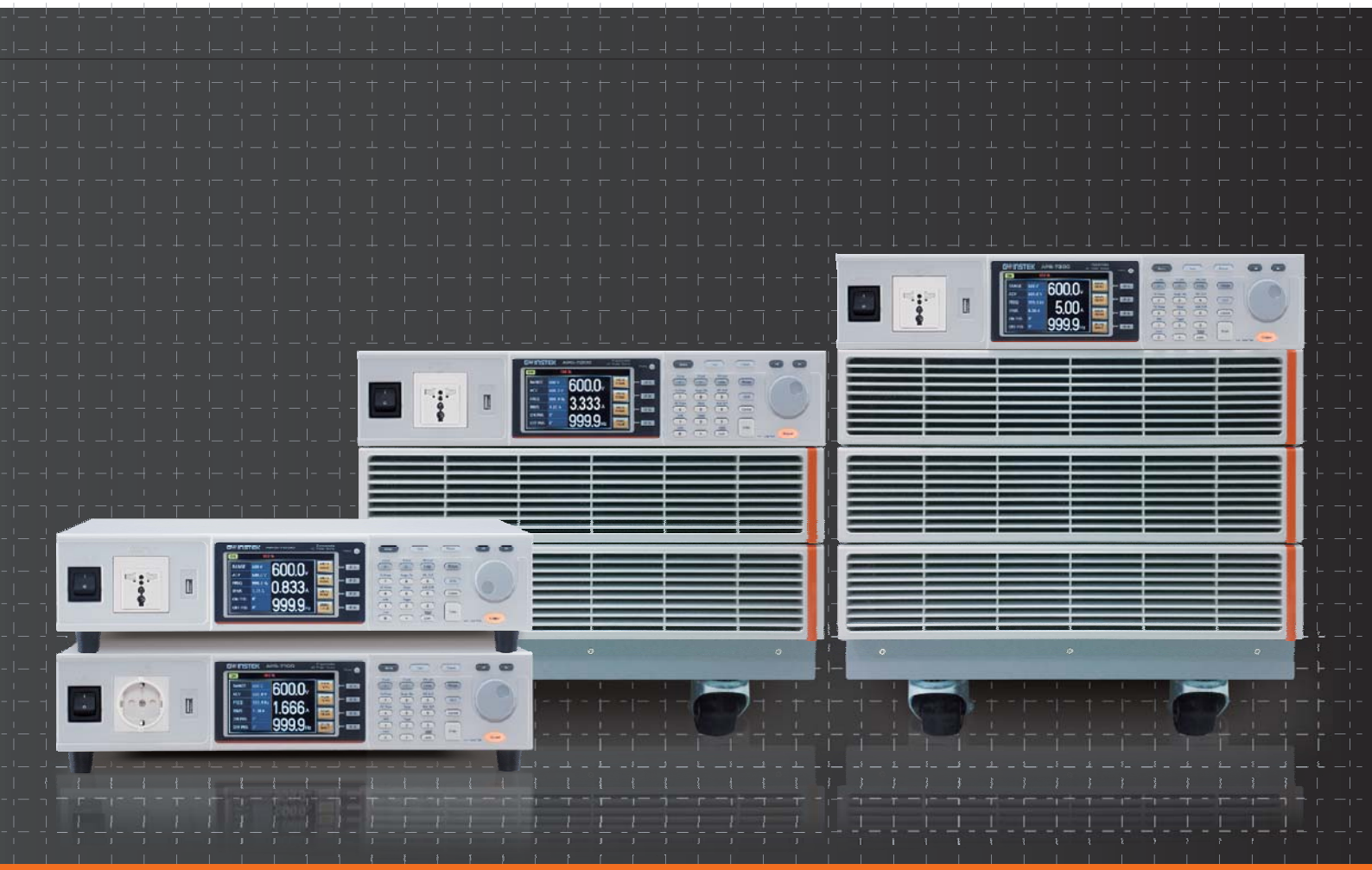


APS-7000 Series

500/1000/2000/3000 VA Programmable Linear AC Power Source

FEATURES

- 4.3-inch TFT-LCD
- Output Capacity : APS-7050(500VA,310Vrms,4.2Arms); APS-7100(1000VA,310Vrms,8.4Arms) APS-7200(2000VA,310Vrms,16.8Arms); APS-7300(3000VA,310Vrms,25.2Arms) Output Augmentation by Options(0~600Vrms/45~999.9Hz)
- Low Ripple & Noise
- Measurement and Test Functions Include VOLT, CURR, PWR, SVA, IPK, IPKH, FREQ, PF, CF
- Support a Small AC Current Measurement 2mA ~ 35A, Min. Rresolution 0.01mA(APS- 7050&APS-7100)
- Reverse Current Alarm Function
- 10 sets of Sequence Function to Edit Output Waveforms/10 sets of Simulate Mode to Rapidly Simulate Transient Power Supply/10 sets of Program mode to Define Measurement Sequence/10 sets of Panel Memory Function
- Automatic Execution of Sequence, Simulate, Program mode and Output Function when the Power is on
- Standard Interfaces : USB Host, USB Device, LAN
- Optional Interfaces : GPIB(APS-001); RS-232/USB CDC(APS-002 for APS-7050&APS-7100 only) RS-232(APS-007 for APS-7200& APS-7300 only)

GW INSTEK

Simply Reliable

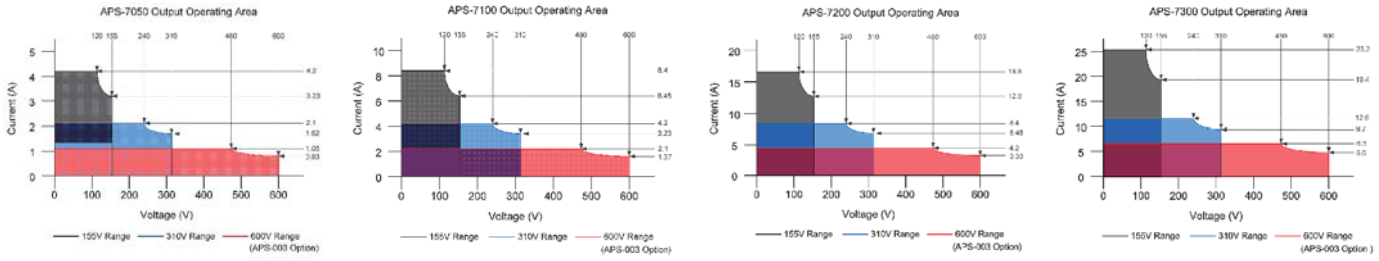
GWInstek introduces APS-7000 series programmable AC power sources, which consists of 500VA of APS-7050, 1000VA of APS-7100, 2000VA of APS-7200 and 3000VA of APS-7300. APS-7000 series feature power characteristics from its linear structure design including low noise, low THD, and highly stabilized power output that are ideal for the product development and verification of input power with low noise requirement or stereo, video and audio device applications, etc. The maximum