

## ASR-2000 Specifications

The specifications apply when the ASR-2000 is powered on for at least 30 minutes under +20°C~+30°C.

### Input Ratings (AC rms)

Model		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Nominal input voltage		100 Vac to 240 Vac	
Input voltage range		90 Vac to 264 Vac	
Phase		Single phase, Two-wire	
Input frequency range		47 Hz to 63 Hz	
Max. power consumption		800 VA or less	1500 VA or less
Power factor <sup>*1</sup>	100Vac	0.95 (typ.)	
	200Vac	0.90 (typ.)	
Max. input current	100Vac	8 A	15 A
	200Vac	4 A	7.5 A

\*1. For an output voltage of 100 V/200 V (100V / 200V range), maximum current, and a load power factor of 1.

### AC Mode Output Ratings (AC rms)

Model		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Voltage	Setting Range <sup>*1</sup>	0.0 V to 175.0 V / 0.0 V to 350.0 V	
	Setting Resolution	0.1 V	
	Accuracy <sup>*2</sup>	±(0.5 % of set + 0.6 V / 1.2 V)	
Output phase		Single phase, Two-wire	
Maximum current <sup>*3</sup>	100 V	5 A	10 A
	200 V	2.5 A	5 A
Maximum peak current <sup>*4</sup>	100 V	20 A	40 A
	200 V	10 A	20 A
Power capacity		500 VA	1000 VA
Frequency	Setting range	AC Mode: 40.00 Hz to 999.9 Hz, AC+DC Mode: 1.00 Hz to 999.9 Hz	
	Setting resolution	0.01 Hz (1.00 to 99.99 Hz), 0.1 Hz (100.0 to 999.9 Hz)	
	Accuracy	For 45 Hz to 65 Hz: 0.01% of set For 40 Hz to 999.9 Hz: 0.02% of set	
	Stability <sup>*5</sup>	± 0.005%	
Output on/off phase		0.0° to 359.9° variable (setting resolution 0.1°)	
DC offset <sup>*6</sup>		Within ± 20 mV (TYP)	

\*1. 100 V / 200 V range

\*2. For an output voltage of 17.5 V to 175 V / 35 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

\*3. For an output voltage of 1 V to 100 V / 2 V to 200 V. Limited by the power capacity when the output voltage is 100 V to 175 V / 200 V to 350 V. If there is the DC superimposition, the current of AC+DC mode satisfies the maximum current. In the case of lower than 40 Hz, and the ambient temperature is 40°C or higher, the maximum current will be decrease.

\*4. With respect to the capacitor-input rectifying load. Limited by the maximum current.

\*5. For 45 Hz to 65 Hz, the rated output voltage, no load and the resistance load for the maximum current, and the operating temperature.

\*6. In the case of the AC mode and output voltage setting to 0 V.

**Output Rating for DC Mode**

Model		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Voltage	Setting Range <sup>*1</sup>	-250 V to +250 V / -500 V to +500 V	
	Setting Resolution	0.1 V	
	Accuracy <sup>*2</sup>	$\pm( 0.5\% \text{ of set}  + 0.6 \text{ V} / 1.2 \text{ V})$	
Maximum current <sup>*3</sup>	100 V	5 A	10 A
	200 V	2.5 A	5 A
Maximum peak current <sup>*4</sup>	100 V	20 A	40 A
	200 V	10 A	20 A
Power capacity		500 W	1000 W

\*1. 100 V / 200 V range

\*2. For an output voltage of -250 V to -25 V, +25 V to +250 V / -500 V to -50 V, +50 V to +500 V, no load, AC voltage setting 0V (AC+DC mode) and 23°C ± 5°C

\*3. For an output voltage of 1.4 V to 100 V / 2.8 V to 200 V. Limited by the power capacity when the output voltage is 100 V to 250 V / 200 V to 500 V.

\*4. Within 5 ms, Limited by the maximum current.

**Output Voltage Stability**

Model	ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Line regulation <sup>*1</sup>	±0.2% or less	
Load regulation <sup>*2</sup>	0.15% @45 - 65Hz 0.5% @DC, all other frequencies (0 to 100%, via output terminal)	
Ripple noise <sup>*3</sup>	0.7 Vrms / 1.4 Vrms (TYP)	

\*1. Power source input voltage is 100 V, 120 V, or 230 V, no load, rated output.

\*2. 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.

\*3. For 5 Hz to 1 MHz components in DC mode using the output terminal on the rear panel.

