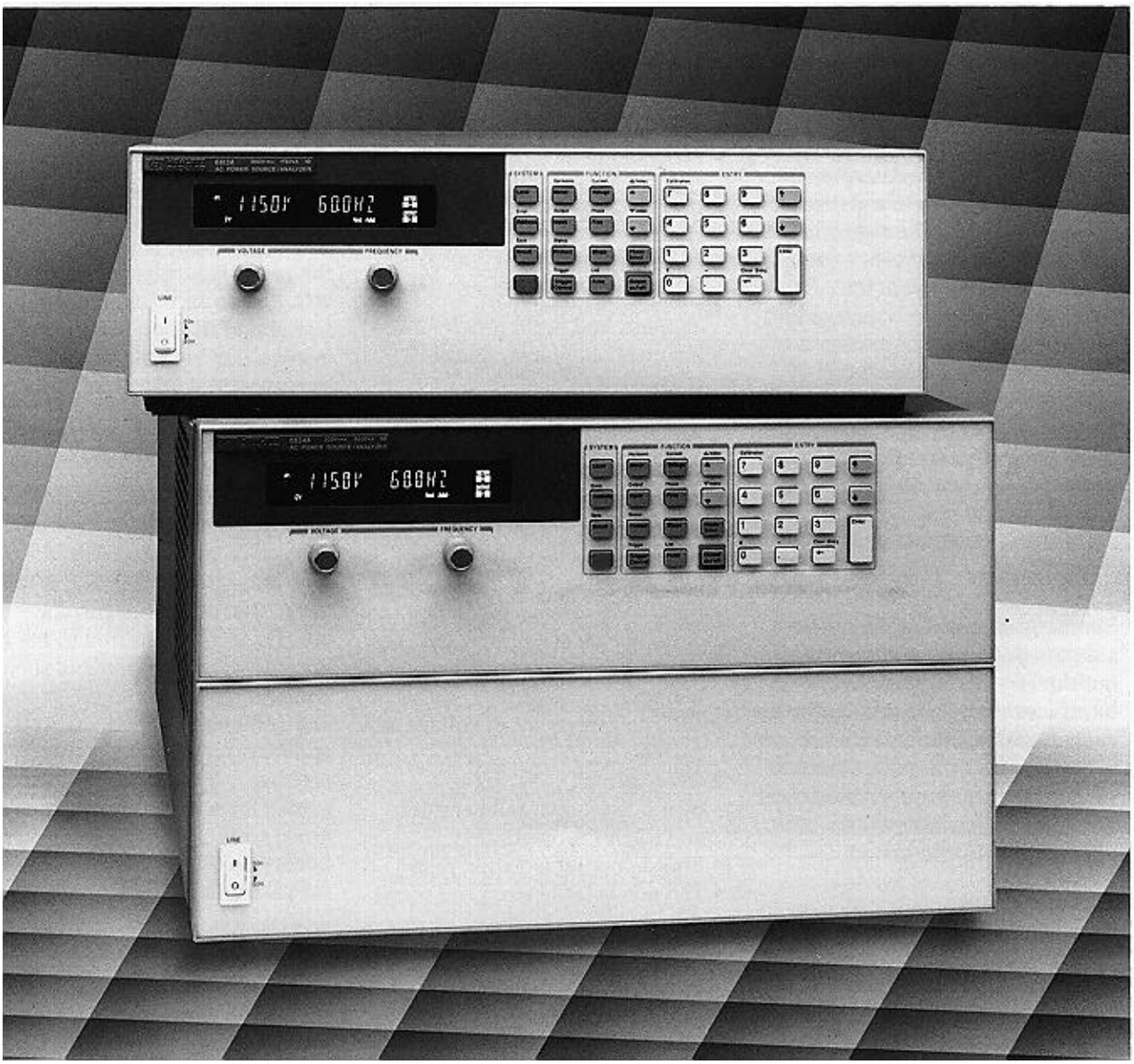
H

HP 6800 Series
AC Power Source/Analyzers

Technical Data

Introducing New
Integrated High Performance
AC Test Soltions



HP 6800 Series AC Power Source/Analyzers

HP 6812A 0 - 300 V_{rms}, 750 VA
Single PhaseModel
Panel Height: 5.25"

