



Advanced Test Equipment Rentals
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5700A

CALIBRATOR

Service Manual

PN 791996

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FLUKE™

Table 1-1. Specifications

DC VOLTAGE

Range	Resolution	Absolute Uncertainty ± 5°C from calibration temperature				Relative Uncertainty ± 1°C	
		24 Hours	90 Days	180 Days	1 Year	24 Hours	90 Days
		± (ppm output + μV)				± (ppm output + μV)	
220 mV	10 nV	6.5 + .75	7 + .75	8 + .75	9 + .8	2.5 + .5	4 + .5
2.2V	100 nV	3.5 + 1.2	6 + 1.2	7 + 1.2	8 + 1.2	2.5 + 1.2	4 + 1.2
11V	1 μV	3.5 + 3	5 + 4	7 + 4	8 + 4	1.5 + 3	3.5 + 4
22V	1 μV	3.5 + 6	5 + 8	7 + 8	8 + 8	1.5 + 6	3.5 + 8
220V	10 μV	5 + 100	6 + 100	8 + 100	9 + 100	2.5 + 100	4 + 100
1100V	100 μV	7 + 600	8 + 600	10 + 600	11 + 600	3 + 600	4.5 + 600

Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Range	Stability ± 1°C	Temperature Coefficient [Note]		Linearity ± 1°C	Noise	
		10°-40°C	0°-10°C and 40°-50°C		Bandwidth 0.1-10 Hz	Bandwidth 10-10 kHz
	24 Hours			pk-pk	RMS	
	± (ppm output + μV)	± (ppm output + μV)/°C	± (ppm output + μV)	μV		
220 mV	.3 + .3	.4 + .1	1.5 + .5	1 + .2	.15 + .1	5
2.2V	.3 + 1	.3 + .1	1.5 + 2	1 + .6	.15 + .4	15
11V	.3 + 2.5	.15 + .2	1 + 1.5	.3 + 2	.15 + 2	50
22V	.4 + 5	.2 + .4	1.5 + 3	.3 + 4	.15 + 4	50
220V	.5 + 40	.3 + 5	1.5 + 40	1 + 40	.15 + 60	150
1100V	.5 + 200	.5 + 10	3 + 200	1 + 200	.15 + 300	500

Note: Temperature coefficient is an adder to uncertainty specifications that does not apply unless operating more than ±5°C from calibration temperature.

Minimum output: 0V for all ranges, except 100V for 1100V range

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

Load regulation: <0.2 ppm + 0.2 μV change, full load to no load

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

Settling time: 3 seconds to full accuracy; + 1 second for range or polarity change; + 1 second for 1100V range

Overshoot: <5%

Common mode rejection: 140 dB, DC to 400 Hz

Remote sensing: Available 0V to ±1100V, on 2.2V through 1100V ranges

Table 1-1. Specifications

DC VOLTAGE

Range	Resolution	Absolute Uncertainty ± 5°C from calibration temperature				Relative Uncertainty ± 1°C	
		24 Hours	90 Days	180 Days	1 Year	24 Hours	90 Days
		± (ppm output + μV)				± (ppm output + μV)	
220 mV	10 nV	6.5 + .75	7 + .75	8 + .75	9 + .8	2.5 + .5	4 + .5
2.2V	100 nV	3.5 + 1.2	6 + 1.2	7 + 1.2	8 + 1.2	2.5 + 1.2	4 + 1.2
11V	1 μV	3.5 + 3	5 + 4	7 + 4	8 + 4	1.5 + 3	3.5 + 4
22V	1 μV	3.5 + 6	5 + 8	7 + 8	8 + 8	1.5 + 6	3.5 + 8
220V	10 μV	5 + 100	6 + 100	8 + 100	9 + 100	2.5 + 100	4 + 100
1100V	100 μV	7 + 600	8 + 600	10 + 600	11 + 600	3 + 600	4.5 + 600

Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Range	Stability ± 1°C	Temperature Coefficient [Note]		Linearity ± 1°C	Noise	
		10°-40°C	0°-10°C and 40°-50°C		Bandwidth 0.1-10 Hz	Bandwidth 10-10 kHz
	24 Hours			pk-pk	RMS	
	± (ppm output + μV)	± (ppm output + μV)/°C	± (ppm output + μV)	μV		
220 mV	.3 + .3	.4 + .1	1.5 + .5	1 + .2	.15 + .1	5
2.2V	.3 + 1	.3 + .1	1.5 + 2	1 + .6	.15 + .4	15
11V	.3 + 2.5	.15 + .2	1 + 1.5	.3 + 2	.15 + 2	50
22V	.4 + 5	.2 + .4	1.5 + 3	.3 + 4	.15 + 4	50
220V	.5 + 40	.3 + 5	1.5 + 40	1 + 40	.15 + 60	150
1100V	.5 + 200	.5 + 10	3 + 200	1 + 200	.15 + 300	500

Note: Temperature coefficient is an adder to uncertainty specifications that does not apply unless operating more than ±5°C from calibration temperature.

Minimum output: 0V for all ranges, except 100V for 1100V range

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

Load regulation: <0.2 ppm + 0.2 μV change, full load to no load

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

Settling time: 3 seconds to full accuracy; + 1 second for range or polarity change; + 1 second for 1100V range

Overshoot: <5%

Common mode rejection: 140 dB, DC to 400 Hz

Remote sensing: Available 0V to ±1100V, on 2.2V through 1100V ranges

AC Voltage (continued)
Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Range	Frequency	Stability ± 1°C	Temperature Coefficient		Output Impedance	Maximum Distortion Bandwidth 10 Hz-10 MHz
			10°-40°C	0°-10°C and 40°-50°C		
		24 Hours	±μV/°C		Ω	± (% output + μV)
	Hz	± μV				
2.2 mV	10-20	5	.05	.05	50	.05 + 10
	20-40	5	.05	.05		.035 + 10
	40-20k	2	.05	.05		.035 + 10
	20k-50k	2	.1	.1		.035 + 10
	50k-100k	3	.2	.2		.035 + 10
	100k-300k	3	.3	.3		.3 + 30
	300k-500k	5	.4	.4		.3 + 30
	500k-1M	5	.5	.5		1 + 30
22 mV	10-20	5	.2	.3	50	.05 + 11
	20-40	5	.2	.3		.035 + 11
	40-20k	2	.2	.3		.035 + 11
	20k-50k	2	.4	.5		.035 + 11
	50k-100k	3	.5	.5		.035 + 11
	100k-300k	5	.6	.6		.3 + 30
	300k-500k	10	1	1		.3 + 30
	500k-1M	15	1	1		1 + 30
		± (ppm output + μV)	± (ppm output μV)/°C			
220 mV	10-20	150 + 20	2 + 1	2 + 1	50	.05 + 16
	20-40	80 + 15	2 + 1	2 + 1		.035 + 16
	40-20k	12 + 2	2 + 1	2 + 1		.035 + 16
	20k-50k	10 + 2	15 + 2	15 + 2		.035 + 16
	50k-100k	10 + 2	15 + 4	15 + 4		.035 + 16
	100k-300k	20 + 4	80 + 5	80 + 5		.3 + 30
	300k-500k	100 + 10	80 + 5	80 + 5		.3 + 30
	500k-1M	200 + 20	80 + 5	80 + 5		1 + 30
				Load Regulation ± (ppm output + μV)		
2.2V	10-20	150 + 20	50 + 10	50 + 10	10 + 2	.05 + 80
	20-40	80 + 15	15 + 5	15 + 5	10 + 2	.035 + 80
	40-20k	12 + 4	2 + 1	5 + 2	10 + 4	.035 + 80
	20k-50k	15 + 5	10 + 2	15 + 4	30 + 10	.035 + 80
	50k-100k	15 + 5	10 + 4	20 + 4	120 + 16	.035 + 80
	100k-300k	30 + 10	80 + 15	80 + 15	300 ppm	.3 + 110
	300k-500k	70 + 20	80 + 40	80 + 40	600 ppm	.3 + 110
	500k-1M	150 + 50	80 + 100	80 + 100	.12%	1 + 110
22V	10-20	150 + 20	50 + 100	50 + 100	10 + 20	.05 + 700
	20-40	80 + 15	15 + 30	15 + 40	10 + 20	.035 + 700
	40-20k	12 + 8	2 + 10	4 + 15	10 + 30	.035 + 700
	20k-50k	15 + 10	10 + 20	20 + 20	30 + 50	.035 + 700
	50k-100k	15 + 10	10 + 40	20 + 40	80 + 80	.035 + 700
	100k-300k	30 + 15	80 + 150	80 + 150	100 + 700	.3 + 800
	300k-500k	70 + 100	80 + 300	80 + 300	200 + 1.1 mV	.3 + 800
	500k-1M	150 + 100	80 + 500	80 + 500	600 + 3.0 mV	2 + 800
220V	10-20	150 + 200	50 + 1 mV	50 + 1 mV	10 + .2 mV	.05 + 10 mV
	20-40	80 + 150	15 + 300	15 + 300	10 + .2 mV	.05 + 10 mV
	40-20k	12 + 80	2 + 80	4 + 80	10 + .3 mV	.05 + 10 mV
	20k-50k	15 + 100	10 + 100	20 + 100	30 + .6 mV	.05 + 10 mV
	50k-100k	15 + 100	10 + 500	20 + 500	80 + 3 mV	.1 + 13 mV
	100k-300k	30 + 400	80 + 600	80 + 600	250 + 25 mV	1.5 + 50 mV
	300k-500k	100 + 10 mV	80 + 800	80 + 800	500 + 50 mV	1.5 + 50 mV
	500k-1M	200 + 20 mV	80 + 1 mV	80 + 1 mV	1000 + 110 mV	3.5 + 100 mV
		±(ppm output + mV)	±(ppm output)/°C			±(% output)
1100V	50-1k	20 + .5	2	5	10 + 1	.07

