Keysight Technologies
AC6800B Series Basic AC Power Sources

Data Sheet



KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

Because You Can't Afford Downtime

Engineer reliability into your designs with a new basic AC source alternative from Keysight and test with confidence that your products will perform as designed...

Maximize your uptime with the new Keysight Technologies, Inc. AC6800B Series basic AC power sources, and test your devices with confidence your products will perform as designed – even if voltage from the AC power grid is fluctuating or you are facing extreme inrush current or transient spikes.

Keysight's new AC6800B Series basic AC sources offer the quality and capability you need:

- Intuitive user interface – If you've used a Keysight DC power supply, you'll feel right at home with these AC sources.
- Flexible I/O – LAN/LXI Core and USB (standard), and GPIB (optional). And you can access and control the source remotely via a standard browser.
- Low cost of ownership – backed with global support and the longest standard warranty in the industry.

Models up to 4000 VA are available to meet your basic AC source requirements.

Models and Options

Models	
AC6801B	Basic AC power source, 500 VA, 310 V, 2.5 A
AC6802B	Basic AC power source, 1000 VA, 310 V, 5 A
AC6803B	Basic AC power source, 2000 VA, 310 V, 10 A
AC6804B	Basic AC power source, 4000 VA, 310 V, 20 A
Options	
AC68BALGU	Upgrade - user-installable analog interface board for AC6800B Series AC sources
AC68GPBU	Upgrade - user-installable GPIB interface board for AC6800B Series AC sources
AC68BRAC3	Rack mount flange kit for AC6801B, AC6802B, AC6803B
AC68BRAC6	Rack mount flange kit for AC6804B

A New Basic AC Power Source Alternative for Bench and Production-Line Testing

Whether you want to manually control your basic AC source on your R&D bench or program it to use in a fully automated test rack, it must provide stable, dependable AC power to your DUT.



Choose from models up to 4000 VA, all with 0 to 310 Vrms and 40 to 500 Hz capability.

You can use the AC6800B Series basic AC power sources for:

- Simple tasks such as simulating global AC power conditions
- Testing varying frequency and voltage combinations to simulate real-world conditions
- Power factor correction testing and similar AC + DC applications (for example, test your input circuitry to look at ripple voltage)

AC6800 Series Basic AC Sources				
	AC6801B	**AC6802B**	**AC6803B**	**AC6804B**
Phases	Single-phase			
Maximum output power	500 VA	1000 VA	2000 VA	4000 VA
AC output mode				
Voltage ranges (low/high range)	155 Vrms/310 Vrms			
Maximum rms current (low/high range)	5 A/2.5 A	10 A/5 A	20 A/10 A	40 A/20 A
Frequency	40-500 Hz			
DC output mode				
Voltage ranges (low/high range)	219 V/438 V			
Maximum current (low/high range)	4 A/2 A	8 A/4 A	16 A/8 A	32 A/16 A
Power capacity	400 W	800 W	1600 W	3200 W
Measurements & I/O				
Measurements	Voltage, current, power, AC, DC and AC+DC			
Transients	Basic transient capability via optional analog card (Option: AC68BALGU)			
I/O	LAN/LXI Core with remote Web interface USB GPIB (Option: AC68GPBU)			

Need higher-performance capabilities?

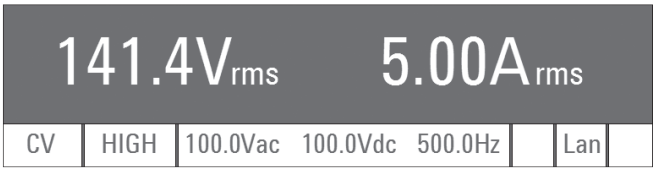
If you need to generate and analyze more-sophisticated waveforms, harmonics or more complex transient signals, the Keysight 6800C Series AC power source/analyzers with built-in arbitrary waveform generator give you the ability to source and analyze more-complex AC applications up to 1750 VA.

See **www.keysight.com/find/ACSources** for more information.



Easy Operation with an Intuitive, Time-Tested User Interface

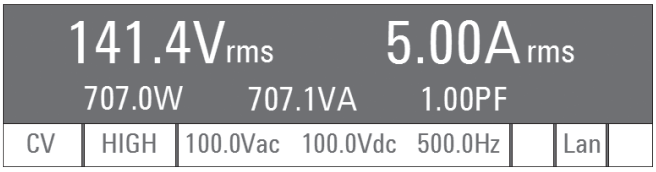
The AC6800B's simple user interface allows you to easily access and view setup and measurement information directly from the front panel or programmatically. And you won't need to spend a lot of time learning to use the interface. If you've used an Keysight DC power supply, you'll feel right at home with the AC6800B Series basic sources.



See basic voltage and current measurement information

Set your display to show just the information you want

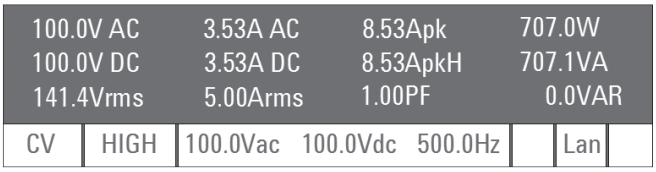
Simply click through the metering options to modify the display to show your measurement priorities and increasing levels of details.



See voltage, current and power measurement information

The information displayed indicates both the setting levels and the selected output coupling mode or configuration to allow you to control the AC source programmatically.

Measurements may be AC coupled, DC coupled, or AC+DC coupled independent of the output coupling mode.

