

Description

The ac source combines three instruments in one unit as shown in the following figure. The function generator produces waveforms with programmable amplitude, frequency, and shape. The power amplifier amplifies the function generator signal to produce the ac power for your application. The measurement functions range from a simple readback of rms voltage and current, to sophisticated capabilities such as waveform analysis.

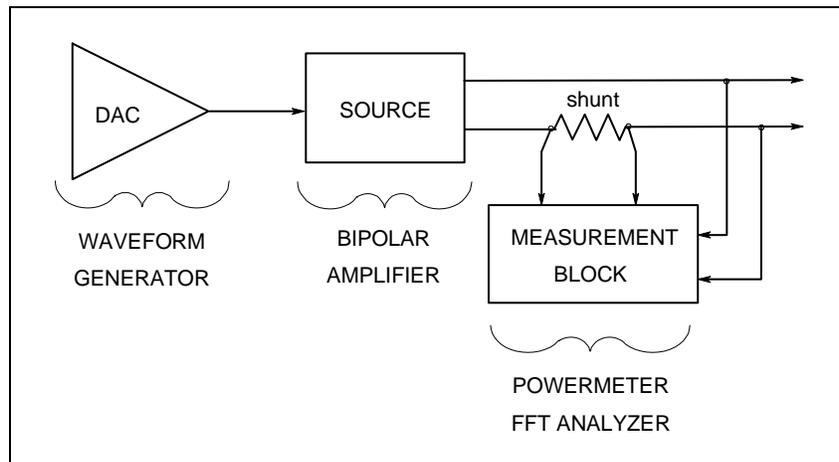


Figure 1-1. AC Source Functional Elements

The following model ac power sources are described in this User's Guide:

Model	Description
Agilent 6814B	3000 VA single –phase operation
Agilent 6834B	1500 VA/ phase for three-phase operation (4500 VA for single-phase operation)
Agilent 6843A	4500 VA single-phase operation

Capabilities

- ◆ Programmable ac voltage, dc voltage, frequency, phase, and current limit.
- ◆ Sine, square, clipped sine, and user-definable waveforms.
- ◆ Voltage and frequency slew control.
- ◆ Synthesized waveform generation for high resolution and accuracy in frequency, low waveform distortion, and glitch-free phase transitions.
- ◆ Step and pulse output transients for generating surge, sag, dropout, and other line disturbance simulations.
- ◆ Nonvolatile list programming for generating complex output transients or test sequences.
- ◆ Three-phase/single-phase output capability (Agilent 6834B only)
- ◆ Extensive measurement capability:
 - Ac rms, dc, ac+dc voltage and current and peak current.
 - Real, reactive, and apparent power.
 - Harmonic analysis of voltage and current waveforms gives amplitude, phase, and total harmonic distortion results up to the 50th harmonic.
 - Triggered acquisition of digitized voltage and current with extensive post-acquisition calculations.

1 - General Information

- Additional total power and neutral current measurements in the three-phase model.
- All measurements made with 16-bit resolution.
- ◆ Trigger In and Trigger Out for synchronizing transient events or measurements with external signals.
- ◆ Front panel control with 14-character vacuum fluorescent display, keypad, and rotary pulse generators for voltage and frequency settings.
- ◆ Built-in GPIB and RS-232 interface programming with SCPI command language.
- ◆ Nonvolatile state and waveform storage and recall.
- ◆ Over-voltage, over-power, over-current, over-temperature, and RI/DFI protection features.
- ◆ Built-in output and sense disconnect relays.
- ◆ Extensive selftest, status reporting, and software calibration.

Front Panel/Remote Operation

The front panel has both rotary (RPG) and keypad controls for setting the output voltage and frequency. The panel display provides digital readouts of a number of output measurements. Annunciators display the operating status of the ac source. System keys let you perform system functions such as setting the GPIB address and recalling operating states. Front panel Function keys access the ac source function menus. Front panel Entry keys let you select and enter parameter values. Refer to Chapter 4 for a complete description of the front panel controls.

