

Single Output High Capacity Power Supply GPSA-1500 Series

Single Output High Capacity Power Supply



Model	Description	Stock
GPSA-1500-24P-TES	+24V output block terminal type	Standard stock
GPSA-1500-48P-TES	+48V output block terminal type	Standard stock
GPSA-1500-24P-PES	+24V output copper bar type	Standard stock
GPSA-1500-48P-PES	+48V output copper bar type	Standard stock

Model Name Coding GPSA - 1500 - *P - * * * ① ② ③④ ⑤ ⑥⑦		1. Series name 2. Output power 3. 24:+24V output 48:+48V output 4. Peak output compliant 5. Output terminal P: Copper bar T: Block terminal 6. Fan direction E: Blow out I: Blow in 7. Modification No.
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Features

- Industrial power supply with simple design for low price
- Various safety standards (IEC/UL/CSA60950-1)
- High efficiency 93%
- External remote ON-OFF control signal available
- Worldwide range input (85-264 VAC)
- +12VSB output available
- Parallel operation available
- Copper bar type and block terminal type are available
- Another model with backup functionality at blackout is also scheduled to be added in the lineup

Safety standard / Approval	UL	CSA	EN	CE	CCC
Reliability Grade	HFA	FA	HOA	OA	

Function



Input

Input	85-264VAC (worldwide range)
	120-370VDC*

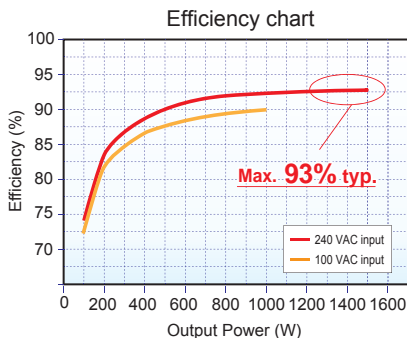
*The rated input voltage range at the application of safety standard is "100-240 VAC (50/60Hz)". In the case of DC input use, an external DC fuse shall be equipped to protect from power supply failure.

Output

Output voltage	+24V	+48V	+12VSB
Max. current / max. power (continuous) 100 VAC	44A 1056W	23A 1104W	0.5A 6W
Max. current / max. power (continuous) 200 VAC	63A 1512W	34A 1632W	0.5A 6W
Peak current / peak power (5 sec. max.) 100 VAC	55A 1320W	27.5A 1320W	- -
Peak current / peak power (5 sec. max.) 200 VAC	85A 2040W	44A 2112W	- -
Min. current	0A	0A	0A

Dimensions

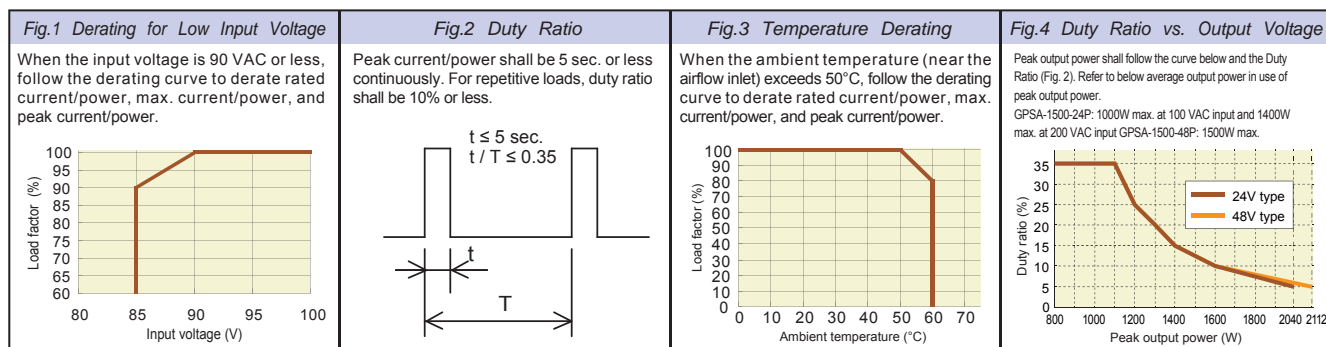
W×H×D (mm)	128×82×250 (Width 2U / Height 3U size)
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General Specification Condition: at normal temperature and humidity unless otherwise specified

