

SECTION 6.3 4808 SPECIFICATIONS

General

Power Supply (Calibrator)

Voltage : 100V/120V/220V/240V
(single phase) : selectable from rear panel
Line Frequency : 48Hz to 62Hz
Consumption : 370VA normal
: 660VA full power
Fuses 220/240V : 3.15A
100/120V : 6.25A

Power Supply (Option 70)

Voltage : 115V/230V
(single phase) : selectable from rear panel
Line Frequency : 48Hz to 62Hz
Consumption : 40VA
Fuses 230V : 5A Input; 250mA Unit
115V : 10A Input; 500mA Unit

Mechanical

Dimensions:

Without Option 70 : Height: 178mm (7 inches)
: Width: 455mm (17.9 inches)
: Depth: 563mm (22.2 inches)
With Option 70 : Height: 222.5mm (8.75 inches)
: Width: 455mm (17.9 inches)
: Depth: 563mm (22.2 inches)

Weight:

Without Option 70 : 36kg (80lbs)
With Option 70 : 43.05kg (94lb 12oz)

SAFETY : Designed to UL1244, IEC348, IEC1010,
BS4743

Environmental Conditions

Operating Temperature : 0°C to 50°C

Caution

Above 30°C on 1kV Range max output power is derated

Storage Temperature : -40°C to +70°C

Max. Relative Humidity : 75% at 40°C,
non-condensing

Warm-up Time : Two hours to meet all specifications

Operating Indications

Indication : Symbols lit on displays and illuminated
keys

Scale Lengths

Output Display : 7.5 digits maximum

Frequency Display : 3 digits plus store location

Mode Display : 7.5 digits maximum

'General' Continued overleaf

General (Contd.)

Peak Terminal Voltages

Guard to Ground	:	920V
Lo to Guard	:	920V
Lo to Ground	:	920V
Hi to Guard	:	1556V
Hi to Ground	:	1556V

Rear Panel Digital Inputs:

to Hi	:	1556V
to Lo	:	920V
to Guard	:	920V
to Ground	:	0V to +5V

N.B.

Digital Common is internally connected to Ground

Option Summary

- Option 10 : DCV function to 200V.
Option 20 : ACV function to 200V.
Option 30 : Integral 1000V Amplifier for:
DCV (requires Option 10); or
ACV (requires Option 20); or both.
Option 40 : Current Converter for:
DCI (requires Option 10); or
ACI (requires Option 20); or both.
Option 50 : Resistance function.
Option 60 : Current Range Extender to 11A for:
DCI (requires Options 10 & 40); or
ACI (requires Option 20 & 40); or both. Includes Model
4600 Transconductance Amplifier and all necessary
cabling.
Option 70 : AC Voltage Wideband Source from 10Hz to 30MHz at
from 300 μ V to 3.5V (requires Option 20). Includes
Wideband Source and all necessary cabling.
Option 90 : Rack Mount Kit.

Accuracy Specifications

Absolute Uncertainty

To calculate the absolute uncertainty in a measurement made with a factory-calibrated 4808, combine the 4808 Performance Relative to Calibration Standards' with the relevant 'Calibration Uncertainty'.

When different calibration standards are used, simply substitute their uncertainties in place of the column headed 'Calibration Uncertainty' and combine them with the 4808 Performance Relative to Calibration Standards'.

DCV Accuracy Specifications

Option 10 - DC Voltage (Requires Option 30 for 1000V Range)

Voltage Range	Accuracy Relative to Calibration Standards ± (ppm OUTPUT + Floor) [1]				Calibration Uncertainty (±ppm Output)	Temperature Coefficient (±ppm/°C)	
	24 Hours Stability [2]		90 Days T _{cert} [3] ± 1°C	180 Days T _{cert} [3] ± 5°C			1 Year T _{cert} [3] ± 5°C
	100µV	0.4 + 0.3µV	3 + 0.4µV	4.5 + 0.5µV			7 + 0.5µV
1mV	0.4 + 0.3µV	3 + 0.4µV	4.5 + 0.5µV	7 + 0.5µV	6	1	
10mV	0.4 + 0.3µV	3 + 0.4µV	4.5 + 0.5µV	7 + 0.5µV	6	1	
100mV	0.4 + 0.3µV	3 + 0.4µV	4.5 + 0.5µV	7 + 0.5µV	6	1	
1V	0.3 + 0.5µV	2 + 0.8µV	3.5 + 1µV	5 + 1µV	3.2	0.5	
10V	0.3 + 1µV	1 + 3µV	2 + 3µV	3 + 3µV	2.4	0.15	
100V	0.5 + 20µV	2 + 50µV	3.5 + 50µV	5 + 50µV	3.3	0.5	
1000V	0.5 + 200µV	3 + 500µV	5 + 500µV	7 + 500µV	3.3	0.5	

