AC SOURCE/ANALYZERS

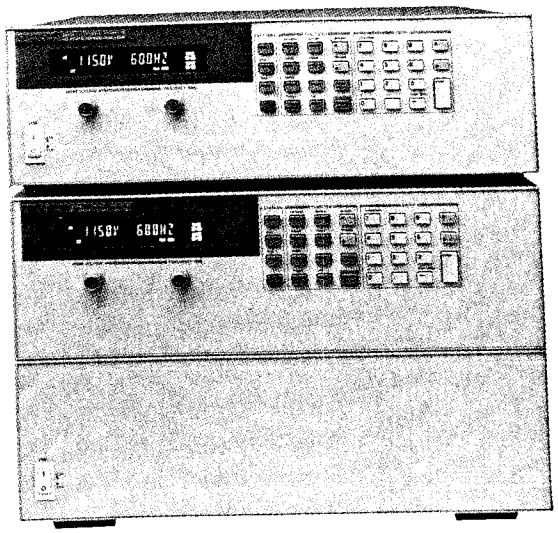
HP 6800 Series AC Power Source/Analyzers

HP 6812A – 6814A, 6834A

- 1Φ and 3Φ models
- AC and dc output capability
- Compact size
- Power line disturbance simulation
- Arbitrary waveform generation
- High accuracy readback
- Built-in harmonic analysis capability
- Autoranging output (HP 6812A and 6813A)
- Standard Commands for Programmable Instruments (SCPI)
- Built-in HP-IB and RS-232 interface
- EC'92 compliant

NEW

DESIGNED FOR HP-IB SYSTEMS



HP 6800 Series AC Power Source/Analyzers

HP 6812A 0 to 300 V_{rms}, 750 VA
Single Phase Model
Panel Height: 5.25″

HP 6813A 0 to 300 V_{rms}, 1750 VA
Single Phase Model
Panel Height: 5.25″

HP 6814A 0 to 300 V_{rms}, 3000 VA
Single Phase Model
Panel Height: 10.5″

HP 6834A 0 to 300 V_{rms}, 4500 VA_{total}
Three Phase Model
Panel Height: 10.5″

Hewlett-Packard ac power source/analyzers are designed for applications which require precise control, accurate measurement, and analysis of single and three phase ac power. The feature set and performance levels of this new product family provide the flexibility necessary to power and test a wide variety of devices. These products are ideal for applications such as power supply testing, UPS testing, avionics ATE, the testing of power factor corrected equipment and devices, and compliance testing to regulatory standards.

The HP 6800 ac power source/analyzers are "one-box" solution power products and have built-in HP-IB and RS-232 interfaces that come standard with each model. System configuration is greatly simplified since the need to configure an appropriate power amplifier with a compatible programmer is eliminated.

The HP 6800 series utilizes a low noise switching topology, which delivers high performance and reduced size. These products can output dc (HP 6812A and HP 6813A models), ac, complex, and user-defined waveforms for exceptional application flexibility over the bus or via an easy-to-use front panel.

Key Features

- Sine, square, and up to 12 user-defined waveforms
- Programmable voltage, current limit, frequency, phase, and distortion
- Programmable dc output (HP 6812A and 6813A only)
- Programmable output impedance (HP 6812A and 6813A only)
- Voltage and frequency slew control
- Power line disturbance simulation (sag, surge, dropout, clippin and event programming)
- Independent phase control (HP 6834A)
- Measurement of rms voltage, rms current, peak current, neutra current (HP 6834A), frequency, phase, real power, reactive power, apparent power, total 3Φ power (HP 6834A), and powe factor
- Harmonic analysis of voltage and current with magnitude and phase results up to the 50th harmonic
- THD measurement of voltage and current
- Over-current, over-voltage, over-power, over-temperature, anc RI/DFI protection
- Built-in output isolation relays
- Sixteen non-volatile store and recall states
- User-definable power-on state
- Self-test at power-up
- HP ITG and VEE support
- Electronic calibration via the bus or front panel

Global AC Power Trends Demand More Sophisticated AC Sources

The dramatic growth of consumer and industrial electronic products has posed many challenges for local power utilities. The sheer volume of these products has created a trend of increasing power demand. In many instances, the result is local ac service with steady-state ac voltage levels at the low end of the nominal range. This is compounded with a higher occurrence of brownout conditions which can cause improper operation of equipment or equipment shutdown.

