AC6900 Series Power Sources

A complete 3-phase AC power solution

Introduction

Keysight's AC6900 Series AC power sources provide a complete AC and DC power solution by combining the capabilities of a multimeter, harmonic analyzer, and power analyzer in one instrument. You can easily produce DC power, either alone or as a DC offset to an AC waveform, in a compact form factor.

KEYSIGHT

Easily Achieve Your Test Goals

The increasing demand for testing avionics devices such as air traffic management systems, sensors, and crewless aircraft systems demands a sophisticated AC and DC power solution. Test system designers constantly look for ways to optimize their avionic electronic systems.

A compact, high-performance AC power source with DC capability is ideal for achieving this goal. An avionics test software suite will help to accelerate pre-compliance testing that meets commercial and military standards.

Since your product must operate in the real world of unpredictable AC power, you must design and verify its operation under a wide range of AC power inputs. For example, brownouts, dropouts, sags, and other irregularities are uncommon in many industries today.

You need to test using the compliance tests of the country where you plan to sell the product to ensure it meets their regulatory requirements for line voltages and frequencies.

The AC6900 Series AC power sources have the features to easily achieve your test goals in either a research and development environment or on the manufacturing test floor.

The five-inch LCD color display shows the main measurements for all phases simultaneously. The intuitive interface minimizes your team's learning curve while making measurements. The multiple IO connectivity – LXI-LAN, USB, and GPIB provides flexible synchronization.

Feature

Output

- Single-phase, single-phase three-wire, or three-phase four-wire
- AC, DC, or AC plus DC mode
- Maximum AC voltage at 320 Vrms
- Maximum DC voltage at 452 V
- Frequency up to 5 kHz
- Parallel operation

Built-in tests

- Power line disturbance
- Sequencing
- Harmonic analysis
- Built-in waveform generation

Protection

- Over and Undervoltage, including current protection
- Output inhibit

Programming

- Soft start/stop function
- Analog and digital control
- LAN eXtensions, USB, and GPIB

Simplify Test Setups with Accurate Measurement Capabilities

AC6900 Series AC power sources have extensive measurement capabilities that typically require complex measurement instruments encompassing a multimeter, harmonic analyzer, and power analyzer. This solution is suitable for testing equipment in the avionics industry that operates at nominally 400 Hz, 800 Hz, or up to 5,000 Hz to meet RTCA DO-160 and MIL-STD-704 standards. These two standards include both AC and DC immunity tests.

You will experience the following precision measurements:

- AC, DC, AC plus DC voltage, and current
- Peak voltage and current
- Real, apparent, and reactive power; crest factor and power factor
- Harmonic analysis of voltage and current waveforms providing amplitude and phase up to the 50th harmonic
- Total Harmonic Distortion (THD)

Using the measurement capabilities of a Keysight AC6900 Series 3-phase AC power source simplifies your test setups, reduces test complexity, and helps you output accurate data quickly.

Extensive Protection to Prevent Load Damage

In addition to overcurrent, overvoltage, overpower, and overtemperature protection, the AC6900 Series 3-phase AC power source offers output disconnect relays and remote inhibit capability to quickly disable the AC power source's output via a Transistor-Transistor Logic (TTL) signal to protect the DUT.

Intuitive and Easy-to-Use Front Panel Interface and Flexible IO Connectivity

The five-inch LCD color display shows the primary measurements of all phases simultaneously. The interface is intuitive, minimizing the learning curve, enhancing the user experience, and optimizing operation. The multiple IO connectivity – LXI-LAN, USB, and GPIB provides the greatest flexibility.

Application information

Avionics

- Test instrumentation and Automated Test Equipment (ATE) test stations
- Simulate power interruption on cockpit electronics
- Evaluate the window heating system
- Perform pre-compliance test

Specialty testing

- Measure current harmonic content and create custom AC power waveforms; combined AC and DC signals
- Test current harmonics and voltage fluctuations for pre-compliance requirements
- Ensure relays, transformers, power components, and fire alarms are operating correctly
- Test power products such as AC / DC adapters, AC / DC power supplies, and uninterruptible power supplies
- Check AC motors and electronic controllers