Other DCV Specifications

Scale Length	100µV to 100V ranges: 0 to ±200% of nominal range 1000V range: 0 to ±110% of nominal range
Settling Time	<1second to 10ppm of step size
Setting Resolution	0.1ppm or 10nV
Maximum Load	1V to 1000V ranges: 25mA 100µV to 100mV ranges: Output impedance 100Ω

NOTES: [1] Relative accuracy specifications and calibration uncertainties calculated to a 99% confidence level.
Methods of combining uncertainty of calibration standards should comply with the requirements defined in documents ISO TAG4 and NIST Technical Note 1287.

[2] For same conditions between 18°C and 28°C.

[3] T_{cert} = temperature at certification. Factory certification temperature = 23°C

ACV Accuracy Specifications

General ACV Specifications

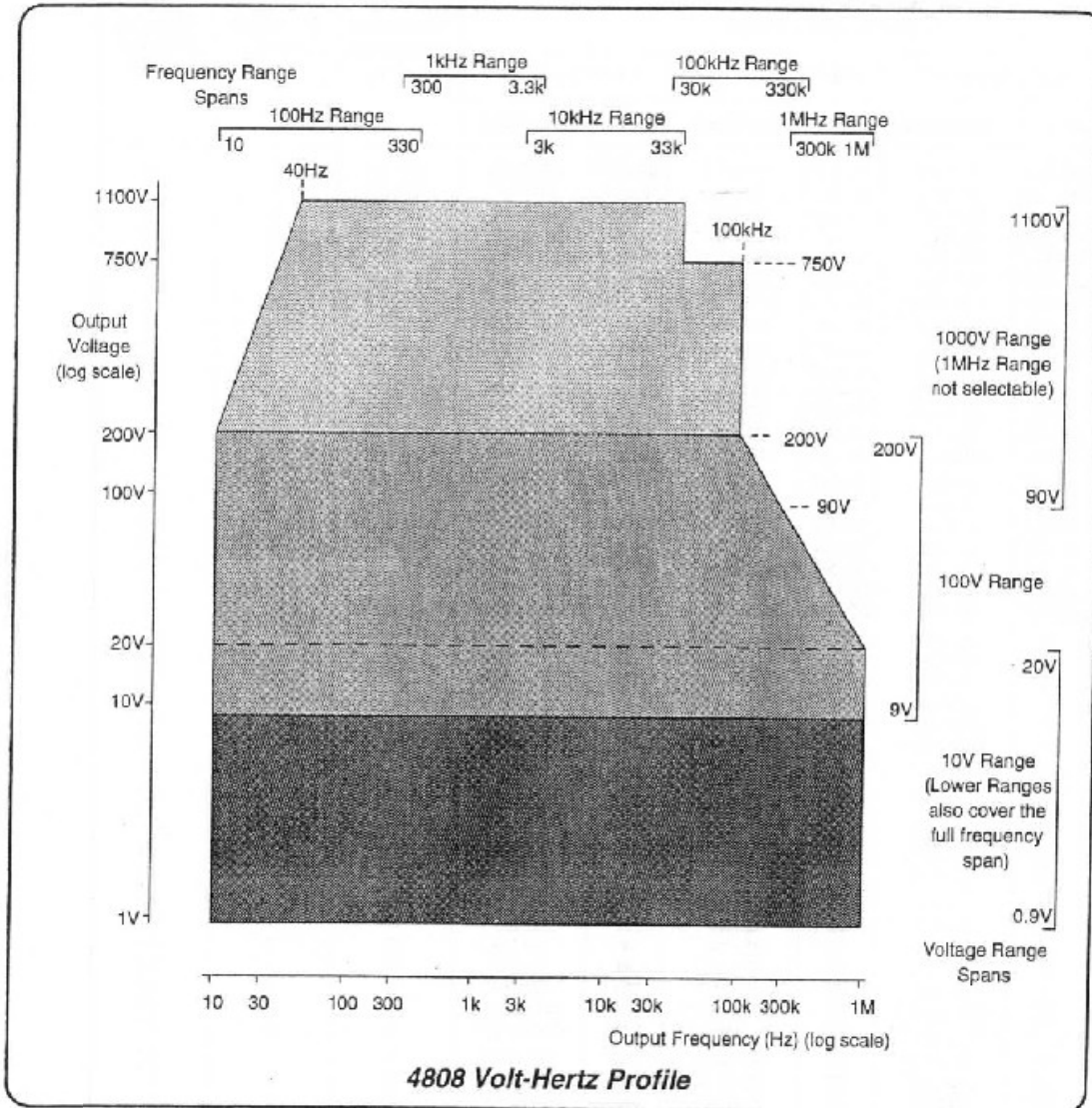
Scale Length	1mV to 100V ranges: 1000V range:	9% to 200% of nominal range 9% to 110% of nominal range
Settling Time	To 10ppm of step size:	10Hz to 32Hz: <10 seconds 33Hz to 330Hz: <3 seconds >330Hz: <1 second Double the above times
Setting Resolution	1ppm or 100nV	
Frequency Accuracy	<= 100ppm for life	
Maximum Resistive Load	100µV to 100mV ranges: 1V range: 10V range: 100V range: 1000V range: 1000V range;	Output impedance 30Ω 50mA rms 60mA rms 120mA rms 15mA rms 65mA rms
Maximum Capacitive Load	1V to 100V ranges: 1000V range;	1000pF 300pF

