GW INSTEK
Simply Reliable

ASR-6000 Series

4.5kVA/6.5kVA High-Performance AC/DC Power Supply

CE | RS-232 | USB | LAN | CAN | Device Net | GPIB

From the very moment Alpha Go defeated the human chess champion with its ultra-high-speed computing capability, artificial intelligence technology (AI) has developed rapidly around the world. Today, servers with advanced AI functions process tremendous amounts of data under the high-speed computing architecture of 2 CPUs + 8 GPUs. servers require a huge amount of power to maintain high-speed computing! In order to meet this demand, the power, density and efficiency of server power supplies have been greatly improved. High-power server power modules require high-efficiency conversion and saving of power consumption. AC single-phase input, HVDC 400V input or increased DC voltage output designs can be utilized to achieve this purpose. In order to ensure power stability when high-power servers are operating, power modules with hot-swappable redundant power supply specifications (such as CRPS) have been widely applied in server racks. Power modules with redundant functions require testing of multiple power modules at a time to ensure that all modules can maintain normal operation during high power output. Due to the rapid changes in the development of server power supplies GW Instek developed the brand new flagship model ASR-6000 series to meet customer needs. ASR-6000 series series has two models - ASR-6450 AC/DC 4.5kVA and ASR-6600 series AC/DC 6kVA.

ASR-6000 series is the first stand-alone unit from GW Instek that supports AC single/three-phase input and output, and has rated DC power output. The series employs third-generation semiconductor silicon carbide (SiC) technology to create a 4U 6kVA high power density and high-performance AC/DC power source ASR-6000 series has the ability to emulate more diverse power environment changes, such as balanced three-phase and unbalanced three-phase, phase failure, and features multi-channel output function in three-phase output mode, programmable output impedance adjustment, and up to tens of thousands of arbitrary waveform outputs. The invincible launch of GW Instek flagship model ASR-6000 series demonstrates that GW Instek can provide a complete test solution for high-power AC sources. ASR-6000 series is the MVP of GW Instek power sources.

FEATURES

* Adopts Third-generation Semiconductor Silicon Carbide (SiC) Technology to Create a 4U 6kVA High-performance AC/DC Power Source with High Power Density
* AC Input Supports Single-phase and Three-phase, Phase Voltage 200V to 240V±10% (Delta or Y Connection)
* 10 output Modes: Including External Input Signal Frequency and Mains Synchronization(SYNC), External Voltage Controlled Internal Amplifier Output (VCA)
* Multi-channel Output Function
* Supports AC 1P2W, 1P3W, 3P4W Output
* AC Maximum Output Phase Voltage: 350Vrms Line Voltage: 700Vrms
* AC Balanced and Unbalanced Three-phase, Phase Failure Output Functions
* Programmable Output Impedance Adjustment
* Dual-channel Voltage/current Output Monitoring Function
* Voltage Output Rise Time Can be Adjusted in Three Ranges
* Supports Sequence Editing and Emulation Output Mode
* Powerful Arbitrary Waveform Editing and Output Function, Built-in Over 40 Types of Arbitrary Waveform Outputs
* Advanced Web Server Control to Support Data Acquisition and Data Logger Both Functions
* 100th Order Harmonic Measurement Function
* Support External Parallel Connection to Increase Output Power
* Support Diverse Interface: RS-232C(Std), USB(Std), LAN(Std), CAN BUS(Opt), DeviceNet(Opt), GPIB(Opt)

APPLICATIONS

* Server/Communication Power Supply
* 6kVA Car Charger
* Uninterruptible Power Supply System (UPS)
* Military Industry, Scientific Research, Education

Model	ASR-6450	ASR-6600
AC Input Voltage	Single/Three Phase 200 Vac to 240 Vac ±10 %	
AC Output Voltage	Phase Voltage 0~175V/0~350V Line Voltage 0~700V	
AC Output Current	1P2W 45A/22.5A;1P3W & 3P4W;15A/7.5A	1P2W 60A/30A;1P3W & 3P4W;20A/10A
Output Frequency	2000Hz	2000Hz
Rated Output Power	1P2W--4.5KVA;1P3W--3KVA;3P4W--4.5KVA	1P2W--6KVA;1P3W--4KVA;3P4W--6KVA
DC Output Voltage	-250.0 V ~ +250.0 V/-500.0 V ~ +500.0 V	