Measurements at a Glance with Large Color Display

Meter view – default

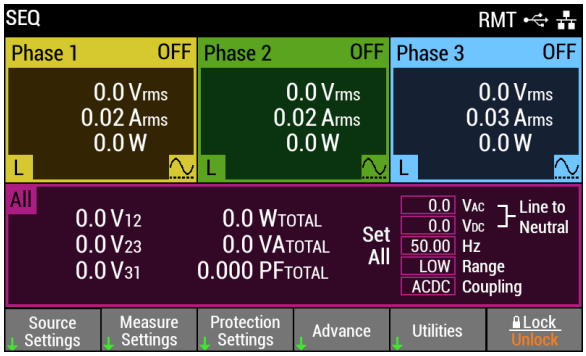

Figure 1. View all 3 phases at a glance

Meter view – 1-phase view

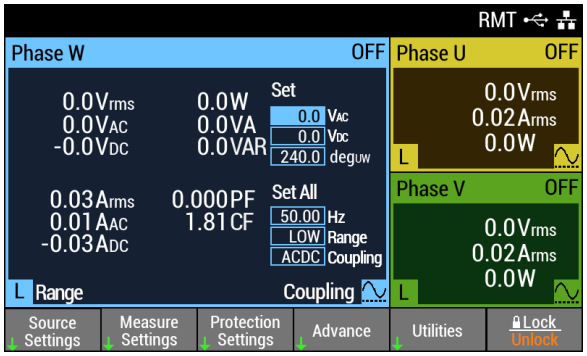

Figure 2. View more information on a selected phase

Built-in powerline disturbance simulation

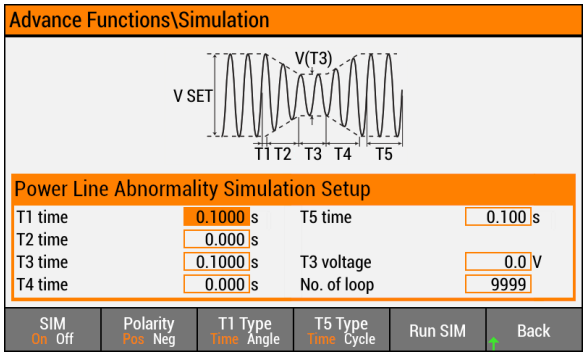

Figure 3. Simulate power outages, surges, and sag for environmental testing on your devices

Built-in sequencer

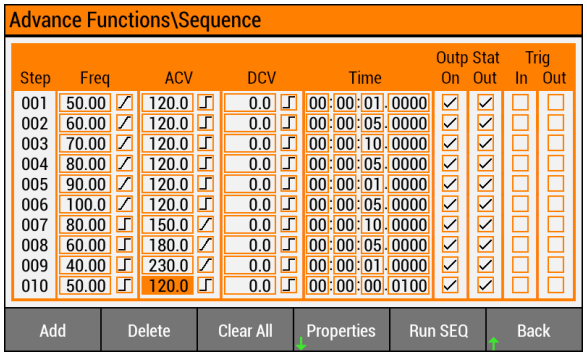

Figure 4. Easily generate output voltage and frequency transients over time for stress tests

Built-in harmonic analysis

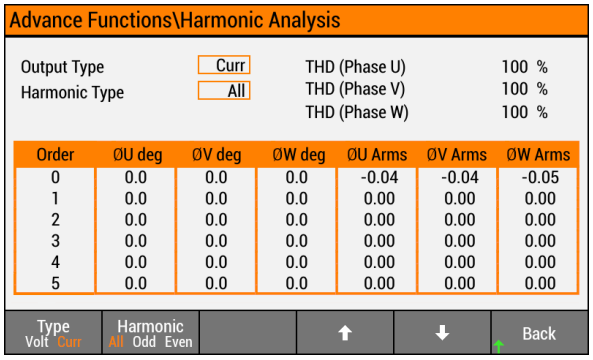

Figure 5. Analyze current or voltage harmonics up to 50th order

Built-in waveform generation

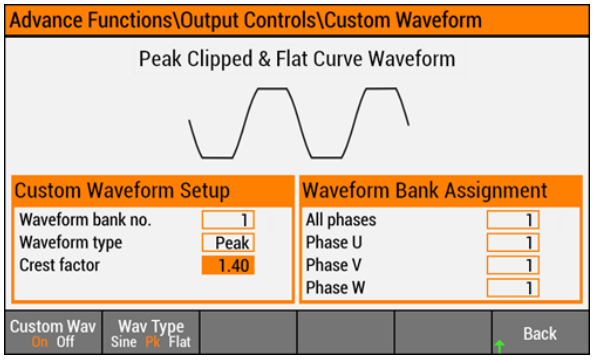

Figure 6. Generate sine wave, peak clipped, and flat curve waveforms for cockpit electronics characterization

Operate Remotely

Keysight's Pathwave BenchVue software for the PC enables you to operate the AC6900 Series remotely to:

- Track and record your AC outputs to understand the impact of events related to the power draw.
- Create and execute a series of test steps using the sequencer function.
- Simulate power line abnormalities using the power simulation function.
- Perform IEC61000-4 pre-compliance testing.
- Facilitate harmonics measurement and analysis, providing the amplitude and phase of voltage and current waveforms in table and histogram chart.
- Capture and display power measurement as a waveform on the PC using the data log function.
- Export data quickly to a .csv file for further analysis.