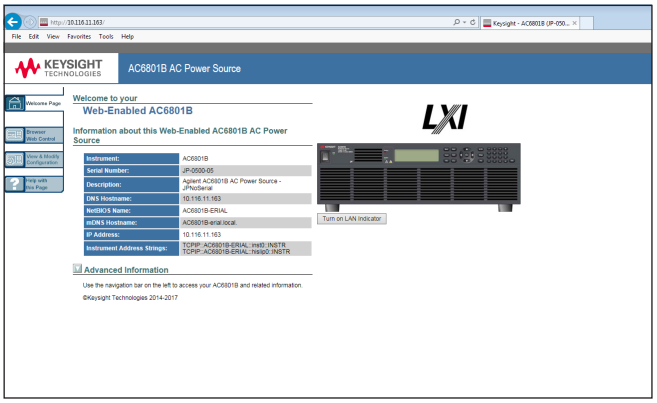


See full details of all measurement information available

Whether you use the front panel or control your AC source programmatically via SCPI (Standard Commands for Programmable Instruments), you can fully access all features.

Flexible I/O to meet your needs

Keysight AC6800B Series basic AC power sources come with LAN/LXI Core and USB interfaces (standard). For your legacy applications, an optional GPIB interface is also available that you can easily install yourself.



Set up, monitor and operate your AC6800B sources remotely

You can use the built-in Web server to remotely access and control your AC6800B Series AC sources via a standard browser. This control goes above and beyond the LXI Core specification, giving you the ability to monitor and control the instrument from anywhere.

Add more flexibility with an optional analog input board to add basic transient signals

If you want to generate non-sinusoidal output waveforms or output transient events, use the optional analog input, which allows you to create analog waveforms using your function generator. See page 12 to learn more about the analog card's characteristics. The analog input option is also useful in situations where you want to control the output voltage level with an external DC control signal.

Low Cost of Ownership – Backed with Global Support and the Industry's Longest Standard Warranty

In manufacturing test applications, the upfront cost of your power supplies is just one factor in the total cost of test. Keysight's new AC6800B Series sets a new standard for reliability, so you can expect the lowest overall cost of ownership. You can:

- Increase your confidence in your AC source uptime. With the industry's longest standard warranty for an AC power source, you'll see a lower total cost of ownership and fewer budgetary surprises.
- Take advantage of Keysight's network of global service and support centers. You can easily move AC6800B Series sources between global locations. If you ever need a repair, Keysight's global support network offers the convenience of nearby support.
- Easily document calibration. Each AC6800B Series AC source ships with a printed copy of the commercial calibration certificate along with all the test data obtained from the calibration cycle.

Example applications where AC6800B basic AC sources are ideal

- **Testing universal power supplies designed to work globally**
  The AC6800 AC source can be used to output the voltages and frequencies found around the world. The AC6800 has many built-in measurements, it can accurately measure power in Watts, VA, and phase angle. Inrush current can be measured consistently by setting the phase angle at which the voltage turns on.

- **Testing avionic electronics designed for 400 Hz**
  If you need single-phase 400 Hz power on the bench to check avionic electronics the AC6800B series can supply clean power. The AC6800 series offers a wide variety of input voltages and frequencies and can provide 500 VA to 4 kVA. It is currently used in development, manufacturing, and repair of avionic electronics.

- **Testing commercial light drivers and ballasts**
  LED drivers and fluorescent ballasts can be tested up to 310 VAC which ideal for testing electronics to 277 VAC ± 10%. In manufacturing, many ballasts can be verified in parallel with an AC source capable of 500 VA to 4 kVA. An AC6800B series is used to output steady voltage allowing the ballast to be tested for efficiency and output regulation.



Definitions

Specifications

Unless otherwise noted, specifications are warranted over the ambient temperature range of 0 to 40 °C after a 30-minute warm-up period. Specifications apply at the output terminals. Accuracy specifications are warranted for three years.

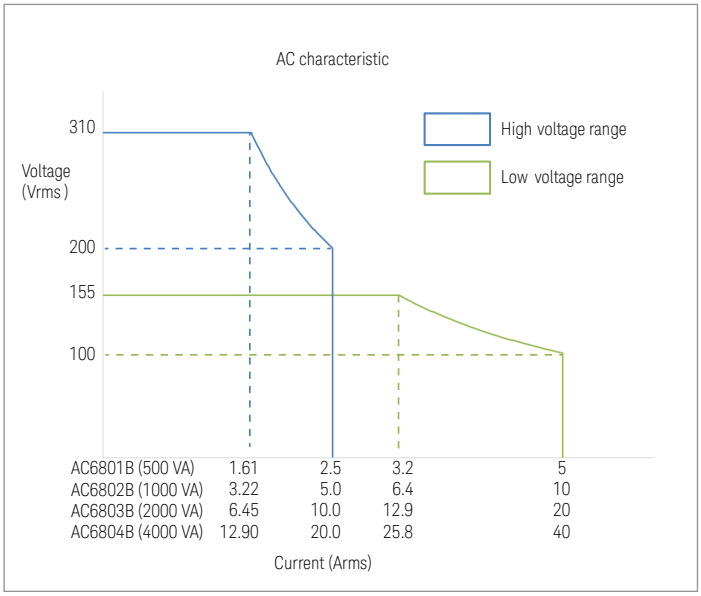
Supplemental characteristics/typical values

Supplemental characteristics are not warranted but are descriptions of performance determined either by design or by type testing. All supplemental characteristics are typical unless otherwise noted.

