

ASR-2000 Series

Compact Programmable AC/DC Power Supply

FEATURES

- Output Rating: AC 0 \sim 350 Vrms, DC 0 \sim ±500 V
- Output Frequency up to 999.9 Hz
- DC Output (100% of Rated Power)
- Output Capacity: 500VA/1000VA
- Measurement Items: Vrms, Vavg, Vpeak, Irms, IpkH, Iavg, Ipeak, P, S, Q, PF, CF
- Voltage and Current Harmonic Analysis (THDv, THDi)
- Customized Phase Angle for Output On/Off
- Remote Sensing Capability
- OVP, OCP, OPP, OTP, AC Fail Detection and Fan Fail Alarm
- Interface: USB, LAN (std.); RS-232+GPIB (opt)
- Built-in External Control I/O and External Signal Input
- Built-in Output Relay Control and Memory Function (up to 10 sets)
- Sequence and Simulation Function (up to 10 sets)
- Support Arbitrary Waveform Function and Built-in Web Server

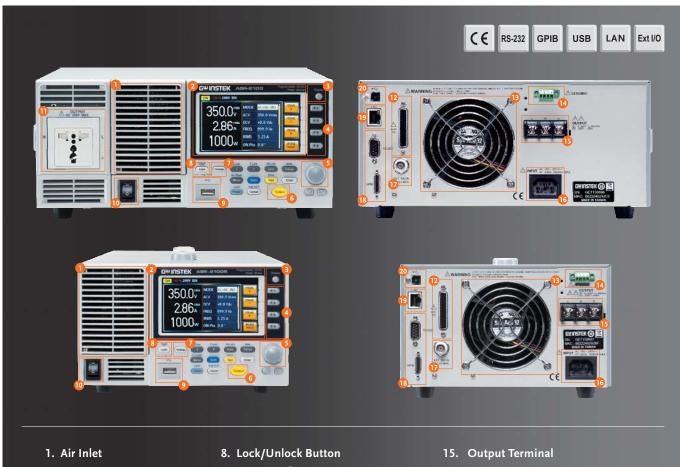


The ASR-2000 series, an AC+DC power source aiming for system integration or desktop applications, provides both rated power output for AC output and rated power output for DC output. Nine ASR-2000 output modes are available, including 1) AC power output mode (AC-INT Mode), 2) DC power output mode (DC-INT Mode), 3) AC/DC power output mode (AC+DC-INT Mode), 4) External AC signal source mode (AC-EXT Mode), 5) External AC/DC signal source mode (AC+DC-EXT Mode), 6) External AC signal superposition mode (AC-ADD Mode), 7) External AC/DC signal superposition mode (AC+DC-ADD Mode), 8) External AC/DC signal synchronization mode (AC+DC-SYNC Mode).

The ASR-2000 series provides users with waveform output capabilities to meet the test requirements of different electronic component development, automotive electrical devices and home appliance, including 1) Sequence mode generates waveform fallings, surges, sags, changes and other abnormal power line conditions; 2) Arbitrary waveform function allows users to store/upload user-defined waveforms; and 3) Simulate mode simulates power outage, voltage rise, voltage fall, and frequency variations. When the ASR-2000 series power source outputs, it can also measure Vrms, Vavg, Vpeak, Irms, Iavg, Ipeak, IpkH, P, S, Q, PF, CF, 40th-order Voltage Harmonic and Current Harmonic. In addition, the Remote sense function ensures accurate voltage output. The Customized Phase Angle for Output On/Off function can set the starting angle and ending angle of the voltage output according to the test requirements. V-Limit, Ipeak-Limit, F-Limit, OVP, OCP, OPP function settings can protect the DUT during the measurement process. In addition to OTP, OCP, and OPP protection, the ASR-2000 series also incorporates the Fan fail alarm function and AC fail alarm function.

The front panel of the ASR-2050/2100 provides a universal socket or a European socket, which allows users to plug and use so as to save wiring time. The ASR-2050R/2100R is 3U height and 1/2 Rack width design, which is compatible with ATS assembly. The ASR-2000 series supports I/O interface and is equipped with USB, LAN, External I/O and optional RS-232C and GPIB.