An additional problem that has been growing in step with the increasing power demand is the amount of harmonic current interference transferred to the ac line from various products such as computers, consumer electronics, and commercial and industrial appliances. To address this problem, international regulatory bodies have developed standards (such as IEC 555-2) specifying the maximum current harmonic level for devices powered directly by local power utilities. A wide range of devices must be tested for both the ability to operate under marginal power conditions, and to verify that they do not further degrade the ac line.

The variability of ac line conditions and the effort to minimize harmonic current content through international regulatory standards has resulted in the need for more sophisticated ac sources. These ac sources must be capable of simulating a wide variety of ac line conditions, accurately measuring ac and dc parameters, and performing analysis on captured waveform data to provide useful test information. The new HP 6800 series of ac power source/analyzers provide all of these capabilities in a compact, reliable, easy-to-use product.

Performance and Features to Meet Critical Testing Needs

Powerful Direct Digital Synthesis (DDS) Waveform Generation

The HP 6800 series offers the ultimate in waveform generation versatility. These products can provide low distortion sine and square waveforms up to a maximum frequency of 1 kHz. For testing products under ac line distortion conditions, clipped sinewaves can be generated with 0% to 43% distortion. Up to twelve user-defined arbitrary waveforms can be defined and stored in non-volatile memory. These waveforms can be used to generate steadystate outputs or can be combined for more complex transient generation schemes. Testing for compliance to ac line harmonic immunity standards can easily be achieved. Sinewaves with harmonic content specified by this standard can be downloaded into non-volatile memory and generated as needed.

For testing that requires dc output capability or waveforms with a dc offset, the output of the HP 6812A and 6813A can be configured in ac or dc mode. Output changes can be programmed to start at any phase angle.

Flexible Transient Generation

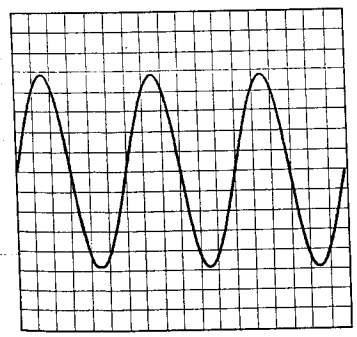
When testing requires precise synchronization between waveform generation and measurement of the device under test, the HP 6800 series transient generation capability provides a powerful tool. The Step and Pulse modes offer an easy and convenient method of executing single step and continuous output changes. The output voltage amplitude, frequency, phase, waveform shape, voltage slew rate, and frequency slew rate can be controlled in response to an input trigger generated from an internal or external event. The List transient mode further extends this capability for more complex waveform generation needs. Up to 99 sequences of output settings can be precisely executed in response to a trigger or paced by programmed dwell times without computer intervention. Output triggers can be generated at the beginning and end of each List step to synchronize external events and measurements with output changes.

Extensive Measurement and Analysis

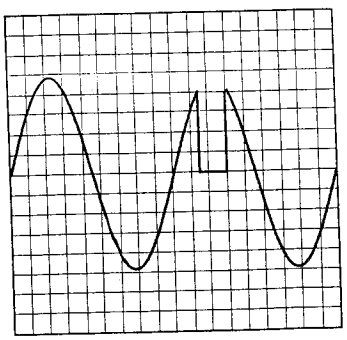
The HP 6800 series has measurement functionality equivalent to commercially available high-accuracy wattmeters. This eliminates the need for a separate system wattmeter for most applications, and lowers systems cost, increases available rack space, and simplifies cabling. All measurements are made with 16-bit resolution, suitable for even the most demanding applications.