rated voltage is 0~ 310Vrms, 25.2Arms, 100.8A peak current and the output frequency range is 45~500.0Hz. Users can conveniently augment the output voltage from 0Vrms to 600Vrms and output frequency from 45Hz to 999.9Hz by purchasing options without sending equipment back to GW Instek.

One of the popular alternative energy solutions in the market is to utilize inverter to convert DC to AC and the converted AC is then sent to power grid or products require electricity. For instance, AC produced by PV inverter is sent to power grid or equipment requires electricity. While simulating power grid to verify inverter connecting with power grid, general AC power sources cannot withstand DUT's feedback energy, hence, additional power consumption resistors are needed to prevent AC power source from being damaged. On the contrary, APS-7000 series have the characteristic of absorbing reverse current so that additional power consumption resistors are not required. The input terminal of APS-7000 series is designed to isolate from the simulated AC power grid output terminal, therefore, users do not need an additional isolation device to protect DUT. APS-7000 series are suitable for simulating power grid and conducting inverter output characteristic tests, including synchronized phase and frequency. Reverse current and power detected by APS-7000 series will be displayed in red readings to facilitate user's test observation. APS-7000 series utilize Simulate mode and Sequence mode to provide a single step or consecutive power changes; and to simulate power grid's Voltage Abnormality Test and Frequency Abnormality Test.