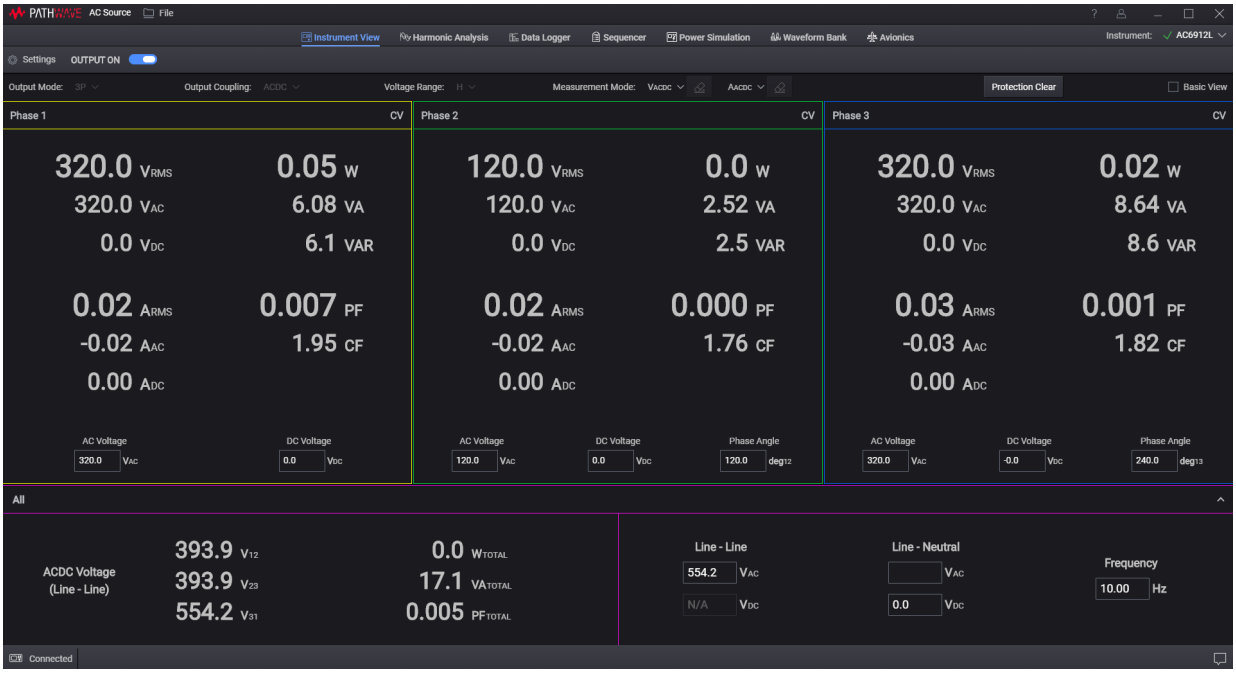

Figure 7. PathWave BenchVue AC source control software (BV0026B)

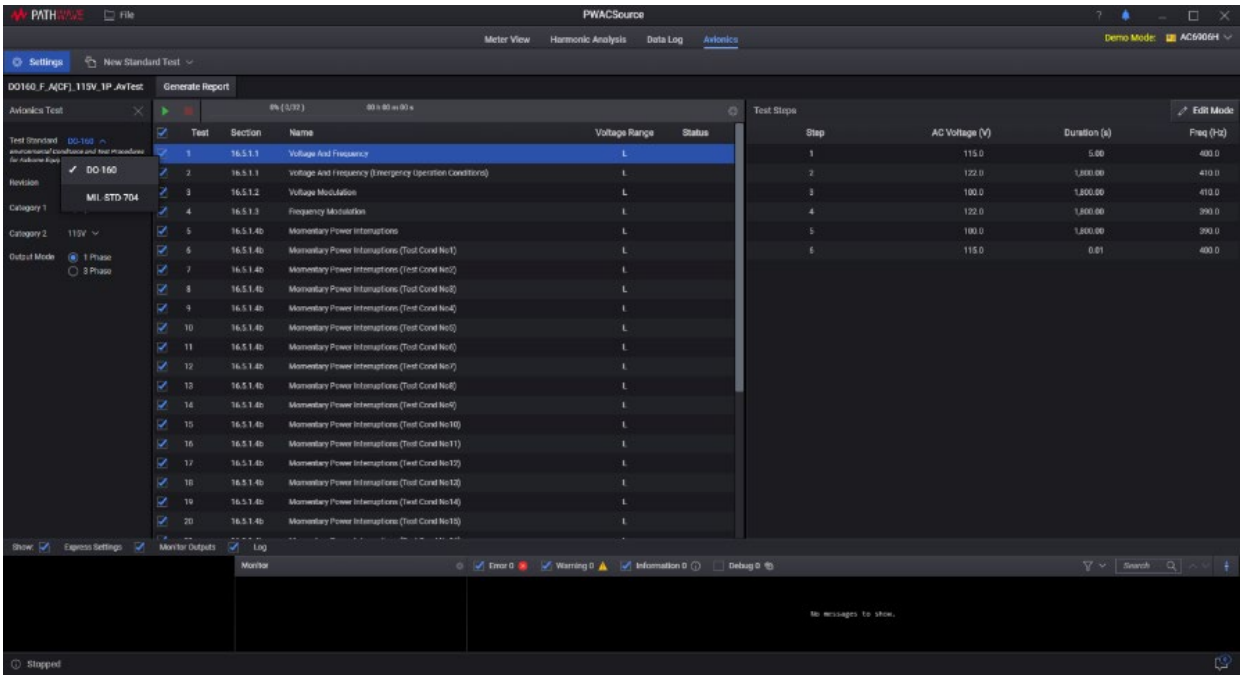

Figure 8. PathWave BenchVue AC source avionics standard test software (BV0028B)

