ASR-6000 Series

4.5/6/9/12/13.5/18/24/30/36 kVA High-Performance AC/DC Power Supply

FEATURES

- Adopts Third-generation Semiconductor Silicon Carbide (SiC) Technology to Create a 4 U 6 kVA High-performance AC/DC Power Source with High Power Density
- AC Input Supports Single-phase and Three-phase, Phase Voltage 200 V to 240 V±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: 350 Vrms Line Voltage: 700 Vrms
- 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 253 Types of Arbitrary Waveform Outputs
- Advanced Web Server Control to Support Data Acquisition and Data Logger Both Functions
- 100th Order Harmonic Measurement Function
- Support Parallel Connection Type Up to 36 kVA Maximum
- Interfaces: RS-232C, USB, LAN; Opt: CAN BUS, DeviceNet, GPIB

* Stand-alone models only.

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 400 V 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 4.5 kVA and ASR-6600 series AC/DC 6 kVA.

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 6 kVA 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.

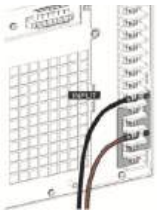
PANEL INTRODUCTION

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

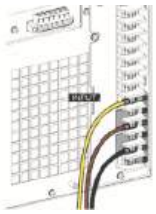
1. Air Inlet
2. 7-inch TFT-LCD Screen
3. Function Keys
4. Power Switch Button
5. USB Host Port
6. Menu/Test/Preset Keys
7. V/F/Irms and Limit, Range, Lock/Unlock Buttons
   Numerical Keypad with Shortcut Functions
   Cancel and Enter Keys
8. Scroll Wheel and Arrow Keys
9. Output Key
10. USB Device Connector
11. LAN Connector
12. RS-232C Connector
13. External IN/OUT Connection in Parallel Function
14. External I/O Connector
15. Remote Sensing Input Terminal
16. Output Terminal
17. AC Line Input Terminal
18. Ground Point
19. Optional Interface Slot

Model	ASR-6450	ASR-6600	ASR-6450-09	ASR-6450-13.5	ASR-6600-12	ASR-6600-18	ASR-6600-24	ASR-6600-30	ASR-6600-36
AC Input Voltage	Single/Three Phase 200 Vac to 240 Vac ±10 %		200 Vac to 240 Vac ±10 % (Phase Voltage) / 380 to 415 Vac ± 10 % (Line Voltage)						
AC Output Voltage	Phase Voltage 0 V to 350.0 V/Line Voltage 0 V to 700 V								
AC Output Current	1P2W 45 A/22.5 A 1P3W, 3P4W 15 A/7.5 A	1P2W 60 A/30 A 1P3W, 3P4W 20 A/10 A	1P2W 90 A/45 A 1P3W, 3P4W 30 A/15 A	1P2W 135 A/67.5 A 1P3W, 3P4W 45 A/22.5 A	1P2W 120 A/60 A 1P3W, 3P4W 40 A/20 A	1P2W 180 A/90 A 1P3W, 3P4W 60 A/30 A	1P2W 240 A/120 A 1P3W, 3P4W 80 A/40 A	1P2W, 300 A/150 A 1P3W, 3P4W 100 A/50 A	1P2W, 360 A/180 A 1P3W, 3P4W 120 A/60 A
Output Frequency	2000 Hz	2000 Hz	1000 Hz	1000 Hz	1000 Hz	1000 Hz	550 Hz	550 Hz	550 Hz
AC Output Capacity	4.5 kVA	6 kVA	9 kVA	13.5 kVA	12 kVA	18 kVA	24 kVA	30 kVA	36 kVA
DC Output Voltage	-250.0 V to +250.0 V/-500.0 V to +500.0 V								
DC Output Capacity	4.5 kW	6 kW	9 kW	13.5 kW	12 kW	18 kW	24 kW	30 kW	36 kW

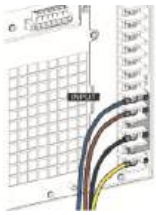
A. SINGLE UNIT PROVIDES AC SINGLE/THREE-PHASE INPUT FUNCTION



AC One-phase Input



AC Three-phase Input (Delta Connection)

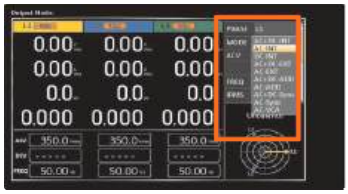


AC Three-phase Input (Y Connection)