**Output Voltage Waveform Distortion Ratio, Output Voltage Response Time, Efficiency**

Model	ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Output voltage waveform distortion ratio <sup>*1</sup>	0.5 % or less	
Output voltage response time <sup>*2</sup>	100 us (TYP)	
Efficiency <sup>*3</sup>	70 % or more	

\*1. At an output voltage of 50 V to 175 V / 100 V to 350 V, a load power factor of 1, and in AC and AC+DC mode.

\*2. 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

\*3. For AC mode, at an output voltage of 100 V / 200 V, maximum current, and load power factor of 1 and sine wave only.

**Measured Value Display**

All accuracy of the measurement function is indicated for 23 °C±5 °C.

Model		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Voltage	RMS, AVG value <sup>*1</sup>	Resolution	0.1 V
		Accuracy <sup>*2</sup>	For 45 Hz to 65 Hz and DC: $\pm(0.5\% \text{ of reading} + 0.3 \text{ V} / 0.6 \text{ V})$ For 40 Hz to 999.9 Hz: $\pm(0.7\% \text{ of reading} + 0.9 \text{ V} / 1.8 \text{ V})$

	PEAK value	Resolution	0.1 V	
		Accuracy	For 45 Hz to 65 Hz and DC: $\pm( 2\% \text{ of reading}  + 1 \text{ V} / 2 \text{ V})$	
Current	RMS, AVG value	Resolution	0.01 A	
		Accuracy <sup>*3</sup>	For 45 Hz to 65 Hz and DC: $\pm(0.5\% \text{ of reading} + 0.02 \text{ A} / 0.02 \text{ A})$ For 40 Hz to 999.9 Hz: $\pm(0.7\% \text{ of reading} + 0.04 \text{ A} / 0.04 \text{ A})$	For 45 Hz to 65 Hz and DC: $\pm(0.5\% \text{ of reading} + 0.04 \text{ A} / 0.02 \text{ A})$ For 40 Hz to 999.9 Hz: $\pm(0.7\% \text{ of reading} + 0.08 \text{ A} / 0.04 \text{ A})$
	PEAK value	Resolution	0.01 A	
		Accuracy <sup>*4</sup>	For 45 Hz to 65 Hz and DC: $\pm( 2\% \text{ of reading}  + 0.2 \text{ A} / 0.1 \text{ A})$	For 45 Hz to 65 Hz and DC: $\pm( 2\% \text{ of reading}  + 0.2 \text{ A} / 0.1 \text{ A})$
Power	Active (W)	Resolution	0.1 / 1 W	
		Accuracy <sup>*5</sup>	$\pm(2\% \text{ of reading} + 0.5 \text{ W})$	$\pm(2\% \text{ of reading} + 1 \text{ W})$
	Apparent (VA)	Resolution	0.1 / 1 VA	
		Accuracy <sup>*5*6</sup>	$\pm(2\% \text{ of reading} + 0.5 \text{ VA})$	$\pm(2\% \text{ of reading} + 1 \text{ VA})$
	Reactive (VAR)	Resolution	0.1 / 1 VAR	
		Accuracy <sup>*5*7</sup>	$\pm(2\% \text{ of reading} + 0.5 \text{ VAR})$	$\pm(2\% \text{ of reading} + 1 \text{ VAR})$
Load power factor	Range	0.000 to 1.000		
	Resolution	0.001		
Load crest factor	Range	0.00 to 50.00		
	Resolution	0.01		
Harmonic voltage Effective value (rms) Percent (%) (AC-INT and 50/60 Hz only)	Range	Up to 100th order of the fundamental wave		
	Full Scale	175 V / 350 V, 100%		
	Resolution	0.1 V, 0.1%		
	Accuracy <sup>*8</sup>	Up to 20th $\pm(0.2\% \text{ of reading} + 0.5 \text{ V} / 1 \text{ V})$ 20th to 100th $\pm(0.3\% \text{ of reading} + 0.5 \text{ V} / 1 \text{ V})$		
Harmonic current Effective value (rms) Percent (%) (AC-INT and 50/60 Hz only)	Range	Up to 100th order of the fundamental wave		
	Full Scale	5 A / 2.5 A, 100%	10 A / 5 A, 100%	
	Resolution	0.01 A, 0.1%		
	Accuracy <sup>*3</sup>	Up to 20th $\pm(1\% \text{ of reading} + 0.1 \text{ A} / 0.05 \text{ A})$ 20th to 100th $\pm(1.5\% \text{ of reading} + 0.1 \text{ A} / 0.05 \text{ A})$	Up to 20th $\pm(1\% \text{ of reading} + 0.2 \text{ A} / 0.1 \text{ A})$ 20th to 100th $\pm(1.5\% \text{ of reading} + 0.2 \text{ A} / 0.1 \text{ A})$	

\*1. The voltage display is set to RMS in AC/AC+DC mode and AVG in DC mode.

