mu\Omega$ |
| 1 | 85 | 95 | 100 | 110 | 32 | 40 |
| 1.9 | 85 | 95 | 100 | 110 | 25 | 33 |
| 10 | 23 | 25 | 26 | 27 | 5 | 8 |
| 19 | 23 | 25 | 26 | 27 | 4 | 7 |
| 100 | 10 | 11 | 11.5 | 12 | 2 | 4 |
| 190 | 10 | 11 | 11.5 | 12 | 2 | 4 |
| 1 k | 7 | 7.2 | 7.5 | 8 | 2 | 3 |
| 1.9 k | 7 | 7.2 | 7.5 | 8 | 2 | 3 |
| 10 k | 6 | 7 | 7.5 | 8 | 2 | 3 |
| 19 k | 6 | 7 | 7.5 | 8 | 2 | 3 |
| 100 k | 7 | 8 | 9 | 10 | 2 | 3 |
| 190 k | 8 | 10 | 11 | 12 | 2 | 3 |
| 1 M | 13 | 14 | 14.5 | 15 | 2.5 | 5 |
| 1.9 M | 15 | 17 | 19 | 21 | 3 | 6 |
| 10 M | 33 | 37 | 40 | 46 | 10 | 14 |
| 19 M | 43 | 47 | 50 | 55 | 20 | 24 |
| 100 M | 100 | 110 | 115 | 120 | 50 | 60 |
| 95 % Confidence Level | | | | | | |
| 0 | 40 $\mu\Omega$ | 40 $\mu\Omega$ | 40 $\mu\Omega$ | 40 $\mu\Omega$ | 40 $\mu\Omega$ | 40 $\mu\Omega$ |
| 1 | 70 | 80 | 85 | 95 | 27 | 35 |
| 1.9 | 70 | 80 | 85 | 95 | 20 | 26 |
| 10 | 20 | 21 | 22 | 23 | 4 | 7 |
| 19 | 20 | 21 | 22 | 23 | 3.5 | 6 |
| 100 | 8 | 9 | 9.5 | 10 | 1.6 | 3.5 |
| 190 | 8 | 9 | 9.5 | 10 | 1.6 | 3.5 |
| 1 k | 5.5 | 5.7 | 6 | 6.5 | 1.6 | 2.5 |
| 1.9 k | 5.5 | 5.7 | 6 | 6.5 | 1.6 | 2.5 |
| 10 k | 5 | 5.5 | 6 | 6.5 | 1.6 | 2.5 |
| 19 k | 5 | 5.5 | 6 | 6.5 | 1.6 | 2.5 |
| 100 k | 5.5 | 7.5 | 8 | 8.5 | 1.6 | 2.5 |
| 190 k | 6 | 7 | 8 | 8.5 | 1.6 | 2.5 |
| 1 M | 10 | 11 | 12 | 13 | 2 | 4 |
| 1.9 M | 12 | 13.5 | 15 | 18 | 2.5 | 4 |
| 10 M | 27 | 31 | 34 | 40 | 8 | 12 |
| 19 M | 35 | 39 | 42 | 47 | 16 | 20 |
| 100 M | 85 | 95 | 100 | 100 | 40 | 50 |
| Note: | | | | | | |
| 1. Specifications apply to displayed value. 4-wire connections, except 100 M Ω . | | | | | | |

Resistance Secondary Performance Specifications and Operating Characteristics

| Nominal Value (Ω) | Stability ±1 °C [1] 24 Hours | Temperature Coefficient Adder [2] | | Full Spec Load Range [3] I _L - I _V (mA) | Maximum Peak Current I _{MAX} (mA) | Maximum Difference of Characterized to Nominal Value | Two-Wire Adder Active Compensation [4] | |
|-------------------|---------------------------------|-----------------------------------|--------------------------|--|--|--|---|--------------------------|
| | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | | | Lead Resistance | |
| | | ±ppm/°C | | | | | 0.1 Ω | 1 Ω |
| ±ppm | | | | | | ±ppm | ±mΩ | |
| 0 | — | — | — | 8 - 500 | 500 | — | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 1 | 32 | 4 | 5 | 8 - 100 | 700 | 500 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 1.9 | 25 | 6 | 7 | 8 - 100 | 500 | 500 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 10 | 5 | 2 | 3 | 8 - 11 | 220 | 300 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 19 | 4 | 2 | 3 | 8 - 11 | 160 | 300 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 100 | 2 | 2 | 3 | 8 - 11 | 70 | 150 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 190 | 2 | 2 | 3 | 8 - 11 | 50 | 150 | $2 + \frac{4\mu V}{I_m}$ | $4 + \frac{4\mu V}{I_m}$ |
| 1 k | 2 | 2 | 3 | 1 - 2 | 22 | 150 | 10 | 15 |
| 1.9 k | 2 | 2 | 3 | 1 - 1.5 | 16 | 150 | 10 | 15 |
| 10 k | 2 | 2 | 3 | 100 - 500 μA | 7 | 150 | 50 | 60 |
| 19 k | 2 | 2 | 3 | 50 - 250 μA | 5 | 150 | 100 | 120 |
| 100 k | 2 | 2 | 3 | 10 - 100 μA | 1 | 150 | I _m = Current produced by Ohmmeter (A) | |
| 190 k | 2 | 2 | 3 | 5 - 100 μA | 500 μA | 150 | | |
| 1 M | 2.5 | 2.5 | 6 | 5 - 20 μA | 100 μA | 200 | | |
| 1.9 M | 3.5 | 3 | 10 | 2.5 - 10 μA | 50 μA | 200 | | |
| 10 M | 10 | 5 | 20 | 0.5 - 2 μA | 10 μA | 300 | | |
| 19 M | 20 | 8 | 40 | 0.25 - 1 μA | 5 μA | 300 | | |
| 100 M | 50 | 12 | 100 | 50 - 200 nA | 1 μA | 500 | | |

Notes:

- Stability specifications are included in the Absolute specification values in the primary specification tables.
- Temperature coefficient is an adder to Absolute specifications that does not apply unless operated more than 5 °C from calibration temperature, or calibrated outside the range 19 °C to 24 °C. Two examples:
 - Calibrate at 20 °C: Temperature coefficient adder is not required unless operated below 15 °C or above 25 °C.
 - Calibrate at 26 °C: Add 2 °C temperature coefficient adder. Additional temperature coefficient adder is not required unless operated below 21 °C or above 31 °C.
- Refer to current derating factors table for loads outside of this range.
- Active two-wire compensation may be selected for values less than 100 kΩ, with either the front panel or the meter input terminals as reference plane. Active compensation is limited to 11 mA load, and to 2 V burden. Two-wire compensation can be used only with Ω-meters that source continuous (not pulsed) dc current.