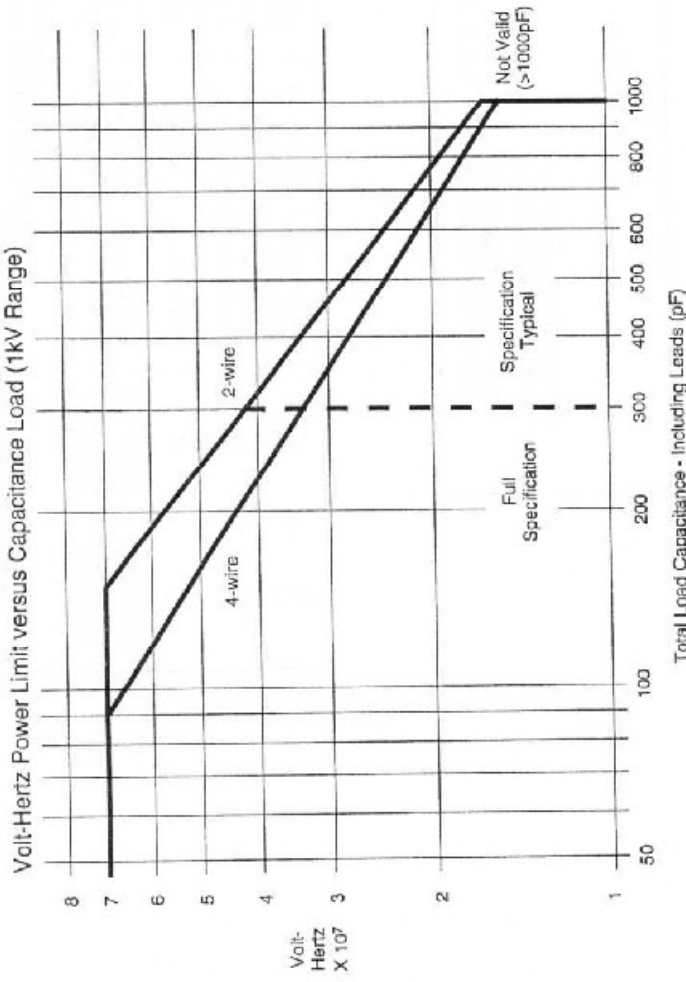
- NOTES:**
- [1] Relative accuracy specifications and calibration uncertainties calculated to a 99% confidence level. Methods of combining uncertainty of calibration standards should comply with the requirements defined in documents ISO TAG4 and NIST Technical Note 1297.
 - [2] For same conditions between 18°C and 28°C.
 - [3] Tcert = temperature at certification. Factory certification temperature = 23°C.
 - [4] Temperature Coefficient (ppm/°C) applies outside ±5°C Tcert bands.
 - [5] Spot frequency specification applies to Full Range only.
 - [6] Valid over load range: 0-50mA rms. Above 50mA add: $\frac{F(\text{kHz}) \times [I(\text{mA}) - 50]}{75}$ ppm.
 - [7] Requires Option 60 Transconductance Amplifier.
 - [8] Figures indicate pure THD only, excluding noise, which is included in the main specification. THD is predominantly second harmonic (negligible error on mean-sensing equipment).