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

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

HP 6834A 0 - 300 V_{rms}, 4500VA
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

- Compact size
- Sine, square, or arbitrary waveform output
- Programmable voltage, current limit, frequency, phase, and distortion
- Programmable dc output (HP 6812A and 6813A only)
- Voltage and frequency slew control
- Power line disturbance simulation (sag, surge, dropout, clipping, and event programming)
- Independent phase control (HP 6834A)
- Measurement of rms voltage, rms current, peak current, neutral current (HP 6834A), frequency, phase, real power, reactive power, apparent power, total 3ϕ power (HP 6834A), and power 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, and RI/DFI protection
- Built-in output isolation relays
- Ten non-volatile store and recall states
- User-definable power-on state
- Self-test at power-up
- HP ITG and VEE support
- Standard Commands for Programmable Instruments (SCPI)
- Built-in HP-IB and RS-232
- EC'92 compliant
- 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 steadystate 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

Performance and Features to Meet Critical Testing Needs

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.

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, IEC 77A (Secretariat) 99 draft (September 1993), 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

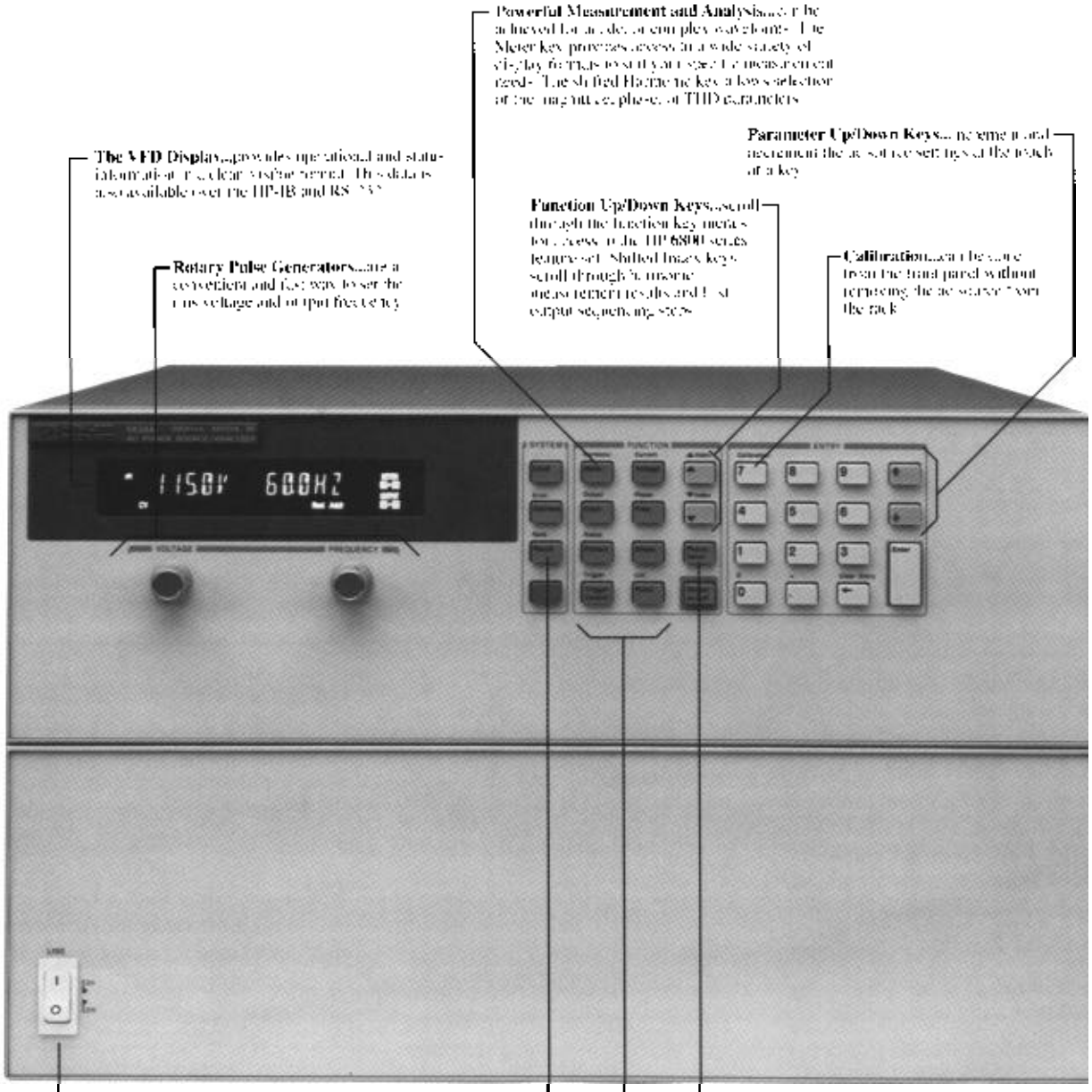
When testing requires precise synchronization between waveform generation and measurement of the device under test, the HP 6800 Series transient generation capability provides a powerful tool. The Step and Pulse modes offer an easy and convenient method of executing single step and continuous output 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 pre-compliance testing during product development.