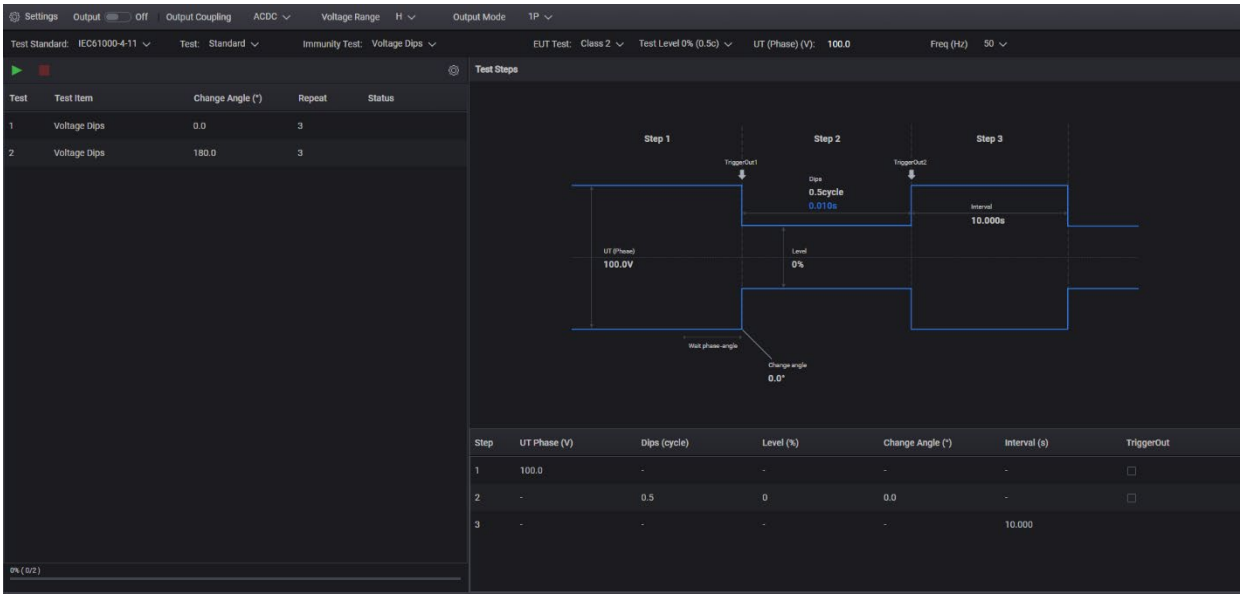

Figure 9. PathWave BenchVue AC Source Pre-Compliance Test (BV0030B)

Specifications

Programming accuracy (at 23 °C ± 5 °C)	AC6903H 5 kHz AC6903L 550 Hz	AC6906H 5 kHz AC6906L 550 Hz	AC6912H 5 kHz AC6912L 550 Hz	AC6918H 5 kHz AC6918L 550 Hz
Output AC[1]				
AC voltage [2] (Low range / High range)	160 V / 320 V			
Setting range (Low range / High range)	0.0 ~ 161.0 V / 0.0 ~ 322.0 V			
Resolution	0.1 V			
Accuracy [3, 4] (Low range/High range)	± (0.15% + 0.3 V) (45 Hz - 500 Hz)			
	± (1% + 0.3 V) / ± (1% + 0.6 V) (500 Hz - 5 kHz)			
Max rms current [5]				
1P (Low range / High range)	30 A / 15 A	60 A / 30 A	120 A / 60 A	180 A / 90 A
1P3W or 3P (Low range / High range)	10 A / 5 A	20 A / 10 A	40 A / 20 A	60 A / 30 A
Power capacity				
1P or 3P	3 kVA	6 kVA	12 kVA	18 kVA
1P3W	2 kVA	4 kVA	8 kVA	12 kVA
Load power factor	0 ~ 1 (leading or lagging)			
Frequency				
Range [6]	1 Hz ~ 5 kHz (5 kHz -3 dB, < 40 Hz power de-rating is required)			
Resolution	0.01Hz (1.00 Hz ~ 99.99 Hz), 0.1Hz (100.0 Hz ~ 999.9 Hz), 1 Hz (1 kHz ~ 5 kHz)			
Accuracy [7]	± 0.01%, temperature coefficient： ± 0.005%/℃			
Phase	1P (single-phase), 1P3W (single-phase three wire)			
	3P4W (three-phase four-wire) switchable			
Resolution	0.1° (waveform bank 0 and 1 Hz ~ 500 Hz), 1° (500 Hz ~ 4 kHz), 2° (> 4 kHz)			
Accuracy [8]	Within 120°± (0.4° + fo×0.9°); fo = output frequency (kHz)			
Output DC [1]				
DC voltage [9] (Low range / High range)	± 226 V / ± 452 V			
Setting range (Low range / High range)	0 to ± 227.5 V / 0 to ± 455 V			
Resolution	0.1 V			
Accuracy	± (0.15% + 0.3V)			
Max current [10]	30 A / 15 A	60 A / 30 A	120 A / 60 A	180 A / 90 A
Power capacity	3 kW	6 kW	12 kW	18 kW
Parallel operation				
Maximum number of units in parallel operation	-	N (units in parallel) ≤ 4	N (units in parallel) ≤ 4	N (units in parallel) ≤ 4
Maximum power capacity [11]	3 kW	[Capacity of one unit] x N	[Capacity of one unit] x N	[Capacity of one unit] x N