For testing devices for compliance to regulatory standards such as IEC 555-2 and its proposed revisions, the HP 6800 series has built-in voltage and current waveform digitization combined with harmonic analysis capability. Amplitude, phase, and total harmonic distortion results up to the 50th harmonic are provided for output frequencies equal to or less than 250 Hz. This measurement feature, accessible via the front panel or over the bus, provides a sophisticated solution for verification of compliance in regulatory testing agencies and for precompliance testing during product development.

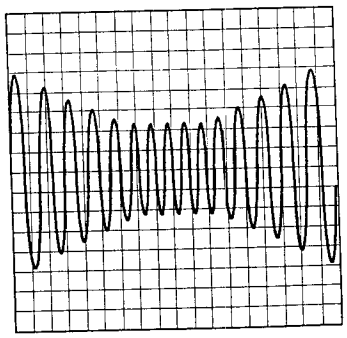
HP 6800 Series Waveform Examples



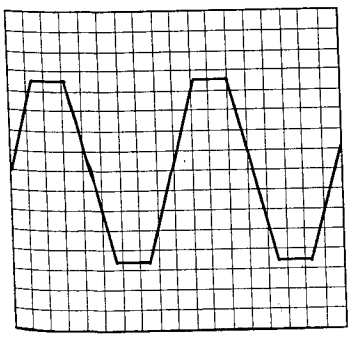
Low distortion sinewave



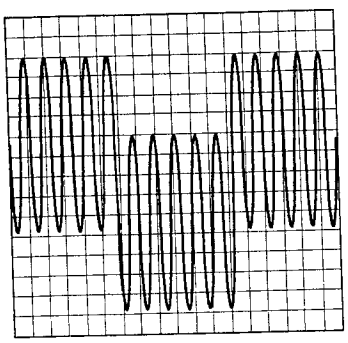
Phase referenced cycle dropout



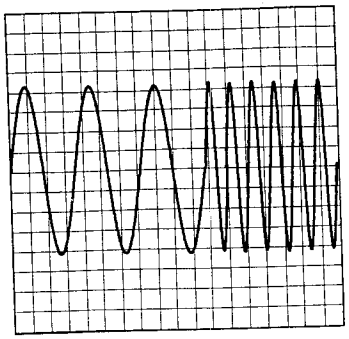
Voltage amplitude change with programmable slew rate



Programmable distortion (clipped sinewave)



Waveform with a dc offset



Frequency change with programmable slew rate

AC SOURCE/ANALYZERS

HP 6800 Series AC Power Source/Analyzers (cont'd)

HP 6812A – 6814A, 6834A

Specifications (Per phase for a sinewave with a resistive load at 0° to 40° C, within an output frequency range of 45 Hz to 1000 Hz, and in a coupled mode unless otherwise noted)