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SPECIFICATIONS

Model		ASR-6450		ASR-6600	
Input Ratings					
Power type		Single-phase ; Three-phase, Delta or Y connection selectable			
Voltage range*1		200 Vac to 240 Vac ±10 % phase voltage (Delta: L-L, Y: L-N)			
Frequency range		47 Hz to 63 Hz			
Power factor*2		0.95 or higher (typ.)			
Efficiency*2		80 % or higher			
Maximum power consumption		6 kVA or lower		8 kVA or lower	
AC Output					
Multi-phase output		Single-phase output	Polyphase output	Single-phase output	Polyphase output
Output capacity		4.5 kVA	1P3W: 3 kVA ; 3P4W: 4.5 kVA	6 kVA	1P3W: 4 kVA ; 3P4W: 6 kVA
Mode		1P2W	1P3W ; 3P4W (Y-connection)	1P2W	1P3W ; 3P4W (Y-connection)
Setting mode*3		---	Independ, Balanced	---	Independ, Balanced
Phase voltage	Setting Range*4	0.00 V to 175.0 V / 0.0 V to 350.0 V (sine and square wave), Setting Resolution: 0.01 V / 0.1 V			
		0.00 Vpp to 500.0 Vpp / 0.00 Vpp to 1000 Vpp (triangle and arbitrary wave), Setting Resolution: 0.01 Vpp / 0.1 Vpp / 1 Vpp			
	Accuracy*5	±(0.3 % of set + 0.5 V / 1 V)			
Line voltage setting range*6		---	1P3W: 0.00 V to 350.0 V / 0.00 V to 700.0 V 3P4W: 0.00 V to 303.1 V / 0.00 V to 606.2 V (sine and square wave) Setting Resolution: 0.01 V / 0.1 V	---	1P3W: 0.00 V to 350.0 V / 0.00 V to 700.0 V 3P4W: 0.00 V to 303.1 V / 0.00 V to 606.2 V (sine and square wave) Setting Resolution: 0.01 V / 0.1 V
			1P3W: 0.00 Vpp to 1000 Vpp / 0.00 Vpp to 2000 Vpp 3P4W: 0.00 Vpp to 866.0 Vpp / 0.00 Vpp to 1732 Vpp (triangle and arbitrary wave) Setting Resolution: 0.01 Vpp / 0.1 Vpp / 1 Vpp		1P3W: 0.00 Vpp to 1000 Vpp / 0.00 Vpp to 2000 Vpp 3P4W: 0.00 Vpp to 866.0 Vpp / 0.00 Vpp to 1732 Vpp (triangle and arbitrary wave) Setting Resolution: 0.01 Vpp / 0.1 Vpp / 1 Vpp
Maximum current*7		45 A / 22.5 A	15 A / 7.5 A	60 A / 30 A	20 A / 10 A
Maximum peak current*8		Four times of the maximum RMS current			
Load power factor*9		0 to 1 (leading phase or lagging phase, 45 Hz to 65Hz)			
Frequency	Setting range	AC Mode: 15.00 Hz to 2000.0 Hz, AC+DC Mode: 1.00 Hz to 2000.0 Hz, Setting resolution: 0.01 Hz / 0.1 Hz			
	Accuracy	± 0.01% of set			
	Stability*10	± 0.005%			
Output on phase setting range*11		0.0° to 359.9° variable (Free / Fix selectable), 0.1° (1 Hz to 500 Hz), 1° (500 Hz to 2000 Hz)			
Output off phase setting range*11		0.0° to 359.9° variable (Free / Fix selectable), 0.1° (1 Hz to 500 Hz), 1° (500 Hz to 2000 Hz)			
Setting range of the phase angle*12		---	1P3W: L2 phase: 0° to 359.9° 3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	1P3W: L2 phase: 0° to 359.9° 3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°
Phase angle accuracy*13		---	45 Hz to 65 Hz: ±1.0° 15 Hz to 2000 Hz: ±2.0°	---	45 Hz to 65 Hz: ±1.0° 15 Hz to 2000 Hz: ±2.0°
DC offset*14		± 20 mV (typ.)			
DC Output (Only Single Phase Output)					
Output capacity		4.5 kW		6 kW	
Mode		Floating output, the N terminal can be grounded			
Voltage	Setting Range	-250.0 V to +250.0 V / -500.0 V to +500.0 V, Setting Resolution: 0.01 V / 0.1 V			
	Accuracy*15	±(|0.3 % of set| + 0.3 V / 0.6 V)			
Maximum current*16		45 A / 22.5 A		60 A / 30 A	
Maximum peak current*17		Four times of the maximum current			
Output Stability, Total Harmonic Distortion, Output Voltage Rising Time and Ripple Noise					
Line regulation		±0.1% or less (Phase voltage)			
Load regulation*18		±0.1 V / ±0.2 V, @DC (only single-phase output) ±0.1 V / ±0.2 V, @45 Hz to 65 Hz (phase voltage, 0 to 100%, via output terminal) ±0.5 V / ±1.0 V, @all other frequencies (phase voltage, 0 to 100%, via output terminal)			
Distortion of Output*19		<0.3 % @1Hz to 100Hz, <0.5 % @100.1 Hz to 500 Hz, <1 % @500.1 Hz to 2000 Hz			
Output voltage response time*20		Fast: 50 µs (typ.) ; Middle:100µs (typ.) ; Slow: 300 µs (typ.)			
Ripple noise*21		0.5 Vrms / 1 Vrms (TYP)			