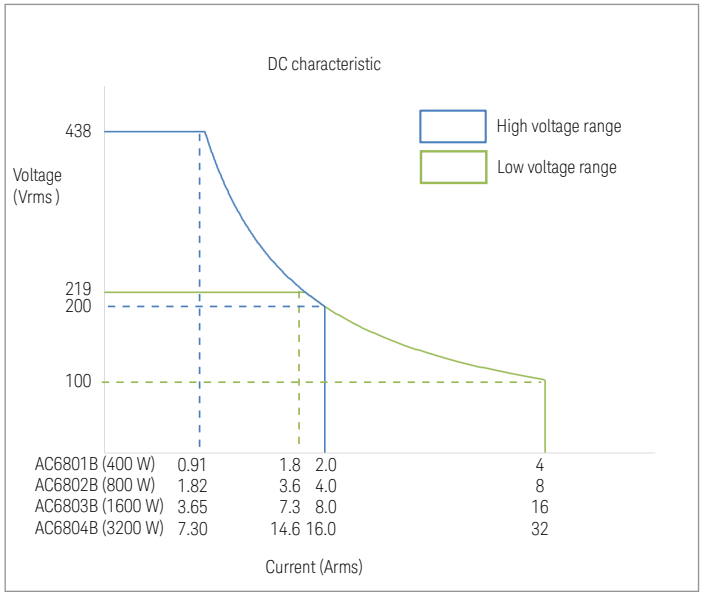
Specifications

Model	AC6801B	AC6802B	AC6803B	AC6804B
Output ratings for AC mode (155 V/310 V range)				
Rated voltage range	1 to 155 Vrms/2 to 310 Vrms			
Voltage setting accuracy[1]	0.35% of full scale			
Output phases	Single			
Maximum rms current[2]	5 A/2.5 A	10 A/2.5 A	20 A/10 A	40 A/20 A
Load power factor capability	0 to 1 (leading or lagging)			
Maximum power	500 VA	1 kVA	2 kVA	4 kVA
Frequency setting range	40 to 500 Hz			
Frequency accuracy	±0.02%			
Output ratings for DC mode (155 V/310 V range)				
Rated voltage range	1.4 to 219 V/2.8 to 438 V			
Voltage setting accuracy[3]	0.3% of full scale/0.25% of full scale			
Maximum rms current[4]	4 A/2 A	8 A/4 A	16 A/8 A	32 A/16 A
Maximum power	400 W	800 W	1600 W	3200 W

1. For an output voltage of 13.5 to 155 V/27 to 310 V, an output frequency of 45 Hz to 65 Hz, no load, and 23 ±5 °C
2. For an output voltage of 1 to 100 V/2 to 200 V. Limited by the output power when the output voltage is 100 to 155 V/200 to 310 V
3. For an output voltage of 19 to 219 V/38 to 438 V, no load, and 23 ±5 °C
4. For an output voltage of 1.4 to 100 V/2.8 to 200 V. Limited by the output power when the output voltage is 100 to 219 V/200 to 438 V



AC6800B steady-state AC output characteristic



AC6800B steady-state DC output characteristic

Specifications continued

Model		AC6801B	AC6802B	AC6803B	AC6804B
Output voltage stability (155 V/310 V range)					
Load regulation[1]			For 40 to 100 Hz: ±0.15 V/±0.3 V For other frequencies: ±0.5 V/±1 V		
Measurements[2,3] (155 V/310 V range)					
Voltage accuracy[4]	RMS, AC, DC		For 45 to 65 Hz and DC: ±(0.5% of reading + 0.35 V/0.7 V) Typical: ±(0.25% of reading + 0.15 V/0.3 V) For all other frequencies: ±(0.7% of reading + 1.0 V/2.0 V)		
Current accuracy[5,6]	RMS, AC, DC	For 45 to 65 Hz and DC: ±(0.5% of reading + 0.02 A/0.01 A) Typical: ±(0.25% of reading + 0.02 A/0.01 A) For all other frequencies: ±(0.7% of reading + 0.04 A/0.02 A)	For 45 to 65 Hz and DC: ±(0.5% of reading + 0.04 A/0.02 A) Typical: ±(0.25% of reading + 0.04 A/0.02 A) For all other frequencies: ±(0.7% of reading + 0.08 A/0.04 A)	For 45 to 65 Hz and DC: ±(0.5% of reading + 0.08 A/0.04 A) Typical: ±(0.25% of reading + 0.08 A/0.04 A) For all other frequencies: ±(0.7% of reading + 0.16 A/0.08 A)	For 45 to 65 Hz and DC: ±(0.5% of reading + 0.16 A/0.08 A) Typical: ±(0.25% of reading + 0.16 A/0.08 A) For all other frequencies: ±(0.7% of reading + 0.32 A/0.16 A)
AC power accuracy (45-65 Hz)[7]	W_{AC}	±(2% of reading + 0.5 W) Typical: ±(1% of reading + 0.5 W)	±(2% of reading + 1 W) Typical: ±(1% of reading + 1 W)	±(2% of reading + 2 W) Typical: ±(1% of reading + 2 W)	±(2% of reading + 4 W) Typical: ±(1% of reading + 4 W)
DC power accuracy[7]	W_{DC}	±(2% of reading + 0.5 W + 0.02 W/0.01 W per VDC) Typical: ±(1% of reading + 0.5 W + 0.01 W/0.005 W per VDC)	±(2% of reading + 1 W + 0.04 W/0.02 W per VDC) Typical: ±(1% of reading + 1 W + 0.02 W/0.01 W per VDC)	±(2% of reading + 2 W + 0.08 W/0.04 W per VDC) Typical: ±(1% of reading + 2 W + 0.04 W/0.02 W per VDC)	±(2% of reading + 4 W + 0.16 W/0.08 W per VDC) Typical: ±(1% of reading + 4 W + 0.08 W/0.04 W per VDC)