Option 20 - AC Voltage (Requires Option 30 for 1000V Range)

Voltage Range	Frequency (Hz)	Accuracy Relative to Calibration Standards ± (ppm OUTPUT + Floor) ⁽¹⁾						Calibration Uncertainty (±ppm Output + Floor)	Temperature Coefficient (±ppm/°C) ⁽⁴⁾	Total Harmonic Distortion (%) ⁽⁶⁾		
		24 Hour Stability ⁽²⁾		90 day T _{cert} (3) ± 1°C		180 day T _{cert} (3) ± 5°C					1 Year T _{cert} (3) ± 5°C	
		Spot (5)	Broadband	Spot (5)	Broadband	Spot (5)	Broadband				Spot (5)	Broadband
1mV	10 - 31	60 + 3.6µV	90 + 3µV	90 + 5.4µV	35 + 3µV	110 + 5.4µV	100 + 3µV	120 + 5.4µV	0.1			
	32 - 330	30 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04			
	300 - 10k	20 + 3.6µV	30 + 3µV	30 + 5.4µV	35 + 3µV	50 + 5.4µV	40 + 3µV	60 + 5.4µV	0.04			
	10k - 33k	20 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04			
	30k - 100k	30 + 3.6µV	60 + 3µV	260 + 5.4µV	70 + 3µV	290 + 5.4µV	80 + 3µV	300 + 5.4µV	0.1			
	100k - 330k	60 + 3.6µV	120 + 3µV	730 + 12µV	300 + 3µV	380 + 12µV	350 + 3µV	0.1% + 72µV	0.3			
	300k - 1M	130 + 18µV	850 + 3µV	0.15% + 72µV	880 + 3µV	0.1% + 3µV	0.1% + 3µV	157 + 2µV	1.0			
	10mV	10 - 31	60 + 3.6µV	90 + 3µV	90 + 5.4µV	35 + 3µV	110 + 5.4µV	100 + 3µV	120 + 5.4µV	0.1		
		32 - 330	30 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04		
		300 - 10k	20 + 3.6µV	30 + 3µV	30 + 5.4µV	35 + 3µV	50 + 5.4µV	40 + 3µV	60 + 5.4µV	0.04		
		10k - 33k	20 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04		
		30k - 100k	30 + 3.6µV	60 + 3µV	280 + 5.4µV	70 + 3µV	250 + 5.4µV	80 + 3µV	300 + 5.4µV	0.1		
100k - 330k		60 + 3.6µV	120 + 3µV	730 + 12µV	300 + 3µV	380 + 12µV	350 + 3µV	0.1% + 12µV	0.3			
300k - 1M		130 + 18µV	850 + 3µV	0.15% + 72µV	880 + 3µV	0.1% + 3µV	0.1% + 3µV	1207 + 2µV	1.0			
100mV		10 - 31	60 + 3.6µV	90 + 3µV	90 + 5.4µV	35 + 3µV	110 + 5.4µV	100 + 3µV	120 + 5.4µV	0.1		
		32 - 330	30 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04		
		300 - 10k	20 + 3.6µV	30 + 3µV	30 + 5.4µV	35 + 3µV	50 + 5.4µV	40 + 3µV	60 + 5.4µV	0.04		
		10k - 33k	20 + 3.6µV	40 + 3µV	40 + 5.4µV	45 + 3µV	60 + 5.4µV	50 + 3µV	70 + 5.4µV	0.04		
		30k - 100k	30 + 3.6µV	60 + 3µV	280 + 5.4µV	70 + 3µV	250 + 5.4µV	80 + 3µV	300 + 5.4µV	0.1		
	100k - 330k	60 + 3.6µV	120 + 3µV	730 + 12µV	300 + 3µV	380 + 12µV	350 + 3µV	0.1% + 20µV	0.3			
	300k - 1M	130 + 18µV	850 + 3µV	0.15% + 72µV	880 + 3µV	0.1% + 3µV	0.1% + 3µV	1207 + 2µV	1.0			
	1V	10 - 31	30 + 20µV	70	80 + 30µV	85	85 + 30µV	80	30 + 30µV	0.1		
		32 - 330	10 + 10µV	20	40 + 20µV	25	45 + 20µV	30	50 + 20µV	0.04		
		300 - 33k	7 + 5µV	15	30 + 10µV	18	35 + 10µV	20	40 + 10µV	0.04		
		30k - 100k	15 + 10µV	35	60 + 20µV	40	70 + 20µV	50	80 + 20µV	0.1		
		100k - 330k	30 + 20µV	120	385 + 100µV	130	395 + 100µV	150	405 + 100µV	0.3		
300k - 1M		100 + 20µV	800	0.21% + 400µV	900	0.22% + 400µV	0.1%	0.2% + 120µV	1.0			
10V		10 - 31	30 + 200µV	75	80 + 300µV	78	85 + 300µV	80	90 + 300µV	0.1		
		32 - 330	10 + 100µV	25	25 + 200µV	28	45 + 200µV	30	50 + 200µV	0.04		
		300 - 33k	7 + 50µV	20	20 + 100µV	23	35 + 100µV	25	40 + 100µV	0.04		
		30k - 100k	15 + 100µV	35	35 + 200µV	40	70 + 200µV	50	80 + 200µV	0.1		
		100k - 330k	30 + 200µV	120	120 + 1µV	130	215 + 1µV	150	230 + 1µV	0.3		
		300k - 1M	100 + 200µV	780	800 + 5µV	900	0.13% + 5µV	0.1%	0.15% + 5µV	1.0		
	100V	10 - 31	30 + 2mV	75	80 + 3mV	78	95 + 3mV	80	100 + 3mV	0.1		
		32 - 330	10 + 1mV	25	50 + 2mV	28	65 + 2mV	30	80 + 2mV	0.04		
		300 - 10k	10 + 400µV	25	40 + 1mV	28	45 + 1mV	30	50 + 1mV	0.04		
		10k - 33k	10 + 400µV	35	50 + 1mV	38	65 + 1mV	40	80 + 1mV	0.04		
		30k - 100k	15 + 1mV	45	90 + 3mV	50	105 + 3mV	60	120 + 3mV	0.2		
		100k - 330k	30 + 2mV	200	530 + 50mV ⁽³⁾	300	615 + 50mV ⁽³⁾	400	700 + 50mV ⁽³⁾	0.3		
300k - 1M		600 + 15mV	0.67%	0.8% + 130mV ⁽³⁾	0.60%	0.9% + 130mV ⁽³⁾	0.72%	1% + 130mV ⁽³⁾	1.0			
(to 750V max)		10 - 31	20 + 10mV	120	130 + 20mV	125	140 + 20mV	130	150 + 20mV	0.2		
		32 - 330	20 + 10mV	120	130 + 20mV	125	140 + 20mV	130	150 + 20mV	0.2		
		300 - 33k	20 + 4mV	80	90 + 20mV	85	95 + 20mV	90	100 + 20mV	0.1		
		3k - 10k	20 + 4mV	80	130 + 20mV	85	185 + 20mV	90	140 + 20mV	0.1		
		10k - 33k	30 + 4mV	120	130 + 20mV	125	185 + 20mV	130	140 + 20mV	0.1		
	30k - 100k	50 + 20mV	170	750 + 40mV ⁽³⁾	180	875 + 40mV ⁽³⁾	200	0.11% + 40mV ⁽³⁾	0.5			