\*2. AC mode: For an output voltage of 17.5 V to 175 V / 35 V to 350 V and 23 °C  $\pm$  5 °C. DC mode: For an output voltage of 25 V to 250 V / 50 V to 500 V and 23 °C  $\pm$  5 °C.

\*3. An output current in the range of 5 % to 100 % of the maximum current, and 23 °C  $\pm$  5 °C.

\*4. An output current in the range of 5 % to 100 % of the maximum peak current in AC mode, an output current in the range of 5 % to 100 % of the maximum instantaneous current in DC mode, and 23 °C  $\pm$  5 °C. The accuracy of the peak value is for a waveform of DC or sine wave.

\*5. 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, and 23 °C  $\pm$  5 °C.

\*6. The apparent and reactive powers are not displayed in the DC mode.

\*7. The reactive power is for the load with the power factor 0.5 or lower.

\*8. An output voltage in the range of 17.5 V to 175 V / 35 V to 350 V and 23 °C  $\pm$  5 °C.

**Others**

Model		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Protections		OCP, OTP, OPP, FAN Fail	
Display		TFT-LCD, 4.3 inch	
Memory Function		10 sets for Store and Recall settings	
Arbitrary Wave	Number of memories	16 (nonvolatile)	
	Waveform length	4096 words	

**General Specifications**

Model			ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
Interface	Standard	USB	Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB-CDC	
		LAN	MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask	
		EXT Control	External Signal Input External Control I/O	
	Factory Optional	GPIB	SCPI-1993, IEEE 488.2 compliant interface	
		RS-232C	Complies with the EIA-RS-232 specifications	
Insulation resistance	Between input and chassis, output and chassis, input and output		500 Vdc, 30 MΩ or more	
Withstand voltage	Between input and chassis, output and chassis, input and output		1500 Vac, 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)			ASR-2000: 285(W)×124(H)×480(D) (not including protrusions) ASR-2000R: 213(W)×124(H)×480(D) (not including protrusions)	
Weight			ASR-2000: Approx. 11.5 kg ASR-2000R: Approx. 10.5 kg	

**External Signal Input (AC+DC-EXT, AC-EXT Mode)**

	Specification	Factory Default
Gain setting range	100 V range: 0.0 to 250.0 times	100
	200 V range: 0.0 to 500.0 times	200
Input terminal	BNC connector	
Input impedance	1 MΩ	
Input voltage range	±2.5 V (A/D resolution 12 bit)	
Nondestructive maximum input voltage	±10 V	
Gain resolution	0.1 times	
Accuracy	±5 % (DC, or 45Hz ~ 65 Hz, gain is at initial value, with rate voltage output, no load)	

EXT: Output voltage (V) = External signal input (V) x Gain (V/V)

**External Signal Input (AC+DC-ADD, AC-ADD Mode)**

	Specification	Factory Default
Gain setting range	100 V range: 0.0 to 250.0 times	100
	200 V range: 0.0 to 500.0 times	200
Input terminal	BNC connector	
Input impedance	1 MΩ	
Input voltage range	±2.5 V (A/D resolution 12 bit)	
Nondestructive maximum input voltage	±10 V	
Input frequency range	DC to 999.9 Hz (sine wave) DC to 100 Hz (other than sine wave)	
Gain resolution	0.1 times	
Accuracy	±5 % (DC, or 45Hz ~ 65 Hz, gain is at initial value, with rate voltage output, no load)	

ADD: Output voltage (V) = External signal input (V) x Gain (V/V) + Internal signal source setting (V)

**External Synchronous Signal or Line (AC+DC-SYNC, AC-SYNC)**

	Specification	Factory Default
Synchronization signal source	External synchronization signal (EXT) or Power input (LINE)	LINE
Synchronization frequency range	40.00 Hz to 999.9 Hz	
Input terminal	BNC connector	
Input impedance	1 MΩ	
Threshold of input voltage	TTL level	
Minimum pulse width	500 us	
Nondestructive maximum input voltage	±10 V	
Resolution	0.01/0.1 Hz	
Accuracy	±0.2 Hz	