AC Voltage (continued)
Secondary Performance and Operating Characteristics (continued)
Included in Uncertainty Specifications

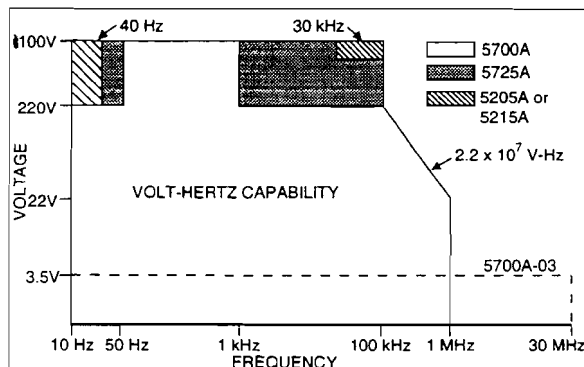
5725A Amplifier:

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

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

Notes:

- 2.2V Range, 100 kHz-1.2 MHz only: uncertainty specifications cover loads to 10 mA or 1000 pF. For higher loads, load regulation is added.
- The 5725A will drive up to 1000 pF of load capacitance. Uncertainty 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."
- Applies from 0°C to 40°C



Output display formats: Voltage or dBm, dBm referencee 600Ω.

Minimum output: 10% on each range

External sense: Selectable for 2.2v, 22V, 220V, and 1100V ranges; 5700A <100 kHz, 5725A <30 kHz

Settling time to full accuracy:

Frequency (Hz)	Settling time (seconds)
<20	7
120-120k	5
>120k	2

+ 1 second for amplitude or frequency range change; + 2 seconds for 5700A 1100V range; + 4 seconds for 5725A 1100V range

Overshoot: <10%

Common mode rejection: 140 dB, DC to 400 Hz

Frequency:

Ranges (Hz):

10.000-11.999, 12.00-119.99

120.0-1199.9, 1.200k-11.999k

12.00k-119.99k, 120.0k-1.1999

Uncertainty: ±0.01%

Resolution: 11.999 counts

Phase lock: Selectable rear panel BNC input

Phase uncertainty (except 1100V range):

>30 Hz: ±1° + 0.05°/kHz, <30 Hz: ±3°

Input voltage: 1V to 10V rms sine wave (do not exceed 1V for mV ranges)

Frequency range: 10 Hz to 1.1999 MHz

Lock range: ±2% of frequency

Lock-in time: Larger of 10/frequency or 10 msec

Phase reference: Selectable, rear panel BNC output

Range: ±180°

Phase Uncertainty (except 1100V range):