*1 Y connection is three-phase, five-wire, Delta connection is three-phase, four-wire. (Accessories will be provided)
*2. In the case of AC-INT mode, the rate output voltage, resistance load at maximum output current,45 Hz to 65 Hz and sine wave output only.
*3. Can be only set in polyphase mode.
*4. For phase voltage setting in polyphase output. In balance mode all phase are collectively set and in unbalance mode each phase are individually set.
*5. For an output voltage of 10 V to 175 V / 20 V to 350 V, sine wave, an output frequency of 45 Hz to 65 Hz, no load, DC voltage setting 0V (AC+DC mode) and 23°C ± 5°C. For phase voltage setting in the polyphase output.
*6. Line voltage only can be set in balance mode.
*7. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the DC superimmpositions, the active current of AC+DC satisfies the maximum current. In the case of 40 Hz or lower or 400 Hz or higher, and that the ambient temperature is 40 degree or higher, the maximum current may decrease.
*8. With respect to the capacitor-input rectifying load. Limited by the maximum current.
*9. External power injection or regeneration which is over short reverse power flow capacity is not available.
*16. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the AC superimmpositions , the active current of AC+DC satisfies the maximum current. And the ambient temperature is 40 degree or higher, the maximum current may decrease.
*17. Instantaneous within 3 ms , limited by the maximum current at rated output voltage.
*18. For an output voltage of 75 V to 175 V / 150 V to 350 V, a load power factor of 1,stepwise change from an output current of 0 A to maximum current (or its reverse), using the output terminal on the rear panel.
*19. 50 % or higher of the rated output voltage, the maximum current or lower, AC and AC+DC modes, THD+N. For the polyphase it is a specification for phase voltage setting.
*20. For an output voltage of 100 V / 200 V, a load power factor of 1, with respect to stepwise change from an output current of 0 A to the maximum current (or its reverse). 10% ~ 90% of output voltage.
*21. For 5 Hz to 1 MHz components in DC mode using the output terminal on the rear panel.

Measured Value Display (All accuracy of the measurement function is indicated for 23 °C±5 °C.)