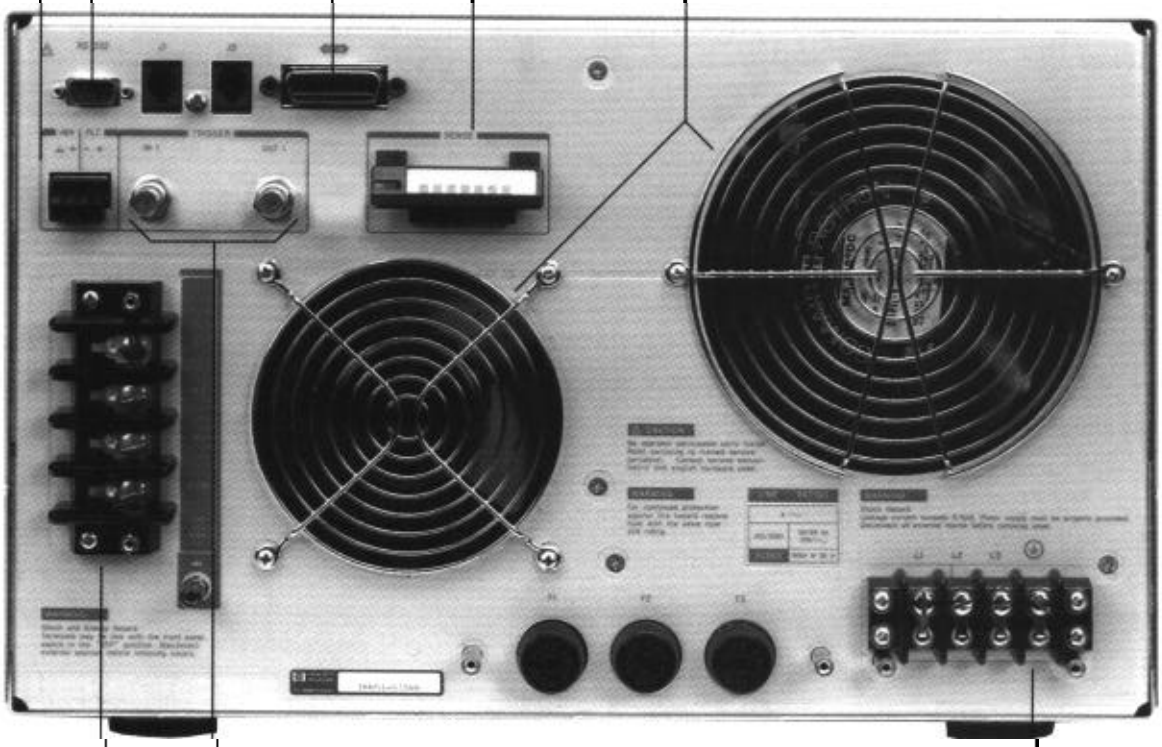


Automatic Selftest...at power-up gives an extra measure of assurance that the power and interface circuits are operating properly.