±1° at quadrature points (0°, ±90°, ±180°) elsewhere ±2°

Stability: ±0.1°

Resolution: 1°

Output level: 2.5V rms ±0.2V

Frequency range: 50 kHz to 1 kHz, useable 10 Hz to 1.1999 MHz

Resistance

Nominal Value	Absolute Uncertainty of Characterized Value ±5°C from calibration temperature [Note 1]			
	24 Hours	90 Days	180 Days	1 Year
Ω	±ppm			
0	50 μΩ	50 μΩ	50 μΩ	50 μΩ
1	85	95	100	110
1.9	85	95	100	110
10	26	28	30	33
19	24	26	28	31
100	15	17	18	20
190	15	17	18	20
1k	11	12	13	15
1.9k	11	12	13	15
10k	9	11	12	14
19k	9	11	12	14
100k	11	13	14	16
190k	11	13	14	16
1M	16	18	20	23
1.9M	17	19	21	24
10M	33	37	40	46
19M	43	47	50	55
100M	110	120	125	130

Relative Uncertainty ±1°C	
24 Hours	90 Days
±ppm	
50 μΩ	50 μΩ
32	40
25	33
5	8
4	7
2	4
2	4
2	3.5
2	3.5
2	3.5
2	3.5
2.5	5
3.5	6
10	14
20	24
50	60

Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Nominal Value	Stability ±1°C 24 Hours	Temperature Coefficient [Note 2]		Full Spec Load Range [Note 3]	Maximum Peak Current	Maximum Difference of Characterized to Nominal Value	Two-Wire Adder active compensation [Note 4]	
		10°-40°C	0°-10°C and 40°-50°C				Lead Resistance	
							0.1Ω	1Ω
Ω	±ppm	±ppm/°C		mA	mA	±ppm	±mΩ	
0	—	—	—	8-500	500	—	2	4
1	32	4	5	8-100	700	500	2	4
1.9	25	6	7	8-100	500	500	2	4
10	5	2	3	8-11	220	300	2	4
19	4	2	3	8-11	160	300	2	4
100	2	2	3	8-11	70	150	2	4
190	2	2	3	8-11	50	150	2	4
1k	2	2	3	1-2	22	150	10	15
1.9k	2	2	3	1-1.5	16	150	10	15
10k	2	2	3	100-500 μA	7	150	50	60
19k	2	2	3	50-250 μA	5	150	100	120
100k	2	2	3	10-100 μA	1	150		
190k	2	2	3	5-50 μA	500 μA	150		
1M	2.5	2.5	6	5-20 μA	100 μA	200		
1.9M	3.5	3	10	2.5-10 μA	50 μA	200		
10M	10	5	20	.5-2 μA	10 μA	300		
19M	20	8	40	.25-1 μA	5 μA	300		
100M	50	12	100	50-200 nA	1 μA	500		

Notes:

- Specifications apply to displayed value. 4-wire connections, except 100 mΩ.
- Temperature coefficient is an adder to uncertainty 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:
a) Calibrate at 20°C: Temperature coefficient adder is not required unless operated below 15°C or above 25°C.
b) 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 2V burden. Two wire compensation can be used only with Ω meters that source continuous (not pulsed) dc current.

Current Derating Factors

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

Notes:

- For $I < I_L$, errors occur due to thermally generated voltages within the 5700A. Use the following equation to determine the error, and add this error to the corresponding UNCERTAINTY or STABILITY specification.

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

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 $I_U < I_{MAX}$, errors occur due to self-heating of the resistors in the 5700A. Use the following equation to determine the error in ppm and add this error to the corresponding UNCERTAINTY or STABILITY specification.

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

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

Range	Resolution	Absolute Uncertainty ±5°C from calibration temperature				Relative Uncertainty ±1°C	
		24 Hours	90 Days	180 Days	1 Year	24 Hours	90 Days
		± (ppm output + nA)					
nA		± (ppm output + nA)					
220 µA	.1	45 + 10	50 + 10	55 + 10	60 + 10	24 + 2	26 + 2
2.2 mA	1	45 + 10	50 + 10	55 + 10	60 + 10	24 + 5	26 + 5
22 mA	10	45 + 100	50 + 100	55 + 100	60 + 100	24 + 50	26 + 50
µA		± (ppm output + µA)					
220 mA	.1	55 + 1	60 + 1	65 + 1	70 + 1	26 + .3	30 + .3
2.2A	1	75 + 30	80 + 30	90 + 30	95 + 30	40 + 7	45 + 7
5725A Amplifier:							
11A	10	330 + 470	340 + 480	350 + 480	360 + 480	100 + 130	110 + 130

Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Range	Stability ±1°C 24 Hours	Temperature Coefficient [Note 2]		Compliance Limits	Burden Voltage Adder [Note 3]	Maximum Load For Full Accuracy [Note 4]	Noise	
		10°-40°C	0°-10°C and 40°-50°C				Bandwidth 0.1-10 Hz	Bandwidth 10-10 kHz
		± (ppm output + nA)/°C					pk-pk	RMS
V	± (ppm output + nA)	± (ppm output + nA)/°C			±nA/V	Ω	ppm output + nA	nA
220 µA	5 + 1	1 + .40	3 + 1	10	.2	20k	6 + .9	10
2.2 mA	5 + 5	1 + 2	3 + 10	10	.2	2k	6 + 5	10
22mA	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
2.2A	9 + 7 µA	1 + 2.5 µA	A3 + 10 µA	3 [Note 5]	2 µA	2	12 + 1.5 µA	20 µA
5725A:	± (ppm output + µA)	± (ppm output + µA)/°C					ppm output + µA	µA
11A	25 + 100	20 + 75	30 + 120	4	0	4	15 + 70	175

Notes:

Maximum output from 5700A terminals is 2.2A. Uncertainty specifications for 220 µA and 2.2 mA ranges are increased by 1.3 X when supplied through 5725A terminals.

Specifications are otherwise identical for all output locations.

1. Add to uncertainty specifications:

±200 X I² ppm for >100 mA on 220 mA range
±10 X I² ppm for >1A on 2.2A range

2. Temperature coefficient is an adder to uncertainty specifications. It does not apply unless operating more than ±5°C from calibration temperature.

3. Burden voltage adder is an adder to uncertainty specifications that does not apply unless burden voltage is greater than 0.5V.

4. For higher loads, multiply uncertainty specification by:

$$1 + \frac{0.1 \times \text{actual load}}{\text{maximum load for full accuracy}}$$

5. 5700A compliance limit is 2V for outputs from 1A to 2.2A. 5725A Amplifier may be used in range-lock mode down to 0A.

Minimum output: 0 for all ranges, including 5725A.

Settling time to full accuracy: 1 second for µA and mA ranges; 3 seconds for 2.2A range; 6 seconds for 11A range; + 1 second for range or polarity change

Overshoot: <5%

AC CURRENT

Range	Resolution	Frequency	Absolute Uncertainty ±5°C from calibration temperature				Relative Uncertainty ±1°C	
			24 Hours	90 Days	180 Days	1 Year	24 Hours	90 Days
			± (ppm output + nA)					
220 µA	1 nA	10-20	650 + 30	700 + 30	750 + 30	800 + 30	450 + 30	500 + 30
		20-40	350 + 25	380 + 25	410 + 25	420 + 25	270 + 25	300 + 25
		40-1k	120 + 20	140 + 20	150 + 20	160 + 20	110 + 20	120 + 20
		1k-5k	500 + 50	600 + 50	650 + 50	700 + 50	450 + 50	500 + 50
		5k-10k	.15% + 100	.16% + 100	.17% + 100	.18% + 100	.14% + 100	.15% + 100
2.2 mA	10 nA	10-20	650 + 50	700 + 50	750 + 50	800 + 50	450 + 50	500 + 50
		20-40	350 + 40	380 + 40	410 + 40	420 + 40	270 + 40	300 + 40
		40-1k	120 + 40	140 + 40	150 + 40	160 + 40	110 + 40	120 + 40
		1k-5k	500 + 500	600 + 500	650 + 500	700 + 500	450 + 500	500 + 500
		5k-10k	.15% + 1 µA	.16% + 1 µA	.17% + 1 µA	.18% + 1 µA	.14% + 1 µA	.15% + 1 µA
22 mA	100 nA	10-20	650 + 500	700 + 500	750 + 500	800 + 500	450 + 500	500 + 500
		20-40	350 + 400	380 + 400	410 + 400	420 + 400	270 + 400	300 + 400
		40-1k	120 + 400	140 + 400	150 + 400	160 + 400	110 + 400	120 + 400
		1k-5k	500 + 5 µA	600 + 5 µA	650 + 5 µA	700 + 5 µA	450 + 5 µA	500 + 5 µA
		5k-10k	.15% + 10 µA	.16% + 10 µA	.17% + 10 µA	.18% + 10 µA	.14% + 10 µA	.15% + 10 µA
		Hz	± (ppm output + µA)				± (ppm output + µA)	
220 mA	1 µA	10-20	650 + 5	700 + 5	750 + 5	800 + 5	450 + 5	500 + 5
		20-40	350 + 4	380 + 4	410 + 4	420 + 4	280 + 4	300 + 4
		40-1k	120 + 4	150 + 4	170 + 4	180 + 4	110 + 4	130 + 4
		1k-5k	500 + 50	600 + 50	650 + 50	700 + 50	450 + 50	500 + 50
		5k-10k	.15% + 100	.16% + 100	.17% + 100	.18% + 100	.14% + 100	.15% + 100
2.2A	10 µA	20-1k	600 + 40	650 + 40	700 + 40	750 + 40	600 + 40	650 + 40
		1k-5k	700 + 100	750 + 100	800 + 100	850 + 100	650 + 100	750 + 100
		5k-10k	.80% + 200	.90% + 200	.95% + 200	1.0% + 200	.75% + 200	.85% + 200
5725A Amplifier:								
11A	100 µA	40k-1k	370 + 170	400 + 170	440 + 170	460 + 170	300 + 170	330 + 170
		1k-5k	800 + 380	850 + 380	900 + 380	950 + 380	700 + 380	800 + 380
		5k-10k	.3% + 750	.33% + 750	.35% + 750	.36% + 750	.28% + 750	.32% + 750