		Single-phase output	Polyphase output*6
Voltage*1*2	Resolution	0.01 V / 0.1 V	
	RMS value accuracy	45 Hz to 65 Hz and DC: ± (0.5 % of rdg + 0.5 V / 1 V) 15 Hz to 2000 Hz: ± (0.7 % of rdg + 1 V / 2 V)	45 Hz to 65 Hz: ± (0.5 % of rdg + 0.5 V / 1 V) 15 Hz to 2000 Hz: ± (0.7 % of rdg + 1 V / 2 V)
	AVG value accuracy	DC: ± (|0.5 % of rdg| + 0.5 V / 1 V)	DC: ± (|0.5 % of rdg| + 0.5 V / 1 V)
	PEAK value accuracy*3	45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 1 V / 2 V)	45 Hz to 65 Hz: ±(|2 % of rdg| + 1 V / 2 V)
Current*4	Resolution	0.01 A / 0.1 A	
	RMS value accuracy	45 Hz to 65 Hz and DC: ±(0.5 % of rdg + 0.1 A / 0.05 A) 15 Hz to 2000 Hz: ±(0.7 % of rdg + 0.2 A / 0.1 A)	45 Hz to 65 Hz: ±(0.5 % of rdg + 0.05 A / 0.03 A) 15 Hz to 2000 Hz: ±(0.7 % of rdg + 0.1 A / 0.05 A)
	AVG value accuracy	DC: ± (|0.5 % of rdg| + 0.2 A / 0.1 A)	DC: ± (|0.5 % of rdg| + 0.1 A / 0.05 A)
	PEAK value accuracy*5	45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 1 A / 0.5 A)	45 Hz to 65 Hz: ±(|2 % of rdg| + 0.5 A / 0.25 A)

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SPECIFICATIONS

Model			ASR-6450	ASR-6600
Power*7*8	Active (W)	Resolution	0.1 W /1 W	
		Accuracy*9	±(1 % of rdg + 3 W)	±(1 % of rdg + 1 W)
	Apparent (VA)	Resolution	0.1 VA / 1 VA	
		Accuracy	±(2 % of rdg + 6 VA)	±(2 % of rdg + 2 VA)
	Reactive (VAR)	Resolution	0.1 VAR / 1 VAR	
		Accuracy*10	±(2 % of rdg + 6 VAR)	±(2 % of rdg + 2 VAR)
Power factor		Range	0.000 to 1.000	
		Resolution	0.001	
Harmonic voltage Effective value (rms) Percent (%) (AC-INT and 50/60 Hz only)*11		Range	Up to 100th order of the fundamental wave	
		Full Scale	200 V / 400 V, 100%	
		Resolution	0.01 V /0.1 V, 0.1%	
		Accuracy*12	Up to 20th: ±(0.2 % of rdg + 0.5 V / 1 V) ; 20th to 100th: ±(0.3 % of rdg + 0.5 V / 1 V)	
Harmonic current Effective value (rms) Percent (%) (AC-INT and 50/60 Hz only)*11		Range	Up to 100th order of the fundamental wave	
		Full Scale	63 A / 31.5 A, 100%	21 A / 10.5 A, 100%
		Resolution	0.01 A / 0.1 A, 0.1%	
		Accuracy*13	Up to 20th: ±(1 % of rdg + 1.5 A / 0.75 A) 20th to 100th: ±(1.5 % of rdg + 1.5 A / 0.75 A)	Up to 20th: ±(1 % of rdg + 0.5 A / 0.25 A) 20th to 100th: ±(1.5 % of rdg + 0.5 A / 0.25 A)

*1. In the polyphase output, the specification is for phase voltage, and the DC average value display cannot be selected.
*2. Accuracy values are in the case that the output voltage is within voltage setting range.
*3. The accuracy is for output waveform DC or sine wave only.
*4. Accuracy values are in the case that the output current is 5% to 100% of the maximum current.
*5. The accuracy is for output waveform DC or sine wave only.
*6. In the polyphase output, these are the specifications for each phase.
*7. For an output voltage of 50 V or greater, an output current in the range of 10 % to 100 % of the maximum current, DC or an output frequency of 45 Hz to 65 Hz.
*8. The apparent and reactive powers are not displayed in the DC mode.
*9. For the load with the power factor 0.5 or higher.
*10. For the load with the power factor 0.5 or lower.
*11. The measurement does not conform to the IEC or other standard. Phase Voltage and Phase Current.
*12. For an output voltage of 10 V to 175 V / 20 V to 350 V.
*13. An output current in the range of 5 % to 100 % of the maximum current.

