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Keysight 6800C Series

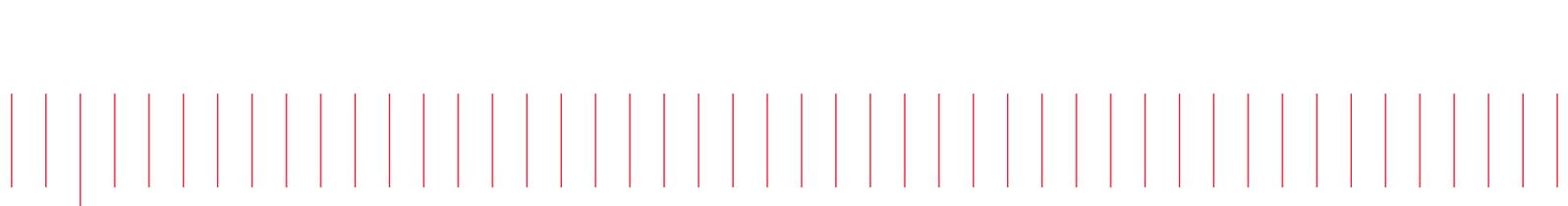
AC Power Source/Analyzers, 375-1750 VA

An integrated AC power solution

Data Sheet



- Provides a complete AC and DC power and measurement solution
- Protect valuable DUTs with extensive protection features



The Complete AC Power Test Solution

Keysight Technologies, Inc., AC power source/analyzers provide a complete AC test solution. As AC sources, they combine the capabilities of a power amplifier and an arbitrary waveform generator. This allows you to simulate normal waveforms and many types of distorted power waveforms. The built in power analyzer combines the capabilities of a multimeter, oscilloscope, harmonic analyzer and power analyzer. These instruments may also be used to produce DC power, either alone or as a DC offset to an AC waveform.

Since your product will have to operate in the real world of unpredictable AC power, you need to design and verify its correct operation under a wide range of AC power inputs. Brownouts, dropouts, sags, and other irregularities are not unusual in many communities today. Keysight AC power source/analyzers have the features needed to easily accomplish this test goal either in an R&D environment or on the manufacturing test floor. If you plan to sell your products in a worldwide market, you will also need to test them at the line voltages and frequencies for which they will eventually operate. There is also additional testing needed to meet regulatory requirements for sale into some countries.

Keysight AC power source/analyzers offer a complete solution for AC power testing, helping you to simplify this important task. These instruments combine the features of a power amplifier and arbitrary waveform generator to give you the ability to do all of the tests that you need. There are many standard preprogrammed waveforms, or you can use the transient generation system to simulate sophisticated and repeatable AC line disturbances. DC power can also be generated, either as a DC offset or as a pure DC signal.

LXI-LAN, USB and GPIB IO Connectivity

Keysight 6800C Series AC power source/analyzers comes standard with LXI-LAN, USB and GPIB IO connectivity, allows convenient setup and easy communication to PC controller and other instruments.

Powerful Built-in Measurement Capabilities

Keysight AC power source/analyzers have extensive 16-bit precision measurement capabilities which would normally require a number of complex measurement instruments, including a DMM (digital multimeter), oscillo-scope, power analyzer, and harmonic analyzer. The precision measurements include:

- rms, DC, AC + DC voltage and current
- Peak voltage and current
- Real, apparent, and reactive power
- Harmonic analysis of voltage and current waveforms providing amplitude and phase up to the 50th harmonic
- THD (total harmonic distortion)
- Triggered acquisition of digitized voltage and current

Using the measurement capabilities of a Keysight AC power source/analyzer simplifies your test setups and helps you obtain accurate data quickly.

Dual Power Analyzer Option 020

The powerful built-in power analyzer in Keysight AC power source/analyzers provides everything that you need to make AC measurements at the AC input to your DUT. For many test scenarios, this is the extent of the AC analysis required. Some test scenarios, however, require AC measurements to be made at both the AC input and the AC output of the DUT. Option 020 provides an additional power analyzer, complete with a precision current shunt, which can be connected anywhere you need it. This second analyzer can even be used for tests where the AC power source/analyzer is not providing power, thus expanding the usefulness of this instrument to many more test configurations. The additional analyzer is equivalent in specifications and capabilities to the standard analyzer.