1. For an output voltage of 80 to 155 V/160 to 310 V, a load power factor of 1, a step change in output current from 0 A to maximum rms current (or its reverse) using the output terminal on the rear panel
2. RMS, AC, DC, and power (W) are derived using the following equations:
   a. $RMS = \sqrt{\frac{1}{N}\sum(\textit{instantaneous voltage or current})^2}$
   b. $DC = \frac{1}{N}\sum(\textit{instantaneous voltage or current})$
   c. $AC = \sqrt{RMS^2 - DC^2}$
   d. $W_{TOTAL} = \frac{1}{N}\sum(\textit{instantaneous voltage} \times \textit{instantaneous current})$
   e. $W_{DC} = V_{DC} \times I_{DC}$
   f. $W_{AC} = W_{TOTAL} - W_{DC}$
3. Further measurement information:
   a. Sample window: 100ms to 125 ms for AC or AC+DC output coupling (an integer multiple of the output waveform period), 125 ms for DC output
   b. Update interval: Approximately 3 times/sec, averaging up to 16 intervals when averaging is turned on
   c. Peak current value returns the maximum of the absolute values of the instantaneous current samples in a single measurement interval (averaging off)
   d. The meter display is set to "RMS" in AC+DC meter coupling, "AC" in AC meter coupling, and "DC" in DC meter coupling.
4. AC mode: For an output voltage of 13.5 to 155 V/27 to 310 V and 23 ±5 °C
   DC mode: For an output voltage of 19 to 219 V/38 to 438 V and 23 ±5 °C
5. For a waveform of crest factor 3 or less, an output current in the range of 5 to 100% of the maximum rms current, and 23 ±5 °C
6. Peak current measurement accuracy information available in "Supplemental Characteristics" section
7. For an output voltage of 50 V or greater, an output current in the range of 10 to 100% of the maximum rms current, DC or an output frequency of 45 to 65 Hz, a load power factor of 1, and 23 ±5 °C

Supplemental Characteristics

Model	AC6801B	AC6802B	AC6803B	AC6804B
Input rating				
Nominal input rating	100 to 120 Vrms/200 to 240 Vrms, 50 Hz or 60 Hz, single-phase			
Input voltage range	90 to 132 Vrms/180 to 264 Vrms (auto detected when the power is turned on)			
Input frequency range	47 Hz to 63 Hz			
Apparent power	800 VA or less	1600 VA or less	3200 VA or less	6400 VA or less
Power factor[1]	0.9 (typical)			
Input current	8 A/4 A or less (@100 V/200 V)	16 A/8 A or less (@100 V/200 V)	32 A/16 A or less (@100 V/200 V)	64 A/32 A or less (@100 V/200 V)
	6.7 A/3.5 A or less (@120 V/230 V)	13.4 A/7.0 A or less (@120 V/230 V)	26.8 A/14.0 A or less (@120 V/230 V)	53.6 A/28.0 A or less (@120 V/230 V)
Output ratings for AC mode (155 V/310 V range)				
Programmable voltage range	0 to 157.5 Vrms/0 to 315 Vrms			
Voltage setting resolution	0.1 V			
Frequency setting resolution	0.1 Hz			
Voltage THD[2]	0.5% or less			
Efficiency[3]	70% or greater			
Maximum repetitive peak current[4]	15 A/7.5 A	30 A/15 A	60 A/30 A	120 A/60 A
Output ratings for DC mode (155 V/310 V range)				
Programmable voltage range	–222.5 to 222.5 V/–445 to 445 V			
Voltage setting resolution	0.1 V			
Maximum repetitive peak current[4]	12 A/6 A	24 A/12 A	48 A/24 A	96 A/48 A
Ripple noise[5]	0.7 Vrms/1.4 Vrms (typical)			
Output voltage stability				
Temperature coefficient[6]	100 ppm/°C (typical)			
Output voltage response time[7]	150 us (typical)			
Line regulation[8]	±0.15% of full scale			
Measurements (135 V/270 V range)				
Voltage measurement resolution	0.1 V			
Current measurement resolution	0.01 A			
Peak current measurement accuracy[9]	±(2% of reading + 0.1 A/0.05 A) (typical)	±(2% of reading + 0.2 A/0.1 A) (typical)	±(2% of reading + 0.4 A/0.2 A) (typical)	±(2% of reading + 0.8 A/0.4 A) (typical)
Power measurement resolution	0.1 W, 1 W (for 1000 W or more)			

1. For an output voltage of 100 V/200 V (155 V/310 V range), maximum rms current, and a load power factor of 1
2. At an output voltage of 50 to 155 V/100 to 310 V, a load power factor of 1, and in AC mode
3. For AC mode, at an output voltage of 100 V/200 V, maximum rms current, load power factor of 1, and an output frequency of 40 to 500Hz
4. For a periodic, pulsed current waveform with the total rms current under the specified maximum rms current
5. For 5 Hz to 1 MHz components measured at the output terminals on the rear panel
6. For an output voltage of 100 V/200 V, an output current of 0 A, and within the operating temperature range
7. For DC mode, an output voltage of 100 V/200 V, a load power factor of 1, and settling within a band of ±1% about nominal, under a step change in output current from 0A to the maximum rms current (or its reverse)
8. For line voltage and frequency changes within the rated range
9. For a waveform of crest factor 3 or less, an output current in the range of 5 to 100% of the Maximum repetitive peak current, and 23 ±5 °C