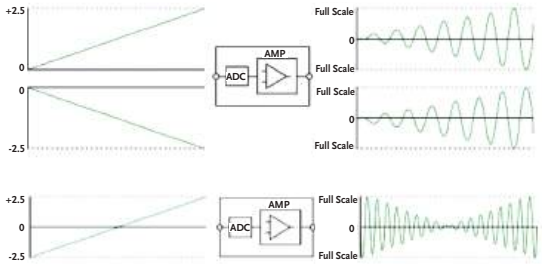
The ASR-6000 series is GW Instek's first programmable AC/DC power source that supports AC single/three-phase input.
AC three-phase input supports delta (Delta) and star (Y) wiring methods
Advantages:
a. ASR-6000 can use mains in most countries around the world (ex. Mainland China, Southeast. Asia, India, Europe...)AC single-phase 220 V input can help test software development engineers work with the ASR-6000 on mains in the office. No additional three-phase power source is required.
b. ASR-6000 can be used immediately in various regions around the world and is not affected by differences in power grids in different countries.

Note: 1. The AC input three-phase Y connection method must be connected to the N wire, otherwise the ASR-6000 cannot be turned on.
2. ASR-6000 AC voltage input range AC 200 V ~ AC 240 V.

B. 10 OUTPUT MODES



ASR-6000 Has 10 Output Modes



AC-VCA Output Mode

Output Phase	Output Mode	Signal Source				
		INT	EXT	ADD	Sync.	VCA
1P	AC+DC	AC+DC-INT	AC+DC-EXT	AC+DC-ADD	AC+DC-Sync.	N/A
	AC	AC-INT	AC-EXT	AC-ADD	AC-Sync.	AC-VCA
	DC	DC-INT	N/A	N/A	N/A	N/A
1P3W	AC+DC	AC+DC-INT	AC+DC-EXT	AC+DC-ADD	AC+DC-Sync.	N/A
	AC	AC-INT	AC-EXT	AC-ADD	AC-Sync.	AC-VCA
	DC	DC-INT	N/A	N/A	N/A	N/A
3P	AC+DC	AC+DC-INT	AC+DC-EXT	AC+DC-ADD	AC+DC-Sync.	N/A
	AC	AC-INT	AC-EXT	AC-ADD	AC-Sync.	AC-VCA
	DC	DC-INT	N/A	N/A	N/A	N/A

- AC+DC-INT AC & DC Internal output
- AC-INT AC Internal output
- DC-INT DC Internal output
- AC+DC-EXT AC & DC External output
- AC-EXT AC External output
- AC+DC-ADD AC & DC Additional output
- AC-ADD AC Additional output
- AC+DC-Sync AC & DC Synchronal output
- AC-Sync AC Synchronal output
- AC-VCA AC Voltage Control Amplifier output

A high-performance AC power source = amplifier + signal source
It has: internal output + external input signal to control internal output + amplify external input signal. and output, and other diversified output functions.
ASR-6000 has up to 10 output modes, including :
1.Internal output (INT)
2.External input controls internal output (EXT)
3.Sum output of external and internal signal sources (ADD)
4.Mains frequency synchronous output (SYNC)
5.External DC signal controls internal AC amplitude (VCA)

C. AC SINGLE/THREE-PHASE OUTPUT + MULTI-CHANNEL OUTPUT FUNCTION

The ASR-6000 series has diverse output functions, including three modes: 1P2W, 1P3W and 3P4W. The maximum output for phase voltage is 350 Vrms and the maximum output for line voltage is 700 Vrms.
In AC three-phase output (3P4W) mode, each phase supports independent output settings. Taking ASR-6600 as an example, The maximum output of each phase reaches 2 kVA, supporting power supply testing of up to three DUTs to meet the needs of server power modules, Testing requirements for high-power AC power products such as electric vehicle chargers and uninterruptible power supply systems. independent output settings. Taking ASR-6600 as an example, The maximum output of each phase reaches 2 kVA, supporting power supply testing of up to three DUTs to meet the needs of server power modules, Testing requirements for high-power AC power products such as electric vehicle chargers and uninterruptible power supply systems.

D. AC BALANCED/UNBALANCED THREE-PHASE OUTPUT MODES

AC Balanced Three-phase

The ASR-6000 series has unbalanced and balanced three-phase output modes. In the AC three-phase output mode, users can set the phase angles of L1, L2 and L3 for control.

AC Unbalanced Three-phase

Main applications: Three-phase input power supply products, when emulating unbalanced three-phase input and phase loss, the ability of three-phase power input products to restore balanced three-phase.