Current Derating Factors

| Nominal Value (Ω) | Value of Derating Factor K for Over or Under Current | | |
|----------------------|--|------------------------------------|---|
| | Two-Wire Comp I < IL ^[1] | Four-Wire I < IL ^[1] | Four-Wire IU < I < I _{MAX} ^[2] |
| SHORT | 4.4 | 0.3 | — |
| 1 | 4.4 | 300 | 4 x 10 ⁻⁵ |
| 1.9 | 4.4 | 160 | 1.5 x 10 ⁻⁴ |
| 10 | 4.4 | 30 | 1.6 x 10 ⁻³ |
| 19 | 4.4 | 16 | 3 x 10 ⁻³ |
| 100 | 4.4 | 3.5 | 1 x 10 ⁻² |
| 190 | 4.4 | 2.5 | 1.9 x 10 ⁻² |
| 1 k | 4.4 | 0.4 | 0.1 |
| 1.9 k | 4.4 | 0.4 | 0.19 |
| 10 k | 5000 | 50 | 2.0 |
| 19 k | 5000 | 50 | 3.8 |
| 100 k | — | 7.5 | 2 x 10 ⁻⁵ |
| 190 k | — | 4.0 | 3.8 x 10 ⁻⁵ |
| 1 M | — | 1.0 | 1.5 x 10 ⁻⁴ |
| 1.9 M | — | 0.53 | 2.9 x 10 ⁻⁴ |
| 10 M | — | 0.2 | 1 x 10 ⁻³ |
| 19 M | — | 0.53 | 1.9 x 10 ⁻³ |
| 100 M | — | 0.1 | — |

Notes:

- For I < I_L, errors occur due to thermally generated voltages within the 5730A. Use the following equation to determine the error, and add this error to the corresponding specifications.

$$\text{Error} = K(I_L - I) / (I_L \times I)$$

Where: Error is in mΩ for all two-wire comp values and four-wire short, and in ppm for the remaining four-wire values.

K is the constant from the above table;

I and I_L are expressed in mA for short to 1.9 kΩ;

I and I_L are expressed in μA for 10 kΩ to 100 MΩ

- For I_U < I < I_{MAX} errors occur due to self-heating of the resistors in the calibrator. Use the following equation to determine the error in ppm and add this error to the corresponding specifications.

$$\text{Error in ppm} = K(I^2 - I_U^2)$$

Where: K is the constant from the above table;

I and I_U are expressed in mA for short to 19 kΩ;

I and I_U are expressed in μA for 100 kΩ to 100 MΩ

DC Current Specifications

5730A DC Current Specifications

| Range | Resolution nA | Absolute / ±5 °C from calibration temperature | | | | Relative ±1 °C | |
|--|------------------|---|-----------|-----------|-----------|----------------|-----------|
| | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| 99 % Confidence Level | | | | | | | |
| $\pm(\text{ppm output} + \text{nA})$ | | | | | | | |
| 220 µA | 0.1 | 40 + 7 | 42 + 7 | 45 + 7 | 50 + 7 | 24 + 2 | 26 + 2 |
| 2.2 mA | 1 | 30 + 8 | 35 + 8 | 37 + 8 | 40 + 8 | 24 + 5 | 26 + 5 |
| 22 mA | 10 | 30 + 50 | 35 + 50 | 37 + 50 | 40 + 50 | 24 + 50 | 26 + 50 |
| $\pm(\text{ppm output} + \mu\text{A})$ | | | | | | | |
| 220 mA ^[1] | 0.1 | 40 + 0.8 | 45 + 0.8 | 47 + 0.8 | 50 + 0.8 | 26 + 0.3 | 30 + 0.3 |
| 2.2 A ^[1] | 1 | 60 + 15 | 70 + 15 | 80 + 15 | 90 + 15 | 40 + 7 | 45 + 7 |
| 5725A Amplifier: | | | | | | | |
| 11 A | 10 | 330 + 470 | 340 + 480 | 350 + 480 | 360 + 480 | 100 + 130 | 110 + 130 |
| 95 % Confidence Level | | | | | | | |
| $\pm(\text{ppm output} + \text{nA})$ | | | | | | | |
| 220 µA | 0.1 | 32 + 6 | 35 + 6 | 37 + 6 | 40 + 6 | 20 + 1.6 | 22 + 1.6 |
| 2.2 mA | 1 | 25 + 7 | 30 + 7 | 33 + 7 | 35 + 7 | 20 + 4 | 22 + 4 |
| 22 mA | 10 | 25 + 40 | 30 + 40 | 33 + 40 | 35 + 40 | 20 + 40 | 22 + 40 |
| $\pm(\text{ppm output} + \mu\text{A})$ | | | | | | | |
| 220 mA ^[1] | 0.1 | 35 + 0.7 | 40 + 0.7 | 42 + 0.7 | 45 + 0.7 | 22 + 0.25 | 25 + 0.25 |
| 2.2 A ^[1] | 1 | 50 + 12 | 60 + 12 | 70 + 12 | 80 + 12 | 32 + 6 | 40 + 6 |
| 5725A Amplifier: | | | | | | | |
| 11 A | 10 | 330 + 470 | 340 + 480 | 350 + 480 | 360 + 480 | 100 + 130 | 110 + 130 |

Note:
 Maximum output from the calibrator's terminals is 2.2 A. Specifications for 220 µA and 2.2 mA ranges are increased by a factor of 1.3 when supplied through 5725A terminals.
 Specifications are otherwise identical for all output locations.