1. Combined with AC and DC output, the peak voltage must be between -455 V to 455 V (High range) or -227.5 V to 227.5 V (Low range).
2. The specified guaranteed voltage range is 1 V to 160 V and 2 V to 320 V.
3. At no load, the response is in FAST or MID, using the compensation function.
4. At the phase angle of 120° for each phase for line voltage.
5. The maximum rms current is associated with the output voltage range. When the output voltage is between 100 VAC and 160 VAC or 200 VAC and 320 VAC, the output voltage reduces the output current. When the output frequency is between 1 Hz and 40 Hz, the output frequency reduces the output current. The output current is 70% at 1 Hz.
6. L models – the frequency is 1 Hz to 550 Hz for three-phase output.
7. Temperature coefficient applies when the environmental temperature is beyond 23 °C ± 5 °C. Example: At temperature 30 ℃ and setting frequency 1 kHz, frequency accuracy = 1 kH±0.002 kHz. (±0.01%＋0.005%/℃×2 ℃＝±0.02%).
8. Example: Performance of angle conversion at a given frequency within 120° ±0.5° at 60 Hz output, within 120° ±0.8° at 400 Hz output.
9. The guaranteed voltage range is 1.4 VDC to 226 VDC and 2.8 VDC to 452 VDC.
10. The maximum rms current is associated with the output voltage range. When the output voltage is between 100 VDC and 226 VDC or 200 VDC and 452 VDC, the output voltage reduces the output current.
11. The maximum rating is limited to 48kVA for single-phase and 72kVA for single-phase three wire, regardless of the number of units in parallel

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Measurement accuracy (at 23 °C ± 5 °C)	AC6903H 5 kHz AC6903L 550 Hz	AC6906H 5 kHz AC6906L 550 Hz	AC6912H 5 kHz AC6912L 550 Hz	AC6918H 5 kHz AC6918L 550 Hz
Measurement				
AC voltage resolution	0.1 V			
AC voltage accuracy	± (0.03% + 100 mV) (45 Hz ~ 100 Hz) ± (0.1% + 100 mV) (100 Hz ~ 999.9 Hz) ± (0.5% + 1 V) (1 kHz ~ 5 kHz)			
rms current resolution	0.01 A		0.1 A	
rms current accuracy [1]	± (0.15% + 0.2% of fs) (45 Hz ~ 65 Hz) ± (0.5% + 0.5% of fs) (DC, 40 Hz ~ 999.9 Hz) ± (1.2% + 1.2% of fs) (1 kHz ~ 5 kHz)			
Peak current resolution	0.01 A		0.1 A	
Peak current accuracy [2]	4% of full scale			
Active power resolution	1 W		10 W	
Active power accuracy [1, 3] (Low range/High Range)	± (0.7% + 0.7% of fs + 0.001% of fs/V) / ± (0.7% + 0.7% of fs + 0.0005% of fs/V) (45 Hz ~ 100 Hz)			
Apparent power resolution	1 VA		10 VA	
Apparent power accuracy [1, 3] (Low range/High Range)	± (0.3% + 0.3% of fs + 0.001% of fs/V) / ± (0.3% + 0.3% of fs + 0.0005% of fs/V) (45 Hz ~ 100 Hz)			
Power factor resolution	0.01			
DC Voltage resolution	0.1 V			
DC Voltage accuracy	0.05% + 150 mV			
Output stability				
Line regulation [4]	±0.1%			
Load regulation [5, 6] (Low range/High Range) ≤ 100 Hz ≤ 500 Hz ≤ 1 kHz	 ± 0.1 V / ± 0.2 V ± 0.3 V / ± 0.6 V ± 1 V / ± 2 V			± 0.2 V / ± 0.4 V ± 0.3 V / ± 0.6 V ± 1 V / ± 2 V
Total harmonic distortion [6]	0.3% (≤ 100 Hz), 0.5% (≤ 330 Hz), 1.5% / kHz (≤ 5 kHz)			

1. At 10 % to 100 % of maximum rated current; sine wave. fs = full scale.
2. Pulse height of sine wave.
3. Power factor of 1.
4. For input voltage changes within the rated range.
5. For output current changes within 0 to 100 % of the rating when not using the compensation function.
6. When the output phase voltage is 80 V – 160 V (Low range) or 160 V – 320 V (High range), the load power factor is 1, and the response is FAST at the output terminal block

