

# **ASR-3000 Series**

**Programmable AC/DC Power Source** 

# **FEATURES**

- Output Rating: AC 0 ~ 400 Vrms, DC 0 ~  $\pm$  570 V
- Output Frequency up to 999.9Hz (5kHz for ASR-3400HF only)
- DC Output (100% of Rated Power)
- Measurement Items: Vrms, Vavg, Vpeak, Irms, IpkH, lavg, Ipeak, P, S, Q, PF, CF
- Voltage and Current Harmonic Analysis (THDv, THDi)
- Remote Sensing Capability
- OCP, OPP, OTP, AC Fail Detection and Fan Fail Alarm
- Support Arbitrary Waveform Function
- Output Capacity: 2kVA/3kVA/4kVA
- Customized Phase Angle for Output On/Off
- Sequence and Simulation Function(up to 10 sets)
- Interface(std): USB, LAN, RS-232, GPIB
- Built-in External Control I/O and External Signal Input
- Built-in Output Relay Control
- Memory Function (up to 10 sets)
- Built-in Web Server



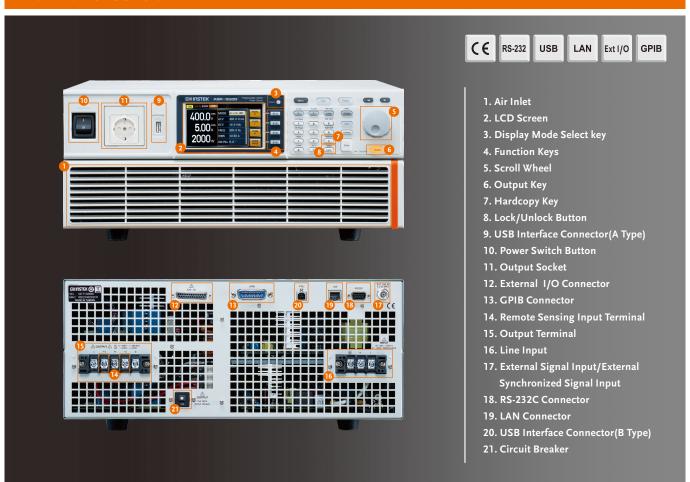
The ASR-3000 Series is an AC+DC power source, featuring high-speed DC voltage rising and falling time (≤100us). There are four models of the series: ASR-3200(2kVA), ASR-3300(3kVA) and ASR-3400/3400HF (4kVA). The series can provide rated power output during AC output and DC output. Ten ASR-3000 Series 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 superimposition mode (AC-ADD Mode), 7) External AC/DC signal superimposition mode (AC+DC-ADD Mode), 8) External AC signal synchronization mode (AC-SYNC Mode), 9) External AC/DC signal synchronization mode (AC+DC-SYNC Mode)10) External DC voltage control of AC output mode(AC-VCA).

ASR-3000 Series is ideal for the development of On-board Chargers, Server Powers, LED modules, AC Motors, AC Fans, UPS and various electronic components, as well as for testing applications of automotive electrical equipment and home appliances.

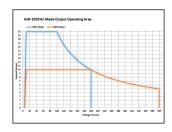
The ASR-3000 Series provides users with waveform output capabilities including 1) Sequence mode generates waveform fallings, surges, sags, changes and other abnormal power line conditions; 2) Arbitrary waveform function allows users to store/upload user-defined waveforms; and 3) Simulate mode simulates power outage, voltage rise, voltage fall, and frequency variations. When the ASR-3000 Series power source outputs, it can also measure Vrms, Vavg, Vpeak, Irms, Iavg, Ipeak, IpkH, P, S, Q, PF, CF, 100th-order Voltage Harmonic and Current Harmonic. In addition, the remote sensing function ensures accurate voltage output, and the Customized Phase Angle for Output On/Off function can set the start and end angles of the voltage output according to the test requirements. The protection limits of V-Limit, Ipeak-Limit and F-Limit can be set according to user requirements. Over voltage limit, OCP, OPP will protect the DUT during the output process. The Fan Fail Alarm function and the AC fail alarm function are also designed in the ASR-3000 Series.

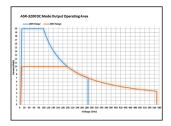
The front panel of the ASR-3000 Series provides a universal socket or a European socket, which allows users to plug and use so as to save wiring time. Since the power socket specification has a maximum current of 15A, the rear panel of ASR-3000 Series is designed with a current circuit breaker. When the socket current is greater than 15A, it will automatically open the circuit to protect users. The ASR-3000 Series supports I/O interface and is standardly equipped with USB, LAN, External I/O, RS-232C and GPIB.