1. Add to specifications:
 ±200 x I² ppm for >100 mA on 220 mA range
 ±10 x I² ppm for >1 A on 2.2 A range

DC Current Secondary Performance Specifications and Operating Characteristics

| Range | Stability ±1 °C ^[1] 24 Hours | Temperature Coefficient ^[2] | | Compliance Limits | Burden Voltage Adder ^[3] (±nA/V) | Maximum Load for Published Specification ^[4] (Ω) | Noise | |
|--------------|---|--|--------------------------|-------------------|--|--|------------------------------|-------------------------------|
| | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | | | Bandwidth 0.1-10 Hz pk-pk | Bandwidth 10 Hz-10 kHz RMS |
| | | $\pm(\text{ppm output} + \text{nA}) / \text{°C}$ | | | | | ppm output + nA | nA |
| 220 µA | 5 + 1 | 1 + 0.40 | 3 + 1 | 10 | 0.2 | 20k | 6 + .9 | 10 |
| 2.2 mA | 5 + 5 | 1 + 2 | 3 + 10 | 10 | 0.2 | 2k | 6 + 5 | 10 |
| 22 mA | 5 + 50 | 1 + 20 | 3 + 100 | 10 | 10 | 200 | 6 + 50 | 50 |
| 220 mA | 8 + 300 | 1 + 200 | 3 + 1 µA | 10 | 100 | 20 | 9 + 300 | 500 |
| 2.2 A | 9 + 7 µA | 1 + 2.5 µA | 3 + 10 µA | 3 ^[5] | 2 µA | 2 | 12 + 1.5 µA | 20 µA |
| 5725A | $\pm(\text{ppm output} + \mu\text{A})$ | $\pm(\text{ppm output} + \mu\text{A}) / \text{°C}$ | | | | | ppm output + µA | µA |
| 11 A | 25 + 100 | 20 + 75 | 30 + 120 | 4 | 0 | 4 | 15 + 70 | 175 |

Notes:

Maximum output from the calibrator's terminals is 2.2 A. Specifications for 220 µA and 2.2 mA ranges are increased by a factor of 1.3 when supplied through 5725A terminals.

- Stability specifications are included in the Absolute specification values for the primary specifications.
- Temperature coefficient is an adder to Absolute specifications. It does not apply unless operating more than ±5 °C from calibration temperature.
- Burden voltage adder is an adder to Absolute specifications that does not apply unless burden voltage is greater than 0.5 V.

4. For higher loads, multiply Absolute specification by: $1 + \frac{0.1 \times \text{actual load}}{\text{maximum load for published specification}}$

5. The calibrator's compliance limit is 2 V for outputs from 1 A to 2.2 A. 5725A Amplifier may be used in range-lock mode down to 0 A.

Minimum Output 0 for all ranges, including 5725A.

Settling Time 1 second for μA and mA ranges; 3 seconds for 2.2 A range; 6 seconds for 11 range; + 1 second for range or polarity change

Overshoot <5 %

AC Current Specifications

5730A AC Current Specifications: 99 % Confidence Level

| Range | Resolution | Frequency (Hz) | Absolute / $\pm 5^\circ\text{C}$ from calibration temperature | | | | Relative $\pm 1^\circ\text{C}$ | |
|---|-------------------|----------------|---|-------------|-------------|-------------|--------------------------------|-------------|
| | | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| $\pm(\text{ppm output} + \text{nA})$ | | | | | | | | |
| 220 μA | 1 nA | 10 - 20 | 260 + 20 | 280 + 20 | 290 + 20 | 300 + 20 | 260 + 20 | 280 + 20 |
| | | 20 - 40 | 170 + 12 | 180 + 12 | 190 + 12 | 200 + 12 | 130 + 12 | 150 + 12 |
| | | 40 - 1 k | 115 + 10 | 117 + 10 | 118 + 10 | 120 + 10 | 100 + 10 | 110 + 10 |
| | | 1 k - 5 k | 300 + 15 | 320 + 15 | 340 + 15 | 350 + 15 | 250 + 15 | 280 + 15 |
| | | 5 k - 10 k | 1000 + 80 | 1100 + 80 | 1200 + 80 | 1300 + 80 | 900 + 80 | 1000 + 80 |
| 2.2 mA | 10 nA | 10 - 20 | 260 + 50 | 280 + 50 | 290 + 50 | 300 + 50 | 260 + 50 | 280 + 50 |
| | | 20 - 40 | 170 + 40 | 180 + 40 | 190 + 40 | 200 + 40 | 130 + 40 | 150 + 40 |
| | | 40 - 1 k | 115 + 40 | 117 + 40 | 118 + 40 | 120 + 40 | 100 + 40 | 110 + 40 |
| | | 1 k - 5 k | 210 + 130 | 220 + 130 | 230 + 130 | 240 + 130 | 190 + 130 | 220 + 130 |
| | | 5 k - 10 k | 1000 + 800 | 1100 + 800 | 1200 + 800 | 1300 + 800 | 900 + 800 | 1000 + 800 |
| 22 mA | 100 nA | 10 - 20 | 260 + 500 | 280 + 500 | 290 + 500 | 300 + 500 | 260 + 500 | 280 + 500 |
| | | 20 - 40 | 170 + 400 | 180 + 400 | 190 + 400 | 200 + 400 | 130 + 400 | 150 + 400 |
| | | 40 - 1 k | 115 + 400 | 117 + 400 | 118 + 400 | 120 + 400 | 100 + 400 | 110 + 400 |
| | | 1 k - 5 k | 210 + 700 | 220 + 700 | 230 + 700 | 240 + 700 | 190 + 700 | 220 + 700 |
| | | 5 k - 10 k | 1000 + 6000 | 1100 + 6000 | 1200 + 6000 | 1300 + 6000 | 900 + 6000 | 1000 + 6000 |
| $\pm(\text{ppm output} + \mu\text{A})$ | | | | | | | | |
| 220 mA | 1 μA | 10 - 20 | 260 + 5 | 280 + 5 | 290 + 5 | 300 + 5 | 260 + 5 | 280 + 5 |
| | | 20 - 40 | 170 + 4 | 180 + 4 | 190 + 4 | 200 + 4 | 130 + 4 | 150 + 4 |
| | | 40 - 1 k | 115 + 3 | 117 + 3 | 118 + 3 | 120 + 3 | 100 + 3 | 110 + 3 |
| | | 1 k - 5 k | 210 + 4 | 220 + 4 | 230 + 4 | 240 + 4 | 190 + 4 | 220 + 4 |
| | | 5 k - 10 k | 1000 + 12 | 1100 + 12 | 1200 + 12 | 1300 + 12 | 900 + 12 | 1000 + 12 |
| 2.2 A | 10 μA | 20 - 1 k | 270 + 40 | 280 + 40 | 290 + 40 | 300 + 40 | 260 + 40 | 280 + 40 |
| | | 1 k - 5 k | 440 + 100 | 460 + 100 | 480 + 100 | 500 + 100 | 420 + 100 | 440 + 100 |
| | | 5 k - 10 k | 6000 + 200 | 7000 + 200 | 7500 + 200 | 8000 + 200 | 6000 + 200 | 7000 + 200 |
| 5725A Amplifier: | | | | | | | | |
| 11 A | 100 μA | 40 - 1 k | 370 + 170 | 400 + 170 | 440 + 170 | 460 + 170 | 300 + 170 | 330 + 170 |
| | | 1 k - 5 k | 800 + 380 | 850 + 380 | 900 + 380 | 950 + 380 | 700 + 380 | 800 + 380 |
| | | 5 k - 10 k | 3000 + 750 | 3300 + 750 | 3500 + 750 | 3600 + 750 | 2800 + 750 | 3200 + 750 |
| Note: Maximum output from the calibrator's terminals is 2.2 A. Specifications for 220 μA and 2.2 mA ranges are increased by a factor of 1.3 plus 2 μA when supplied through 5725A terminals. | | | | | | | | |