Remotely programming is accomplished from either the GPIB bus or from an RS-232 serial port. GPIB and RS-232 programming uses SCPI commands (Standard Commands for Programmable Instruments) that make the ac source programs compatible with those of other instruments. AC source status registers permit remote monitoring of a wide variety of ac source operating conditions

NOTE: Refer to the ac source Programming Guide for further information about remotely programming the ac source. If you are using the Agilent 6843A, refer to the appropriate Regulatory Test Solution User's Guide for information about regulatory testing.

Output Characteristic

Ranges

The ac source's output characteristic is shown in the following figure. The output voltage of the ac source may be adjusted to any value within the range of the unit. On three-phase units, each phase can be adjusted independently of the other two.

Rated output VA and conversion efficiency is greatest when the output voltage is set near maximum. For this reason, the ac source is designed to operate on one of two ranges: 150 volts full-scale, or 300 volts full-scale. You should choose the range that allows you to operate nearest the full-scale output capability of the selected range.

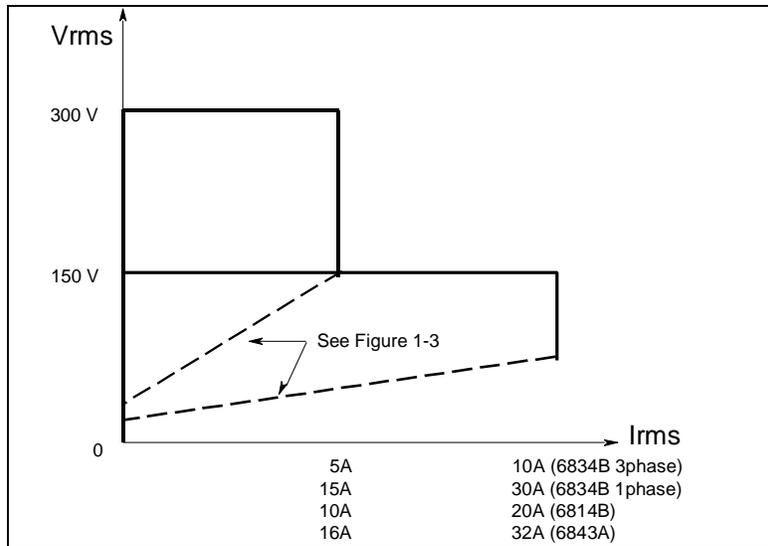


Figure 1-2. AC Source Output Characteristic (in real-time mode)

Output VA Capability

The output capability of each output phase is limited by VA (volts-amps) rather than power (watts). The amount of VA available to a load can be determined by examining figure 1-3, the output power curve. This curve rates the available VA versus output voltage. Full VA is available only at a full-scale voltage. Full current is available at voltages between 50% and 100% of the output voltage range. Appendix A documents the ac source’s specifications and supplemental characteristics.

NOTE: The load on the ac source may draw full VA at any power factor between 0 and 1, and may draw maximum current with a crest factor of 4 (3 for Agilent 6843A). If the load draws current in excess of the maximum rated rms or peak current, the voltage amplitude will be clipped to prevent excessive internal power dissipation.