ACV Accuracy Specifications (Contd.)





Capacitive Loading Constraints

DCI Accuracy Specifications

Option 40 with Option 10 - DC Current

Current Range	Accuracy Relative to Calibration Standards ± (ppm OUTPUT + Floor) [1]				Calibration Uncertainty (±ppm Output)	Temperature Coefficient (±ppm/°C) [4]
	24 Hours Stability [2]	90 Days Tcert [3] ± 1°C	180 Days Tcert [3] ± 5°C	1 Year Tcert [3] ± 5°C		
100µA	7 + 2nA	50 + 2nA	75 + 2nA	100 + 2nA	29	15
1mA	3 + 8nA	20 + 10nA	30 + 10nA	40 + 10nA	18	6
10mA	3 + 80nA	20 + 100nA	30 + 100nA	40 + 100nA	18	6
100mA	3 + 800nA	20 + 1µA	30 + 1µA	40 + 1µA	22	6
1A	7 + 20µA	50 + 20µA	75 + 20µA	100 + 20µA	36	15
10A [7]	15 + 200µA	50 + 500µA	100 + 500µA	150 + 500µA	74	15

Other DCI Specifications

Scale Length	100µA to 1A ranges: 10A range:	0 to ±200% of nominal range 0 to ±100% of nominal range
Settling Time	100µA to 1A ranges: 10A range:	<1second to full specification <1second to 40ppm of step size
Setting Resolution		1ppm
Compliance Voltage	100µA to 1A ranges: 10A range:	3V 2V

- NOTES:**
- [1] Relative accuracy specifications and calibration uncertainties calculated to a 99% confidence level. Methods of combining uncertainty of calibration standards should comply with the requirements defined in documents ISO TAG4 and NIST Technical Note 1297.
 - [2] For same conditions between 18°C and 28°C.
 - [3] Tcert = temperature at certification. Factory certification temperature = 23°C.
 - [4] Temperature Coefficient (ppm/°C) applies outside ±5°C Tcert bands.
 - [7] Requires Option 60 Transconductance Amplifier.