Supplemental Characteristics continued

Model	AC6801B	AC6802B	AC6803B	AC6804B
Common				
Isolation to ground	310 Vrms or 438 VDC			
Insulation resistance (Between input and chassis, output and chassis, input and output)	500 Vdc, 30 MΩ or more			
Withstand voltage (Between input and chassis, output and chassis, input and output)	1.5 kV AC for 1 minute			
Earth continuity	25 A AC, 0.1 Ω or less			
Electromagnetic compatibility (EMC) [1]	Complies with the requirements of the following directive and standards EMC Directive 2004/108/EC EN 61326-1 Under following conditions: The maximum length of all connecting cables and wires to the unit is less than 3 m.			
Safety	Complies with the requirements of the following directive and standards Low Voltage Directive 2006/95/EC EN 61010-1 Class I Pollution Degree 2			
Environment				
Operating environment	Indoor use, Overvoltage Category II			
Operating temperature and humidity range	0 to 40 °C (32 to 104 °F), 20% to 80% R.H. non-condensing			
Storage temperature and humidity range	–10 to 60 °C (14 to 140 °F), 90% or less R.H. non-condensing			
Altitude	Up to 2000 m			
Acoustic noise	< 70 dbA			
Physical				
Dimensions (Depth includes Barrier Block Safety Cover)	428 × 128 × 370 mm 16.9 x 5.0 x 14.6”	428 × 128 × 370 mm 16.9 x 5.0 x 14.6”	428 × 128 × 581 mm 16.9 x 5.0 x 22.9”	428 × 262 × 611 mm 16.9 x 10.3 x 24”
Weight	Approx. 8 kg (17.64 lb)	Approx. 11 kg (24.25 lb)	Approx. 15 kg (33.07 lb)	Approx. 31 kg (68.34 lb)
Input terminal	IEC 320 inlet	M4 terminal block	M6 terminal block	M6 terminal block
Output terminal	M4 terminal block	M4 terminal block	M4 terminal block	M6 terminal block
LAN interface				
Hardware	IEEE 802.3 100Base-TX or 10Base-T Ethernet Complies with LXI Specification version 1.4 Class C IPv4, RJ-45 connector2			
Communication protocol	VXI-11, HiSLIP, or SCPI-RAW			
Program message terminator	VXI-11 and HISLIP: LF or END during reception, LF + END during transmission SCPI-RAW: LF during reception, LF during transmission			
USB interface				
Hardware	Complies with USB 2.0; Data rate: 12 Mbps (full speed)			
Program message terminator	LF or EOM during reception, LF + EOM during transmission			
Device class	Complies with the USBTMC-USB488 device class specifications			
GPIB interface (Option AC68GPBU)				
Hardware	Complies with IEEE Std 488.1-1978 SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E1			
Program message terminator	LF or EOI during reception, LF + EOI during transmission			
Primary address	1 to 30			

1. Only on models that have CE marking on the panel. AC68xx models will not be in compliance with EMC limits unless the ferrite core is attached on the load wires

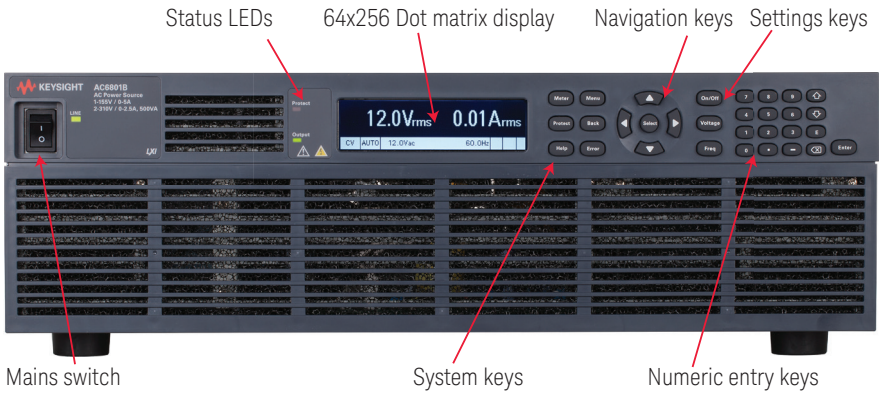
Supplemental Characteristics continued

Model			AC6801B	AC6802B	AC6803B	AC6804B
Common interface specifications						
Software protocol			IEEE Std 488.2-1992			
Command language			SCPI Specification 1999.0			
Save/recall states			Save and recall up to ten instrument states in non-volatile memory			
Accessories included						
Power cord			1 standard power cord [1] Length: Approx. 2.5 m	Not included	Not included	Not included
Ferrite core			1			
Cable tie			1			
Analog programming interface (Option AC68BALGU)						
Input	Maximum voltage		±15 V			
	Connector		BNC			
	Impedance		10 kΩ ± 5% (unbalanced)			
	Isolation voltage		±100 Vmax			
EXT-AC mode [2]	Input voltage range		0 V to +10 V (DC)			
	Voltage amplification ratio (155 V/310 V range)		15.5x/31x (Outputs an AC voltage of 0 V to 155 V/0 V to 310 V with respect to a DC voltage input of 0 V to 10 V)			
	Frequency setting range		40 Hz to 500 Hz			
	Other output rating specifications		Same as the specifications of the output rating for AC mode			
EXT-DC mode	Input voltage range	When ATT is OFF	0 V to ±2.19 Vpeak (0 V to 1.55 Vrms sine wave)			
		When ATT is ON	0 V to ±10 V (DC)			
	Input frequency range	When ATT is OFF [3]	40 to 500 Hz (sine wave)/40 to 100 Hz (rectangular wave)/DC			
	Frequency response	When ATT is OFF	–0.3 dB at 500 Hz with respect to 55 Hz (typical)			
	Voltage amplification ratio (155 V/ 310 V range)	When ATT is OFF	100x/200x (Outputs an AC voltage of 0 to 155 V/0 to 310 V with respect to a AC voltage input of 0 to 1.55 V)			
		When ATT is ON	21.9x/43.8x (Outputs a DC voltage of 0 to ±219 V/0 to ±438 V with respect to a DC voltage input of 0 to ±10 V)			
	Other output rating specifications		Same as the specifications of the output rating for DC mode			
Output voltage distortion ratio [4]			Main specifications + 0.5% or less			
Output voltage temperature coefficient			Main specifications + 200 ppm/°C (typical)			
Insulation resistance	Between input (BNC) and chassis, input (BNC) and output		500 V DC, 30 MΩ or more			
Withstand voltage	Between input (BNC) and chassis, input (BNC) and output		500 V AC for 1 minute			