Others			
Protections			UVP, OVP, OCP, OTP, OPP, Fan Fail, Peak and RMS Current Limit
Parallel function			Up to 3 units
Display			TFT-LCD, 7 inch
Memory function			Store and recall settings, Basic settings: 10
Arbitrary Wave	Number of memories		16 (nonvolatile)
	Waveform length		4096 words
	Amplitude resolution		16 bits

General Specifications			
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB-CDC / USB-TMC
		LAN	MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask
		External	External Signal Input ; External Control I/O ; V/I Monitor Output
		RS-232C	Complies with the EIA-RS-232 specifications
	Optional 1	GPIB	SCPI-1993, IEEE 488.2 compliant interface
	Optional 2	CAN Bus	Complies with CAN 2.0A or 2.0B based protocol
	Optional 3	DeviceNet	Complies with CAN 2.0A or 2.0B based protocol
Insulation resistance	Between input and chassis, output and chassis, input and output		DC 500 V, 30 MΩ or more
Withstand voltage	Between input and chassis, output and chassis, input and output		AC 1500 V or DC 2130 V , 1 minute
EMC			EN 61326-1 (Class A) EN 61326-2-1/-2-2 (Class A) EN 61000-3-2/-3-12 (Class A, Group 1) EN 61000-3-3/-3-11 (Class A, Group 1) EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11/-4-34 (Class A, Group 1) EN 55011 (Class A, Group1)
Safety			EN 61010-1
Vibration, Shock and Transportation Integrity			ISTA 2A Test Procedure
Environment	Operating environment		Indoor use, Overvoltage Category II
	Operating temperature range		0 °C to 40 °C
	Storage temperature range		-10 °C to 70 °C
	Operating humidity range		20 %rh to 80 % RH (no condensation)
	Storage humidity range		90 % RH or less (no condensation)
	Altitude		Up to 2000 m
Dimensions (mm)			430(W)×176(H)×590(D) (not including protrusions)
Weight			Approx. 40 kg

A value with the accuracy is the guaranteed value of the specification. However, an accuracy noted as reference value shows the supplemental data for reference when the product is used, and is not under the guarantee.
A value without the accuracy is the nominal value or representative value (shown as typ.). Product specifications are subject to change without notice.

Specifications subject to change without notice. ASR-6000ID1DS

ORDERING INFORMATION

ASR-6450 4.5kVA High-Performance AC/DC Power Supply
ASR-6600 6kVA High-Performance AC/DC Power Supply

ACCESSORIES

Quick start guide, Safety guide, Input terminal cover,
Output terminal cover, Copper plate for delta connection input,
Copper plate for single phase and Y connection input,
Copper plate for delta connection input,
Copper plate for 1P output,
GRA-451-E Rack mount adapter (EIA)
GTL-246 USB cable (USB 2.0 Type A - Type B cable, approx. 1.2M)

OPTION ACCESSORIES

ASR-003 GPIB interface card
ASR-004 DeviceNet interface card
ASR-005 CAN BUS interface card
ASR-006 External parallel cable
GTL-232 RS-232C Cable, approx. 2M
GTL-248 GPIB Cable, approx. 2M
GRA-451-E Rack mount adapter(EIA)
GRA-451-J Rack mount adapter(JIS)
GPW-008 6RV3 Power Cord; 10AWG/3C, 3m Max Length, , RV5-5*3P, RV5-5*3P UL TYPE
GPW-009 6RVV3 Power Cord; 2.5mm2/3C, 3m Max Length,, RVS3-5*3P, RVS3-5*3P VDE TYPE
GPW-010 6RVT3 Power Cord; 2.0mm2/3C, 3m Max Length, RVS2-5*3P, RVS2-5*3P PSE TYPE
GPW-011 6RV5 UL Power Cord; 10AWG/5C, 3m, RV5-5*5P,RV5-5*5P UL Type
GPW-012 6RVV5 VDE Power Cord; 2.5mm2/5C, 3m Max Length, RVS3-5*5P, RVS3-5*5P VDE Type
GPW-013 6RVT5 PSE Power Cord; 2.0mm2/5C, 3m Max Length, RVS2-5*5P, RVS2-5*5P PSE Type
GPW-014 6RV4 UL Power Cord; 10AWG/4C, 3m, RV5-5*4P,RV5-5*4P UL TYPE
GPW-015 6RVV4 VDE Power Cord; 2.5mm2/4C, 3m Max Length, RVS3-5*4P, RVS3-5*4P VDE Type
GPW-016 6RVT4 PSE Power Cord; 2.0mm2/4C, 3m Max Length, RVS2-5*4P, RVS2-5*4P PSE Type

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