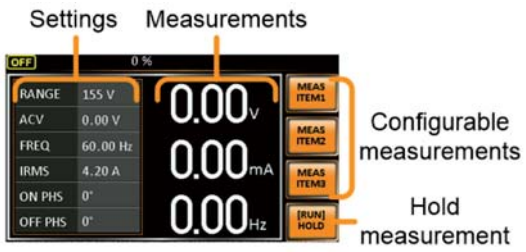
APS-7000 series comprise nine measurement and test functions (Vrms, Irms, F, Ipk, W, VA, PF, Ipk hold, CF), and provide user interface similar to that of AC Power Meter. APS-7000 series are ideal for the LED industry and standby mode power consumption test. Under the ARB mode, APS-7000 series provide waveforms in seven categories including Sine waveform, Triangle waveform, Staircase waveform(Square wave), Clipped Sinewave, Crest factor waveform, Surge waveform, and Fourier series and 20,000 waveform combinations so as to meet the requirements of simulating abnormal input power waveform test of various industries. Ten Preset settings allow users to store ten sets of data; Power ON Output setting allows Sequence, Simulate, and Program to automatically execute output after the equipment power is on.

To meet the test criteria of line voltage fluctuation often seen in consumer electronics, APS-7000 series feature five methods to cope with special purpose or abnormal voltage, frequency, and phase; ten sets of the Simulate mode simulate power outage, voltage rise, and voltage fall; ten sets of the Sequence mode allow users to define parameters and produce sine wave by editing steps; ten sets of the Program mode can edit AC waveform output and define the ceiling and floor level of measurement items for different DUTs; Ramp Control allows users to set the variation speed for output voltage rise and fall; Surge/Dip Control simulates DUT's input power producing a Surge or Dip voltage overlapping with output voltage waveform at a specific time. For larger current output applications, voltage drop across the output cables should be avoided. APS-7200/7300 also provide the remote sense function, which senses DUT's voltage and sends the information back to APS-7200/7300 for program controlled voltage compensation. Therefore, APS-7200/7300 can avoid the voltage drop of the cable to affect output voltage.

Ethernet Port, on the rear panel, can be used for remote program control; Sync Output Socket provides external 10V sync output; Signal Output Connector provides monitor of Program execution results. APS-7000 series also provide users with Trigger In/Out and Output on/off remote control functions from J1 connector on the rear panel.

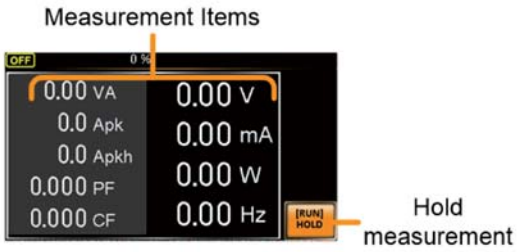


A. CONTROL PANEL CHARACTERISTICS



Standard Mode

There are two control panel modes: Standard mode and Simple mode. Both modes are shown on the above. Standard mode combines settings and AC Power Meter measurement window display. Users apply Function key (F1~F3) to select required measurement items.



Simple Mode

There are nine items for selection. Simple mode shows all measurement items on the display.

B REVERSE CURRENT DISPLAY

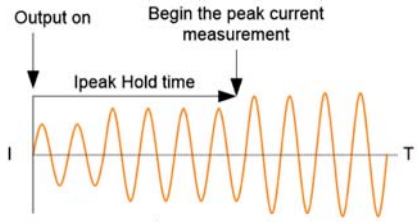
Standard Mode

Simple Mode

When output terminal detects 180 degree phase difference between voltage and current (reverse current), the front panel of APS-7000 Series will remind users the power and power factor measurement results in red numerical display. This feature can be applied to show the power and power factor measurement while testing inverter for feedback power grid.

As shown on the above :
APS-7000 Series can withstand reverse current: 30% of the maximum effective current or maximum current output within three minutes.

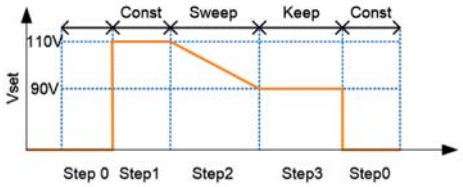
C T IPEAK, HOLD FUNCTION



Ipeak Measurement

T, Ipk Hold sets delay time (1ms~60 seconds) for measurement after the output of Ipeak value and the maximum value will be retrieved. Update will be proceeded only if measured value is greater than the original value. Ipk Hold is for measuring transient inrush current as soon as the equipment power is on that is usually done by oscilloscope and current probe. T, Ipk Hold delay time setting can be applied to measure inrush current of sequentially activated DUT.