5730A AC Current Specifications: 95 % Confidence Level

| Range | Resolution | Frequency (Hz) | Absolute / ±5 °C from calibration temperature | | | | Relative ±1 °C | |
|-------------------------|------------|----------------|---|------------|-------------|-------------|----------------|------------|
| | | | 24 Hours | 90 Days | 180 Days | 1 Year | 24 Hours | 90 Days |
| | | | ±(ppm output + nA) | | | | | |
| 220 µA | 1 nA | 10 - 20 | 210 + 16 | 230 + 16 | 240 + 16 | 250 + 16 | 210 + 16 | 230 + 16 |
| | | 20 - 40 | 130 + 10 | 140 + 10 | 150 + 10 | 160 + 10 | 110 + 10 | 130 + 10 |
| | | 40 - 1 k | 96 + 8 | 99 + 8 | 101 + 8 | 103 + 8 | 80 + 8 | 90 + 8 |
| | | 1 k - 5 k | 240 + 12 | 250 + 12 | 270 + 12 | 280 + 12 | 200 + 12 | 230 + 12 |
| | | 5 k - 10 k | 800 + 65 | 900 + 65 | 1000 + 65 | 1100 + 65 | 700 + 65 | 800 + 65 |
| 2.2 mA | 10 nA | 10 - 20 | 210 + 40 | 230 + 40 | 240 + 40 | 250 + 40 | 210 + 40 | 230 + 40 |
| | | 20 - 40 | 130 + 35 | 140 + 35 | 150 + 35 | 160 + 35 | 110 + 35 | 130 + 35 |
| | | 40 - 1 k | 96 + 35 | 99 + 35 | 101 + 35 | 103 + 35 | 80 + 35 | 90 + 35 |
| | | 1 k - 5 k | 170 + 110 | 180 + 110 | 190 + 110 | 200 + 110 | 160 + 110 | 170 + 110 |
| | | 5 k - 10 k | 800 + 650 | 900 + 650 | 1000 + 650 | 1100 + 650 | 700 + 650 | 800 + 650 |
| 22 mA | 100 nA | 10 - 20 | 210 + 400 | 230 + 400 | 240 + 400 | 250 + 400 | 210 + 400 | 230 + 400 |
| | | 20 - 40 | 130 + 350 | 140 + 350 | 150 + 350 | 160 + 350 | 110 + 350 | 130 + 350 |
| | | 40 - 1 k | 96 + 350 | 99 + 350 | 101 + 350 | 103 + 350 | 80 + 350 | 90 + 350 |
| | | 1 k - 5 k | 170 + 550 | 180 + 550 | 190 + 550 | 200 + 550 | 160 + 550 | 170 + 550 |
| | | 5 k - 10 k | 800 + 5000 | 900 + 5000 | 1000 + 5000 | 1100 + 5000 | 700 + 5000 | 800 + 5000 |
| | | | ±(ppm output + µA) | | | | | |
| 220 mA | 1 µA | 10 - 20 | 210 + 4 | 230 + 4 | 240 + 4 | 250 + 4 | 210 + 4 | 230 + 4 |
| | | 20 - 40 | 130 + 3.5 | 140 + 3.5 | 150 + 3.5 | 160 + 3.5 | 110 + 3.5 | 130 + 3.5 |
| | | 40 - 1 k | 96 + 2.5 | 99 + 2.5 | 101 + 2.5 | 103 + 2.5 | 80 + 2.5 | 90 + 2.5 |
| | | 1 k - 5 k | 170 + 3.5 | 180 + 3.5 | 190 + 3.5 | 200 + 3.5 | 160 + 3.5 | 170 + 3.5 |
| | | 5 k - 10 k | 800 + 10 | 900 + 10 | 1000 + 10 | 1100 + 10 | 700 + 10 | 800 + 10 |
| 2.2 A | 10 µA | 20 - 1 k | 214 + 35 | 224 + 35 | 234 + 35 | 244 + 35 | 200 + 35 | 230 + 35 |
| | | 1 k - 5 k | 350 + 80 | 390 + 80 | 420 + 80 | 450 + 80 | 300 + 80 | 350 + 80 |
| | | 5 k - 10 k | 5000 + 160 | 6000 + 160 | 6500 + 160 | 7000 + 160 | 5000 + 160 | 6000 + 160 |
| 5725A Amplifier: | | | | | | | | |
| 11 A | 100 µA | 40 - 1 k | 370 + 170 | 400 + 170 | 440 + 170 | 460 + 170 | 300 + 170 | 330 + 170 |
| | | 1 k - 5 k | 800 + 380 | 850 + 380 | 900 + 380 | 950 + 380 | 700 + 380 | 800 + 38 |
| | | 5 k - 10 k | 3000 + 750 | 3300 + 750 | 3500 + 750 | 3600 + 750 | 2800 + 750 | 3200 + 750 |

Note:

Maximum output from the calibrator's terminals is 2.2 A. Specifications for 220 µA and 2.2 mA ranges are increased by 1.3 plus 2 µA when supplied through 5725A terminals.