Items		Specification			Measurement conditions, etc.	
AC Input	Rated Voltage	AC100-240V(AC85~264V)(Output≤1062W) / AC200-240V (AC180-264V) Output >1062W DC120-370V*1			Worldwide range *Refer to Fig.1	
	Input Frequency	50/60Hz			47-63Hz	
	Efficiency	87% min. (100 VAC), 91% min. (240 VAC) *Characteristic data: Fig.5			At rated output	
	Power Factor	94% min. (100 VAC), 90% min. (240 VAC) *Characteristic data: Fig.6				
	Inrush Current	30A peak (primary inrush current), 40A peak (secondary inrush current) *Characteristic data: Fig.7			At rated input/output at cold start (25°C)	
Output	Input Current	13A max. (100 VAC, GPSA-1500-24P), 14A max. (100 VAC, GPSA-1500-48P), 8.5A max. (200 VAC) 16A max. (100 VAC), 10.5A max. (240 VAC)			At rated input and max. output At rated input and peak output	
	Model	GPSA-1500-24P	GPSA-1500-48P	Common for all models		
Output	Rated Voltage	+24V	+48V	+12VSB		
	Rated Current / Power	100 VAC	44A	23A	0.5A	
			1056W	1104W	6W	
	200 VAC	63A	34A	0.5A		
		1512W	1632W	6W		
	Peak Current / Power	100 VAC	55A	27.5A	-	Time: 5 sec. or less Duty ratio of repetitive load: 35% or less *Refer to Fig.4
			1320W	1320W	-	
	200 VAC	85A	44A	-		
		2040W	2112W	-		
	Min. Current		0A	0A	0A	
	Setup Voltage at Factory		24V±2%	48V±2%	12V±5%	
	Voltage Adjustable Range		21.6-28.0V	38.4-52.8V	-	
Static Input Fluctuation		96mV max.	192mV max.	120mV max.	The values shall be measured at output terminal block, connector, or copper bar.	
Static Load Fluctuation		150mV max.	300mV max.	600mV max.		
Time-lapse Drift		96mV max.	192mV max.	120mV max.	At 25°C	
Max. Ripple Voltage (mVp-p)	-10 to 0°C	160mV max.	250mV max.	150mV max.	Two wires are coming out from the output terminal block and connected into one at the edge of 100cm max. long. 47µF electrolytic capacitor and 0.1µF ceramic capacitor are placed on it and it is measured by the 100MHz oscilloscope. *Characteristic data: Fig.18	
	0 to 60°C	120mV max.	150mV max.	120mV max.		
Max. Spike Voltage (mVp-p)	-10 to 0°C	180mV max.	350mV max.	180mV max.		
	0 to 60°C	150mV max.	200mV max.	150mV max.		
Protection	Overcurrent Protection	OCP Point (A)	101% min. of peak current		Applying peak current 5 sec. or more shutdowns PSU. (Recovery: AC input reclosing) At 12VSB overcurrent, the recovery of main output (when the load factor of main output is 1% or less) shall be reclosing of AC input or PS_ON signal. *Characteristic data: Fig.20	
		Method	Hold down current limiting	Hold down current limiting		
	Recovery (Overcurrent)	At AC Operation	Automatic recovery (Output shuts off at longer than 5sec. peak current)	Automatic recovery		
	Overvoltage Protection	OVP Point (V)	110-130% of Vout		Output voltage follow-up type	
Method		Output shutdown				
Recovery (Overvoltage)	At AC Operation	Reclosing of AC input				
Environment	Operating Temp. / Humidity	-10 to 60°C*/10 to 90%			*Refer to Fig.3 No condensation	
	Storage Temp. / Humidity	-25 to 75°C/10 to 95%			No condensation	
	Vibration	Acceleration amplitude: 2G (10 - 55Hz), Sweep cycles: 10, Test duration: 10 minutes each axis			JIS-C-60068-2-6, at no operation	
	Mechanical Shock	Lift one bottom edge up to 50mm and let it fall. Number of bumps: 3 each of 4 edges			JIS-C-60068-2-31, at no operation	
Insulation	Dielectric Strength	AC input - DC output: 3000 VAC for 1 minute AC input - FG: 2000 VAC for 1 minute			Cut-off current: 15mA Completion inspection: at 1 sec. each	
	Insulation Resistance	AC input - DC output: 50MΩ min.			500VDC	
		AC input - FG: 50MΩ min.				
		DC output - FG: 50MΩ min.				
Leakage Current	0.5mA max. (100 VAC) / 1.0mA max. (240 VAC) *Characteristic data: Fig.8			YEW. TYPE3226 (1kΩ) or equivalent		
EMC	Line Noise Immunity	± 2000V (pulse width: 100/1000ns, repetitive cycle: 30-100Hz, normal/common mode with pos./neg. polarity for 10 minutes)			Measured by INS-410 No fluctuation of DC output or malfunction	
	Electrostatic Discharge	EN61000-4-2 compliant				
	Radiated, Radio-Frequency EM Field	EN61000-4-3 compliant				
	Fast Transient Burst	EN61000-4-4 compliant				
	Lightning Surge	EN61000-4-5 compliant				
	RF Conducted Immunity	EN61000-4-6 compliant				
	Magnetic Field Immunity	EN61000-4-8 compliant				
	Voltage Dip / Regulation	EN61000-4-11 compliant				
	Conducted Emission	VCCI-B, FCC-B, EN55022-B, CISPR22-B compliant *Characteristic data: Fig. 9, 10			Measured by single unit	
Harmonic Current Regulation	IEC61000-3-2 (Ver.2.1) Class A compliant			At rated input/output		
Others	Safety Standard	UL60950-1, CSA22.2 No60950-1(c-UL) CE Marking				
	Cooling System	Forced air cooling			Thermal-sensing variable speed fan embedded	
	Output Grounding	Capacitor grounding				
	Output Hold-up Time	PWR_OK holds up 20ms min. after AC failure *Characteristic data: Fig.15			At rated output	
	Reliability Grade	FA (industrial equipment grade, double-sided through hole PCB)			Follow our standard	
	MTBF	70,000 H min.			Based on EIAJ RCR-9102	
	Weight	2.5 kg typ.				
	Warranty	3 years after delivery. If any faults belong to us, the defective unit shall be repaired or replaced at our cost.			Except for errors caused by operation not listed	