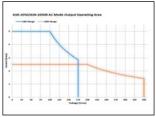
PANEL INTRODUCTION



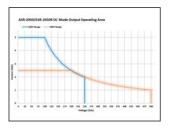
- 2. LCD Screen
- 3. Display Mode Select Key
- 4. Function Keys
- 5. Scroll Wheel
- 6. Output Key
- 7. Hardcopy Key

- 9. USB Interface Connector(A Type)
- 10. Power Switch Button
- 11. Output Socket
- 12. External I/O Connector
- 13. Exhaust Fan
- 14. Remote Sensing Input Terminal
- 16. Line Input
- 17. External Signal Input/External Synchronized Signal Input
- 18. RS-232C & GPIB Connectors
- 19. LAN Connector
- 20. USB Interface Connector(B Type)

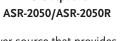
OPERATING AREA FOR ASR-2000 SERIES



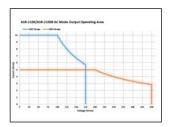
AC Output for ASR-2050/ASR-2050R



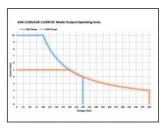
DC Output for



The ASR-2000 series is an AC+DC power source that provides rated power output not only at the AC output, but also at the DC output. The operation areas are shown in diagrams.



AC Output for ASR-2100/ASR-2100R



DC Output for ASR-2100/ASR-2100R

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-2050	500 VA	5 / 2.5 A	350 Vrms / 500 Vdc
ASR-2100	1000 VA	10 / 5 A	350 Vrms / 500 Vdc
ASR-2050R	500 VA	5 / 2.5 A	350 Vrms / 500 Vdc
ASR-2100R	1000 VA	10 / 5 A	350 Vrms / 500 Vdc

MEASUREMENT ITEMS FOR ASR-2000 SERIES



RMS Meas Display



AVG Meas Display

Vmax	+495.7	Vpk	P	0.0	w	(Simple Harm
Vmin	-494.2	Vpk		2.9	VA	RMS
lmax	+0.03	Apk		+2.9	var	[PEAK
lmin	-0.03	Apk	PF	0.000		
IpkH	+0.19	Apk	CF	0.00		[RUN]

Peak Meas Display

ON	ON	ON	ON 94 % 200V SQU				
Harr	Harn	Harn	Harmonic	Voltage Measure	THDv= 42.2 %	Simple	
31th	21th	11th	1st	179.9 Vrms	90.7 %	[Harm]	
32th	22th	12th	2nd	0.0 Vrms	0.0%		
33th	23th	13th	3rd	59.8 Vrm:	30.2 %	[THDv]	
34th	24th	14th	4th	0.0 Vrms	0.0%	THDi	
35th	25th	15th	5th	35.8 Vrms	18.0 %		
36th	26th	16th	6th	0.0 Vrms	0.0%		
37th	27th	17th	7th	25.5 Vrms	12.9 %		
38th	28th	18th	8th	0.0 Vrms	0.0%		
39th	29th	19th	9th	19.8 Vrms	10.0%	Page	
40th	30th	20th	10th	0.0 Vrms	0.0 %	Down	

Voltage Harmonic

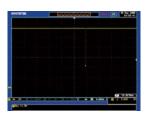
The ASR-2000 series provides users with measurement capabilities including Vrms, Vavg, Vpeak, Irms, Iavg, Ipeak, IpkH, P, S, Q, PF, CF, 40th-order Voltage Harmonic and Current Harmonic. During the power output, the measurement

ON	ON	ON	ON 94%	200V SQU		
Harr	Harn	Harn	Harmonic	Current Measure	THDI = 42.2 %	Simple
31th	21th	11th	1st	4.31 Arms	90.7 %	[Harm]
32th	22th	12th	2nd	0.00 Arms	0.0%	
33th	23th	13th	3rd	1.44 Arms	30.2 %	THDV
34th	24th	14th	4th	0.00 Arms	0.0 %	[THDI]
35th	25th	15th	5th	0.86 Arms	18.0 %	
36th	26th	16th	6th	0.00 Arms	0.0 %	
37th	27th	17th	7th	0.61 Arms	12.8 %	
38th	28th	18th	8th	0.00 Arms	0.0 %	
39th	29th	19th	9th	0.47 Arms	9.9 %	Page
40th	30th	20th	10th	0.00 Arms	0.0 %	Down

Current Harmonic

parameters including Vrms/Irms, Vavg/Iavg and Vmax/Vmin/ Imax/Imin can be switched by users at any time to display the instantaneous calculation reading.