# PANEL INTRODUCTION

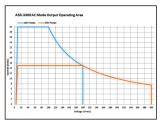


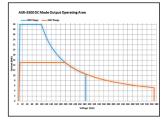
### A. OPERATING AREA FOR ASR-3000 SERIES





DC Output for ASR-3200





AC Output for ASR-3200

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AC Output for ASR-3300

DC Output for ASR-3300

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-3200	2k VA	20 / 10 A	400 Vrms / ±570 Vdc
ASR-3300	3k VA	30 / 15 A	400 Vrms / ±570 Vdc
ASR-3400	4k VA	40 / 20 A	400 Vrms / ±570 Vdc
ASR-3400HF	4k VA	40 / 20 A	400 Vrms / ±570 Vdc

AC Output for ASR-3400/3400HF

DC Output for ASR-3400/3400HF

The ASR-3000 series is an AC + DC power source that provides not only rated power output for AC output, but also rated power output for DC output.

# **MEASUREMENT ITEMS FOR ASR-3000 SERIES**



ON 0 % AUTOSIN						
Vavg	+0.2	٧		0.0	w	[Simple] Harm
lavg	-0.00	А		2.9	VA	RMS [AVG]
				+2.9	var	PEAK
			PF	0.000		
lpkH	+0.19	Apk	CF	0.00		[RUN] HOLD



**RMS Meas Display** 

**AVG Meas Display** 

Peak Meas Display

ON	ON	ON	ON	94 % 200V SQU		
Harr	Harn	Harn	Har	monic Current Measure	THDi = 42.2 %	Simple [Harm]
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

Voltage Harmonic

The ASR-3000 Series provides users with measurement capabilities including Vrms, Vavg, Vpeak, Irms, Iavg, Ipeak, IpkH, P, S, Q, PF, CF, 100th-order Voltage Harmonic and Current Harmonic. During the power output, the measurement

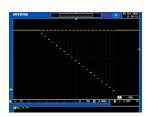
**Current Harmonic** 

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

#### C. SEQUENCE MODE AND BUILT-IN ISO-16750-2 WAVEFORMS

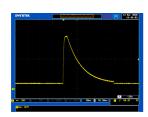


SEQ6: Momentary Drop in Supply Voltage



SEQ7: Reset Behavior at Voltage Drop with 12V System

SEQ8: Starting Profile Waveform

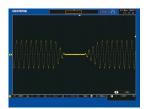


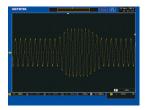
SEQ9: Load Dump with Tr\_10ms, Td\_40ms

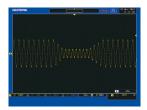
The sequence mode provides editable 10 sets of SEQ0~SEQ9, each set has 0~999 steps, each step time setting range is 0.0001~999.9999 seconds. Users can combine multiple sets of steps to generate the required waveforms, including waveform falling, surges, sags and other abnormal power line conditions to meet the needs of the test applications.

In addition, ASR-3000 Series also built in common ISO-16750-2 test waveforms in the Sequence Mode preset waveforms, including Momentary Drop in Supply Voltage built in at SEQ6, Reset Behavior at Voltage Drop with 12V system built in at SEQ7, Starting Profile Waveform built in at SEQ8 and Load Dump with Tr\_10ms, and Td\_40ms built in at SEQ9.

# SIMULATE MODE







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.

**Power Outage** 

Voltage Rise

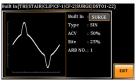
Voltage Fall

# **FUNCTION WAVEFORM (ARBITRARY EDIT) MODE**











TRI Waveform

**STAIR Waveform** 

**CLIP Waveform** 

**SURGE Waveform** 

Fourier Series Synthesized Waveform

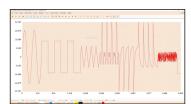
ASR-3000 Series provides more than 20,000 waveform combinations then the waveform is loaded into the ARB 1~16 waveform register in seven categories, allowing users to quickly simulate different AC voltage waveforms. Adjust the desired waveform type directly through the panel (displayed synchronously on the screen),

through the access procedures, and return to the main menu output mode to perform ARB Waveform output.

# **PC SOFTWARE**









**Basic Controller** 

Sequence Mode

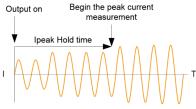
**ARB Waveform Edit** 

The Waveform is Observed with DSO

The ASR-3000 Series software includes basic settings, the Simulate Mode, the Sequence Mode, Data Log and the arbitrary waveform editing function. Users can directly set output voltage, frequency, start/stop phase on ASR-3000 Series through the software. The Simulate Mode can quickly simulate different transient waveforms such as power outage, voltage rise, voltage fall... etc.