AC Current Secondary Performance Specifications and Operating Characteristics

| Range | Frequency (Hz) | Stability ±1 °C ^[1] 24 Hours | Temperature Coefficient ^[2] | | Compliance Limits (V rms) | Maximum Resistive Load For Published Specification ^[3] (Ω) | Noise and Distortion (Bandwidth 10 Hz - 50 kHz <0.5V Burden) ±(% output + μA) |
|-------------------------|----------------|--|--|--------------------------|---------------------------|---|--|
| | | | 10 - 40 °C | 0 - 10 °C and 40 - 50 °C | | | |
| | | ±(ppm output + nA) | ±(ppm output + nA)/ °C | | | | |
| 220 μA | 10 - 20 | 150 + 5 | 50 + 5 | 50 + 5 | 7 | 2 k | 0.05 + 0.1 |
| | 20 - 40 | 80 + 5 | 20 + 5 | 20 + 5 | | | 0.05 + 0.1 |
| | 40 - 1 k | 30 + 3 | 4 + 0.5 | 10 + 0.5 | | | 0.05 + 0.1 |
| | 1 k - 5 k | 50 + 20 | 10 + 1 | 20 + 1 | | | 0.25 + 0.5 |
| | 5 k - 10 k | 400 + 100 | 20 + 100 | 20 + 100 | | | 0.05 + 0.1 |
| 2.2 mA | 10 - 20 | 150 + 5 | 50 + 5 | 50 + 5 | 7 | 800 | 0.05 + 0.1 |
| | 20 - 40 | 80 + 5 | 20 + 4 | 20 + 4 | | | 0.05 + 0.1 |
| | 40 - 1 k | 30 + 3 | 4 + 1 | 10 + 2 | | | 0.05 + 0.1 |
| | 1 k - 5 k | 50 + 20 | 10 + 100 | 20 + 100 | | | 0.25 + 0.5 |
| | 5 k - 10 k | 400 + 100 | 50 + 400 | 50 + 400 | | | 0.05 + 0.1 |
| 22 mA | 10 - 20 | 150 + 50 | 50 + 10 | 50 + 10 | 7 | 80 | 0.05 + 0.1 |
| | 20 - 40 | 80 + 50 | 20 + 10 | 20 + 10 | | | 0.05 + 0.1 |
| | 40 - 1 k | 30 + 30 | 4 + 10 | 10 + 20 | | | 0.05 + 0.1 |
| | 1 k - 5 k | 50 + 500 | 10 + 500 | 20 + 400 | | | 0.25 + 0.5 |
| | 5 k - 10 k | 400 + 1000 | 50 + 1000 | 50 + 1000 | | | 0.05 + 0.1 |
| | Hz | ±(ppm output + μA) | ±(ppm output + μA)/°C | | | | |
| 220 mA | 10 - 20 | 150 + 0.5 | 50 + 0.05 | 50 + 0.05 | 7 | 8 | 0.05 + 10 |
| | 20 - 40 | 80 + 0.5 | 20 + 0.05 | 20 + 0.05 | | | 0.05 + 10 |
| | 40 - 1 k | 30 + 0.3 | 4 + 0.1 | 10 + 0.1 | | | 0.05 + 10 |
| | 1 k - 5 k | 50 + 3 | 10 + 2 | 20 + 2 | | | 0.25 + 50 |
| | 5 k - 10 k | 400 + 5 | 50 + 5 | 50 + 5 | | | 0.05 + 0.1 |
| 2.2 A | 20 - 1 k | 50 + 5 | 4 + 1 | 10 + 1 | 1.4 ^[4] | 0.8 | 0.5 + 100 |
| | 1 k - 5 k | 80 + 20 | 10 + 5 | 20 + 5 | | | 0.3 + 500 |
| | 5 k - 10 k | 800 + 50 | 50 + 10 | 50 + 10 | | | 1 + 1 mA |
| 5725A Amplifier: | | | | | | | ±(% output) |
| 11 A | 40 - 1 k | 75 + 100 | 20 + 75 | 30 + 75 | 3 | 3 | 0.05 ^[5] |
| | 1 k - 5 k | 100 + 150 | 40 + 75 | 50 + 75 | | | 0.12 ^[5] |
| | 5 k - 10 k | 200 + 300 | 100 + 75 | 100 + 75 | | | 0.5 ^[5] |

Notes:

Maximum output from 5730A terminals is 2.2 A. Specifications for 220 μA and 2.2 mA ranges are increased by a factor of 1.3, plus 2 μA when supplied through 5725A terminals. Specifications are otherwise identical for all output locations.

- Stability specifications are included in the Absolute values for the primary specifications.
- Temperature coefficient is an adder to specifications that does not apply unless operating more than ±5 °C from calibration temperature.
- For larger resistive loads multiply accuracy specifications by: $\left(\frac{\text{actual load}}{\text{maximum load for published specification}} \right)^2$
- 1.5 V compliance limit above 1 A. 5725A Amplifier may be used in range-lock mode down to 1 A.
- For resistive loads within rated compliance voltage limits.

Minimum Output.....9 μA for 220 μA range, 10 % on all other ranges. 1 A minimum for 5725A.

Inductive Load Limits.....400 μH (5730A, or 5725A). 20 μH for 5730A output > 1 A.

Power Factors.....5730A, 0.9 to 1; 5725A, 0.1 to 1. Subject to compliance voltage limits.

Frequency

Range (Hz)10.000 - 11.999, 12.00 - 119.99, 120.0 - 1199.9, 1.200 k - 10.000 k

Specification.....±0.01 % of output

Resolution.....11,999 counts

Settling Time.....5 seconds for 5730A ranges; 6 seconds for 5725A 11 A range; + 1 second for amplitude or frequency range change.