Fast Recall of Instrument States...is achieved through non-volatile storage of up to 16 sets of output and protection settings. The ac source can also recall a user-defined state at power-up.

AC Line Disturbance Simulation and Output Sequences...can be easily set up and executed with precise timing. Up to 99 List mode output settings can be sequenced and controlled by triggers or by computer-independent timing parameters.

The Output Phase Select Key...of the HP 6834A provides flexible independent phase programming.


The FLT/INH Port...allows connections for Remote Inhibit/Discrete Fault Indicator capability between ac sources or external devices.
HP-IB and RS 232 Interface...are built-in and accessed via Standard Commands for Programmable Instruments (SCPI).
Local/Remote Sense...permits remote voltage sensing for precise regulation at the load.
Automatic Fan Speed Control...minimizes acoustic noise and fan wear while providing the cooling required for reliable operation.
The Trigger In/Out Port...
Output Connections...

Specifications

Specifications are warranted 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 ac coupled mode unless otherwise noted.

Hewlett-Packard Model	HP 6812A Available Sept '94	HP 6813A Available Sept '94	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 - 300 V	0 - 300 V	0 - 300 V (high range) 0 - 150 V (low range)	0 - 300 V (high range) 0 - 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 Non-repetitive 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 - 1kHz	dc; 45 Hz - 1kHz	45 Hz - 1kHz	45 Hz - 1kHz
Constant Voltage Ripple and Noise (20 kHz - 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) rmsVoltage	0.15% + 0.3V (45-100 Hz) 0.5% + 0.3V (> 100-500 Hz) 1% + 0.3V (> 500-1000 Hz)	0.15% + 0.3V (45-100 Hz) 0.5% + 0.3V (> 100-500 Hz) 1% + 0.3V (> 500-1000 Hz)	0.15% + 0.3V (45-100 Hz) 0.5% + 0.3V (> 100-500 Hz) 1% + 0.3V (> 500-1000 Hz)	0.15% + 0.3V (45-100 Hz) 0.5% + 0.3V (> 100-500 Hz) 1% + 0.3V (> 500-1000 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 degree (45-100 Hz) 1 degree (> 100 - 1kHz)
Measurement Accuracy (25°C +/- 5°C) rmsVoltage	0.03% + 100 mV	0.03% + 100 mV	0.05% + 100 mV	0.05% + 100 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% + 25 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}			

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

AC Input Ratings (*output derated for operation at these input voltages):

Hewlett-Packard Model	HP 6812A	HP 6813A	HP 6814A	HP 6834A
Voltage Range (Vac)	*87- 106 Vac, 104 - 127 Vac, *174 - 212 Vac, 207 - 253 Vac	*174 - 212 Vac, 207 - 253 Vac	180 - 254 Vac (3φ) 360 - 440 Vac (3φ)	180 - 254 Vac (3φ) 360 - 440 Vac (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 - 63 Hz	47 - 63 Hz	47 - 63 Hz	47 - 63 Hz

Supplemental Characteristics

Supplemental characteristics are intended to provide information useful in applying the ac source by describing non-warranted performance that has been determined by design or type testing.

		Available Sept '94	Available Sept '94		
Hewlett-Packard Model		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 mA
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	0.001 degree (45 Hz - 1 kHz)	0.001 degree (45 Hz - 1 kHz)	0.001 degree (45 Hz - 1 kHz)	0.001 degree (45 Hz - 1 kHz)
Average Readback Resolution	rms Voltage	10 mV	10 mV	10 mV	10 mV
	rms Current	1 mA	2 mA	1.2 mA	6 mA

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.