ACI Accuracy Specifications

Option 40 with Option 20 - AC Current

Current Range	Frequency (Hz)	Accuracy Relative to Calibration Standards ± (ppm OUTPUT + Floor) ^[1]						Calibration Uncertainty (±ppm Output)	Temperature Coefficient (±ppm/°C) ^[4]	Total Harmonic Distortion (%) ^[8]	Output Impedance		
		24 Hour Stability ^[2]		90 day T _{cert} ^[3] ± 1°C		180 day T _{cert} ^[3] ± 5°C						1 Year T _{cert} ^[3] ± 5°C	
		Spot ^[5]	Broadband	Spot ^[5]	Broadband	Spot ^[5]	Broadband					Spot ^[5]	Broadband
100µA	10 - 1k	50 + 4nA	100	120 + 6nA	125	135 + 10nA	130	150 + 10nA	124	10	0.2	100MΩ*	
	1k - 5k	70 + 5nA	180	250 + 8nA	200	270 + 14nA	220	300 + 14nA	153	20	0.5	30MΩ	
1mA	10 - 1k	30 + 20nA	60	70 + 60nA	80	85 + 100nA	90	100 + 100nA	114	10	0.2	30MΩ	
	1k - 5k	40 + 20nA	100	120 + 60nA	150	160 + 100nA	160	200 + 100nA	172	10	0.2	30MΩ	
10mA	10 - 1k	30 + 200nA	60	70 + 600nA	80	85 + 1µA	90	100 + 1µA	108	10	0.2	30MΩ	
	1k - 5k	40 + 200nA	100	120 + 600nA	150	160 + 1µA	160	200 + 1µA	162	10	0.2	30MΩ	
100mA	10 - 1k	30 + 2µA	60	70 + 6µA	80	85 + 10µA	90	100 + 10µA	108	10	0.2	300kΩ	
	1k - 5k	40 + 2µA	100	120 + 6µA	150	160 + 10µA	160	200 + 10µA	162	10	0.2	300kΩ	
1A	10 - 1k	50 + 40µA	170	250 + 60µA	200	275 + 100µA	200	300 + 100µA	150	20	0.2	30kΩ**	
	1k - 5k	70 + 60µA	270	400 + 60µA	300	425 + 140µA	320	450 + 140µA	285	25	0.2	30kΩ**	
10A ^[9]	10 - 1k	40 + 400µA	210	300 + 1.2mA	250	350 + 1.3mA	270	400 + 1.3mA	329	13	0.2	>2kΩ	
	1k - 5k	75 + 600µA	300	750 + 1.5mA	400	800 + 1.6mA	480	850 + 1.6mA	454	28	0.2	>2kΩ	
>10k	5k - 10k	400 + 1.2mA	0.11%	0.15% + 6mA	0.13%	0.18% + 8mA	0.14%	0.22% + 6mA	746	50	0.2	>400Ω	
	10k - 20k	0.2% + 3mA	0.4%	0.54% + 32mA	0.45%	0.63% + 32mA	0.5%	0.72% + 32mA	1911	50	1.0	>67Ω	

* Typical effective output capacitance = 200pF } Negligible on other ranges

** Typical effective output capacitance = 0.5µF }

Other ACI Specifications

Scale Length	100µA to 1A ranges: 10A range:	9% to 200% of nominal range 9% to 110% of nominal range
Settling Time	To 10ppm of step size:	10Hz to 32Hz: <10 seconds 33Hz to 330Hz: <3 seconds >330Hz: <1 second
Setting Resolution	Range change:	Double the above times
Frequency Accuracy	1 ppm	
Maximum Reactive Load	<±100ppm for life	
Compliance Voltage	10nF, 1mH (time constant <1µs)	
	100µA to 1A ranges:	3V rms
	10A range:	2V rms

- NOTES:**
- [1] Relative accuracy specifications and calibration uncertainties calculated to a 99% confidence level. Methods of combining uncertainty of calibration standards should comply with the requirements defined in documents ISO TAG4 and NIST Technical Note 1297.
 - [2] For same conditions between 18°C and 28°C.
 - [3] T_{cert} = temperature at certification. Factory certification temperature = 23°C.
 - [4] Temperature Coefficient (ppm/°C) applies outside ±5°C T_{cert} bands.
 - [5] Spot frequency specification applies to Full Range only.
 - [7] Requires Option 60 Transconductance Amplifier.
 - [9] Figures indicate pure THD only, excluding noise, which is included in the main specification. THD is predominantly second harmonic (negligible error on mean-sensing equipment).