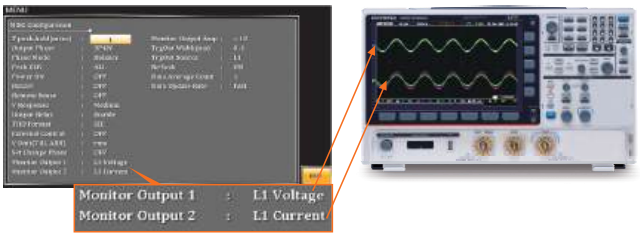
E. OUTPUT IMPEDANCE ADJUSTMENT FUNCTION

ASR-6000 has an output impedance adjustment function, which is mainly used to change the output inductance value and output impedance value of each phase to emulate the output voltage drop of each phase due to line loss. The adjustable range of the output impedance of ASR-6000 is as follows:

L1, L2, L3 Output Inductance	0.0 ~ 2000μH
L1, L2, L3 Output Resistance	0.0 ~ 1Ω

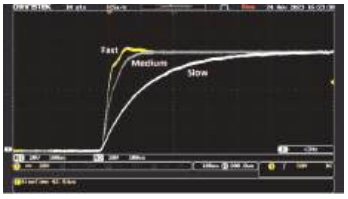
Note: This function only supports stand-alone applications. This function is automatically turned off in external parallel connection.

F. VOLTAGE AND CURRENT OUTPUT MONITORING FUNCTIONS



ASR-6000 provides dual-channel voltage and current monitoring, allowing instant output of voltage and current signals of each phase to an oscilloscope for measurement.

G. OUTPUT VOLTAGE RISE TIME IS ADJUSTABLE



In order to meet the test requirements of different DUT output voltages, it is necessary to adjust the rise time of different output voltages. The ASR-6000 offers users up to three adjustable settings: typical values are fast (50 microseconds), medium (100 microseconds) and slow (300 microseconds). ASR-6000 is initially set to medium speed. Note: When using 1P2W output, impedance adjustment or external parallel connection, the fast range setting will be automatically turned off. Application: It can output high-speed arbitrary waveforms to emulate various changes in the power system caused by transient high-speed rising voltage, etc.

H. ADVANCED WEB SERVER CONTROL FEATURES

ASR-6000 provides a full range of web control functions, including:

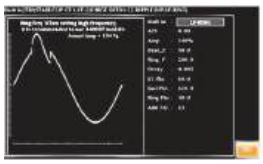
* View system and information, and network configuration
* Monitor measurements
* Set/Operate ASR-6000
* Sequence Function/Simulate Function/Edit Waveform
* Data logger function

I. DIVERSE WAVEFORM OUTPUT FUNCTION

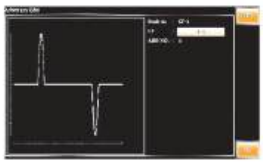
DIP

RIPPLE

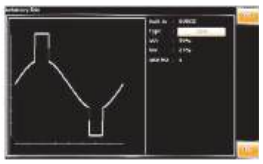
DST



LF-RING

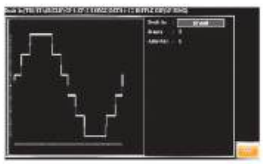


CF-1



Surge

CF-2



STAIR

CLIP

ASR-6000 provides more than 40 built-in waveforms, including: TRI, STAIR, CLIP, CF-1, CF-2, SURGE, DST01-22, RIPPLE, DIP, LF-RING. Each waveform also provides a change setting function, which can modulate thousands of combined waveforms and quickly emulate different AC output environments.

Users can adjust the required waveform type through the panel (the screen is displayed simultaneously), then load it into the ARB 1 to 16 waveform register through the access step, and return to the main menu output mode to perform ARB Waveform output. Users can also edit waveform through ASR-6000 software and then import it into ASR-6000 for execution.

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 wave only) 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 wave only) Setting Resolution: 0.01 V / 0.1 V
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		---	3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	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: 100 µs (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.
*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 3P4W mode.
*4. For phase voltage setting in polyphase output. In balance mode all phase are collectively set and in unbalance mode each phases 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 superimmposition, 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.
*10. For 45 Hz to 65 Hz, the rated output voltage, no load and the resistance load for the maximum current, and the operating temperature range.
*11. L1, L2 and L3 phase can be set independ at independ mode in the polyphase output.
*12. Can be set only with independ mode in polyphase output.
*13. For an output voltage of 50V or higher, sine wave, same load and voltage condition for all phase.
*14. In the case of the AC mode and output voltage setting to 0 V, 23°C ± 5°C
*15. For an output voltage of -250 V to -10 V, +10 V to +250 V / -500 V to -20 V, +20 V to +500 V, no load, AC voltage set to 0V (AC+DC mode) and 23°C ± 5°C
*16. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the AC superimmposition, 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 eithin 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 output, 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)
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)

SPECIFICATIONS

Model			ASR-6450	ASR-6600
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 4 units
Display			TFT-LCD, 7 inch
Memory function			Store and recall settings, Basic settings: 10
Arbitrary Wave	Number of memories		253 (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.