HP-IB Capabilities: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0, 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

Recommended Calibration Interval: One year

Warranty Period: Three years

Weight:

6812A: 28.2 kg (62 lb) net
31.8 kg (70 lb) shipping

6813A: 32.7 kg (72 lb) net
36.4 kg (80 lb) shipping

6814A: 79.5 kg (175 lb) net
119.1 kg (262 lb) shipping

6834A: 425.5 kg (193 lb) net
127.3 kg (280 lb) shipping

Ordering Information

HP 6812A and 6813A AC Power Source/Analyzer

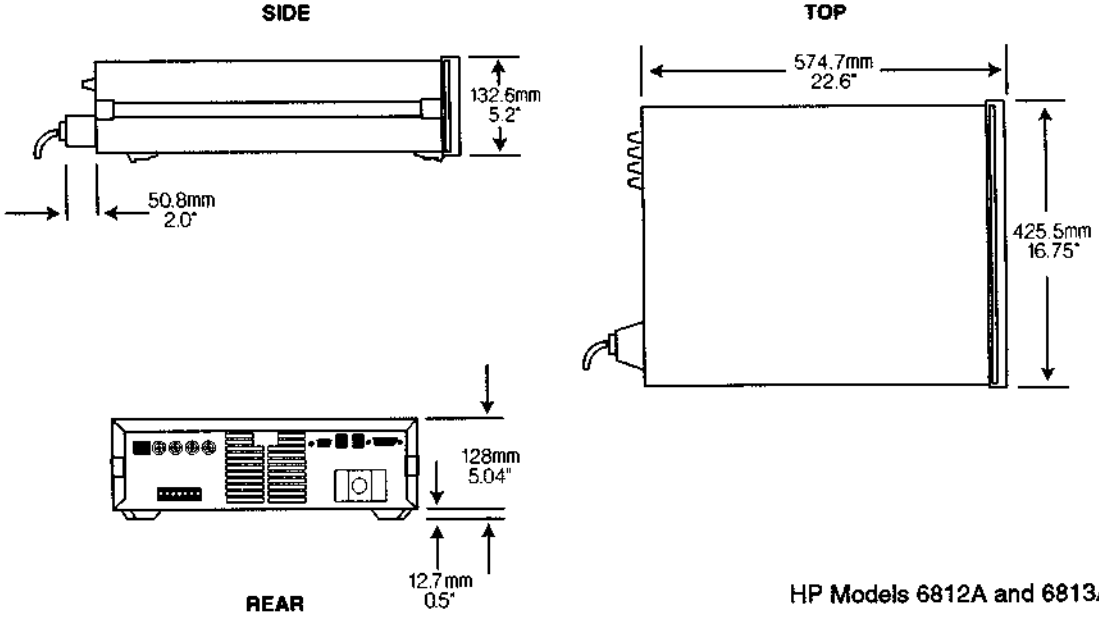
(* Options applicable to HP model 6812A only)
(** Options applicable to HP model 6813A only)
Option 0B1: Extra documentation
Option 1CM: Rack mount kit (HP p/n 5062-3977)
Option 1CP: Rack mount kit with handles (HP p/n 5062-3983)
Option 1CP: Rack mount kit with handles (HP p/n 5062-3983)
****Option 200:** 174-220 Vac, 47-63 Hz (Japan only)
Option 831: 12 AWG, 200 to 240 Vac, unterminated
****Option 832:** 4 mm^2 wire size, unterminated
***Option 833:** 1.5 mm^2 wire size, 200 to 240 Vac, unterminated
Option 834: 10 AWG, 100 to 120 Vac, unterminated
Option 841: Line cord with NEMA 6-20P; 20A, 250V plug
****Option 842:** Line cord with IEC 309, 32A, 220V plug
Option 843: Line cord with JIS C8303 Appended Fig 6(2); 20A, 250V plug
****Option 844:** Line cord with NEMA L6-30P, 30A, 250V locking plug
***Option 845:** Line cord with IEC 309; 16A, 220V plug
***Option 846:** Line cord with NEMA L5-30P; 30A, 120V plug
***Option 847:** Line cord with CEE 7/7; 16A, 220V plug
***Option 848:** Line cord with BS 546; 15A, 240V plug
Support rails required when rack mounting this product with options 1CM and 1CP