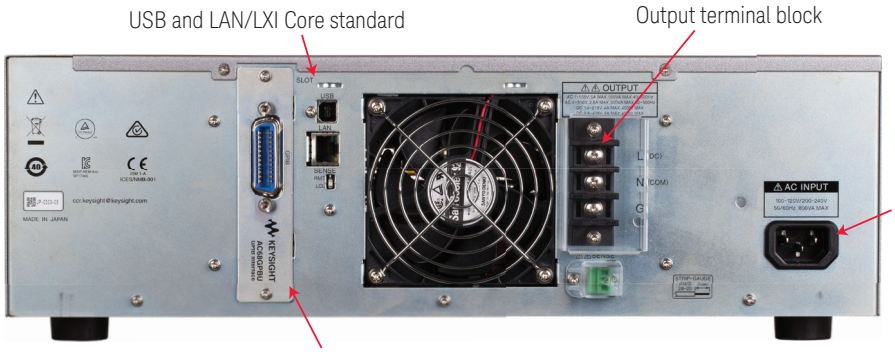
1. Based on country of use; power cords for Continental Europe, United States/Canada or China included. For other countries, applicable power cord can be selected
2. Set ATT to 'ON' in EXT-AC mode at all times
3. The measurable range of voltage, current, and power is DC and 40 to 500 Hz. To improve measurement stability of an AC output, set the frequency to match the frequency of the external input signal
4. When DC voltage is applied for EXT-AC mode or when a sine wave with distortion ratio of 0.1% or less is applied for EXT-DC mode