GRA-451-J Rack Mount Kit (JIS)

GRA-451-E Rack Mount Kit (EIA)

SPECIFICATIONS

Model		ASR-6450-09		ASR-6600-12	
Input Ratings					
Power type		Three-phase Three-wire Delta connection, Three-phase Four-wire Y connection			
Voltage range *1		200 Vac to 240 Vac (Phase Voltage), 380 Vac to 460 Vac (Line Voltage)			
Frequency range		47 Hz to 63 Hz			
Power factor *2		0.95 or higher (typ.)			
Efficiency *2		80 % or higher			
Maximum power consumption		12 kVA or lower		16 kVA or lower	
AC output					
Multi-phase output		Single-phase output	Polyphase output	Single-phase output	Polyphase output
Output capacity		9 kVA	1P3W: 6 kVA 3P4W: 9 kVA	12 kVA	1P3W: 8 kVA 3P4W: 12 kVA
Mode		1P2W	1P3W 3P4W (Y-connection)	1P2W	1P3W 3P4W (Y-connection)
Setting mode *3		---	Unbalance, Balanced	---	Unbalance, 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 wave only) 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 wave only) Setting Resolution: 0.01 V / 0.1 V
Maximum current *7		90 A / 45 A	30 A / 15 A	120 A / 60 A	40 A / 20 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 1000.0 Hz, AC+DC Mode: 1.00 Hz to 1000.0 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 1000 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 1000 Hz)			
Setting range of the phase angle *12		---	3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	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 1000 Hz: ±2.0°		45 Hz to 65 Hz: ±1.0° 15 Hz to 1000 Hz: ±2.0°
DC offset *14		± 20 mV (typ.)			
DC output (only single phase output)					
Output capacity		**9 kW**		**12 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		90 A / 45 A		120 A / 60 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		±0.5 V / ±1.0 V (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 1000 Hz			
Output voltage response time *20		Middle: 100 µs (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.
*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 3P4W mode.
*4. For phase voltage setting in polyphase output. In balance mode all phase are collectively set and in unbalance mode each phases 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 superimmposition, 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.
*10. For 45 Hz to 65 Hz, the rated output voltage, no load and the resistance load for the maximum current, and the operating temperature range.
*11. L1, L2 and L3 phase can be set independ at independ mode in the polyphase output.
*12. Can be set only with independ mode in polyphase output.
*13. For an output voltage of 50V or higher, sine wave, same load and voltage condition for all phase.
*14. In the case of the AC mode and output voltage setting to 0 V, 23°C ± 5°C
*15. For an output voltage of -250 V to -10 V, +10 V to +250 V / -500 V to -20 V, +20 V to +500 V, no load, AC voltage set to 0V (AC+DC mode) and 23°C ± 5°C
*16. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the AC superimmposition, 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 eithin 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 output, 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 1000 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 1000 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 + 0.2 A / 0.1 A) 15 Hz to 1000 Hz: ±(0.7 % of rdg + 0.4 A / 0.2 A)	45 Hz to 65 Hz: ±(0.5 % of rdg + 0.1 A / 0.05 A) 15 Hz to 1000 Hz: ±(0.7 % of rdg + 0.2 A / 0.1 A)
	AVG value accuracy	DC: ± (|0.5 % of rdg| + 0.4 A / 0.2 A)	DC: ± (|0.5 % of rdg| + 0.2 A / 0.1 A)
	PEAK value accuracy *5	45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 2 A / 1 A)	45 Hz to 65 Hz: ±(|2 % of rdg| + 1 A / 0.5 A)

SPECIFICATIONS

			ASR-6450-09	ASR-6600-12
Power*7*8	Active (W)	Resolution	0.1 W / 1 W / 10 W	
		Accuracy*9	±(2 % of rdg + 6 W)	±(2 % of rdg + 2 W)
	Apparent (VA)	Resolution	0.1 VA / 1 VA / 10VA	
		Accuracy	±(2 % of rdg + 9 VA)	±(2 % of rdg + 3 VA)
	Reactive (VAR)	Resolution	0.1 VAR / 1 VAR / 10VAR	
		Accuracy*10	±(2 % of rdg + 9 VAR)	±(2 % of rdg + 3 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) 21th 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	126 A / 63 A, 100%	42 A / 21 A, 100%
		Resolution	0.01 A / 0.1 A, 0.1%	
		Accuracy*13	Up to 20th: ±(1 % of rdg + 3 A / 1.5 A) 21th to 100th: ±(1.5 % of rdg + 3 A / 1.5 A)	Up to 20th: ±(1 % of rdg + 1 A / 0.5 A) 21th to 100th: ±(1.5 % of rdg + 1 A / 0.5 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
Display			TFT-LCD, 7 inch
Memory function			Store and recall settings, Basic settings: 10
Arbitrary wave	Number of memories		253 (nonvolatile)
	Waveform length		4096 words
	Amplitude resolution		16 bits
General Specifications			
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 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	Device Net	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 (Class A, Group 1) EN 61000-3-3 (Class A, Group 1) EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11 (Class A, Group 1) EN 55011 (Class A, Group1)
Safety			EN 61010-1
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)			598(W)×937(H)×906(D) (not including protrusions)
Weight			Approx. 155 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