Using the dual power analyzer option instead of an additional power analyzer instrument externally is more than just convenient. Measurements on all four measurement channels (AC source output voltage and current, and dual power analyzer voltage and current in-puts) are inherently synchronized with the AC power source/analyzers output waveform. This precision would be difficult to achieve using separate measurement instruments.

Examples Dual Power Analyzer Applications

- Complete testing of uninterruptible power sources (UPS)
- Efficiency testing of DC power supplies
- Efficiency testing of AC power sources
- Efficiency testing of transformers
- Safety testing of transformers
- Line disturbance and brownout testing of DC power supplies
- Line disturbance and brownout testing of AC power sources
- Sleep mode current monitoring
- Independent power analyzer

Sleep Mode Current Monitoring

Many electronic products have power-saving or sleep modes. In this mode, the device draws only enough power to be able to recognize a “wake-up” signal, and then execute a smooth “wake-up”. The power drawn in this mode is a critical parameter, and the ability to accurately monitor it is important. The accessory precision current shunt that is supplied with option 020 is mounted in such a way to make it easy for you to replace it with a precision resistor of your choice. By doing this, you can configure the system to accurately monitor extremely low currents. This provides an easy way for you to profile the current draw in all modes of your product’s operation. Since Keysight 6800C Series AC power source/analyzers produce DC power as well as AC power, portable battery operated products can also be tested with this configuration.

UPS (Uninterruptible Power Source) Testing

The dual power analyzer option provides many important benefits for UPS testing. Since the key to correct UPS operation is having the output react properly to changes on the input, being able to monitor the output relative to the input simplifies testing. For example, commands are available to enable calculation of UPS transfer time, and the phase difference between the UPS input and output voltage. Keysight AC power source/analyzers also have programmable output impedance, enabling the UPS designer to verify product stability over a wide range of AC line impedance.

Test Suite for Avionics Equipment

Keysight AC power source/analyzers are well suited for testing equipment intended for use in the avionics industry which operate at nominally 400 Hz. One of the special requirements that many manufacturers in this industry must concern themselves with is testing to meet RTCA DO-160 standards, which involve both AC and DC immunity tests.

Extensive Protection to Prevent Load Damage

In addition to overcurrent, overvoltage, overpower and overtemperature protection, the 6800C Series offers output disconnect relays and remote inhibit capability (quickly disabling the output of the AC power source/analyzers via a TTL signal) to protect the device under test.

Application Information

The 6800C Series can help you test and improve your products. You can easily perform:

- Static testing—generating and measuring voltage, frequency, and line current for meeting worldwide specifications.
- Dynamic testing—generating AC line transients for limit testing and design verification.
- Specialty testing—measuring current harmonic content and creating custom AC power waveforms (such as a combined AC + DC signal to simulate a telephone ring).
- Precompliance regulatory testing—measuring current harmonics, voltage fluctuations and flicker emissions and generating voltage and frequency disturbances and interharmonics to determine product immunity.
- Development engineers and test professionals in a wide variety of industries use AC power source/analyzers. Here are a few examples:
- Avionics – Instrumentation, ATE test stations
- Computer products – Computers, monitors, peripherals
- Consumer products – Home appliances, audio and video equipment, heating/cooling controls
- Electrical products – Relays, transformers, power components, fire alarms
- Lighting products – Electronic ballasts, compact fluorescent bulbs, timers
- Motors – AC motors, electronic controllers
- Power products – AC/DC adapters, AC/DC power supplies, PBX power supplies, uninterruptible power supplies
- Telecom products – RF amplifiers, CATV devices, MUX's, routers, switches