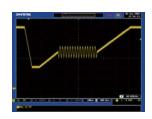
SEQUENCE MODE AND APPLICATIONS



Momentary Drop in Supply Voltage



Reset Behavior at Voltage Drop



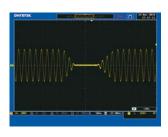
Starting Profile Waveform

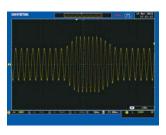


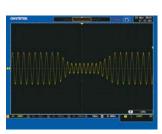
Instantaneous Power Failure

There are 10 sets of Sequence mode and each set has 0~999 steps. The time setting range of each step is $0.0001 \sim 999.9999$ seconds. Users can combine multiple sets of steps to generate

the desired waveforms, including waveform fallings, surges, sags, changes and other abnormal power line conditions to meet the needs of the test application.







Power Outage

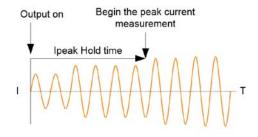
Voltage Rise

Voltage Fall

Simulate Mode can quickly simulate different transient waveforms, such as power outage, voltage rise, voltage fall, etc.,

for engineers to evaluate the impact of transient phenomena on the DUT. Ex: Capacitance durability test.

T, IPK HOLD & IPK, HOLD FUNCTIONS

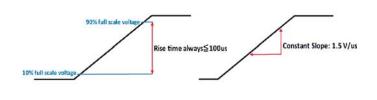


T, Ipk Measurement

T, Ipk Hold is used to set the delay time after the output (1ms \sim 60,000ms) to capture the Ipeak value and keep the maximum value. The update only functions when the measurement value is greater than the original value. The T, Ipk Hold delay time setting can be used to measure surge current at the power on process of the DUT.

Ipk Hold can be used to measure the transient surge current of the DUT at power on without using an oscilloscope and a current probe.

F. SLEW RATE MODE



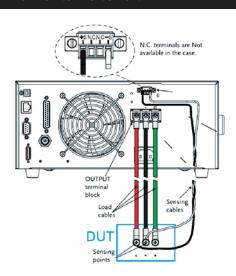
Time Mode

Slope Mode

The ASR-2000 series can set the Slew Rate Mode to determine the rise time of the voltage according to the test requirements of the DUT. Slew Rate Mode provides "Time" and "Slope" modes. When setting "Time" mode, ASR-2000 can increase output to $10{\sim}90\%$ of the set voltage within $100\mu s$; and when selecting "Slope" mode, ASR-2000 increases output voltage by a fixed rising slope of $1.5V/\mu s$ until reaching the set voltage value.

In addition, if users decide to self-define the rise time of the output voltage, users can flexibly set the rise time of the ASR-2000 series voltage by editing the Sequence mode.

G. REMOTE SENSE FUNCTION



For high current output applications, the voltage drop caused by large current passing through the load cables will affect the measurement results. The ASR-2000 series provides the remote sense function that can sense the voltage drop of the DUT to the ASR-2000 series and the DUT will be compensated by the ASR-2000 series. The maximum voltage that the remote sense function can compensate is 5% of the output voltage.