Just the Capability You Need

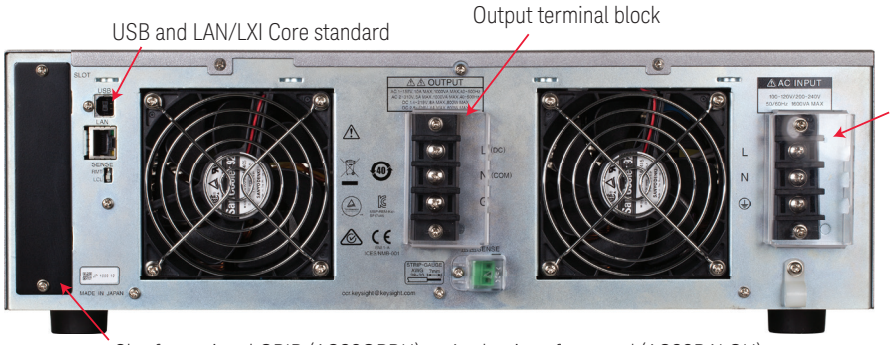
AC6801/2/3B Front Panel



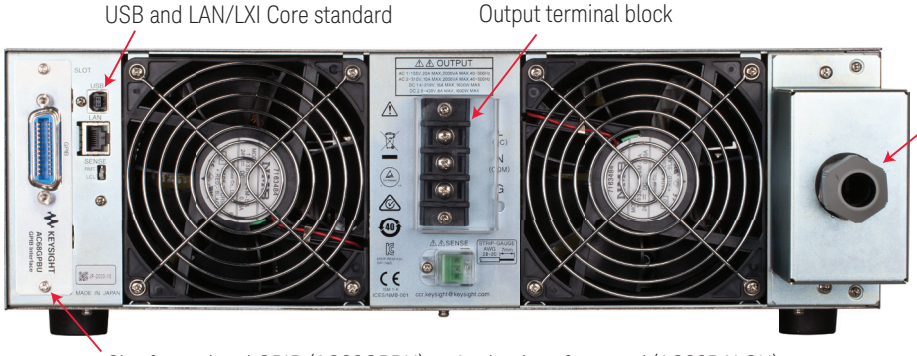
AC6801B Rear Panel



AC6802B Rear Panel

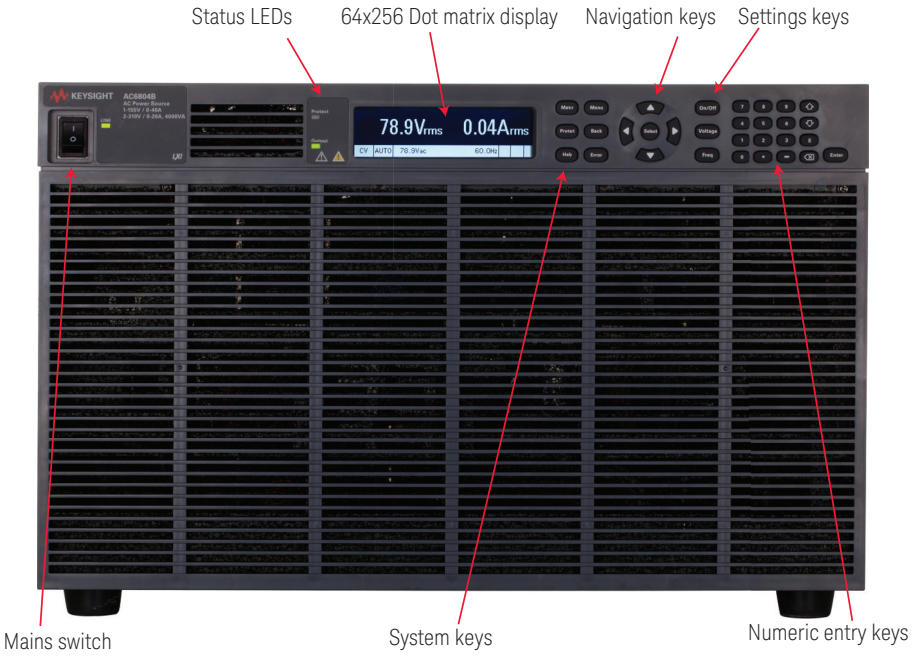


AC6803B Rear Panel

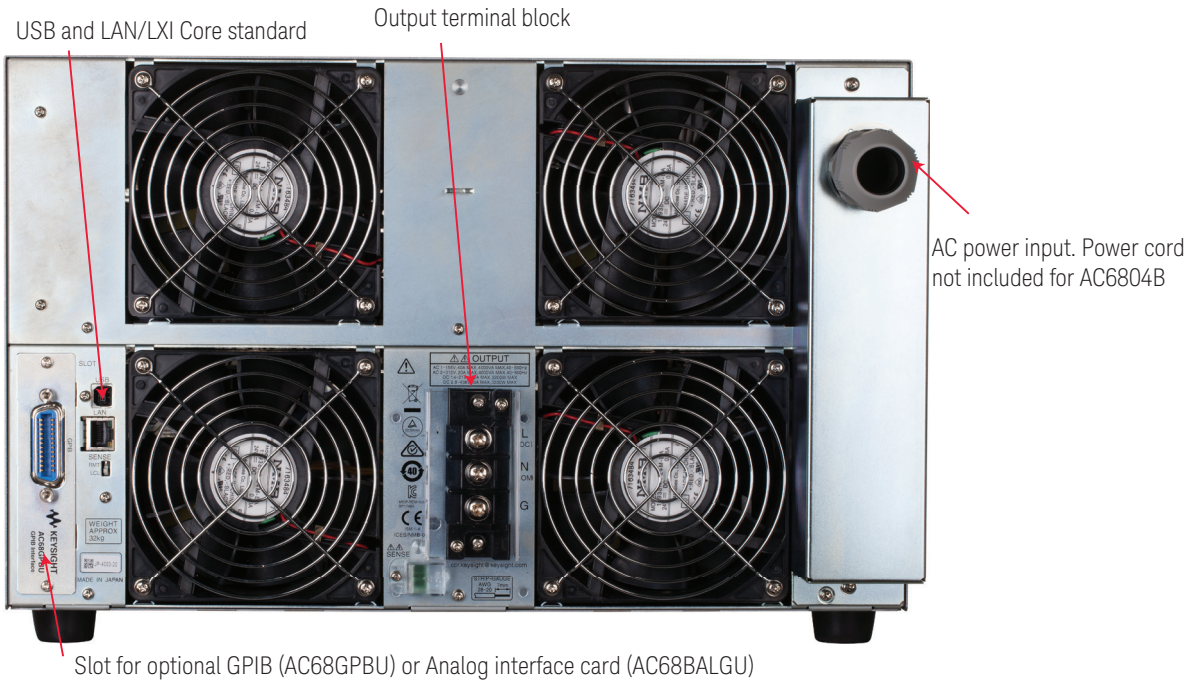


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AC6804B Front Panel

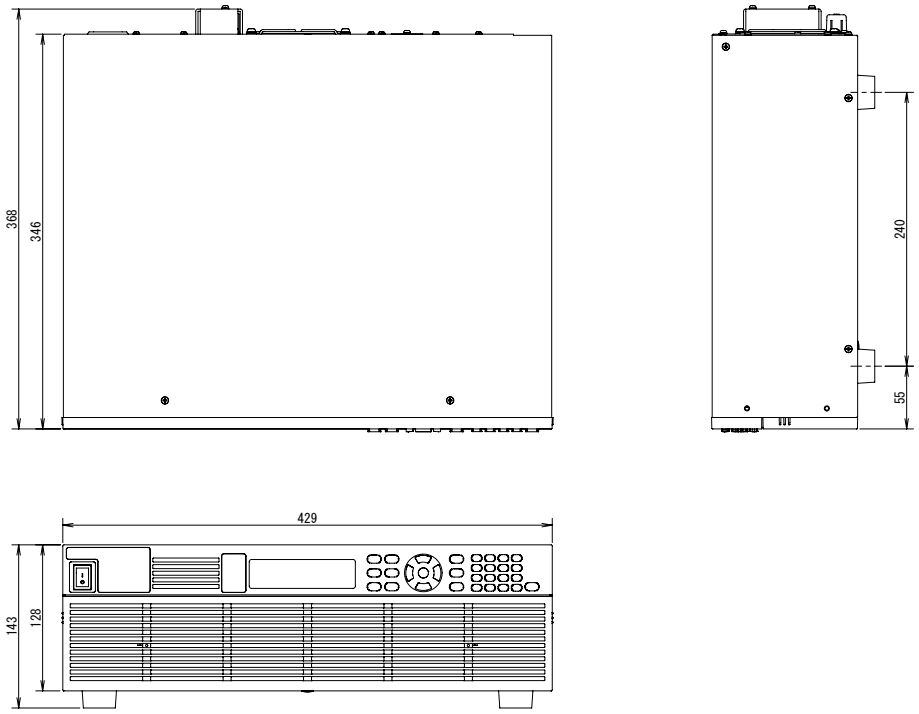


AC6804B Rear Panel

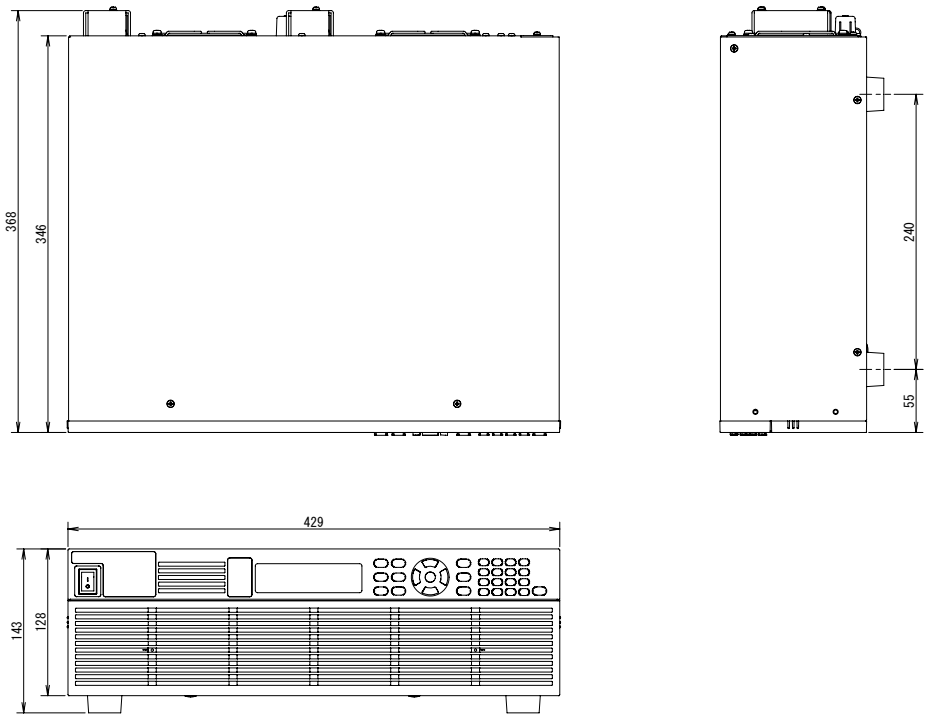