Overshoot.....< 10 %

Wideband AC Voltage (Option 5730A/03 and 5730A/05) Specifications (99 % Confidence Level)

Specifications apply to the end of the cable and 50 Ω termination used for calibration.

| Range | | Resolution | Absolute / ±5 °C from calibration temperature 30 Hz - 500 kHz | | | |
|--------|------|------------|--|------------|------------|-----------|
| Volts | dBm | | 24 Hours | 90 Days | 180 Days | 1 Year |
| | | | ±(% output + μV) | | | |
| 1.1 mV | -46 | 10 nV | 0.4 + 0.4 | 0.5 + 0.4 | 0.6 + 0.4 | 0.8 + 2 |
| 3.3 mV | -37 | 10 nV | 0.4 + 1 | 0.45 + 1 | 0.5 + 1 | 0.7 + 3 |
| 11 mV | -26 | 100 nV | 0.2 + 4 | 0.35 + 4 | 0.5 + 4 | 0.7 + 8 |
| 33 mV | -17 | 100 nV | 0.2 + 10 | 0.3 + 10 | 0.45 + 10 | 0.6 + 16 |
| 110 mV | -6.2 | 1 μV | 0.2 + 40 | 0.3 + 40 | 0.45 + 40 | 0.6 + 40 |
| 330 mV | +3.4 | 1 μV | 0.2 + 100 | 0.25 + 100 | 0.35 + 100 | 0.5 + 100 |
| 1.1 V | +14 | 10 μV | 0.2 + 400 | 0.25 + 400 | 0.35 + 400 | 0.5 + 400 |
| 3.5 V | +24 | 10 μV | 0.15 + 500 | 0.2 + 500 | 0.3 + 500 | 0.4 + 500 |

| Frequency (Hz) | Frequency Resolution (Hz) | Amplitude Flatness, 1 kHz Reference Voltage Range | | | Temperature Coefficient ±ppm/°C | Settling Time To Published Specification (Seconds) | Harmonic Distortion (dB) |
|----------------------------|---------------------------|---|------------|------------|---------------------------------|--|--------------------------|
| | | 1.1 mV | 3.3 mV | >3.3 mV | | | |
| | | ±(% output + floor indicated) | | | | | |
| 10 - 30 | 0.01 | 0.3 | 0.3 | 0.3 | 100 | 7 | -40 |
| 30 - 119.99 | 0.01 | 0.1 | 0.1 | 0.1 | 100 | 7 | -40 |
| 120 - 1.1999 k | 0.1 | 0.1 | 0.1 | 0.1 | 100 | 5 | -40 |
| 1.2 k - 11.999 k | 1 | 0.1 | 0.1 | 0.1 | 100 | 5 | -40 |
| 12 k - 119.99 k | 10 | 0.1 | 0.1 | 0.1 | 100 | 5 | -40 |
| 120 k - 1.1999 M | 100 | 0.2 + 3 μV | 0.1 + 3 μV | 0.1 + 3 μV | 100 | 5 | -40 |
| 1.2 M - 2 M ^[1] | 1 k | 0.2 + 3 μV | 0.1 + 3 μV | 0.1 + 3 μV | 100 | 0.5 | -40 |
| 2 M - 11.9 M | 1 k | 0.4 + 3 μV | 0.3 + 3 μV | 0.2 + 3 μV | 100 | 0.5 | -40 |
| 12 M - 20 M | 10 k | 0.6 + 3 μV | 0.5 + 3 μV | 0.4 + 3 μV | 150 | 0.5 | -34 |
| 20 M - 30 M | 10 k | 1.5 + 15 μV | 1.5 + 3 μV | 1 + 3 μV | 300 | 0.5 | -34 |
| 30 M - 50 M ^[2] | 10 k | 3.0 + 15 μV | 3.0 + 3 μV | 2.0 + 3 μV | 600 | 0.5 | -34 |

Note:

- For output voltages <50 % of full range in the 33 mV, 110 mV, 330 mV, 1.1 V, and 3.5 V ranges, add 0.1 % to the amplitude flatness specification.

Additional Operating Information:

dBm reference = 50 Ω

Range boundaries are at voltage points, dBm levels are approximate.

$$\text{dBm} = 10 \log \left(\frac{\text{Power}}{1\text{mW}} \right); 0.22361 \text{ V across } 50 \Omega = 1 \text{ mW or } 0 \text{ dBm}$$

- Applies to Option 5730A/05 only.

Minimum Output.....300 μV (-57 dBm)

VSWR at Output Terminal.....< 1.1 Typical

Frequency Specification±0.01 % of output

Frequency Resolution11,999 counts to 1.1999 MHz, 10799 counts to 11.999 MHz, 3800 counts to 50 MHz

Overload ProtectionA short circuit on the wideband output will not result in damage. After settling time, normal operation is restored upon removal.

52120A Specifications when Operated with the 5730A

Line Power

| | |
|--------------------------|--------------------------|
| Voltage range | 100 V to 240 V |
| Frequency | 47 to 63 Hz |
| Voltage variations | ±10 % about line voltage |
| Power consumption | < 1500 VA |

Dimensions (HxWxL)

| | |
|--------------------|---|
| With feet | 192 mm x 432 mm x 645 mm (7.6 in x 17.0 in x 25.5 in) |
| Without feet | 178 mm x 432 mm x 645 mm (7.0 in x 17.0 in x 25.5 in) |

Weight 25 kg (54 lb)

Temperature

| | |
|--------------------------|---|
| Operating | 5 °C to 35 °C (41 °F to 95 °F) |
| Calibration (tcal) | 16 °C to 30 °C (61 °F to 86 °F) |
| Storage | 0 °C to 50 °C (32 °F to 122 °F) |
| Transit | -20 °C to +60 °C (-4 °F to +140 °F) < 100 hours |

Warmup Time Twice the time since last warmed up, to a maximum of 1 hour.

Humidity (non-condensing)

| | |
|-----------------|--|
| Operating | <80 %, 5 °C to 31 °C (41 °F to 88 °F) ramping linearly down to 50 % at 35 °C (95 °F) |
| Storage | <95 %, 0 to 50 °C (32 °F to 122 °F) |

Altitude

| | |
|---------------------|------------------------------|
| Operating | 2,500 m (8,200 ft) maximum |
| Non-Operating | 12,000 m (39,400 ft) maximum |

Shock and Vibration MIL-PRF-28800F Class 3

Safety EN/IEC 61010-1, 300 V CAT II, Pollution Degree 2

Electromagnetic Environment IEC 61326-1, Industrial

Electromagnetic Compatibility FCC Rules part 15 sub part B

Applies to use in Korea only. Class A Equipment (Industrial Broadcasting & Communication Equipment)

This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.