Supplemental characteristics

Supplemental characteristics			AC6903H 5 kHz AC6903L 550 Hz	AC6906H 5 kHz AC6906L 550 Hz	AC6912H 5 kHz AC6912L 550 Hz	AC6918H 5 kHz AC6918L 550 Hz
Output						
Max peak current [1]			4 times the maximum output current			
Inrush current capacity			Current at 1.4 times the maximum output current for 0.5 s			
Temp coefficient [2]			100 ppm / °C			
Transient response [3]			40 µs (Fast)			
Response speed Tr/Tf [4]			40 µs (Fast), 100 µs (Medium), 300 µs (Slow)			
Ripple noise [5]			0.25 Vrms		0.3 Vrms	0.4 Vrms
Variation according to output frequency [6, 7]			Output voltage correction function enable: ± 0.3% (1 Hz~1 kHz), ± 10% (1001 Hz~5 kHz) Output voltage correction function disable: -3 dB (5 kHz)			
Harmonics measurement						
Fundamental frequency			10 Hz ~ 1 kHz			
Upper limit harmonic			5th to 50th			
Measurement items			Rms voltage and current / phase angle THD			
Current magnitude accuracy			0.15% + 0.20% of fs (Fundamental 50 Hz or 60 Hz) 1.2% + 1.2% of fs (Harmonics 2nd to 50th)			
Output impedance						
1P						
Low	Resistance		0 Ω to 667 mΩ	0 Ω to 333 mΩ	0 Ω to 167 mΩ	0 Ω to 111 mΩ
	Reactance	Fast	13 µH to 667 µH	7 µH to 333 µH	3 µH to 167 µH	2 µH to 111 µH
		Med	27 µH to 667 µH	13 µH to 333 µH	7 µH to 167 µH	4 µH to 111 µH
		Slow	80 µH to 667 µH	40 µH to 333 µH	20 µH to 167 µH	13 µH to 111 µH
High	Resistance		0 Ω to 2667 mΩ	0 Ω to 1333 mΩ	0 Ω to 667 mΩ	0 Ω to 444 mΩ
	Reactance	Fast	53 µH to 2667 µH	27 µH to 1333 µH	13 µH to 667 µH	9 µH to 444 µH
		Med	107 µH to 2667 µH	53 µH to 1333 µH	27 µH to 667 µH	18 µH to 444 µH
		Slow	320 µH to 2667 µH	160 µH to 1333 µH	80 µH to 667 µH	53 µH to 444 µH
1P3W or 3P						
Low	Resistance		0 Ω to 2000 mΩ	0 Ω to 1000 mΩ	0 Ω to 500 mΩ	0 Ω to 333 mΩ
	Reactance	Fast	40 µH to 2000 µH	20 µH to 1000 µH	10 µH to 500 µH	7 µH to 333 µH
		Med	80 µH to 2000 µH	40 µH to 1000 µH	20 µH to 500 µH	13 µH to 333 µH
		Slow	240 µH to 2000 µH	120 µH to 1000 µH	60 µH to 500 µH	40 µH to 333 µH
High	Resistance		0 Ω to 8000 mΩ	0 Ω to 4000 mΩ	0 Ω to 2000 mΩ	0 Ω to 1333 mΩ
	Reactance	Fast	160 µH to 8000 µH	80 µH to 4000 µH	40 µH to 2000 µH	27 µH to 1333 µH
		Med	320 µH to 8000 µH	160 µH to 4000 µH	80 µH to 2000 µH	53 µH to 1333 µH
		Slow	960 µH to 8000 µH	480 µH to 4000 µH	240 µH to 2000 µH	160 µH to 1333 µH

1. Repeated output is possible when the crest factor is four.
2. For changes within the operating temperature range at output phase voltage 100 V / 200 V, no load.
3. When the output voltage is 100 V / 200 V, the load pf is 1, and the output current changes from 0 A to the rated value and from the rated value to 0 A.
4. At 10% to 90% of the output voltage.
5. 5 Hz to 1 MHz components are in DC mode.
6. The voltage variation over 40 Hz to 5 kHz in AC mode with 55 Hz as the reference.
7. When the output phase voltage is 80 V to 160 V (Low range) or 160 V to 320 V (High range), the load power factor is 1, and the response is FAST.

Supplemental characteristics	AC6903H 5 kHz AC6903L 550 Hz	AC6906H 5 kHz AC6906L 550 Hz	AC6912H 5 kHz AC6912L 550 Hz	AC6918H 5 kHz AC6918L 550 Hz
Output On / Off phase angle setting				
Setting range	0.0 degrees to 360.0 degrees (0.0 degrees = 360.0 degrees)			
Resolution	0.1 degrees			
Accuracy [1]	± 1 degree (≤ 1 kHz)			
Input				
Apparent power	≤ 4 kVA	≤ 7.8 kVA	≤ 15.6 kVA	≤ 23.4 kVA
Power factor [2]	0.93 (TYP)	0.95 (TYP)		
Efficiency [2]	82% (TYP)	85% (TYP)		
Hold-up time for power interruption [2]	10 ms			
Frequency (nominal)	50 ~ 60 Hz			
Frequency (variation)	45 ~ 65 Hz			
200V input model				
Voltage (nominal)	100 to 120 Vrms / 200 to 240 Vrms	200 to 230 Vrms		
Voltage (variation)	85 to 132 Vrms / 170 to 250 Vrms	170 to 250 Vrms		
Phase	1P	3P3W		
Max input current (rms) [3]	48 A / 24 A	27 A	53 A	80 A
Protective conductor current [4]	≤ 3.5 mA	≤ 10 mA	≤ 15 mA	≤ 20 mA
400V input model				
Voltage (nominal)	-	380 to 480 Vrms		
Voltage (variation)	-	323 to 519 Vrms		
Phase	-	3P4W		
Max input current (rms) [3]	-	14 A	28 A	42 A
Protective conductor current	-	≤ 3.5 mA	≤ 3.5 mA	≤ 3.5 mA
Mechanical				
Net weight (200 V / 400 V) (kg)	28	47 / 49	71 / 72	104 / 106
Net dimension, W x H x D (mm)	430 x 129.2 x 667.5	430 x 262 x 562	430 x 389 x 562	430 x 563 x 562
Overall dimension (with wheel and safety cover), W x H x D (mm)	440 x 160 x 720	445 x 345 x 650	445 x 475 x 650	445 x 660 x 665
Input terminal	M6	M5	M5	M8 (200 V input) M5 (400 V input)
Output terminal	M6	M5	M5	M6

1. Lag in phase due to response speed not included.
2. Output voltage at 100 V/200 V, rated output current, sine wave, load power factor 1, output frequency 40 Hz to 1 kHz.
3. The current at the minimum voltage within the allowable variation range.
4. Output voltage at 100 V/200 V, rated output current, sine wave, load power factor 1, output frequency 45 Hz to 65 Hz