AC Current (continued)

Secondary Performance Specifications and Operating Characteristics
Included in Uncertainty Specifications

Range	Frequency	Stability ±1°C 24 Hours	Temperature Coefficient [Note 1]		Compliance Limits	Maximum Resistive Load For Full Accuracy [Note 2]	Noise and Distortion
			10°-40°C	0°-10°C and 40°-50°C			Bandwidth 10 Hz-50 kHz <0.5V Burden
		Hz	± (ppm output + nA)	± (ppm output + nA)/°C			V rms
220 μA	10-20	150 + 5	50 + 5	50 + 5	7	2k	.05 + .1
	20-40	80 + 5	20 + 5	20 + 5			.05 + .1
	40-1k	30 + 3	4 + .5	10 + .5			.05 + .1
	1k-5k	50 + 20	10 + 1	20 + 1			.25 + .5
	5k-10k	400 + 100	20 + 100	20 + 100			.5 + 1
2.2 mA	10-20	150 + 5	50 + 5	50 + 5	7	500	.05 + .1
	20-40	80 + 5	20 + 4	20 + 4			.05 + .1
	40-1k	30 + 3	4 + 1	10 + 2			.05 + .1
	1k-5k	50 + 20	10 + 100	20 + 100			.25 + .5
	5k-10k	400 + 100	50 + 400	50 + 400			.5 + 1
22 mA	10-20	150 + 50	50 + 10	50 + 10	7	150	.05 + .1
	20-40	80 + 50	20 + 10	20 + 10			.05 + .1
	40-1k	30 + 30	4 + 10	10 + 20			.05 + .1
	1k-5k	50 + 500	10 + 500	20 + 400			.25 + .5
	5k-10k	400 + 1 μA	50 + 1 μA	50 + 1 μA			.5 + 1
	Hz	± (ppm output + μA)	± (ppm output + μA)/°C				
220 mA	10-20	150 + .5	50 + .05	50 + .05	7	15	.05 + 10
	20-40	80 + .5	20 + .05	20 + .05			.05 + 10
	40-1k	30 + .3	4 + .1	10 + .1			.05 + 10
	1k-5k	50 + 3	10 + 2	20 + 2			.25 + 50
	5k-10k	400 + 5	50 + 5	50 + 5			.5 + 100
2.2A	20-1k	50 + 5	4 + 1	10 + 1	1.4 [Note 3]	.5	.5 + 100
	1k-5k	80 + 20	10 + 5	20 + 5			.3 + 500
	5k-10k	800 + 50	50 + 10	50 + 10			1 + 1 mA
5725A Amplifier:							± (% output)
11A	40-1k	75 + 100	20 + 75	30 + 75	3	3	[Note 4] $\begin{cases} .05 \\ .12 \\ .5 \end{cases}$
	1k-5k	100 + 150	40 + 75	50 + 75			
	5k-10k	200 + 300	100 + 75	100 + 75			

Notes:

Maximum output from 5700A terminals is 2.2A. Uncertainty specifications for 220 μA and 2.2 mA ranges are increased by 1.3 x plus 2 μA when supplied through 5725A terminals. Specifications are otherwise identical for all output locations.