SPECIFICATIONS					
SPECIFICATIONS		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R		
NPUT RATING (AC)		non 2000/non 2000n	Non Eloophon Eloon		
NORMINAL INPUT VOLTAGE		100 Vac to 240 Vac	100 Vac to 240 Vac		
NPUT VOLTAGE RANGE		90 Vac to 264 Vac	90 Vac to 264 Vac		
PHASE		Single phase, Two-wire	Single phase, Two-wire		
NPUT FREQUENCY RANGE		47 Hz to 63 Hz	47 Hz to 63 Hz		
MAX. POWER CONSUMPTION		800 VA or less	1500 VA or less		
POWER FACTOR*1	100Vac	0.95 (typ.)	0.95 (typ.)		
	200Vac	0.90 (typ.)	0.90 (typ.)		
MAX. INPUT CURRENT	100Vac 200Vac	8 A	15 A		
		4 A	7.5 A		
' '	, , , , ,	maximum current, and a load power factor of 1.			
AC MODE OUTPUT RATINGS OLTAGE	(AC rms) Setting Range ^{*1}	0.0 V to 175.0 V / 0.0 V to 350.0 V			
/OLIAGE	Setting Resolution	0.1 V			
	Accuracy*2	±(0.5 % of set + 0.6 V / 1.2 V)			
OUTPUT PHASE	riccuracy	Single phase, Two-wire			
MAXIMUM CURRENT ^{*3}	100 V	5 A	10 A		
WAXING W CORREIT	200 V	2.5 A	5 A		
MAXIMUM PEAK CURRENT*4	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 Accuracy	0.01 Hz (1.00 to 99.99 Hz), 0.1 Hz (100.0 to 999.9 Hz) For 45 Hz to 65 Hz: 0.01% of set, For 40 Hz to 999.9 Hz: (102% of set		
	Stability*5	± 0.005%	5.02/6 Of Set		
OUTPUT ON PHASE	Stability	0.0° to 359.9° variable (setting resolution 0.1°)			
DC OFFSET*6		Within ± 20 mV (TYP)			
*3. For an output voltage of 1 V to 1 *4. With respect to the capacitor-ing	00 V / 2 V to 200 V, Limit out rectifying load. Limite itput voltage, no load and output voltage setting to	I the resistance load for the maximum current, and the operating temp	200 V to 350 V.		
VOLTAGE	Setting Range ^{*1}	-250 V to +250 V / -500 V to +500 V			
	Setting Resolution	0.1 V			
	Accuracy ^{*2}	±(0.5 % of set + 0.6 V / 1.2 V)			
MAXIMUM CURRENT*3	100 V	5 A	10 A		
*4	200 V 100 V	2.5 A 20 A	5 A 40 A		
MAXIMUM PEAK CURRENT [™]	200 V	10 A	20 A		
POWER CAPACITY	200 1	500 W	1000 W		
	100 V / 2.8 V to 200 V, L	/ -500 V to -50 V, +50 V to +500 V, no load, AC volatge setting 0V (AC+ imited by the power capacity when the output voltage is 100 V to 250 V			
OUTPUT VOLTAGE STABILITY					
LINE REGULATION ^{®1}		±0.2% or less			
LOAD REGULATION ^{*2} 0.15% @45 - 65Hz; 0.5% @DC, all other frequencies (0 to 10)			1000/		
LOAD REGULATION ² RIPPLE NOISE ³		0.7 Vrms / 1.4 Vrms (TYP)			

- *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					
OUTPUT VOLTAGE WAVEFORM DISTORTION RATIO*1	0.5 % or less				
OUTPUT VOLTAGE RESPONSE TIME*2	100 us (TYP)				
EFFICIENCY" ³	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.

MEASURE	MEASURED VALUE DISPLAY						
VOLTAGE	RMS, AVG Value*1	Resolution	0.1 V				
		Accuracy*2	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 % of reading + 1 V / 2 V)				
CURRENT	RMS, AVG Value	Resolution	0.01 A	0.01 A			
		Accuracy ^{*3}	For 45 Hz to 65 Hz and DC:±(0.5 % of reading+0.02 A/0.02 A);				
			For 40 Hz to 999.9 Hz:±(0.7 % of reading + 0.04 A / 0.04 A)	For 40 Hz to 999.9 Hz:±(0.7 % of reading + 0.08 A / 0.04 A)			
	PEAK Value	Resolution	0.1 A	0.1 A			
		Accuracy [™]	For 45 Hz to 65 Hz and DC: \pm (2 % of reading +0.2 A/0.1 A)	For 45 Hz to 65 Hz and DC: \pm (2 % of reading +0.2 A/0.1 A)			
POWER	Active (W)	Resolution	0.1 / 1 W	0.1 / 1 W			
		Accuracy*5	±(2 % of reading + 0.5 W)	±(2 % of reading + 1 W)			
	Apparent (VA)	Resolution	0.1 / 1 VA	0.1 / 1 VA			
		Accuracy*5*6	±(2 % of reading + 0.5 VA)	±(2 % of reading + 1 VA)			
	Reactive (VAR)	Resolution	0.1 / 1 VAR	0.1 / 1 VAR			
		Accuracy*5*7	±(2 % of reading + 0.5 VAR)	±(2 % of reading + 1 VAR)			
LOAD PO	LOAD POWER FACTOR Range		0.000 to 1.000	0.000 to 1.000			
		Resolution	0.001	0.001			
LOAD CRE	ST FACTOR	Range	0.00 to 50.00	0.00 to 50.00			
		Resolution	0.01	0.01			