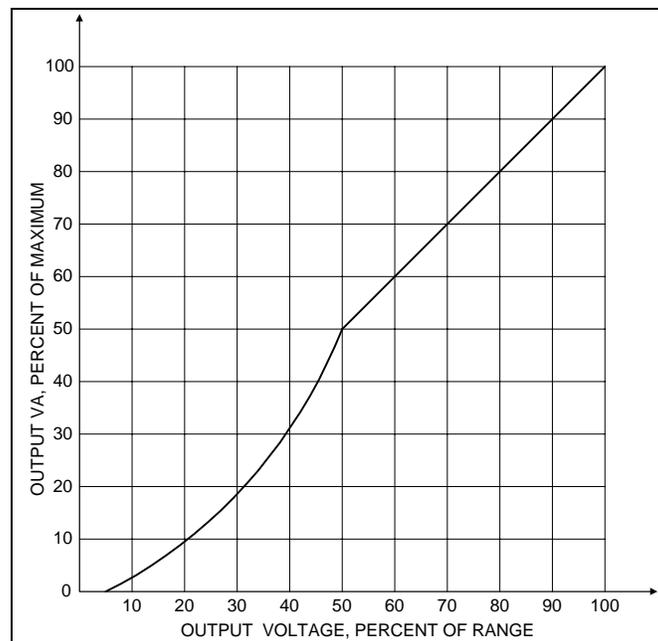


Figure 1-3. AC Source VA Capabilities

Specifications

Specifications

Performance specifications are warranted over the ambient temperature range of 0 to 40 °C. Unless otherwise noted, specifications are per phase for a sinewave with a resistive load at an output frequency range of 45 Hz to 5 kHz (45 Hz-1 kHz, Agilent 6843A) after a 30-minute warmup.

Table A-1. Performance Specifications¹

Parameter	Agilent 6814B	Agilent 6834B		Agilent 6843A
Phases:	1	3	1	1
Maximum Output Ratings				
rms Voltage²:	150 V low range; 300 V high range			
Power:	3 kVA	1.5 kVA/phase	4.5 kVA	4.8 kVA
rms Current:	20 A low range 10 A high range	10 A low range 5 A high range	30 A low range 15 A high range	32 A low range 16 A high range
Repetitive peak Current:	80 A low range 40 A high range	40 A low range 20 A high range	120 A low range 60 A high range	96 A low range 48 A high range
Crest Factor (current):	4	4	4	3
Output Frequency Range:	45 Hz–5 kHz			45 Hz–1 kHz
Constant Voltage Ripple and Noise	–60 dB (20 kHz–10 MHz)			
Load Regulation:	0.5%			
Line Regulation:	0.1%			
Maximum Total Harmonic Distortion:	1% (45 Hz–1 kHz); 1% + 1%/kHz (>1 kHz–5 kHz)			
Programming Accuracy (@ 25°C ±5°C)				
rms Voltage:	0.15% + 0.3 V (45–100 Hz) 0.5% + 0.3 V (>100–500 Hz) 1% + 0.3 V (>500–5 kHz)			
Frequency:	0.01% + 10 µHz			
Phase: (Agilent 6834B in 3-phase mode)	N/A	0.1° (45-100 Hz) 1° (>100–1 kHz) 1° + 1%/kHz (>1k–5 kHz)	N/A	N/A
Measurement Accuracy (@25°C ±5°C)				
rms Voltage	0.05% + 250 mV (45 Hz – 1 kHz) 0.05% + 0.1%/kHz + 250 mV (>1 kHz – 5 kHz)			0.05% + 250 mV
rms Current	0.1% + 50 mA	0.1% + 25 mA	0.1% + 50 mA	0.1% + 50 mA
Frequency:	0.01% + 0.01Hz	0.01% + 0.01Hz	0.01% + 0.01Hz	0.01% + 0.01Hz
Power (VA):	0.15% + 5 VA	0.15% + 3 VA	0.15% + 5 VA	0.15% + 9 VA
Power (Watts):	0.15% + 5 W	0.15% + 3 W	0.15% + 5 W	0.15% + 9 W
Power Factor:	0.01	0.01	0.01	0.01

¹Specifications subject to change without notice.

²From line to neutral on Agilent 6834B

Supplemental Characteristics

Table A-2 lists the supplemental characteristics, which are not warranted but are descriptions of typical performance determined either by design or type testing.