The Sequence Mode can edit the editing parameters read back from ASR-3000 Series, or directly edit the parameters and control ASR-3000 Series to output waveforms according to the set sequence. The arbitrary waveform editing function not only combines various waveforms, including sine waves, square waves, triangle waves, and noise waveforms, but also allows uses to draw arbitrary waveforms and output them.

# T, IPK HOLD & IPK, HOLD FUNCTIONS

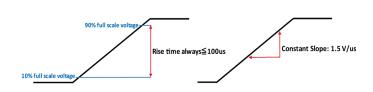


T, Ipk Measurement

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.

# **SLEW RATE MODE**



#### Time Mode

### Slope Mode

The ASR-3000 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-3000 Series can increase output to 10~90% of the set voltage within 100 $\mu$ s; and when selecting "Slope" mode, ASR-3000 Series 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-3000 Series voltage by editing the Sequence mode.

SPECIFICATIONS			ASR-3200	ASR-3300	ASR-3400	ASR-3400HF	
INPUT RATING (AC)							
NOMINAL INPUT VOL			200 Vac to 240 Vac				
PHASE	GE		180 Vac to 264 Vac Single phase, Two-wire				
NOMINAL INPUT FREE			50 Hz to 60 Hz				
INPUT FREQUENCY RAMAX. POWER CONSU			47 Hz to 63 Hz 2500 VA or less	3750 VA or less	5000 VA or less	5000 VA or less	
POWER FACTOR *1		200Vac	0.95 (TYP)			•	
MAX. INPUT CURRENT		200Vac ), maximum current, and a load pow	15 A	22.5 A	30 A	30 A	
AC MODE OUTPUT RA		j, maximum current, and a load pow	er factor of 1.				
VOLTAGE	•	Setting Range *1	0.0 V to 200.0 V / 0.0 V to 400.0 V				
		Setting Resolution Accuracy *2	0.1 V ±(1 % of set + 1 V / 2 V)				
OUTPUT PHASE		Accuracy	Single phase, Two-wire				
MAXIMUM CURRENT	*3	100 V	20 A	30 A	40 A	40 A	
MAXIMUM PEAK CURE	DENT *4	200 V 100 V	10 A 120 A	15 A 180 A	20 A 240 A	20 A 160 A	
		200 V	60 A	90 A	120 A	80 A	
LOAD POWER FACTOR POWER CAPACITY	₹		0 to 1 (leading phase or lagging pha 2000 VA		4000 \/A	4000 \/A	
FREQUENCY		Setting Range	AC Mode: 40.0 Hz to 999.9 Hz,	3000 VA	4000 VA	4000 VA AC Mode: 40.0 Hz to 5000 Hz,	
•			AC+DC Mode: 1 Hz to 999.9 Hz			AC+DC Mode: 1 Hz to 5000 H	
		Setting Resolution	0.01 Hz (1.00 to 99.99 Hz), 0.1 Hz (100.0 to 999.9 Hz)	0.01 Hz (1.00 to 99.99 Hz), 0.1 Hz (100.0 to 999.9 Hz) 1 Hz (1000 to 5000 Hz)			
		Accuracy	0.02% of set (23 °C ± 5 °C)			1112 (1000 to 5000 112)	
OUTDIT ON PICE		Stability *5	± 0.005%	10)			
DC OFFSET TO			0° to 359° variable (setting resolution Within ± 20 mV (TYP)	эн т ј			
*3. For an output voltage of 1 V t If there is the DC superimposi *4. With respect to the capacitor-	o $100 \text{ V} / 2 \text{ V}$ to $200 \text{ V}$ . Limits ition, the current of AC+DC m-input rectifying load. Limited output voltage, no load and and $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .	node satisfies the maximum current. by the maximum current.	utput voltage is 100 V to 200 V / 200 V to 400 V.	g temperature, the maximum current will be decrease.			
VOLTAGE		Setting Range *1	-285 V to +285 V / -570 V to +570 V				
		Setting Resolution	0.1 V				
MAXIMUM CURRENT	*3	Accuracy *2 100 V	±(1 % of set + 1 V / 2 V)	30 A	40 A	40 A	
		200 V	10 A	15 A	20 A	20 A	
MAXIMUM PEAK CURF	RENT *4	100 V	120 A	180 A	240 A	160 A	
POWER CAPACITY		200 V	60 A 2000 W	90 A 3000 W	120 A 4000 W	80 A 4000 W	
LINE REGULATION <sup>9</sup> LOAD REGULATION <sup>9</sup> RIPPLE NOISE <sup>9</sup>		0.2% or less 0.5% or less (0 to 100%, via output terminal) 1 Vrms / 2 Vrms (TYP)					