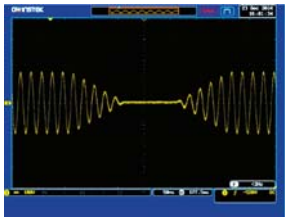
D SEQUENCE MODE



Sequence Mode

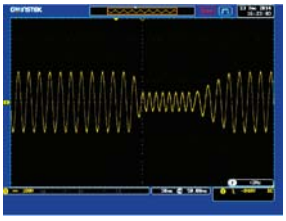
There are ten sets of Sequence mode and each set has 0~255 steps. The time setting range for each step is 0.01 ~ 999.99 seconds. Combining many sets of steps to edit required waveforms can satisfy users' requirement of highly complicated waveforms.

E SIMULATE MODE



Power Outage

Voltage Rise

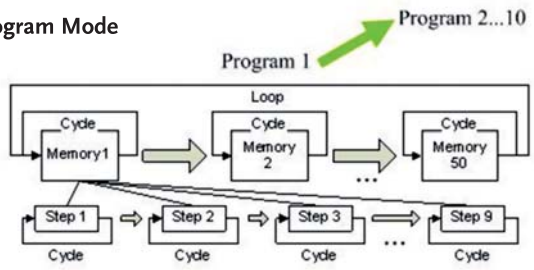


Voltage Fall

This mode can rapidly produce different simulated input transient waveforms such as power outage; voltage rise and voltage fall etc. for engineers to evaluate the impact on DUT posed by the transient phenomena. For instance, capacitor endurance test.

F PROGRAM MODE

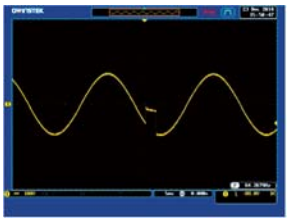
Program Mode



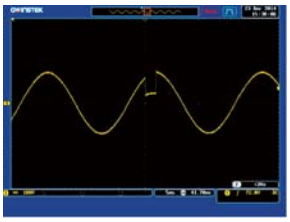
This mode allows users to set ceiling and floor specifications to produce PASS/FAIL result after the measurement is done. It can also show test results for each test procedure or only show the last result.

There are ten sets of Program mode and each set has 50 sets of memory. Each memory comprises 9 steps. Each Program will operate according to memory sequence, self-defined loops or designated steps to stop.

G SURGE/DIP CONTROL



Surge

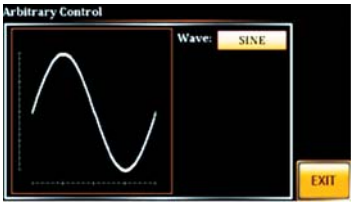


Dip

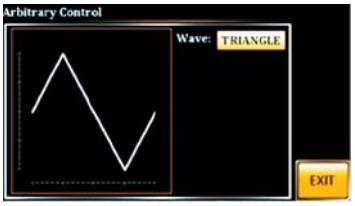
Overlapping a Surge/Dip voltage on a normal voltage as the input power for DUT allows users to simulate Surge/Dip situation and evaluate DUT characteristics.

H. FUNCTION WAVEFORM (ARB) MODE

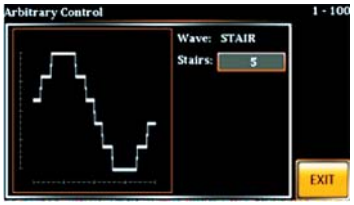
Provide waveforms in seven categories and 20,000 waveform combinations so as to rapidly simulate distorted AC voltage waveforms.



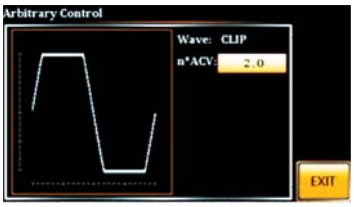
Sine Waveform
Standard AC Waveform



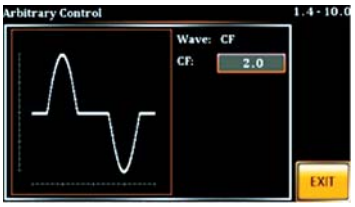
Triangle Waveform
Power Harmonic Output Simulation
Is Triangle Waveform



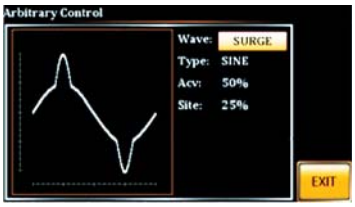
Staircase Waveform
Simulate Square Waveform And Staircase
Waveform For Commercial Ups