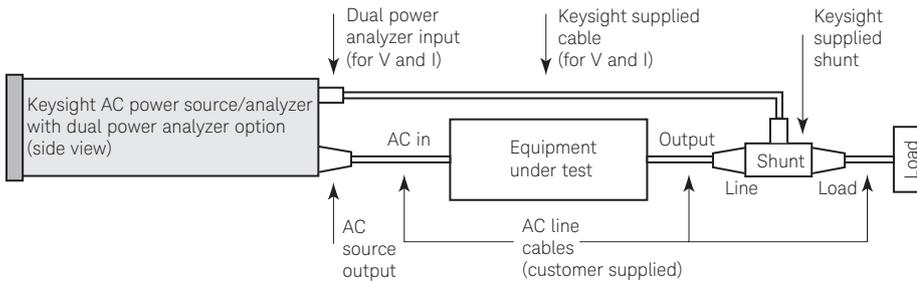


Figure 1. Test configuration of efficiency measurement using an Keysight AC source with the 020 dual power analyzer option.

Specifications

For a sine wave 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 after a 30 minute warm-up unless otherwise noted.

| Specifications <i>(at 0 ° to 40 °C unless otherwise specified)</i> | 6811C | 6812C | 6813C |
|--|---|---|---|
| Number of phases | 1 | 1 | 1 |
| Output ratings (Maximum) | | | |
| Power | 375 VA | 750 VA | 1750 VA |
| rms voltage | 300 V | 300 V | 300 V |
| rms current | 3.25 A | 6.5 A | 13 A |
| Repetitive & non-repetitive peak current | 40 A | 40 A | 80 A |
| Crest factor | 12 | 6 | 6 |
| Load power factor capability | 0 to 1 | 0 to 1 | 0 to 1 |
| DC power | 285 W | 575 W | 1350 W |
| DC voltage | ± 425 VA | ± 425 V | ± 425 V |
| DC current | 2.5 A | 5.0 A | 10.0 A |
| Output frequency range¹ | DC; 45 Hz to 1 kHz | DC; 45 Hz to 1 kHz | DC; 45 Hz to 1 kHz |
| Constant voltage ripple and noise (20 kHz to 10 MHz) | -60 dB (relative to full scale) | -60 dB (relative to full scale) | -60 dB (relative to full scale) |
| Line regulation (% of full scale) | 0.1% | 0.1% | 0.1% |
| Load regulation (% of full scale) | 0.5% | 0.5% | 0.5% |
| Maximum total harmonic distortion | 0.25% at 50/60 Hz 1% worst case 45 to 1 kHz | 0.25% at 50/60 Hz 1% worst case 45 to 1 kHz | 0.25% at 50/60 Hz 1% worst case 45 to 1 kHz |

| Programming accuracy (at 25 ° ± 5 °C) | 6811C | 6812C | 6813C |
|--|--|--|--|
| RMS voltage (% of output + offset) | 45 to 100 Hz 0.15% + 0.3 V >100 to 500 Hz 0.5% + 0.3 V >500 to 1000 Hz 1% + 0.3 V | 45 to 100 Hz 0.15% + 0.3 V >100 to 500 Hz 0.5% + 0.3 V >500 to 1000 Hz 1% + 0.3 V | 45 to 100 Hz 0.15% + 0.3 V >100 to 500 Hz 0.5% + 0.3 V >500 to 1000 Hz 1% + 0.3 V |
| DC voltage | 0.1% + 0.5 V | 0.1% + 0.5 V | 0.5% + 0.3 V |
| Frequency | 0.01% + 10 µHz | 0.01% + 10 µHz | 0.01% + 10 µHz |

1. Product may be operated between DC and 45 Hz subject to certain deratings. Measurements may be extended to 4.5 Hz at full accuracy only by selecting a digitization rate of 250 µs per point. Frequency content of the measured signal must be limited to 4 kHz or less to avoid aliasing effects.