Indoor use only IP20

52120A Electrical Performance Limits

Voltage compliance developed across inductive loads may prevent range maximum current output being achieved at higher frequencies. The appropriate maximum frequency (*F_{max}*) for a given load inductance and current is given by:

$$F_{max} = \frac{4.5}{2 \cdot \pi \cdot I \cdot L} \quad \begin{matrix} I = \text{Current} \\ L = \text{Total inductance} \end{matrix}$$

The maximum frequency calculated with this equation is only approximate. Series resistance and parallel capacitance also affect the maximum achievable frequency.

Input Common Mode Rejection 80 dB @ DC decreasing linearly to 40 dB at 10 kHz

Input Impedance

| | |
|---------------------|--------|
| Voltage input | > 1 MΩ |
| Current input | 10 Ω |

Maximum Output Compliance Voltage 4.5 V rms (6.4 V pk), 6.4 V dc. 120 A range maximum compliance voltage decreases from 4.5 V at 1 kHz to about 3 V at 10 kHz

DC Offset Magnetic remanence that follows abrupt changes in output current level may cause small changes to DC current offset. It is good practice to correct for offsets in DC measurements and techniques such as DC reversal measurement will result in best accuracy.

Operated within 5730A Control Loop (all current ranges)

The current specification of the 52120A, when controlled by a single 5730A, applies to the parallel output of up to three 52120As connected as slaves.

Coverage factor k=2.58 (99 % confidence level)

Current Specification

| Frequency | 1-year, tcal ^[1] ±5 °C ±(% of output + % of range) | |
|-----------------|--|------------|
| | 5730A | |
| | % of output | % of range |
| DC | 0.015 | 0.010 |
| 10 Hz to 850 Hz | 0.011 | 0.003 |
| 850 Hz to 6 kHz | 0.052 | 0.005 |
| 6 kHz to 10 kHz | See Operated Stand Alone current specification table in the 52120A Users Manual. | |

Notes:

- tcal is the temperature at which calibration adjustment took place.
Maximum inductance for stability LCOMP OFF is 100 µH. Maximum inductance for stability LCOMP ON is 400 µH for 2 A and 20 A ranges. 100 µH on the 120 A range.
With LCOMP ON, the output is limited to 7.2e3 A-Hz. For example, a 100 A output is limited to 72 Hz.

Coverage factor k=2.00 (95 % confidence level)

Current Specification

| Frequency | 1-year, tcal ^[1] ±5 °C ±(% of output + % of range) | |
|-----------------|--|------------|
| | 5730A | |
| | % of output | % of range |
| DC | 0.012 | 0.008 |
| 10 Hz to 850 Hz | 0.009 | 0.002 |
| 850 Hz to 6 kHz | 0.040 | 0.004 |
| 6 kHz to 10 kHz | See Operated Stand Alone current specification table in the 52120A Users Manual. | |

Notes:

- tcal is the temperature at which calibration adjustment took place.
Maximum inductance for stability LCOMP OFF is 100 µH. Maximum inductance for stability LCOMP ON is 400 µH for 2 A and 20 A ranges. 100 µH on the 120 A range.
With LCOMP ON, the output is limited to 7.2e3 A-Hz. For example, a 100 A output is limited to 72 Hz.

Maximum Distortion and Noise

| Frequency | Distortion ^[1] | | | | Noise 16 Hz to 10 MHz |
|--------------------------------|---------------------------|----------|----------|----------|--------------------------|
| | LCOMP OFF | | LCOMP ON | | |
| | dBc | Current | dBc | Current | |
| 2 Amp Range | | | | | |
| 16 Hz to 850 Hz | -76 | 42 µA | -70 | 83 µA | -60 dB |
| 850 Hz to 6 kHz | -52 | 662 µA | -46 | 1.3 mA | -60 dB |
| 6 kHz to 10 kHz ^[2] | -40 | 2.6 mA | -35 | 4.7 mA | -60 dB |
| 20 Amp Range | | | | | |
| 16 Hz to 850 Hz | -76 | 418 µA | -60 | 2.6 mA | -70 dB |
| 850 Hz to 6 kHz | -52 | 6.6 mA | -42 | 20.9 mA | -70 dB |
| 6 kHz to 10 kHz ^[2] | -40 | 26.4 mA | -35 | 46.9 mA | -70 dB |
| 120 Amp Range | | | | | |
| 16 Hz to 850 Hz | -76 | 2.5 mA | -60 | 15.8 mA | -70 dB |
| 850 Hz to 6 kHz | -52 | 39.7 mA | -42 | 125.7 mA | -70 dB |
| 6 kHz to 10 kHz ^[2] | -40 | 158.2 ma | -35 | 281.3 mA | -70 dB |

Notes:

- Use dB or Current. Whichever is larger.
- Interharmonics only above 6 kHz.

52120A/COIL 3 kA 25-Turn Coil

Number of Turns..... 25
Minimum internal jaw dimension to clear wires 26 mm (width) x 36 mm (length)
Maximum Input Current 120 A continuous with built-in 12 V fan on
Maximum Voltage..... 4.5 V rms

Specification

| Input Current ^[1] | Frequency | Effective Current Amp-turns | 52120A + Coil Specification ^[2] | |
|------------------------------|-----------------|-----------------------------|--|-------------------|
| | | | ±(% of Amp-turns + % of 52120A range) | |
| | | | % of Amp-turns | % of 52120A Range |
| 0 A to 100 A | DC | 0 to 2500 | 0.7 % | 0.7 % |
| 0 A to 120 A | 10 Hz to 65 Hz | 0 to 3000 | 0.7 % | 0.7 % |
| 0 A to 120 A | 65 Hz to 300 Hz | 0 to 3000 | 0.7 % | 0.7 % |
| 0 A to 40 A | 300 Hz to 1 kHz | 0 to 1000 | 0.7 % | 0.7 % |
| 0 A to 12 A | 1 kHz to 3 kHz | 0 to 300 | 0.8 % | 1.0 % |
| 0 A to 3 A | 3 kHz to 6 kHz | 0 to 75 | 1.5 % | 1.0 % |
| 0 A to 1 A | 6 kHz to 10 kHz | 0 to 25 | 5.0 % | 1.0 % |

Notes:

- The inductance and mutual inductance of the 25 turn coil and clamp that is measured causes a frequency dependent compliance voltage across the coil. The length and configuration of the cables that connect the current to the coil also have an effect. Maximum input current is 120 A input at approximately 100 Hz. Maximum current input decreases to approximately 0.8 A at 10 kHz.
- Includes coil/clamp interaction.