General	All models
Insulation resistance: • Primary-to-chassis • Output-to-chassis • Primary-to-output	500 Vdc, 10 MΩ or more
Withstand voltage: • Primary-to-chassis • Output-to-chassis • Primary-to-output	1500 Vac, 2150 Vdc, 1 minute
Isolation to ground	320 Vrms / 452 Vdc
Electromagnetic compatibility (EMC)	Complies with requirements for the following directives and standards: EMC Directive 2014/30/EU EN 61326-1 (Class A [1] EN 55011 (Class A1, Group 1 [2]) Applicable under the following conditions: The maximum length of all cabling and wiring connected to the product must be < 3 m (< 9.8 feet), excluding the cable that connects to the LAN
Safety	Complies with the requirements of the following directives and standards: Low Voltage Directive 2014/35/EU [1] EN 61010-1 (Class I [3], Pollution Degree 2 [4])
Environmental conditions	
Operating environment	Indoor use, overvoltage category II
Operating temperature range	0 to 40 °C (32 °F to 104 °F)
Storage temperature range	-10 to +60 °C (14 °F to 140 °F)
Operating humidity range	20% RH to 80% RH (no condensation)
Storage humidity range	90% RH or less (no condensation)
Altitude	Up to 2000 m (6561.7 feet)

1. This is a Class A instrument. The intended use for this product is in an industrial environment. This product may cause interference if used in residential areas. Avoid residential use unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.
2. This is a Group 1 instrument. This product does not generate and / or use radio frequency energy in the form of electromagnetic radiation, inductive and / or capacitive coupling for the treatment of material or inspection/analysis purposes.
3. This product conforms to Class I. For safety reasons, ground the protective conductor terminal of this product.
4. Pollution, in addition to foreign matter (solid, liquid, or gaseous), may produce a reduction of dielectric strength or surface resistivity. Pollution Degree 2 assumes only non-conductive pollution will occur except for an occasional temporary conductivity caused by condensation.

Output characteristics

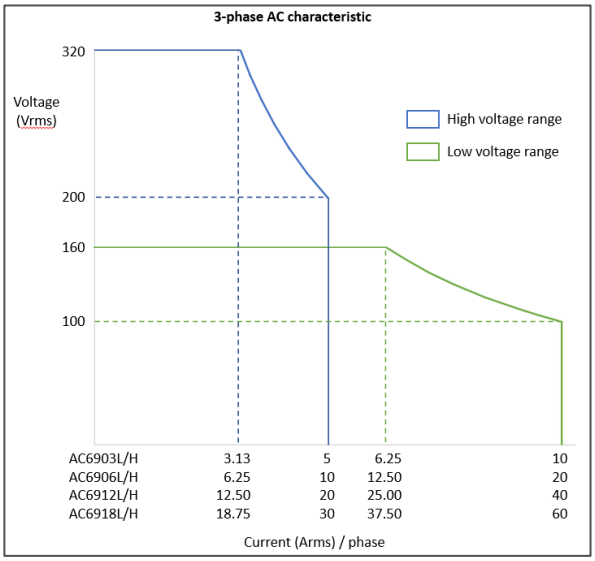

Figure 10. 3-phase AC characteristic

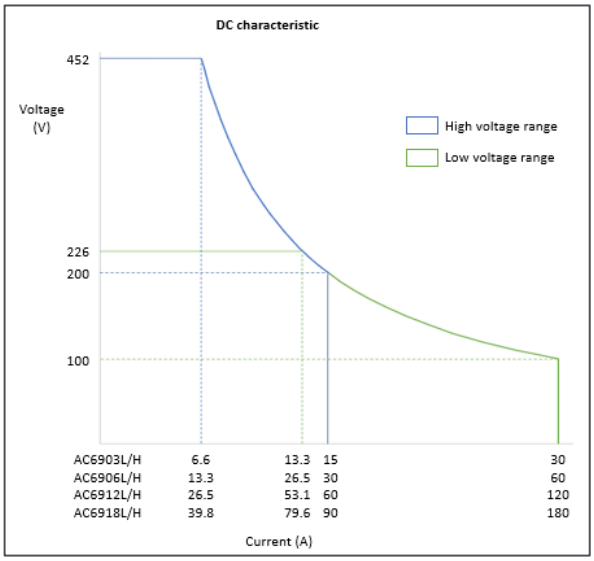

Figure 11. DC characteristic

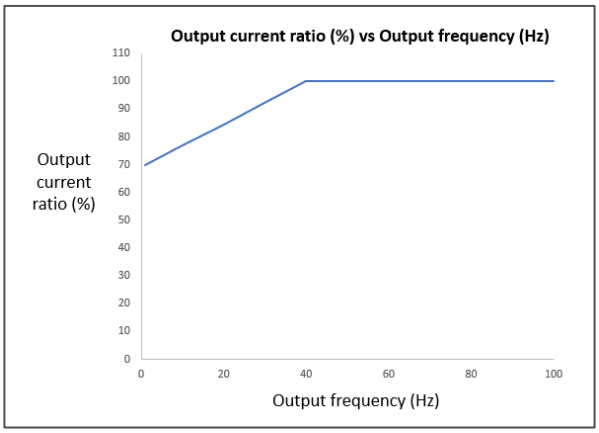

Figure 12. Output current ratio (%) vs Output frequency (Hz)