Specifications (continued)

For a sine wave 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 after a 30 minute warm-up unless otherwise noted.

| Measurement accuracy (at 25 ° ± 55 °C) | 6811C | 6812C | 6813C |
|--|---------------------------|---------------------------|---------------------------|
| Rms. voltage (45 - 100 Hz) | 0.03% + 100 mV1 | 0.03% + 100 mV1 | 0.03% + 100 mV1 |
| DC voltage | 0.05% + 150 mV1 | 0.05% + 150 mV1 | 0.05% + 150 mV1 |
| RMS current (45 - 100 Hz) ² | | | |
| High range | 0.05% + 10 mA | 0.05% + 10 mA | 0.05% + 10 mA |
| Low range | 0.05% + 1.5 mA | 0.05% + 1.5 mA | 0.05% + 1.5 mA |
| Power (VA) (45-100 Hz) ² | | | |
| High range | 0.1% + 1.5 VA + 12 mVA/V | 0.1% + 1.5 VA + 12 mVA/V | 0.1% + 1.5 VA + 12 mVA/V |
| Low range | 0.1% + 1.5 VA + 1.2 mVA/V | 0.1% + 1.5 VA + 1.2 mVA/V | 0.1% + 1.5 VA + 1.2 mVA/V |
| Power (watts) (45-100 Hz) ² | | | |
| High range | 0.1% + 0.3 W + 12 mW/V | 0.1% + 0.3 W + 12 mW/V | 0.1% + 0.3 W + 12 mW/V |
| Low range | 0.1% + 0.3 W + 1.2 mW/V | 0.1% + 0.3 W + 1.2 mW/V | 0.1% + 0.3 W + 1.2 mW/V |
| Frequency | 0.01% + 0.01 Hz | 0.01% + 0.01 Hz | 0.01% + 0.01 Hz |
| Power factor | 0.01 | 0.01 | 0.01 |
| Current magnitude (low range) | | | |
| Fundamental | 0.03% + 1.5 mA | 0.03% + 1.5 mA | 0.03% + 1.5 mA |
| Harmonics 2-49 | 0.03% + 1 mA + 0.2%/kHz | 0.03% + 1 mA + 0.2%/kHz | 0.03% + 1 mA + 0.2%/kHz |
| Current magnitude (high range) | | | |
| Fundamental | 0.05% + 5 mA | 0.05% + 5 mA | 0.05% + 5 mA |
| Harmonics 2-49 | 0.05% + 3 mA + 0.2%/kHz | 0.05% + 3 mA + 0.2%/kHz | 0.05% + 3 mA + 0.2%/kHz |

| Supplemental characteristics (Non-warranted characteristics determined by design and useful in applying the product) | 6811C | 6812C | 6813C |
|---|--------------|--------------|--------------|
| Average programming accuracy (% of output + offset) rms current | 1.2% + 50 mA | 1.2% + 50 mA | 1.2% + 50 mA |
| Average programming resolution | | | |
| rms voltage | 125 mV | 125 mV | 125 mV |
| DC voltage | 250 mV | 250 mV | 250 mV |
| Oversvoltage programming (OVP) | 2 V peak | 2 V peak | 2 V peak |
| rms current | 2 mA | 4 mA | 4 mA |
| Peak current | 1.25 mA | 25 mA | 25 mA |
| Output frequency | 10 μHz | 10 μHz | 10 μHz |
| Phase | N/A | N/A | N/A |

1. Product may be operated between DC and 45 Hz subject to certain deratings. Measurements may be extended to 4.5 Hz at full accuracy only by selecting a digitization rate of 250 μ seconds per point. Frequency content of the measured signal must be limited to 4 kHz or less to avoid aliasing effects.
2. Select low measurement range for improved accuracy (10:1) for lower power measurements.

Specifications (continued)

For a sine wave 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 after a 30 minute warm-up unless otherwise noted.

| Supplemental characteristics (Non-warranted characteristics determined by design and useful in applying the product) | 6811C | 6812C | 6813C |
|--|---|---|---|
| Average measurement resolution | | | |
| rms voltage | 10 mV | 10 mV | 10 mV |
| rms current | 2 mA | 2 mA | 2 mA |
| Programmable output impedance | | | |
| Resistance | 0 – 1 Ω | 0 – 1 Ω | 0 – 1 Ω |
| Inductance | 20 μ h – 1 mh | 20 μ h – 1 mh | 20 μ h – 1 mh |
| Remote sense capability | Up to 1 Vrms can be dropped across each load lead | Up to 1 Vrms can be dropped across each load lead | Up to 1 Vrms can be dropped across each load lead |
| Isolation to ground | 300 Vrms/425 VDC | 300 Vrms/425 VDC | 300 Vrms/425 VDC |
| Net weight | 29.1 kg (64.2 lb) | 29.1 kg (64.2 lb) | 30.1 kg (66.4 lb) |
| Shipping weight | 33.59 kg (74.05 lb) | 33.59 kg (74.05 lb) | 34.59 kg (76.26 lb) |