52120A/COIL 6 kA 50-Turn Coil

Number of Turns..... 50
Minimum Flexible Probe Length..... 500 mm
Maximum Input Current 120 A continuous with built-in 12 V fan on
Maximum Voltage..... 4.5 V rms

Specification

| Input Current ^[1] | Frequency | Effective Current Amp-turns | 52120A + Coil Specification ^[2] | |
|------------------------------|-----------------|-----------------------------|--|-------------------|
| | | | ±(% of Amp-turns + % of 52120A range) | |
| | | | % of Amp-turns | % of 52120A Range |
| 0 A to 100 A | DC | 0 to 5000 | 0.7 % | 0.7 % |
| 0 A to 120 A | 10 Hz to 65 Hz | 0 to 6000 | 0.7 % | 0.7 % |
| 0 A to 120 A | 65 Hz to 300 Hz | 0 to 6000 | 0.7 % | 0.7 % |
| 0 A to 120 A | 300 Hz to 1 kHz | 0 to 6000 | 0.7 % | 0.7 % |
| 0 A to 120 A | 1 kHz to 3 kHz | 0 to 6000 | 0.8 % | 1.0 % |
| 0 A to 25 A | 3 kHz to 6 kHz | 0 to 1250 | 1.5 % | 1.0 % |
| 0 A to 13 A | 6 kHz to 10 kHz | 0 to 650 | 5.0 % | 1.0 % |

Notes:

- The inductance and mutual inductance of the 50 turn coil causes a frequency dependent compliance voltage across the coil. Maximum frequency for 120 A input current is approximately 600 Hz. Maximum current input decreases to approximately 13 A at 10 kHz.
- Includes coil/probe interaction.

Note

The specifications for these coils are at 99 % confidence level and are the combined specification of the coil and a 52120A. If the coils are used with other current sources the calibration specification of the coils alone is 0.65 % (99 % confidence level) from 0 Hz to 10 kHz.

Operating Limits

| | Output Current Range | | |
|-----------------------|----------------------|------------|-------------|
| | 2 A | 20 A | 120 A |
| Current Output (Max.) | 2 A rms | 20 A rms | 120 A rms |
| | Current Input | | |
| Input Current (Max.) | 200 mA rms | 200 mA rms | 120 mA rms |
| Current gain | 10 | 100 | 1,000 |
| | Voltage Input | | |
| Input Voltage (Max.) | 2 V rms | 2 V rms | 1.2 V rms |
| Transconductance | 1 Siemen | 10 Siemens | 100 Siemens |

120 A Range Current/Frequency Limits

| Frequency | Maximum Output Current | Maximum Current Input | Maximum Voltage Input |
|-----------------|------------------------|------------------------|-----------------------|
| DC | ±100 A | ±100 mA | ±1.0 V |
| < 10 Hz | 100 A pk (70 A rms) | 100 mA pk (70 mA rms) | 1.0 V pk (0.7 V rms) |
| 10 Hz to 10 kHz | 170 A pk (120 A rms) | 170 mA pk (120 mA rms) | 1.7 V pk (1.2 V rms) |

Note:

The 2 A and 20 A ranges operate at full output current from DC to 10 kHz.

Output Isolation

| Frequency | Maximum Voltage Signal Applied to any Output Current Terminal with respect to Earth |
|-----------------|---|
| DC to 850 Hz | 600 V rms, 850 V pk, limited 2 A rms, no transient overvoltages |
| 850 Hz to 3 kHz | 100 V rms, 142 V pk, limited 2 A rms, no transient overvoltages |
| 3 kHz to 10 kHz | 33 V rms, 47 V pk, limited 2 A rms, no transient overvoltages |

Ordering Information

Model

| | |
|----------|---|
| 5730A | Multifunction Calibrator |
| 5730A/03 | Multifunction Calibrator with 30 MHz Wideband AC Voltage Option |
| 5730A/05 | Multifunction Calibrator with 50 MHz Wideband AC Voltage Option |
| 5730A/S | Multifunction Calibrator with no front panel USB port |

Accessories

| | |
|------------|--|
| 52120A | Transconductance Amplifier |
| 5725A | Amplifier |
| 5730A-7002 | Low Thermal EMF Cables with Banana Plugs |
| 5730A-7003 | Low Thermal EMF Cables with Spade Connectors |
| Y5737 | 5730A Rack Mount Kit |
| Y5738 | 5730A Rack Ear Kit |
| 57XX/CASE | 5730A Durable Travel Case |

Additional standards

| | |
|-------|---|
| 5790B | AC Measurement Standard |
| 734A | Voltage Reference and DC Voltage Standard |
| 732B | Direct Voltage Standard |
| 742A | Resistance Standards |
| 792A | AC/DC Transfer Standard |

Software

| | |
|----------|---|
| MET/CAL | MET/CAL <i>Plus</i> Calibration Management Software |
| MET/TEAM | MET/TEAM Test Equipment Asset Management Software |

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| | | | | | |
|------------|----|-------------|----------|------|----------|
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Fluke Calibration
PO Box 9090,
Everett, WA 98206 U.S.A.

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands
Web access: <http://www.flukecal.com>

For more information call:
In the U.S.A. (877) 355-3225 or Fax (425) 446-5116
In Europe/M-East/Africa +31 (0) 40 2675 200 or Fax +31 (0) 40 2675 222
In Canada (800)-36-FLUKE or Fax (905) 890-6866
From other countries +1 (425) 446-5500 or Fax +1 (425) 446-5116
Web access: <http://www.flukecal.com>

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