		HP 6812A	HP 6813A	HP 6814A	HP 6834A
Number of phases		1	1	1	3
Output ratings	Power	750 VA	1750 VA	3000 VA	1500 VA/phase
	rms voltage range	0 to 300 V	0 to 300 V	0 to 300 V (high range) 0 to 150 V (low range)	0 to 300 V (high range) 0 to 150 V (low range)
	DC voltage range	425 V	425 V	N/A	N/A
	Maximum rms current	6.5 A	13 A	10 A (high range) 20 A (low range)	5 A (high range) 10 A (low range)
	Maximum dc current	3.25 A	6.5 A	N/A	N/A
	Maximum repetitive peak current	26 A	52 A	25 A (high range) 50 A (low range)	12.5 A (high range) 25 A (low range)
	Crest factor	4	4	2.5	2.5
	Maximum nonrepetitive peak current	40 A	80 A	25 A (high range) 50 A (low range)	12.5 A (high range) 25 A (low range)
Output frequency range		dc; 45 Hz to 1 kHz	dc; 45 Hz to 1 kHz	45 Hz to 1 kHz	45 Hz to 1 kHz
Constant voltage ripple and noise (20 kHz to 10 MHz)		−60 dB	−60 dB	−60 dB	−60 dB
Line regulation		0.1%	0.1%	0.1%	0.1%
Load regulation		0.5%	0.5%	0.5%	0.5%
Maximum total harmonic distortion		1%	1%	1%	1%
Programming accuracy (25° C ±5° C)	rms voltage	0.15% + 0.3V (45 to 100 Hz) 0.5% + 0.3V (>100 to 500 Hz) 1% + 0.3V (>500 to 1000 Hz)	0.15% + 0.3V (45 to 100 Hz) 0.5% + 0.3V (>100 to 500 Hz) 1% + 0.3V (>500 to 1000 Hz)	0.15% + 0.3V (45 to 100 Hz) 0.5% + 0.3V (>100 to 500 Hz) 1% + 0.3V (>500 to 1000 Hz)	0.15% + 0.3V (45 to 100 Hz) 0.5% + 0.3V (>100 to 500 Hz) 1% + 0.3V (>500 to 1000 Hz)
	DC voltage	0.1% + 0.5V	0.5% + 0.3V	N/A	N/A
	Frequency	0.01% + 0.01 Hz	0.01% + 0.01 Hz	0.01% + 0.01 Hz	0.01% + 0.01 Hz
	Phase	N/A	N/A	N/A	0.1° (45 to 100 Hz) 1° (>100 to 1 kHz)
Measurement accuracy (25° C ±5° C)	rms voltage	0.03% + 100 mV	0.03% + 100 mV	0.05% + 250 mV	0.05% + 250 mV
	DC voltage	0.03% + 150 mV	0.03% + 150 mV	N/A	N/A
	rms current	0.05% + 10 mA	0.05% + 10 mA	0.1% + 50 mA	0.1% + 50 mA
	Frequency	0.01% + 0.01 Hz	0.01% + 0.01 Hz	0.01% + 0.01 Hz	0.01% + 0.01 Hz
	Power (VA)	0.1% + 1 VA	0.1% + 1 VA	0.15% + 5 VA	0.15% + 3 VA
	Power (watts)	0.1% + 1 W	0.1% + 1 W	0.15% + 5 W	0.15% + 3 W
	Power factor	0.01	0.01	0.01	0.01
Isolation to ground		300 V_{rms}			

Notes:
1. 30-minute warm-up period
2. Specifications subject to change without notice

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

		HP 6812A	HP 6813A	HP 6814A	HP 6834A
Average programming accuracy	rms current	0.2% + 25 mA	0.2% + 50 mA	0.2% + 80 mA	0.2% + 40 m
Average programming resolution	rms voltage	80 mV	80 mV	80 mV	80 mV
	DC voltage	110 mV	110 mV	N/A	N/A
	Overvoltage programming (OVP)	2 V	2 V	2 V	2 V
	rms current	2 mA	4 mA	5 mA	2.5 mA
	Peak current	10 mA	20 mA	N/A	N/A
	Output frequency	0.001 Hz	0.001 Hz	0.001 Hz	0.001 Hz
	Phase	N/A	N/A	N/A	0.001° (45 Hz to 1 kH
Average measurement resolution	rms voltage	10 mV	10 mV	10 mV	10 mV
	rms current	1 mA	2 mA	1.2 mA	6 mA
	Net weight	28.2 kg (62 lb)	32.7 kg (72 lb)	79.5 kg (175 lb)	87.7 kg (193
	Shipping weight	31.8 kg (70 lb)	36.4 kg (80 lb)	119.1 kg (262 lb)	127.3 kg (280

Remote Sensing: Up to 10 Vrms can be dropped across each load lead.
Command Processing Time: The average time for the output rms voltage to change after receiving an HP-IB command is 10 milliseconds.
Calibration Interval: One year
HP-IB Capabilities: SH1, AH1, T6 L4, SR1, RL1 PP0, DC1, DT1, E1, and CO, and a command set compatible with IEEE 488.2 and SCPI.
Regulatory Compliance: Listed to UL 1244; certified to CSA 22.2 No. 231; conforms to IEC 1010
RFI Suppression: Complies with CISPR-11, Group 1, Class A
Warranty Period: Three years