1. Temperature coefficient is an adder to uncertainty specifications that does not apply unless operating more than ±5°C from calibration temperature.

2. For larger resistive loads multiply uncertainty specifications by:

$$\left(\frac{\text{actual load}}{\text{maximum load for full accuracy}} \right)^2$$

3. 1.5V compliance limit above 1A. 5725A Amplifier may be used in range-lock mode down to 1A.

4. For resistive loads within rated compliance voltage limits.

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

Inductive load limits: 400 μH (5700A or 5725A). 20 μH for 5700A output >1A.

Power factors: 5700A, 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, 1.200k-10.000k

Uncertainty: ±0.01%

Resolution: 11,999 counts

Settling time to full accuracy: 5 seconds for 5700A ranges; 6 seconds for 5725A 11A range; +1 second for amplitude or frequency range change.

Overshoot: <10%

WIDEBAND AC VOLTAGE (OPTION -03)

Specifications apply to the end of the cable and 50W termination used for calibration:

Range		Resolution	Absolute Uncertainty ±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	.4 + .4	.5 + .4	.6 + .4	.8 + 2
3 mV	-37	10 nV	.4 + 1	.45 + 1	.5 + 1	.7 + 3
11 mV	-26	100 nV	.2 + 4	.35 + 4	.5 + 4	.7 + 8
33 mV	-17	100 nV	.2 + 10	.3 + 10	.45 + 10	.6 + 16
110 mV	-6.2	1 μV	.2 + 40	.3 + 40	.45 + 40	.6 + 40
330 mV	+3.4	1 μV	2 + 100	25 + 100	.35 + 100	.5 + 100
1.1V	+14	10 μV	.2 + 400	.25 + 400	.35 + 400	.5 + 400
3.5V	+24	10 μV	15 + 500	.2 + 500	.3 + 500	.4 + 500

Frequency	Frequency Resolution	Amplitude Flatness, 1 kHz Reference Voltage Range			Temperature Coefficient	Settling Time To Full Accuracy	Harmonic Distortion
		1.1 mV	3 mV	>3 mV			
Hz	Hz	±%			±ppm/°C	Seconds	dB
10-30	.01	.3	.3	.3	100	7	-40
30-120	.01	.1	.1	.1	100	7	-40
120-1.2k	.1	.1	.1	.1	100	5	-40
1.2k-12k	1	.1	.1	.1	100	5	-40
12k-120k	10	.1	.1	.1	100	5	-40
120k-1.2M	100	.2 + 3 μV	.1 + 3 μV	.1 + 3 μV	100	5	-40
1.2M-2M	100k	.2 + 3 μV	.1 + 3 μV	.1 + 3 μV	100	0.5	-40
2M-10M	100k	.4 + 3 μV	.3 + 3 μV	.2 + 3 μV	100	0.5	-40
10M-20M	1M	.6 + 3 μV	.5 + 3 μV	.4 + 3 μV	150	0.5	-34
20M-30M	1M	1.5 + 15 μV	1.5 + 3 μV	1 + 3 μV	300	0.5	-34

Additional Operating Information:

dBm reference = 50Ω

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

$$\text{dBm} = 10 \log \left(\frac{\text{Power}}{1 \text{ mW}} \right),$$

0.22361V across 50Ω = 1 mW or 0 dBm

Minimum output: 300 μV (-57 dBm)

Frequency uncertainty: ±0.01%

Frequency resolution: 11,999 counts to 1.1999 MHz, 119 counts to 30 MHz.

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

General Specifications:

Warm-Up time: 2 X the time since last warmed up, to a maximum of 30 minutes.

System installation: Rear output configuration and rack-mount kit available.

Standard interfaces: IEEE-488, RS-232, 5725A, 5205A or 5215A, 5220A, 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.

Safety: Designed to comply with UL1244 (1987); IEC 348-1978; IEC 66E (CO) 4; CSA 556B.