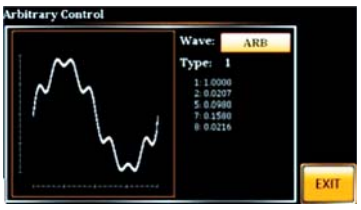
Clipped Sinewave
Simulate Grid Power Supply Heavy
Load Waveform



Crest Factor Waveform
Simulate Rectified Filter Current
Waveform By Capacitor Input



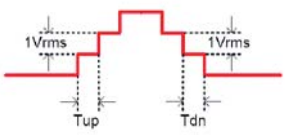
Surge Waveform
Simulate Grid Power Supply's
Peak Over-voltage



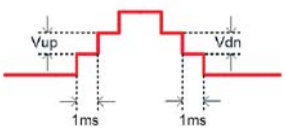
Fourier Series Synthesized Waveform

Simulate real output power waveform. Distorted power waveform is produced due to output impedance and non-linear effect such as inductance, capacitance, and parasitic capacitance effect. For example: motors.

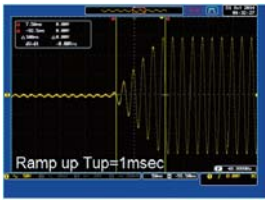
I. RAMP CONTROL



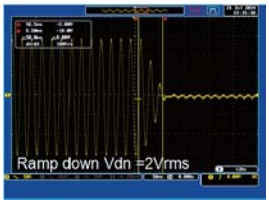
Tup → 0.1 ~ 999.9ms
Tdn → 0.1 ~ 999.9ms



Vup → 0.01 ~ 99.99 Vrms
Vdn → 0.01 ~ 99.99 Vrms



Mode=Time, Tup=1msec,
VAC=100V, Freq=50Hz,
Ramp output=on.



Mode=Voltage, Vdn=2Vrms,
VAC=100V, Freq=50Hz,
Ramp output=off.

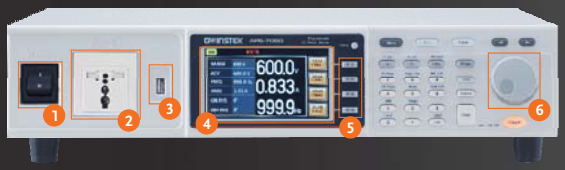
Ramp control allows users to set output voltage rise or fall speed which is based on time (1ms) or voltage (1Vrms) unit.

PANEL INTRODUCTION

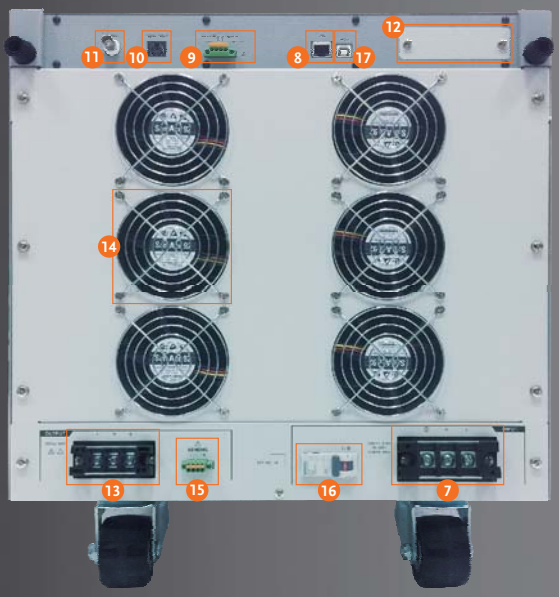
CE | USB | GPIB | LAN | RS-232

(Note : APS-7200/7300 without CE)

APS-7050/APS-7100



APS-7200/APS-7300



1. AC Power switch
2. Universal Regional Plug
3. USB Host (A) Port
4. Display 4.3 Inch TFT
5. Function Keys
6. Scroll Wheel
7. Line Voltage Input
8. Ethernet Port
9. Remote Control-J1 Connector
10. Signal Output Connector
11. Sync Output
12. Interface for Option
13. Rear Panel Output Terminal
14. Fan
15. Remote Sense
16. Circuit Breaker
17. USB Device(B) Port