Model		ASR-6450-13.5		ASR-6600-18	
Input Ratings					
Power type		Three-phase Three-wire Delta connection, Three-phase Four-wire Y connection			
Voltage range *1		200 Vac to 240 Vac (Phase Voltage), 380 Vac to 460 Vac (Line Voltage)			
Frequency range		47 Hz to 63 Hz			
Power factor *2		0.95 or higher (typ.)			
Efficiency *2		80 % or higher			
Maximum power consumption		18 kVA or lower		24 kVA or lower	
AC Output					
Multi-phase output		Single-phase output	Polyphase output	Single-phase output	Polyphase output
Output capacity		13.5 kVA	1P3W: 9 kVA 3P4W: 13.5 kVA	18 kVA	1P3W: 12 kVA 3P4W: 18 kVA
Mode		1P2W	1P3W 3P4W (Y-connection)	1P2W	1P3W 3P4W (Y-connection)
Setting mode *3		---	Unbalance, Balanced	---	Unbalance, 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 wave only) 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 wave only) Setting Resolution: 0.01 V / 0.1 V
Maximum current *7		135 A / 67.5 A	45 A / 22.5 A	180 A / 90 A	60 A / 30 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 1000.0 Hz, AC+DC Mode: 1.00 Hz to 1000.0 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 1000 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 1000 Hz)			
Setting range of the phase angle *12		---	3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	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 1000 Hz: ±2.0°		45 Hz to 65 Hz: ±1.0° 15 Hz to 1000 Hz: ±2.0°
DC Offset *14		± 20 mV (typ.)			
DC output (only single phase output)					
Output Capacity		**13.5 kW**		**18 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		135 A / 67.5 A		180 A / 90 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		±0.5 V / ±1.0 V (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 1000 Hz			
Output voltage response time *20		Middle: 100 µs (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.
*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 3P4W mode.
*4. For phase voltage setting in polyphase output. In balance mode all phase are collectively set and in unbalance mode each phases 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 superimmposition, 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.
*10. For 45 Hz to 65 Hz, the rated output voltage, no load and the resistance load for the maximum current, and the operating temperature range.
*11. L1, L2 and L3 phase can be set independ at independ mode in the polyphase output.
*12. Can be set only with independ mode in polyphase output.
*13. For an output voltage of 50V or higher, sine wave, same load and voltage condition for all phase.
*14. In the case of the AC mode and output voltage setting to 0 V, 23°C ± 5°C
*15. For an output voltage of -250 V to -10 V, +10 V to +250 V / -500 V to -20 V, +20 V to +500 V, no load, AC voltage set to 0V (AC+DC mode) and 23°C ± 5°C
*16. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the AC superimmposition, 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 eithin 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 output, 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 1000 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 1000 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 + 0.3 A / 0.15 A) 15 Hz to 1000 Hz: ±(0.7 % of rdg + 0.6 A / 0.4 A)	45 Hz to 65 Hz: ±(0.5 % of rdg + 0.15 A / 0.08 A) 15 Hz to 1000 Hz: ±(0.7 % of rdg + 0.3 A / 0.15 A)
	AVG value accuracy	DC: ± (|0.5 % of rdg| + 0.6 A / 0.4 A)	DC: ± (|0.5 % of rdg| + 0.3 A / 0.15 A)
	PEAK value accuracy *5	45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 3 A / 1.5 A)	45 Hz to 65 Hz: ±(|2 % of rdg| + 1.5 A / 0.75 A)