Resistance Accuracy Specifications

Option 50 - Resistance

Resistor Nominal Value	4-Wire Accuracy Relative to Calibration Standards ± (ppm OUTPUT) [1]				Calibration Uncertainty (±ppm Output)	Temperature Coefficient (±ppm/°C) [4]	Specified Current (Is)	Maximum Current (Im)	Additional Uncertainty for: Is ≤ 1 ≤ Im (ppm)
	24 Hours Stability [2]		180 Days Tcert [3] ± 5°C						
	80 Days Tcert [3] ± 1°C	180 Days Tcert [3] ± 5°C	1 Year Tcert [3] ± 5°C	1 Year Tcert [3] ± 5°C					
10Ω	2	10	18	25	11	6	10mA	100mA	(10 x 10 ³) ²
100Ω	1	3	8	9	8	2	10mA	25mA	(8.5 x 10 ³) ²
1kΩ	1	3	6	9	5	2	1mA	10mA	(8.5 x 10 ⁴) ²
10kΩ	1	3	6	9	5	2	100µA	2.5mA	(8.5 x 10 ⁵) ²
100kΩ	1	3	7	10	8.8	2	100µA	1mA	(8.5 x 10 ⁶) ²
1MΩ	2	10	18	25	16.5	6	10µA	100µA	(1.0 x 10 ⁷) ²
10MΩ	2	25	38	50	29.4	10	1µA	10µA	(1.5 x 10 ⁸) ²
100MΩ	3	30	50	70	211	20	1µA	10µA	(1.5 x 10 ⁹) ²

Resistor Nominal Value	2-Wire Accuracy Relative to 4-Wire Accuracy			
	24 Hours Stability [2]	90 Days Tcert [3] ± 1°C	180 Days Tcert [3] ± 5°C	1 Year Tcert [3] ± 5°C
10Ω to 100Ω	±10mΩ	±10mΩ	±10mΩ	±20mΩ
1kΩ to 100MΩ	±100mΩ	±100mΩ	±100mΩ	±200mΩ

Other Resistance Specifications

Display Resolution	0.1ppm
Connections	Programmable 2-wire/4-wire sense Programmable remote/local guard
Fuse Protection	To 120V rms

- NOTES:** [1] Relative accuracy specifications and calibration uncertainties calculated to a 99% confidence level. Methods of combining uncertainty of calibration standards should comply with the requirements defined in documents ISO TAG4 and NIST Technical Note 1297.
- [2] For same conditions between 18°C and 28°C.
- [3] Tcert = temperature at certification. Factory certification temperature = 23°C.
- [4] Temperature Coefficient (ppm/°C) applies outside ±5°C Tcert bands.

Wideband AC Voltage Specifications

Specifications apply to the end of the cable (0.75m) and 50Ω termination used for calibration:

Low Frequency Accuracy (30Hz to 330kHz) *

Range of Output Values	Accuracy (Relative to Calibration Standards) ± (% output + μV)					Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours T _{cert} ± 1°C	90 Days T _{cert} ± 5°C	180 Days T _{cert} ± 5°C	1 Year T _{cert} ± 5°C	Factory T _{cert} = 23°C	
Volts	dBm (approx)					
1V-3V	+13.0 to +22.5					
100mV-1V	-6.9 to +13.0					
10mV-100mV	-27 to -7					
1mV-10mV	-47 to -27					
300μV-1mV	-57 to -47					
	0.10 + 300	0.16 + 300	0.16 + 300	0.22 + 300	0.22 + 300	50
	0.14 + 100	0.22 + 100	0.22 + 100	0.28 + 100	0.28 + 100	100
	0.14 + 10	0.22 + 10	0.22 + 10	0.28 + 10	0.28 + 10	100
	0.15 + 1	0.23 + 1	0.23 + 1	0.29 + 1	0.29 + 1	100
	0.30 + 0.4	0.43 + 0.4	0.43 + 0.4	0.50 + 0.4	0.50 + 0.4	100

* Below 30Hz add 0.05%.

Flatness (0.3MHz to 30MHz)

Range of Output Values	Flatness (Relative to 1kHz Output at Same Setting) Identical Range, Temperature & Output Impedance ± (% output + μV)		
	0.3 - 2MHz	2 - 10MHz	10 - 20MHz
Volts	20 - 30MHz		
1V-3V	0.08 + 3	0.15 + 3	0.24 + 3
100mV-1V	0.12 + 3	0.18 + 3	0.34 + 3
10mV-100mV	0.12 + 3	0.18 + 3	0.34 + 3
1mV-10mV	0.12 + 3	0.18 + 3	0.34 + 3
300μV-1mV	0.13 + 3	0.18 + 3	0.34 + 3
			0.35 + 3
			0.45 + 3
			0.45 + 3
			0.45 + 3
			0.45 + 3