	V to 200 V / 200 V to 400 V, a	load power factor of 1, stepwise cha	nge from an output current of 0 A to maximum curre	nt (or its reverse), using the output terminal on the rear p	anel.		
*3. For 5 Hz to 1 MHz componer			TAGE RESPONSE TIME, EFFICIENCY				
TOTAL HARMONIC DI		ON RATIO, GOTPOT VOL	<0.2% @50/60Hz <0.3% @<500Hz <0.5% @500.1Hz-999.9Hz			< 0.2% @50/60Hz < 0.5% @<500Hz < 1.0% @500.1Hz~2000Hz	
			_			< 2.0% @2100Hz~5000Hz	
OUTPUT VOLTAGE RES	SPONSE TIME *2		100 μs (TYP) 80 % or more				
*1. At an output voltage of 50 V t *2. For an output voltage of 100 V	V / 200 V, a load power factor	ad power factor of 1, and in AC mod r of 1, with respect to stepwise chang num current, and load power factor	e. ge from an output current of 0 A to the maximum curr	rent (or its reverse).			
MEASURED VALUE DIS	SPLAY						
VOLTAGE	RMS, AVG Value		0.1 V For 45 Hz to 65 Hz and DC: ±(0.5 9	% of reading + 0.5 V / 1 V/			
	1	Accuracy *2	For 45 Hz to 65 Hz and DC: ±(0.5 % For all other frequencies: ±(0.7 % o				
	PEAK Value	Resolution	0.1 V				
CURRENT	RMS, AVG Value	Accuracy Resolution	For 45 Hz to 65 Hz and DC: ±( 2 % 0.01 A	or reading[ + I V / 2 V)			
		Accuracy *3	For 45 Hz to 65 Hz and DC:	For 45 Hz to 65 Hz and DC:	For 45 Hz to 65 Hz and DC:		
	1		±(0.5 % of reading+0.1 A/0.05 A) For all other frequencies:	±(0.5 % of reading+0.15 A/0.08 A)	$\pm$ (0.5 % of reading+0.2 A/0.1 A) For all other frequencies:		
	1		±(0.7 % of reading+0.2 A/0.1 A)	For all other frequencies: ±(0.7 % of reading+0.3 A/0.15 A)	±(0.7 % of reading+0.4 A/0.2 A)		
	PEAK Value	Resolution	0.1 A				
	1	Accuracy *4	For 45 Hz to 65 Hz and DC: ±( 2 % of reading  + 0.5 A/0.25 A)	For 45 Hz to 65 Hz and DC: ±( 2 % of reading  + 0.8 A/0.4 A)	For 45 Hz to 65 Hz and DC: ±( 2 % of reading  + 1 A/0.5 A)		
POWER	Active (W)	Resolution	±( 2 % of reading  + 0.5 A/0.25 A)	±( 2 /0 01 (cauling) + 0.6 A/0.4 A)			
		Accuracy *5	±(2 % of reading +2 W)	±(2 % of reading +3 W)	±(2 % of reading +4 W)		
	Apparent (VA)	Resolution Accuracy *5*6	1 VA ±(2 % of reading +2 VA)	±(2 % of reading +3 VA)	±(2 % of reading +4 VA)		
	Reactive (VAR)	Resolution	1 VAR	=(= 70 0 odding 10 47)	• • • • • • • • • • • • • • • • • • • •		
LOAD BOWER TACTO		Accuracy *5*7	±(2 % of reading +2 VAR) 0.000 to 1.000	±(2 % of reading +3 VAR)	±(2 % of reading +4 VAR)		
LOAD POWER FACTOR	•	Range Resolution	0.000 to 1.000 0.001				
LOAD CREST FACTOR		Range	0.00 to 50.00				
HARMONIC VOLTAGE		Resolution Range	0.01 Up to 100th order of the fundament	tal wave			
<b>EFFECTIVE VALUE (RM</b>		Full Scale	200 V / 400 V, 100%	ware			
PERCENT (%) Resolution		0.1 V, 0.1%					
(AC-INT and 50/60 Hz	onty)	Accuracy *8	Up to 20th : $\pm$ (0.2 % of reading + 0. 20th to 100th : $\pm$ (0.3 % of reading +				
HARMONIC CURRENT	•	Range	Up to 100th order of the fundament				
EFFECTIVE VALUE (RM		Full Scale	20 A / 10 A, 100%	30 A / 15 A, 100%	40 A / 20 A, 100%		
PERCENT (%) (AC-INT and 50/60 Hz of	only)	Resolution Accuracy *3	0.01 A, 0.1% Up to 20th	Up to 20th	Up to 20th		
, 0/00 112 (		rocuracy	±(1 % of reading+0.4 A/0.2 A)	±(1 % of reading+0.6 A/0.3 A)	±(1 % of reading+0.8 A/0.4 A)		
			20th to 100th ±(1.5 % of reading+0.4 A/0.2 A)	20th to 100th ±(1.5 % of reading+0.6 A/0.3 A)	20th to 100th ±(1.5 % of reading+0.8 A/0.4 A)		