*1 The rated input voltage range at the application of safety standard is "100-240 VAC (50/60Hz)". If it is used with DC input, an external DC fuse shall be equipped in case of the power supply failure.



Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

	Items	Specification	Note		
Input Signal	Output ON / OFF Control Signal (PS_ON#)	The power supply starts up with 4.5V or higher voltage ('H') input between PS_ON-SIG and GND, and shuts down with 'L' or 'OPEN' input (except for 12VSB). If 24V or higher voltage is applied, limiting resistors shall be added in parallel. At 24-30V: 1kΩ limiting resistor, At 30-40V: 2.2kΩ limiting resistor	The pin 4 of SIG connector		
	Remote Sensing + Signal (RS+)	Input terminal for detecting the voltage of 24V or 48V output. By connecting to the load terminal, the line drop of the + side of the output cable is corrected.	The pin 3 of SIG connector		
Output Signal	Normal Output Signal (PWR_OK)	'L' signal is delivered at normal output (detection delay time: 100 - 500ms). Voltage detection: 19.9V or higher for 24V output, 39.8V or higher for 48V output	The pin 5 of SIG connector		
	Fan Monitor Signal (FAN_M)	Two cycle pulses per one rotation of the fan motor are delivered (open collector output).	The pin 2 of SIG connector		
	Blackout Detection Signal (AC FAIL)	The signal goes 'OPEN' at low AC input voltage and blackout detection. (detection voltage: 80 VAC typ., detection delay time: 20 - 40ms after AC input failure, at rated input/output)	The pin 6 of SIG connector		
Signal Circuit					
Input Signal Circuit	(PS_ON#)	Output Signal Circuit	(PWR_OK)	(FAN_M)	(AC FAIL)
	<p>(L' ≤ 0.8V, 4.5V ≤ H' ≤ 24V)</p>				

Internal Structure

RoHS fully compliant

Amount of hazardous materials in PWBs, wires, electronic components, coils, chassis, and labels specified by international standard is lower than acceptable level.