SPECIFICATIONS

Model			ASR-6450-13.5	ASR-6600-18
Power*7*8	Active (W)	Resolution	0.1 W / 1 W / 10 W	
		Accuracy*9	±(2 % of rdg + 6 W)	±(2 % of rdg + 2 W)
	Apparent (VA)	Resolution	0.1 VA / 1 VA / 10VA	
		Accuracy	±(2 % of rdg + 9 VA)	±(2 % of rdg + 3 VA)
	Reactive (VAR)	Resolution	0.1 VAR / 1 VAR / 10VAR	
		Accuracy*10	±(2 % of rdg + 9 VAR)	±(2 % of rdg + 3 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) 21th 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	189 A / 94.5 A, 100%	63 A / 31.5 A, 100%
		Resolution	0.01 A / 0.1 A, 0.1%	
		Accuracy*13	Up to 20th: ±(1 % of rdg + 3 A / 1.5 A) 21th to 100th: ±(1.5 % of rdg + 3 A / 1.5 A)	Up to 20th: ±(1 % of rdg + 1 A / 0.5 A) 21th to 100th: ±(1.5 % of rdg + 1 A / 0.5 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.an output current of 0 A to the maximum current (or its reverse). 10 % to 90 % of output voltage.
*21. For 5 Hz to 1 MHz components in DC mode using the output terminal on the rear panel.

Others			
Protections			UVP, OVP, OCP, OTP, OPP, Fan Fail, Peak and RMS Current Limit
Display			TFT-LCD, 7 inch
Memory function			Store and recall settings, Basic settings: 10
Arbitrary wave	Number of memories		253 (nonvolatile)
	Waveform length		4096 words
	Amplitude resolution		16 bits
General Specifications			
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 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	Device Net	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 (Class A, Group 1) EN 61000-3-3 (Class A, Group 1) EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11 (Class A, Group 1) EN 55011 (Class A, Group1)
Safety			EN 61010-1
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)			598(W)×1116(H)×906(D) (not including protrusions)
Weight			Approx. 200 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

Model		ASR-6600-24		ASR-6600-30		ASR-6600-36	
Input Ratings							
Power type		Three phase Three wire Delta connection, Three phase Four wire Y connection					
Voltage range*1		200 to 240 Vac ± 10 % (Phase Voltage), 380 to 415 Vac ± 10 % (Line Voltage)					
Frequency range		47 Hz to 63 Hz					
Power factor*2		0.95 or higher (typ.)					
Efficiency*2		80 % or higher					
Maximum power consumption		32 kVA or lower		40 kVA or lower		48 kVA or lower	
AC Output							
Multi-phase output		Single-phase output	Polyphase output	Single-phase output	Polyphase output	Single-phase output	Polyphase output
Output capacity		24 kVA	1P3W: 16 kVA 3P4W: 24 kVA	30 kVA	1P3W: 20 kVA 3P4W: 30 kVA	36 kVA	1P3W: 24 kVA 3P4W: 36 kVA
Mode		1P2W	1P3W 3P4W (Y-connection)	1P2W	1P3W 3P4W (Y-connection)	1P2W	1P3W 3P4W (Y-connection)
Setting mode*3		---	Unbalance, Balanced	---	Unbalance, Balanced	---	Unbalance, 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 wave only) 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 wave only) 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
Maximum current*7		240 A / 120 A	80 A / 40 A	300 A / 150 A	100 A / 50 A	360 A / 180 A	120 A / 60 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 550.0 Hz, AC+DC Mode: 1.00 Hz to 550.0 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 550 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 550 Hz)					
Setting range of the phase angle*12		---	3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	3P4W: L2 phase: 0° to 359.9° L3 phase: 0° to 359.9° Setting Resolution: 0.1°	---	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 550 Hz: ±2.0°	---	45 Hz to 65 Hz: ±1.0° 15 Hz to 550 Hz: ±2.0°	---	45 Hz to 65 Hz: ±1.0° 15 Hz to 550 Hz: ±2.0°
DC offset*14		± 20 mV (typ.)					
DC Output (only single phase output)							
Output capacity		24 kW		30 kW		36 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		240 A / 120 A		300 A / 150 A		360 A / 180 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		±1 V (phase voltage, 0 % to 100 %, via output terminal)					
Distortion of Output*19		<0.3 % @1 Hz to 100 Hz, <0.5 % @100.1 Hz to 550 Hz					
Output voltage response time*20		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 3P4W mode.
*4. For phase voltage setting in polyphase output. In balance mode all phase are collectively set and in unbalance mode each phases 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 superimmposition, 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.
*10. For 45 Hz to 65 Hz, the rated output voltage, no load and the resistance load for the maximum current, and the operating temperature range.
*11. L1, L2 and L3 phase can be set independ at independ mode in the polyphase output.
*12. Can be set only with independ mode in polyphase output.
*13. For an output voltage of 50 V or higher, sine wave, same load and voltage condition for all phase.
*14. In the case of the AC mode and output voltage setting to 0 V, 23 °C ± 5 °C
*15. For an output voltage of -250 V to -10 V, +10 V to +250 V / -500 V to -20 V, +20 V to +500 V, no load, AC voltage set to 0 V (AC+DC mode) and 23 °C ± 5 °C
*16. If the output voltage is higher than rated value, this is limited to satisfy the power capacity. If there is the AC superimmposition, 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 eithin 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 output, 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 % to 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.)