Table A-2. Supplemental Characteristics

Parameter	Agilent 6814B	Agilent 6834B	Agilent 6843A
AC Input Voltage Range:	180–235 Vac (3-phase) or 360–440 Vac (3-phase)		
AC Input Frequency:	47–63 Hz		
Output Isolation Voltage:	300 Vrms		
Maximum Input Current (rms):	18 A low range 10 A high range	24 A low range 15 A high range	24 A low range 15 A high range
Maximum Input Power:	5.8 kVA/4.1 kW	8.9 kVA/5.9 kW	8.9 kVA/5.9 kW
Average Programming Accuracy:	0.2% + 80 mA	0.2%+40mA (3-phase) 0.2%+80mA (1-phase)	0.2% + 80 mA
Average Programming Resolution			
rms Voltage:	80 mV	80 mV	80 mV
Overvoltage Programming (OVP):	2 V	2 V	2 V
rms Current:	5 mA	2.5 mA (3-phase) 7.5 mA (1-phase)	7.5 mA
Output Frequency:	10 µHz	10 µHz	10 µHz
Phase (Agilent 6834B in 3-phase mode):	N/A	0.001° (45Hz–1kHz)	N/A
Average Measurement Resolution			
rms Voltage:	10 mV	10 mV	10 mV
rmsCurrent:	3 mA	6 mA (3-phase) 2 mA (1-phase)	6 mA
List Dwell Time	0–4.30133 x 10 ⁵ s	0–1.07533 x 10 ⁶ s	0–4.30133 x 10 ⁵ s
Triggering Accuracy with Respect to Phase Synchronization:	100 µs	250 µs	100 µs
Trigger In Response Time:	200 µs	400 µs	200 µs
Minimum Resolution for Dropout:	500 µs		
Output Response Time: (output change from 10 to 90% or 90 to 10% of its total excursion with full resistive load)	50 µs		
Remote Inhibit Response Time:	<1 ms		
Remote Sense Capability:	Up to 10 Vrms can be dropped across each load lead.		
Waveform Table Resolution (voltage):	1024 points		
Harmonic Measurement Time (amplitude):	1 harmonic ≤100 ms; all 50 harmonics ≤2 s		
RS-232 Interface Capabilities			
Baud Rates:	300, 600, 1200, 2400, 4800, 9600		
Data Format:	7 bits even or odd parity; 8 bits without parity		
Language:	SCPI (Standard Commands for Programmable Instruments), Elgar 9012 PIP		
Trig In/Trig Out Characteristics			
Trig Out (HC TTL output):	V _{oh} = 0.8 max. @ 1.25 mA V _{oh} = 3.3 V max. @ 1.25 mA		
Trig In (10k pullup):	V _{il} = 0.8 V max. V _{ih} = 2 V max.		

Table A-2. Supplemental Characteristics (continued)

Parameter	Agilent 6814B	Agilent 6834B	Agilent 6843A
INH/FLT Characteristics Maximum Ratings: INH Terminals: FLT Terminals:	16.5 Vdc between INH terminals; FLT terminals; and from INH terminals to chassis ground $I_{ol} = 1.25 \text{ mA max.}$ $V_{ol} = 0.5 \text{ Vmax.}$ $V_{il} = 0.8 \text{ V max.}$ $V_{ih} = 2 \text{ V min.}$ $tw = 100 \text{ } \mu\text{s min.}$ $td = 4 \text{ ms typical}$		
Saveable Data (nonvolatile) Instrument States: User-defined waveforms: List Data:	16 (0 to 15) 12 (with 1024 data points in each) 1 to 100 points (for each list function)		
GPIB Interface Capabilities Language: Interface: Programming Time:	SCPI, Elgar 9012 PIP AH1, C0, DC1, DT1, E2, LE1, PP0, RL1, SH1, SR1, TE6 10 ms		
Recommended Calibration Interval:	1 year		
Regulatory Compliance Listed to: Certified to: Conforms to:	UL 3111-1 CSA 22.2 No. 1010-1 IEC 1010		
RFI Suppression Complies with:	CISPR-11, Group 1, Class A		
Dimensions Height (add 12.7 mm or 0.5 in. for feet) Width: Depth:	262.6 mm (10.3 in.) 430.8 mm (16.96 in.) 602 mm (23.7 in.)		
Net Weight:	79.5 kg (175 lb)	87.7 kg (193 lb)	87.7 kg (193 lb)
Shipping Weight:	119.1 kg (266 lb)	127.3 kg (280 lb)	127.3 kg (280 lb)