SPECIFICATIONS ASR-3200 ASR-3300 ASR-3400 ASR-3400HF \*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 20 V to 200 V / 40 V to 400 V and 23 °C ± 5 °C. DC mode: For an output voltage of 28.5 V to 285 V / 57 V to 570 V 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 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 power are not displayed in the DC mode.

\*7. The reactive power is for the load with the power factor 0.5 or lower. ous 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  $^{\circ}8.$  An output voltage in the range of 20 V to 200 V / 40 V to 400 V and 23 °C  $\pm$  5 °C OTHERS PROTECTIONS UVP, OCP, OTP, OPP, Fan Fail DISPLAY TFT-LCD, 4.3 inch MEMORY FUNCTION
ARBITRARY WAVE Store and recall settings, Basic settings: 10 (0~9 numeric keys) **Number of Memories** 16 (nonvolatile) Waveform Length Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB-CDC, USB-TM0

	LAN	MAC Address, DNS IP Address, Oser Password, Gateway IP Address, Instrument IP Address, Subnet Mask		
	RS-232C	Complies with the EIA-RS-232 specifications		
	EXT Control	External Signal Input; External Control I/O		
	GPIB	SCPI-1993, IEEE 488.2 compliant interface		
INSULATION RESISTA	ANCE	500 Vdc, 30 M $\Omega$ or more		
Between input and chassis	s, output and chassis, input and output			
WITHSTAND VOLTAG	SE SE	1500 Vac, 1 minute		
Between input and chassis	s, output and chassis, input and output			
EMC		EN 61326-1, EN 61326-2-1, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12		
		EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-8/-4-11/-4-34, EN 55011 (Class A), EN 55032		
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 % to 80 % RH (no condensation)		

Storage Hu

ASR-3200 2kVA Programmable AC/DC Power Source ASR-3300 3kVA Programmable AC/DC Power Source ASR-3400 4kVA Programmable AC/DC Power Source 4kVA Programmable AC/DC Power Source ASR-3400HF

DIMENSIONS & WEIGH

CD (User manual/Programming manual), Safety guide, Input terminal cover, Output terminal cover Include remote sensing, GRA-442-E Rack mount adapter(EIA), GTL-246 USB Cable

**GPW-005** Power Cord, 3m, 105℃, UL/CSA Type GPW-006 Power Cord, 3m, 105°C, VDE Type GPW-007 Power Cord, 3m, 105°C, PSE Type GRA-442-J Rack mount adapter(JIS) GTL-137

Output power wire (Load wire\_ 10AWG: 50A, 600V/Sense wire\_ 16AWG: 20A, 600V)

GTL-232 RS232C Cable, approx. 2m

GTL-248 GPIB Cable, approx. 2m ASR-002 External three phase control

unit for IP2W, IP3W, 3P4W output

ASR-3000CD2DH

APS-008 Air inlet filter

Specifications subject to change without notice.

\* European Output Outlet(factory installed)

**APS-008 GPW-005** GRA-442-J GTL-137





90 % RH or less (no condensation)

Up to 2000 m





ASR-002 External three phase control unit



- \* Basis Requirement of ASR-002 to ASR-Series
- 1. Must be the three same models of ASR-Series
- \* Functions of ASR-Series are limited when conducts to ASR-002
- 1. No DC Output
  2. Measurement Items: only current(A), power(W) and PF for each phase
- No Voltage and Current Harmonic Analysis
   No Remote Sensing Capability
   No Arbitrary Waveform Function
- 6. No Sequence and Simulation Function

- 7. Not supported External Control I/O 8. No memory Function 9. Only support USB, no LAN port for communication

Global Headquarters

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