SPECIFICATIONS

Model		APS-7050	APS-7100	APS-7200	APS-7300
AC OUTPUT					
Power Rating		500VA	1000VA	2000VA	3000VA
Output Voltage		0 ~ 155Vrms, 0 ~ 310Vrms	0 ~ 155Vrms, 0 ~ 310Vrms	0 ~ 155Vrms, 0 ~ 310Vrms	0 ~ 155Vrms, 0 ~ 310Vrms
Output Frequency		45.00 ~ 500.0 Hz	45.00 ~ 500.0 Hz	45.00 ~ 500.0 Hz	45.00 ~ 500.0 Hz
Maximum Current(r.m.s)*1	0~155Vrms	4.2A	8.4A	16.8A	25.2A
	0~310Vrms	2.1A	4.2A	8.4A	12.6A
Maximum Current(peak)	0~155Vrms	16.8A	33.6A	67.2A	100.8A
	0~310Vrms	8.4A	16.8A	33.6A	50.4A
OPT. APS-003(rms)	0~600Vrms	1.05A	2.1A	4.2A	6.3A
OPT. APS-003(peak)	0~600Vrms	4.2A	8.4A	16.8A	25.2A
Total Harmonic Distortion (THD)*2		≤0.5% at 45 ~ 500Hz (Resistive Load)			
Crest Factor		≥4			
Line Regulation		0.1% (% of full scale)			
Load Regulation		0.5% (% of full scale)			
Response Time		<100us			
Reverse Current		30% of Maximum Output RMS Current (Continue); 100% of Maximum Output RMS Current (Within 3 minutes)			
SETTING					
Voltage	Range	0~155Vrms, 0~310Vrms, Auto			
	Resolution	0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms			
	Accuracy	±(0.5% of setting+2 counts)			
Frequency	Range	45 ~ 500Hz			
	Resolution	0.01Hz at 45.00 ~ 99.99Hz; 0.1Hz at 100.0 ~ 500.0Hz			
	Accuracy	±0.02% of setting			
Power On/Off Phase Angle	Range	0 ~ 359°			
	Resolution	1°			
	Accuracy	±1°(45 ~ 65Hz)			