Ordering Information

Keysight AC6900 series 3-phase AC power sources

Model	Description
AC6903H	AC power source 320 Vrms, 3 kVA, 5 kHz, 3Φ
AC6903L	AC power source 320 Vrms, 3 kVA, 550 Hz, 3Φ
AC6906H	AC power source 320 Vrms, 6 kVA, 5 kHz, 3Φ
AC6906L	AC power source 320 Vrms, 6 kVA, 550 Hz, 3Φ
AC6912H	AC power source 320 Vrms, 12 kVA, 5 kHz, 3Φ
AC6912L	AC power source 320 Vrms, 12 kVA, 550 Hz, 3Φ
AC6918H	AC power source 320 Vrms, 18 kVA, 5 kHz, 3Φ
AC6918L	AC power source 320 Vrms, 18 kVA, 550 Hz, 3Φ
BV0026B	PathWave BenchVue AC source control software
BV0028B	PathWave BenchVue AC source avionics standard test software
BV0030B	PathWave BenchVue AC Source Pre-Compliance Test

Standalone accessories

Model	Description
AC69GPBU	GPIB interface board
AC69ALGU	Analog interface connector
AC69DIGU	Digital interface connector
AC69PAR1	Parallel operation cable (not applicable for AC6903L/H)
AC69SYN1	Synchronization cable (not applicable for AC6903L/H)

For more information

About AC power sources, visit www.keysight.com/us/en/products/ac-power-sources.html

Options

Model	Factory input option	Rack kit
AC6903L/H	NA	AC69RAC3
AC6906L/H	200	AC69RAC6
	400	
AC6912L/H	200	AC69RAC12
	400	
AC6918L/H	200	AC69RAC18
	400	

Option MEM

Option MEM provides a micro-SD card that can be easily removed for sanitization purposes. It can only be ordered when the instrument is purchased.

Note that instruments with Option MEM will not turn on if the original SD card is not installed in the unit. For more information, refer to the Operating and Programming Guide.

Power cords and terminations (plugs)

Due to the number of different power cords and terminations worldwide, the AC6900 series power supplies do not come with power cords or terminations. Users must supply their own depending on the local laws and codes of the country/region where the power supply will be used. Please refer to the user manual for power cord specifications. AC6900 Series Operating and Programming Guide.

Keysight Support Services

Accelerate your learning curve, enhance your test uptime, and confidently guarantee your instrument accuracy with Keysight Support Services. Keysight Services are here to support your test needs with expert technical support, instrument repair and calibration, training, alternative acquisition program options, and more.

A KeysightCare agreement provides dedicated, proactive support through a single point of contact for an extensive group of instruments, software, and solutions to ensure optimal uptime, with fast response times and resolution. Explore the services that are right for you.

Keysight Services

Offering	Benefits
KeysightCare 	KeysightCare provides elevated support for Keysight instruments and software, with access to technical support experts who respond within a specified time and ensure committed repair and calibration turnaround times (TAT). KeysightCare offers multiple service agreement tiers, including KeysightCare Assured, Enhanced, and Application Software Support. See the KeysightCare data sheet for details.
KeysightCare Assured	KeysightCare Assured provides a commitment to respond to your engineer's technical needs quickly. When unexpected repairs are necessary, you can count on a committed repair service turnaround time to get you back up and running.
KeysightCare Enhanced	KeysightCare Enhanced includes all the benefits of KeysightCare Assured plus Keysight's accurate and reliable Calibration Services, accelerated and committed TAT, and technical response.
Keysight Support Portal & Knowledge Center	All KeysightCare tiers include access to the Keysight Support Portal, where you can manage support and service resources related to your assets, such as service requests and status, or browse the Knowledge Center.
Education Services	Build confidence and gain new skills to make accurate measurements, with flexible Education Services developed by Keysight experts. Including Start-up Assistance.
Alternative acquisition options	
KeysightAccess	Reduce budget challenges with a lease-based subscription service that offers low monthly payments, enabling you to get the instruments, software, and technical support you want for your test needs.

Recommended services

Maximize your instrument uptime and confidently make accurate measurements by securing technical support, repair, and calibration services with committed response and turnaround times. High-performance instruments include 1 year of KeysightCare Assured or KeysightCare Warranty Plus. Obtain multi-year KeysightCare upfront to eliminate the need for lengthy and tedious paperwork and yearly requests for maintenance budget. Plus, you benefit from secured service for 2, 3, or 5 years.

Service	Function
KeysightCare Enhanced*	**Includes tech support, warranty and calibration**
R-55B-001-1	KeysightCare Enhanced – Upgrade 1 year
R-55B-001-2	KeysightCare Enhanced – Extend to 2 years
R-55B-001-3	KeysightCare Enhanced – Extend to 3 years (Recommended)
R-55B-001-5	KeysightCare Enhanced – Extend to 5 years (Recommended)
KeysightCare Assured*	**Includes tech support and warranty**
R-55A-001-2	KeysightCare Assured – Extend to 2 years
R-55A-001-3	KeysightCare Assured – Extend to 3 years
R-55A-001-5	KeysightCare Assured – Extend to 5 years
Start-Up Assistance	
PS-S40-01	Included – instrument fundamentals and operations starter
PS-S40-04	Recommended – instrument fundamentals and operations starter
PS-S40-02	Optional, technology & measurement science standard learning

* Limited availability might apply. Please review the service definition tool for model number availability and the datasheet for country availability. Coverage might be limited to KeysightCare Warranty Plus (R-55F-001). If KeysightCare Enhanced is available. R-55B-001-2/3/5 must be ordered with R-55B-001-1.