| AC Input Ratings | 6811C | 6812C | 6813C |
|---|--|--|--|
| Voltage range (VAC) | | | |
| *default factory setting | 87 to 106 VAC *104 to 127 VAC 174 to 220 VAC 191 to 254 VAC | 87 to 106 VAC *104 to 127 VAC 174 to 220 VAC 191 to 254 VAC | 174 to 220 VAC *191 to 254 VAC |
| Maximum input current (rms) (Measured at low line) | 12 A (100 VAC) 10 A (120 VAC) 7.5 A (200/208 VAC) 6.5 A (230 VAC) | 28 A (100 VAC) 24 A (120 VAC) 15 A (200/208 VAC) 13 A (230 VAC) | 22 A (200/208 VAC) 20 A (230 VAC) |
| Input power (max) (Measured at high line) | 1000 VA/700 W | 2500 VA/1400 W | 3800 VA/2600 W |
| Input frequency | 47 to 63 Hz | 47 to 63 Hz | 47 to 63 Hz |

Supplemental characteristics for all model numbers

Size: 425.5 mm W x 132.6 mm H x 574.7 mm D (16.75 in x 5.25 in x 22.6 in)

Ordering Information

The 6800 Series AC power source/analyzers come with full documentation on CD-ROM. The CD-ROM includes user's guide, programming guide, GUI quick reference guide, service manual, quick start guide, and application notes.

| | |
|------------|--|
| Option 019 | Output raised to 2000VA, frequency reduced to 100Hz (6813C only) |
| Option 020 | Dual power analyzer Option |
| Option 026 | 26 Volt, 0.1 A auxiliary 45 to 100 Hz only, reference output (6812C and 6813C) |
| Option 100 | (6811C and 6812C only) 87 to 106 VAC (100 VAC nominal), 47-63 Hz, Japan only |
| Option 120 | 104-127 VAC (120 VAC nominal), 47-63 Hz |
| Option 200 | (6813C only) 174-220 VAC (200 VAC nominal), 47-63 Hz, Japan only |
| Option 208 | (6811C and 6812C only) 174 to 220 VAC (208 VAC nominal), 47-63 Hz |
| Option 230 | 191 to 254 VAC (230 VAC nominal), 24-63 Hz |
| Option 831 | 12 AWG, 200 to 240 VAC, unterminated (6812C, 6813C only) |
| Option 832 | 4 mm ² wire size, unterminated (6813C only) |
| Option 833 | 1.5 mm ² wire size, 200 to 240 VAC, unterminated (6812C only) |
| Option 834 | 10 AWG, 100 to 120 VAC, unterminated (6812C only) |
| Option 841 | Line cord with NEMA L6-20P; 20 A, 250 V plug (6812C only) |
| Option 842 | Line cord with IEC 309; 32 A, 220 V plug (6813C only) |
| Option 844 | Line cord with NEMA L6-30P; 30 A, 250 V locking plug (6813C only) |
| Option 845 | Line cord with IEC 309; 16 A, 220 V plug (6812C only) |
| Option 846 | Line cord with NEMA L6-30P; 30 A, 120 V plug (6812C only) |
| Option 847 | Line cord with CEE 7/7; 16 A, 220 V plug (6812C only) |
| Option 848 | Line cord with BS 546; 15 A, 240 V plug (6812C only) |

Accessories

1CM104A¹ Rack mount flange kit 132.6 mm H (3U) – two flange brackets

1CP108A¹ Rack mount flange and handle kit 132.6 mm H (3U) – two brackets and front handles

E3663AC Support rails for Keysight rack cabinets

1. Support rails required.

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