High Frequency Accuracy (3V on 10V Range)

Range of Output Frequencies	Accuracy (Relative to Calibration Standards) ± (% output + μV)				Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours T _{cert} ± 1°C	90 Days T _{cert} ± 5°C	180 Days T _{cert} ± 5°C	1 Year T _{cert} ± 5°C	
MHz	Factory T _{cert} = 23°C				
0.3 - 2	0.12 + 300	0.20 + 300	0.20 + 300	0.26 + 300	50
2 - 10	0.19 + 300	0.29 + 300	0.29 + 300	0.35 + 300	100
10 - 20	0.30 + 300	0.42 + 300	0.42 + 300	0.48 + 300	150
20 - 30	0.40 + 300	0.54 + 300	0.54 + 300	0.60 + 300	200

Wideband AC Voltage Specifications (Contd.)

High Frequency Accuracy (Output Values: 100mV - 1V)

Range of Output Frequencies MHz	Accuracy (Relative to Calibration Standards) ± (% output + μV) Factory Tcert = 23°C				Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours Tcert ± 1°C	90 Days Tcert ± 5°C	180 Days Tcert ± 5°C	1 Year Tcert ± 5°C	
0.3 - 2	0.18 + 100	0.28 + 100	0.28 + 100	0.34 + 100	100
2 - 10	0.30 + 100	0.42 + 100	0.42 + 100	0.48 + 100	150
10 - 20	0.41 + 100	0.55 + 100	0.55 + 100	0.61 + 100	200
20 - 30	0.52 + 100	0.70 + 100	0.70 + 100	0.76 + 100	300

High Frequency Accuracy (Output Values: 10mV - 100mV)

Range of Output Frequencies MHz	Accuracy (Relative to Calibration Standards) ± (% output + μV) Factory Tcert = 23°C				Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours Tcert ± 1°C	90 Days Tcert ± 5°C	180 Days Tcert ± 5°C	1 Year Tcert ± 5°C	
0.3 - 2	0.18 + 10	0.28 + 10	0.28 + 10	0.34 + 10	100
2 - 10	0.30 + 10	0.42 + 10	0.42 + 10	0.48 + 10	150
10 - 20	0.41 + 10	0.55 + 10	0.55 + 10	0.61 + 10	200
20 - 30	0.52 + 10	0.70 + 10	0.70 + 10	0.76 + 10	300

High Frequency Accuracy (Output Values: 1mV - 10mV)

Range of Output Frequencies MHz	Accuracy (Relative to Calibration Standards) ± (% output + μV) Factory Tcert = 23°C				Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours Tcert ± 1°C	90 Days Tcert ± 5°C	180 Days Tcert ± 5°C	1 Year Tcert ± 5°C	
0.3 - 2	0.18 + 3	0.28 + 3	0.28 + 3	0.34 + 3	100
2 - 10	0.30 + 3	0.42 + 3	0.42 + 3	0.48 + 3	150
10 - 20	0.41 + 3	0.55 + 3	0.55 + 3	0.61 + 3	200
20 - 30	0.52 + 3	0.70 + 3	0.70 + 3	0.76 + 3	300

High Frequency Accuracy (Output Values: 300 μ V - 1mV)

Range of Output Frequencies MHz	Accuracy (Relative to Calibration Standards) \pm (% output + μ V) Factory Tcert = 23°C				Temperature Coefficient ppm/°C (Outside Spec Range)
	24 Hours Tcert \pm 1°C	90 Days Tcert \pm 5°C	180 Days Tcert \pm 5°C	1 Year Tcert \pm 5°C	
0.3 - 2	0.18 + 3	0.28 + 3	0.28 + 3	0.34 + 3	100
2 - 10	0.30 + 3	0.42 + 3	0.42 + 3	0.48 + 3	150
10 - 20	0.41 + 3	0.55 + 3	0.55 + 3	0.61 + 3	200
20 - 30	0.52 + 3	0.70 + 3	0.70 + 3	0.78 + 3	300

Additional Specifications:

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

dBm reference = 500;

0 dBm = 1mW across 50 Ω = 0.22361V
dBm values can be displayed by pressing WBV again when it is already selected.

Minimum output:

Current Limit:

Frequency resolution:

Frequency uncertainty:

Spurious Frequency O/P:

Harmonic Distortion:

Overload protection:

300 μ V (-57 dBm)

150mA

1% of Frequency Range nominal

\pm 0.01%

Not worse than -46dB.

Not worse than -40dB, except -36dB where volt-hertz product exceeds 9×10^7 V-Hz.

A short circuit on the Option 70 output will not result in damage. Normal operation is restored

upon removal of the short.