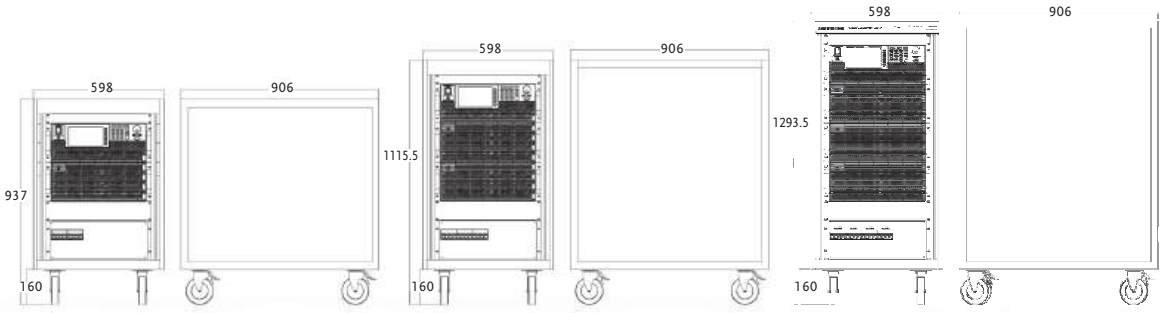
			Single-phase output	Polyphase output*6
Voltage*1*2	Resolution		0.01 V / 0.1 V	
	RMS value accuracy		45 Hz to 65 Hz and DC: ± (0.5 % of rdg + 0.5 V / 1 V) 15 Hz to 550 Hz: ± (0.7 % of rdg + 1 V / 2 V)	
	AVG value accuracy		DC: ± (|0.5 % of rdg| + 0.5 V / 1 V)	
	PEAK value accuracy*3		45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 1 V / 2 V)	
Current*4	Resolution		0.01 A / 0.1 A	
	RMS value accuracy		45 Hz to 65 Hz: ±(0.5 % of rdg + 0.3 A / 0.15 A) 15 Hz to 550 Hz: ±(0.7 % of rdg + 0.6 A / 0.4 A)	45 Hz to 65 Hz: ±(0.5 % of rdg + 0.15 A / 0.08 A) 15 Hz to 550 Hz: ±(0.7 % of rdg + 0.3 A / 0.15 A)
	AVG value accuracy		DC: ± (|0.5 % of rdg| + 0.6 A / 0.4 A)	DC: ± (|0.5 % of rdg| + 0.3 A / 0.15 A)
	PEAK value accuracy*5		45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 3 A / 1.5 A)	45 Hz to 65 Hz and DC: ±(|2 % of rdg| + 1.5 A / 0.75 A)
Power*7*8	Active (W)	Resolution	0.1 W / 1 W / 10 W	
		Accuracy*9	45 Hz to 65 Hz and DC: ±(2 % of rdg + 9 W)	45 Hz to 65 Hz and DC: ±(2 % of rdg + 3 W)
	Apparent (VA)	Resolution	0.1 VA / 1 VA / 10VA	
		Accuracy	45 Hz to 65 Hz: ±(2 % of rdg + 18 VA)	45 Hz to 65 Hz: ±(2 % of rdg + 6 VA)
	Reactive (VAR)	Resolution	0.1 VAR / 1 VAR / 10VAR	
		Accuracy*10	45 Hz to 65 Hz: ±(2 % of rdg + 18 VAR)	45 Hz to 65 Hz: ±(2 % of rdg + 6 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) 21th 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	252 A / 126 A, 100 % (ASR-6600-24), 315 A / 157.5 A, 100 % (ASR-6600-30), 378 A / 189 A, 100 % (ASR-6600-36)	84 A / 42 A, 100 % (ASR-6600-24), 105A / 52.5 A, 100 % (ASR-6600-30), 126 A / 63 A, 100 % (ASR-6600-36)
		Resolution	0.01 A / 0.1 A / 1 A, 0.1%	
		Accuracy*13	Up to 20th: ±(1 % of rdg + 3 A / 1.5 A) 21th to 100th: ±(1.5 % of rdg + 3 A / 1.5 A)	Up to 20th: ±(1 % of rdg + 1 A / 0.5 A) 21th to 100th: ±(1.5 % of rdg + 1 A / 0.5 A)