Supplemental Characteristics continued

Model AC6801B



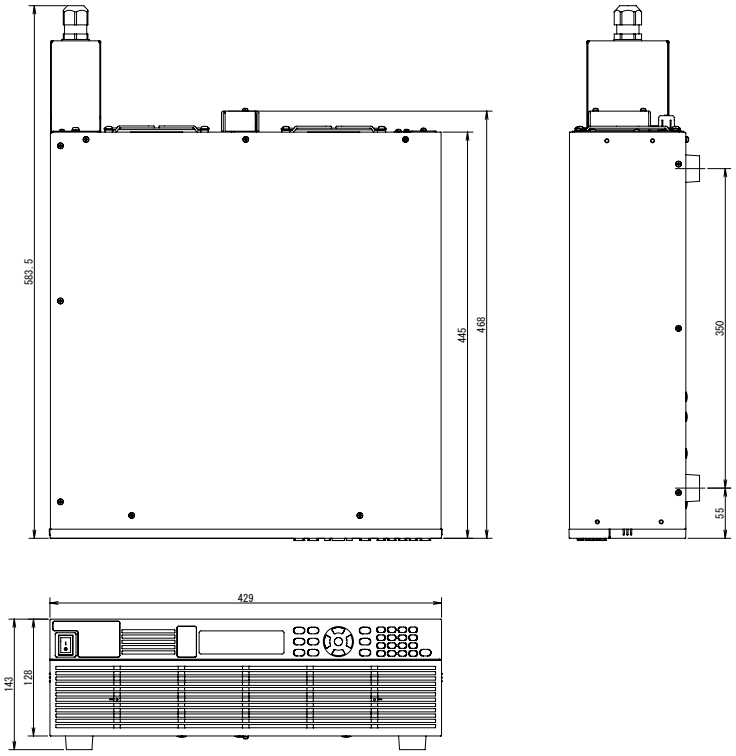
Model AC6802B



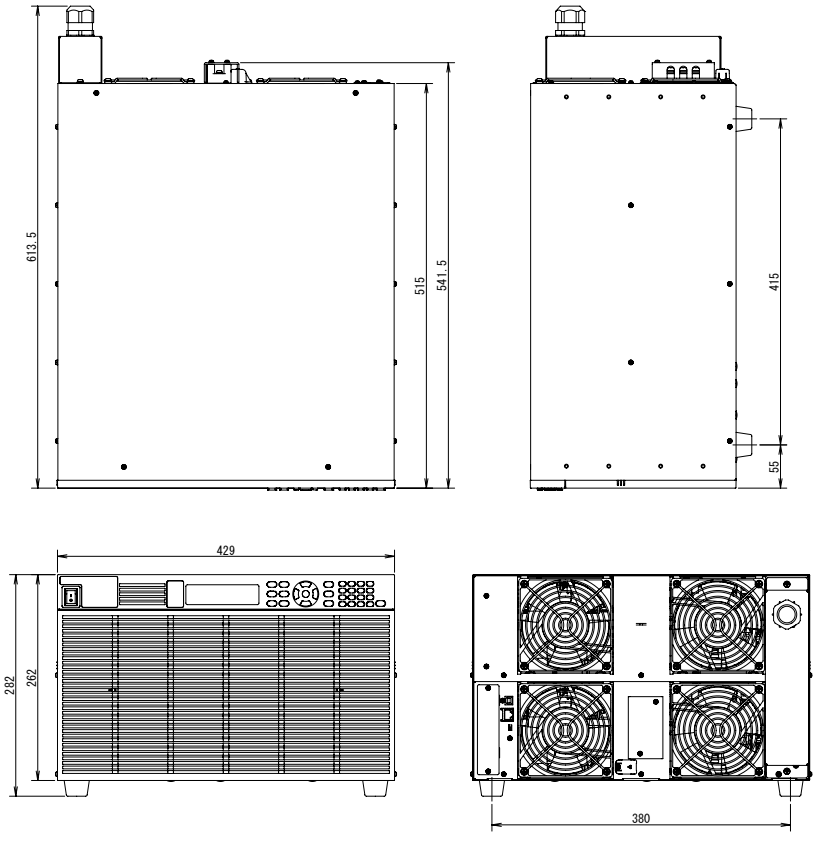
All dimensions in millimeters

Supplemental Characteristics continued

Model AC6803B



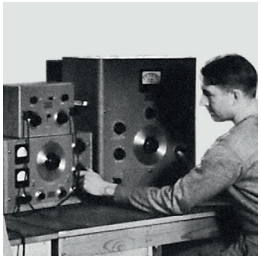
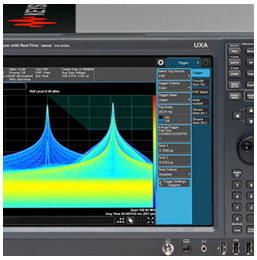
Model AC6804B



All dimensions in millimeters

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