HP 6814A and 6834A AC Power Source/Analyzer

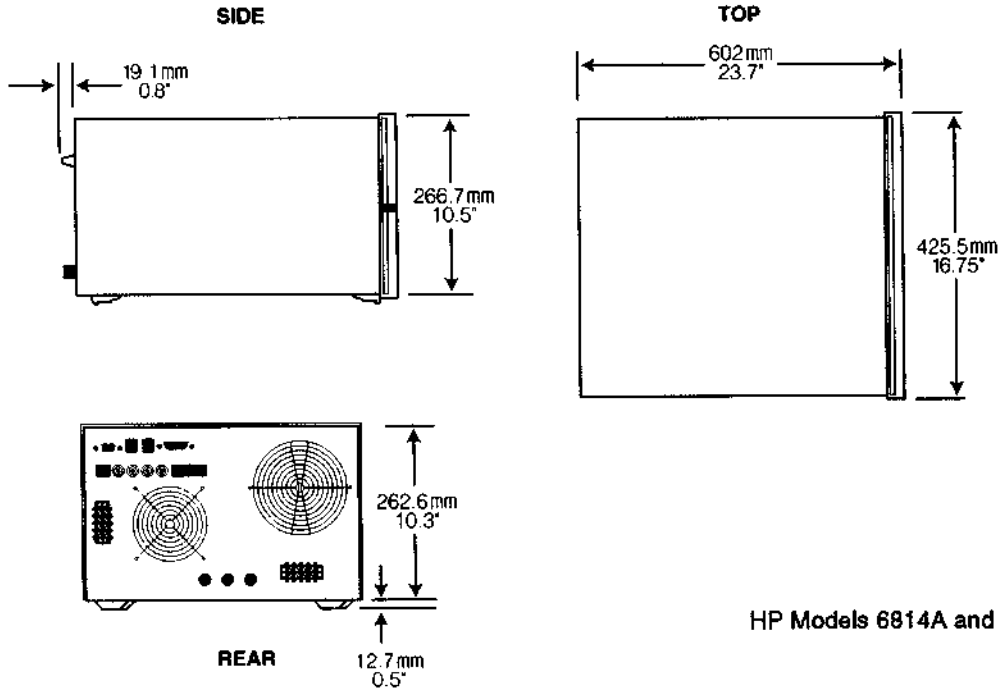
Option 0B1: Extra Documentation Set
Option 1CM: Rack mount kit (Two HP p/n 5062-3977)
Option 1CP: Rack mount kit with handles (Two HP p/n 5062-3983)
Option 400: 360-440 Vac, 3-phase, 47-63 Hz operation
Option 861: 10 AWG; 300V; 4-wire, unterminated
Option 862: 2.5 m^2, 450V; 4-wire, unterminated
HP E3664A cabinet rails must be ordered with options 1CM and 1CP 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 180-235 Vac line
HP p/n 5060-3512: Three 16-A replacement fuses for 360-440 Vac line

Dimensions



HP Models 6812A and 6813A



HP Models 6814A and 6834A

For more information about Hewlett-Packard power products, please ask your local Hewlett-Packard Sales Representative for a copy of the 1994/95 Power Products Catalog, HP p/n 5091-9593.

For special applications, please call your local Hewlett-Packard Sales Representative. Your local HP Sales office is listed in your telephone directory white pages.

~~**Data Subject to Change**~~
January 1994

Printed in the U.S.A.
5962-7088E