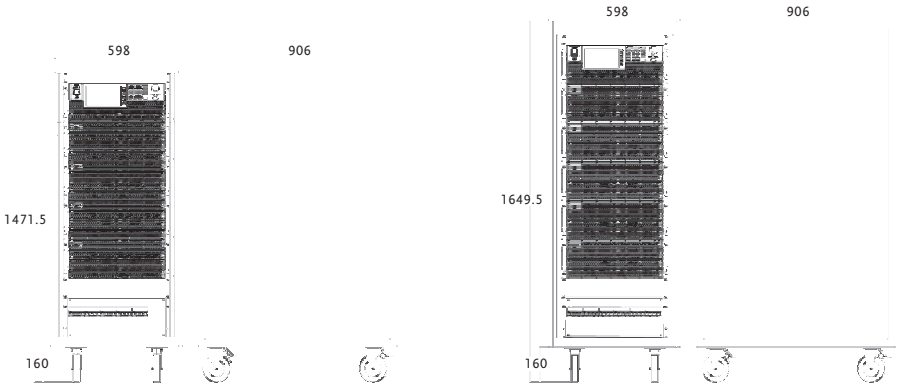
SPECIFICATIONS

Model			ASR-6600-24	ASR-6600-30	ASR-6600-36
*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. *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		
Display			TFT-LCD, 7 inch		
Memory function			Store and recall settings, Basic settings: 10		
Arbitrary wave	Number of memories		253 (nonvolatile)		
	Waveform length		4096 words		
	Amplitude resolution		16 bits		
General Specifications					
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 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	Device Net	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 (Class A, Group 1) EN 61000-3-3 (Class A, Group 1) EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11 (Class A, Group 1) EN 55011 (Class A, Group1)		
Safety			EN 61010-1		
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) (not including protrusions)			598(W)×1294(H)×906(D)	598(W)×1472(H)×906(D)	598(W)×1650(H)×906(D)
Weight			Approx. 250 kg	Approx. 305 kg	Approx. 370 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.

Dimensions(mm)





ASR-6450-09/6600-12 (Two units)

ASR-6450-13.5/6600-18 (Three units)

ASR-6600-24 (Four units)

ASR-6600-30 (Five units)

ASR-6600-36 (Six units)

Specifications subject to change without notice. ASR-6000ID2BH

ORDERING INFORMATION

ASR-6450	**4.5 kVA High-Performance AC/DC Power Supply**
ASR-6450-09	**9 kVA AC/DC Rack Type Power Source**
ASR-6450-13.5	**13.5 kVA AC/DC Rack Type Power Source**
ASR-6600	**6 kVA High-Performance AC/DC Power Supply**
ASR-6600-12	**12 kVA AC/DC Rack Type Power Source**
ASR-6600-18	**18 kVA AC/DC Rack Type Power Source**
ASR-6600-24	**24 kVA AC/DC Rack Type Power Source**
ASR-6600-30	**30 kVA AC/DC Rack Power Source**
ASR-6600-36	**36 kVA AC/DC Rack Power Source**

ACCESSORIES

Input terminal cover, Output terminal cover,
Copper plate for delta connection input(Mark 1),
Copper plate for single phase and Y connection input(Mark 2),
Copper plate for delta connection input(Mark 3),
Copper plate for 1P output(Mark 4),
GRA-451-E Rack mount adapter(EIA)(Stand-alone models only)
GTL-246 USB cable (USB 2.0 Type A - Type B cable, approx. 1.2 M)

OPTION ACCESSORIES

ASR-003	GPIB Interface Card
ASR-004	DeviceNet Interface Card
ASR-005	CAN BUS Interface Card
ASR-C003	Modbus TCP feature
GTL-232	RS-232C Cable, approx. 2 M
GTL-248	GPIB Cable, approx. 2 M
For ASR-6450/ASR-6600 use only :	
GET-006	Universal Extension
ASR-006	External Parallel Cable
GRA-451-E	Rack mount adapter(EIA)
GRA-451-J	Rack mount adapter(JIS)
GPW-008	6RV3 Power Cord; 10 AWG/3 C, 3 m Max Length, RV5-5*3P, RV5-5*3P UL Type
GPW-012	6RVV5 VDE Power Cord; 2.5 mm 2/5 C, 3 m Max Length, RVS3-5*5P, RVS3-5*5P VDE Type
GPW-013	6RVT5 PSE Power Cord; 2.0 mm 2/5 C, 3 m Max Length, RVS2-5*5P, RVS2-5*5P PSE Type
GPW-014	6RV4 UL Power Cord; 10 AWG/4 C, 3 m, RV5-5*4P,RV5-5*4P UL TYPE
GPW-015	6RVV4 VDE Power Cord; 2.5 mm 2/4 C, 3 m Max Length, RVS3-5*4P, RVS3-5*4P VDE Type