AC Input Ratings (*Input power configuration for the standard unit)

	HP 6812A	HP 6813A	HP 6814A	HP 6834A
Voltage range (Vac)	87 to 106 Vac *104 to 127 Vac 191 to 250 Vac	174 to 212 Vac *191 to 250 Vac	*180 to 254 L-L (3Φ) 342 to 456 L-L (3Φ)	*180 to 254 L-L (3Φ) 342 to 456 L-L (3Φ)
Maximum input Current (rms)	24 A (at 100, 120 Vac) 15 A (at 200, 230 Vac)	19 A	18 A 10 A	25 A 15 A
Input power (max)	2500 VA/1400 W	3800 VA/2600 W	5800 VA/4100 W	8900 VA/5900 W
Input frequency	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz

Key Literature

1994/95 Power Products Catalog, p/n 5091-9593.

Ordering Information

HP 6812A AC Power Source/Analyzer
Opt 0BN Extra Documentation
Opt 1CM Rack Mount Kit (p/n 5062-3977)
Opt 100 87 to 106 Vac, 48 to 63 Hz (Japan only)
Opt 230 191 to 250 Vac, 48 to 63 Hz
Opt 831 12 AWG, 200 to 240 Vac, unterminated
Opt 833 1.5 mm^2 wire size, 200 to 240 Vac, unterminated
Opt 834 10 AWG, 100 to 120 Vac, unterminated
Opt 841 Line Cord with NEMA 6-20P; 20 A, 250 V Plug
Opt 843 Line Cord with JIS C8303 Appended Fig 6(2); 20 A, 250 V Plug
Opt 845 Line Cord with IEC 309; 16A, 220V Plug
Opt 846 Line Cord with NEMA L5-30P; 30 A, 120 V Plug
Opt 847 Line Cord with CEE 7/7; 16 A, 220 V Plug
Opt 848 Line Cord with BS 546; 15 A, 240 V Plug

HP 6813A AC Power Source/Analyzer
Opt 0BN Extra Documentation
Opt 1CM Rack Mount Kit (p/n 5062-3977)
Opt 200 174 to 220 Vac, 47 to 63 Hz (Japan only) if Opt 200 is not ordered, the ac source will be configured to operate at 191 to 250 Vac, 47 to 63 Hz.
Opt 831 12 AWG, 200 to 240 Vac, unterminated
Opt 832 4 mm^2 wire size, unterminated
Opt 834 10 AWG, 100 to 120 Vac, unterminated
Opt 841 Line Cord with NEMA 6-20P; 20 A, 250 V Plug
Opt 842 Line Cord with IEC 309, 32 A, 220 V Plug
Opt 843 Line Cord with JIS C8503 Appended Fig 6(2); 20 A, 250 V Plug
Opt 844 Line Cord with NEMA L6-30P, 30 A, 250 V Locking Plug

Support rails required when rack mounting this product with Opt 1CM.

HP 6814A AC Power Source/Analyzer
Opt 0BN Extra Documentation Set
Opt 1CM Rack Mount Kit (Two p/n 5062-3977)
Opt 400 360 to 440 Vac, 3-phase, 47 to 63 Hz operation

HP 6834A AC Power Source/Analyzer
Opt 0BN Extra Documentation Set
Opt 1CM Rack Mount Kit (Two p/n 5062-3977)
Opt 400 360 to 440 Vac, 3-phase, 47 to 63 Hz operation

HP E3664A cabinet rails must be ordered with Opt 1CM for rackmounting the HP 6814A and HP 6834A

HP 6814A and HP 6834A Accessories

HP p/n 5060-3513 Three 30-A replacement fuses for 180 to 235 Vac line
HP p/n 5060-3512 Three 16-A replacement fuses for 360 to 440 Vac line
HP p/n 5063-2310 Heavy duty rack slide kit

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 691.