SPECIFICATIONS			
		ASR-2050/ASR-2050R	ASR-2100/ASR-2100R
HARMONIC VOLTAGE	Range	Up to 40th order of the fundamental wave	Up to 40th order of the fundamental wave
EFFECTIVE VALUE (RMS)	Full Scale	175 V / 350 V, 100%	175 V / 350 V, 100%
PERCENT (%)	Resolution	0.1 V, 0.01%	0.1 V, 0.01%
(AC-INT and 50/60 Hz only)	Accuracy ^{*8}	Up to 20th \pm (0.2 % of reading + 0.5 V / 1 V);	Up to 20th \pm (0.2 % of reading + 0.5 V / 1 V);
		20th to 40th \pm (0.3 % of reading + 0.5 V / 1 V)	20th to 40th ± (0.3 % of reading + 0.5 V / 1 V)
HARMONIC CURRENT	Range	Up to 40th order of the fundamental wave	Up to 40th order of the fundamental wave
EFFECTIVE VALUE (RMS)	Full Scale	5 A / 2.5 A, 100%	10 A / 5 A, 100%
PERCENT (%)	Resolution	0.01 A, 0.01%	0.01 A, 0.01%
(AC-INT and 50/60 Hz only)	Accuracy*3	Up to 20th \pm (1 % of reading + 0.1 A / 0.05 A);	Up to 20th \pm (1 % of reading + 0.2 A / 0.1 A);
	•	20th to 40th ± (1.5 % of reading + 0.1 A / 0.05 A)	20th to 40th ± (1.5 % of reading + 0.2 A / 0.1 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 ± 5 °C. DC mode: For an output voltage of 25 V to 250 V / 50 V to 500 V and 23 °C ± 5 °C.
- *3. An output current in the range of 5 % to 100 % of the maximum current, and 23 °C ± 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, 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 peak current in AC mode, an output current in the range of 5 % to 100 % of the maximum peak current in AC mode, an output current in AC mode, and an output current in AC mod
- and 23 °C ± 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 ± 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 ± 5 °C.

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INTERFACE

Safety

Environment

OCP, OTP, OPP, FAN Fail **PROTECTIONS** DISPLAY TFT-LCD, 4.3 inch

10 sets for Store and Recall settings

MEMORY FUNCTION ARBITRARY WAVE Number of Memories 16 (nonvolatile) Waveform Length 4096 words

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 External Signal Input; External Control I/O

EXT Control GPIB SCPI-1993, IEEE 488.2 compliant interface **Factory Optional** RS-232C Complies with the EIA-RS-232 specifications 500 Vdc, 30 M Ω or more

INSULATION RESISTANCE

een input and chassis, output and chassis, input and output

Standard

WITHSTAND VOLTAGE

een input and chassis, output and chassis, input and output

EN 61326-1 (Class A) EN 61326-2-1/-2-2 (Class A) EN 61000-3-2 (Class A, Group 1)

1500 Vac, 1 minute

EN 61000-3-3 (Class A, Group 1) EN 61000-4-2/-4-3/-4-5/-4-6/-4-8/-4-11 (Class A, Group 1)

EN 55011 (Class A, Group1)

EN 61010-1

Operating Environment Indoor use, Overvoltage Category II

0 °C to 40 °C **Operating Temperature Range** Storage Temperature Range -10 °C to 70 °C **Operating Humidity Range** 20 %rh to 80 % RH (no condensation) 90 % RH or less (no condensation) Storage Humidity Range

Altitude Up to 2000 m

DIMENSIONS & WEIGHT $^{\circ}$ ASR-2000 : 285(W)×124(H)×480(D) (not including protrusions); Approx. 11.5 kg $ASR-2000R: 213 (W) \times 124 (H) \times 480 (\underline{D}) \ (not\ including\ protrusions); \ Approx.\ 10.5\ kg$

ASR-2050 500VA Programmable AC/DC Power Source ASR-2100 1000VA Programmable AC/DC Power Source

ASR-2050R 500VA Programmable AC/DC Power Source for 3U 1/2 Rack Mount ASR-2100R 1000VA Programmable AC/DC Power Source for 3U 1/2 Rack Mount

CD ROM(User Manual, Programming manual), Safety Guide, Power Cord, Mains Terminal Cover Set, Remote Sense Terminal Cover Set, GTL-123 Test Lead, GTL-246 USB Cable

Specifications subject to change without notice. ASR-2000GD1BH

Opt01: RS-232+GPIB Communication Functions (Factory installed) Opt02: European Output Outlet only for ASR-2000 (Factory installed)

GET-003 Extended Universal Power Socket (ASR-2000R only) GFT-004 Extended European Power Socket (ASR-2000R only) GRA-439-E Rack Mount Kit (EIA)

GTL-258 GPIB Cable, approx. 2M, including GRA-439-J Rack Mount Kit (JIS) 25 pins Micro-D connector GTL-232 RS-232C Cable, approx. 2M ASR-001 Air inlet filter

USB Driver

Global Headquarters

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