Guard isolation: 20 volts

EM/RFI: Designed to comply with FCC Rules Part 15, Subpart J, Class B; VDE 0871, Class B.

Reliability: MIL-T-28800D, para. 3.13.3.

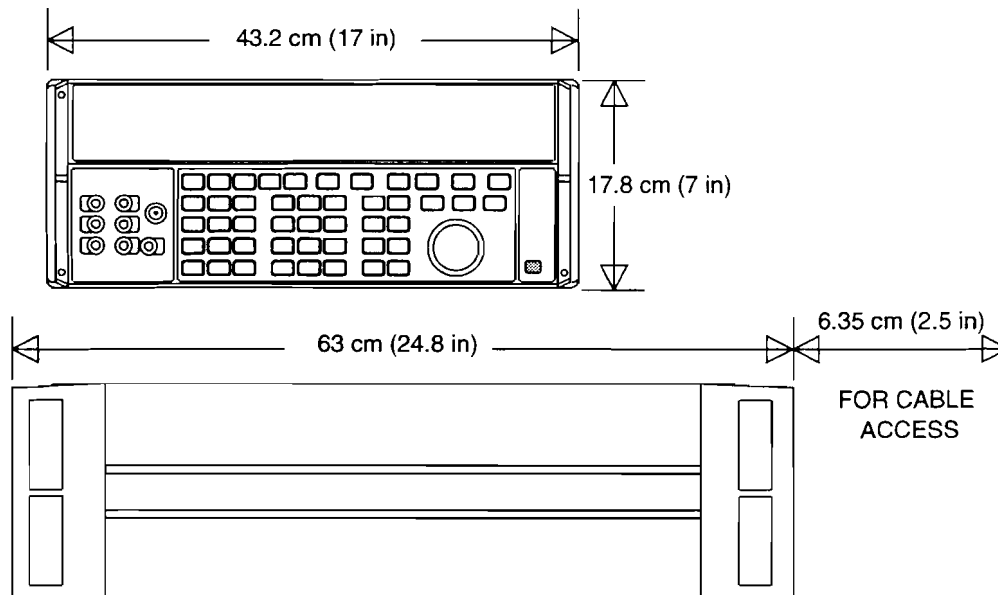
Line Power: 47 to 63 Hz; ±10% allowed about selectable nominal line voltage: 100V, 110V, 115V, 120V, 200V, 220V, 230V, 240V. Maximum power: 5700A, 300VA; 5725A, 750VA.

Size:

5700A: 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 63.0 cm (24.8 in), overall; 57.8 cm (22.7 in), rack depth.

5725A: Height 13.3 cm, (5.25 in); Width and depth same as 5700A. Both units project 5.1 cm, (2 in) from rack front.

Weight: 5700A: 27kg (62 lbs); 5725A: 32kg (70 lbs).



AUXILIARY AMPLIFIER SPECIFICATIONS

Note: See 5205A and 5220A Instruction Manuals for complete specifications.

5205A (220V - 1100V ac, 0V - 1100V dc)

Overshoot: < 10%

Distortion (bandwidth 10 Hz - 1 MHz):

10 Hz - 20 kHz .07%
 20 kHz - 50 kHz .2%
 50 kHz - 100 kHz .25%

Frequency	90 Day Accuracy at 23° ±5°C ± (% output + % range)	Temperature Coefficient for 0°-18°C and 28°-50°C ± (ppm output + ppm range)/°C
DC	0.05 + 0.005	15 + 3
10 Hz - 40 Hz	0.15 + 0.005	45 + 3
40 Hz - 20 kHz	0.04 + 0.004	15 + 3
20 kHz - 50 kHz	0.08 + 0.006	50 + 10
50 kHz - 100 kHz	0.1 + 0.01	70 + 20

5220A (AC Current, 180-day specifications):

Accuracy:

20 Hz - 1 kHz 07% + 1 mA
 1 kHz - 5 kHz (.07% + 1mA) x frequency in
 kHz

Temperature Coefficient (0° - 18°C and 28° - 50°C): (.003% + 100 µA)/°C

Distortion (bandwidth 300 kHz):

20 Hz - 1 kHz .1% + 1 mA
 1 kHz - 5 kHz (.1% + 1 mA) x frequency in
 kHz

Note: 5700A/5220A combination is not specified for inductive loads.