SPECIFICATIONS

Model		APS-7050	APS-7100	APS-7200	APS-7300
MEASUREMENT*3					
Voltage(RMS)	Range	0.20~38.75Vrms;38.76~77.50Vrms;77.51~155.0Vrms;155.1~310.0Vrms		0.20~38.75Vrms;38.76~77.50Vrms;77.51~155.0Vrms;155.1~310.0Vrms	
	Resolution	0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms		0.01V at 0.00 ~ 99.99Vrms; 0.1V at 100.0 ~ 310.0Vrms	
	Accuracy*4	±(0.5% of reading + 2 counts)		±(0.5% of reading + 2 counts)	
Frequency	Range	45 ~ 500Hz		45 ~ 500Hz	
	Resolution	0.01Hz at 45Hz~99.99Hz; 0.1Hz at 100Hz~500.0Hz		0.01Hz at 45Hz~99.99Hz; 0.1Hz at 100Hz~500.0Hz	
	Accuracy	±0.1Hz		±0.1Hz	
Current(RMS)	Range	2.00 ~ 70.00mA;60.0 ~ 350.0mA;0.300 ~ 3.500A;3.00 ~ 17.5A		0.200 ~ 3.500A;3.00 ~ 35.00A	
	Resolution	0.01mA, 0.1mA, 0.001A, 0.01A		0.001A;0.01A	
	Accuracy	±(0.6% of reading+5 counts), 2.00~350.0mA;±(0.5% of reading+5 counts), 0.300~3.500A;±(0.5% of reading+3 counts),3.000~17.50A		± (0.5% of reading + 5 counts) , 0.200 ~ 3.500A ± (0.5% of reading + 3 counts) , 3.00 ~ 35.00A	
Current(Peak)	Range	0.0 ~ 70.0A		0.0 ~ 140.0A	
	Resolution	0.1A		0.1A	
	Accuracy	±(1% of reading+1 count)		± (1% of reading + 1 counts)	
Power(W)	Resolution	0.01W, 0.1W, 1W		0.1W, 1W	
	Accuracy	±(0.6% of reading+5 counts),0.20~99.99W; ±(0.6% of reading+5 counts),100.0~999.9W±(0.6% of reading+2 counts),1000~9999W		± (0.6% of reading + 5counts) , 0.2 ~ 999.9W; ± (0.6% of reading + 2counts) , 1000 ~ 9999W	
Apparent(VA)	Resolution	0.01VA, 0.1VA, 1VA		0.1VA, 1VA	
	Accuracy	±(1% of reading+7 counts),0.20~99.99VA;±(1% of reading+7 counts), 100.0~999.9VA;±(1% of reading+5 counts),1000~9999VA		± (1% of reading + 7 counts) , 0.2 ~ 999.9VA; ± (1% of reading + 5 counts) , 1000 ~ 9999VA	
Power Factor	Resolution	0.001		0.001	
	Accuracy	±(2% of reading + 2 counts)		±(2% of reading + 2 counts)	
GENERAL					
Remote output signal		Pass, Fail, Test-in Process, Trigger in, Trigger out, OUT ON/OFF			
Sync output signal		Output Signal 10 V, BNC Type			
Number of Preset		10 (0~9 numeric keys)			
Protection		OCP, OPP, OTP and Alarm			
Trigger Out		Maximum low level output = 0.8V ; Minimum high level output = 2V ; Maximum source current = 8mA			
Trigger In		Maximum low level input voltage = 0.8V ; Minimum high level input voltage = 2.0V ; Maximum sink current = 8mA			
SEQUENCE/SIMULATION FUNCTION					
Number of Memories		10 (0 ~ 9 Numeric keys)			
Number of Steps		255 max. (For 1 sequence)			
Step Time Setting Range		0.01 ~ 999.99S			
Operation Within Step		Constant, Keep, Linear Sweep			
Parameters		Output Range, Frequency, Waveform (sine wave only); On Phase, Off Phase, Term Jump Count (0 ~ 255) jump-to, Branch 1, Branch 2, Trigger Output			
Sequence Control		Start, Stop, Hold, Continue, Branch 1, Branch 2			
AC INPUT					
Phase		Single Phase	Single Phase	Single Phase	Single Phase
Input Voltage		115/230Vac±15%	115/230Vac±15%	230Vac±15%	230Vac±15%
Input Frequency		50/60Hz	50/60Hz	50/60Hz	50/60Hz
Max. Current		16A/8A	32A/16A	32A	50A
Power Factor		0.7 Typ.	0.7 Typ.	0.7 Typ.	0.7 Typ.
ENVIRONMENT CONDITIONS					
Operating Temperature Range		0 ~ +40℃			
Storage Temperature Range		-10 ~ +70℃			
Operating Humidity Range		20 ~ 80% RH (No Condensation)			
Storage Humidity Range		80% RH or less(No Condensation)			
INTERFACE					
Standard		USB Host, LAN		USB Host, USB CDC, LAN	
Optional		GPIB (APS-001) RS232 / USB CDC (APS-002)		GPIB (APS-001) RS232 (APS-007)	
DIMENSIONS & WEICHT					
		430(W) x 89(H) x 400(D) mm; Approx. 24Kg	430(W) x 89(H) x 560(D) mm; Approx. 38Kg	430(W) x 312(H) x 650(D) mm; Approx. 90Kg	430(W) x 400(H) x 650(D) mm; Approx. 128Kg

Note: The Specifications are not suit for ARB mode.

Specifications subject to change without notice. APS7000CD1BH

*1. Maximum output current at working voltage 120Vrms, 240Vrms
*2. 45~500Hz, 10% or higher of the rated output voltage, the maximum current or lower
*3. All of measurement accuracy is at 23±5℃
*4. In the case of 15~155V, 30~310V, sine wave, no load

ORDERING INFORMATION

APS-7050 500VA Programmable AC Power Source
APS-7100 1000VA Programmable AC Power Source
APS-7200 2000VA Programmable AC Power Source
APS-7300 3000VA Programmable AC Power Source

ACCESSORIES

CD ROM(User Manual, Programming Manual for APS-7000) x 1,
Power Cord(Region Dependent), GTL-123 Test Lead

OPTION ACCESSORIES

APS-001	GPIB interface card
APS-002	RS-232/USB interface card(APS-7050, APS-7100)
APS-007	RS-232 interface card(APS-7200, APS-7300)
APS-003	Output Voltage Capacity(0~600Vrms)
APS-004	Output Frequency Capacity(45~999.9Hz)
GRA-423	APS-7050, APS-7100 rack mount kit
GRA-429	APS-7200 rack mount kit
GRA-430	APS-7300 rack mount kit

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