Feedback noise measures
 FCC-B, VCC-B, EN55022-B, CISPR22-B compliant
 Low leakage current (0.5mA max. at 100 VAC)
 AC input fuses are mounted on both line

Simple layout design

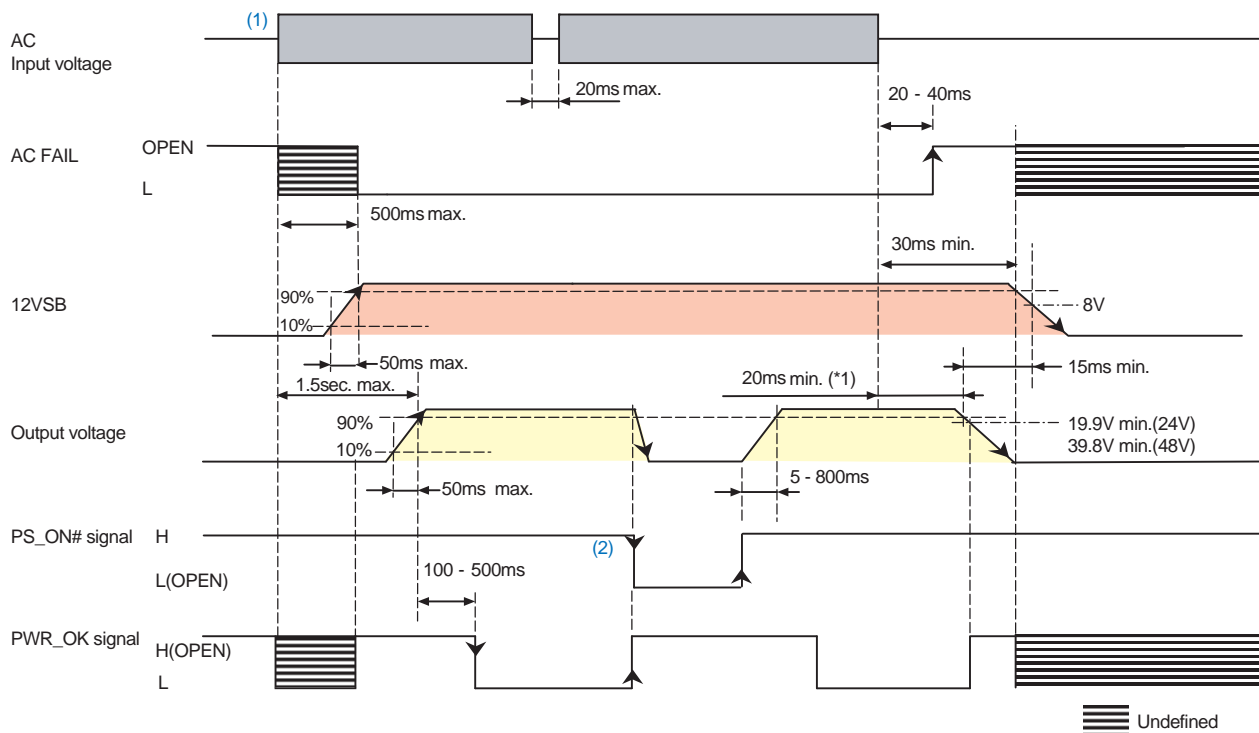
Superior cooling and low inter-component interference layout design.

Electrolytic capacitors

Japanese-made 105°C long lifetime capacitors used for all places

Electronic components by major Japanese manufacturers

Sequence Diagram

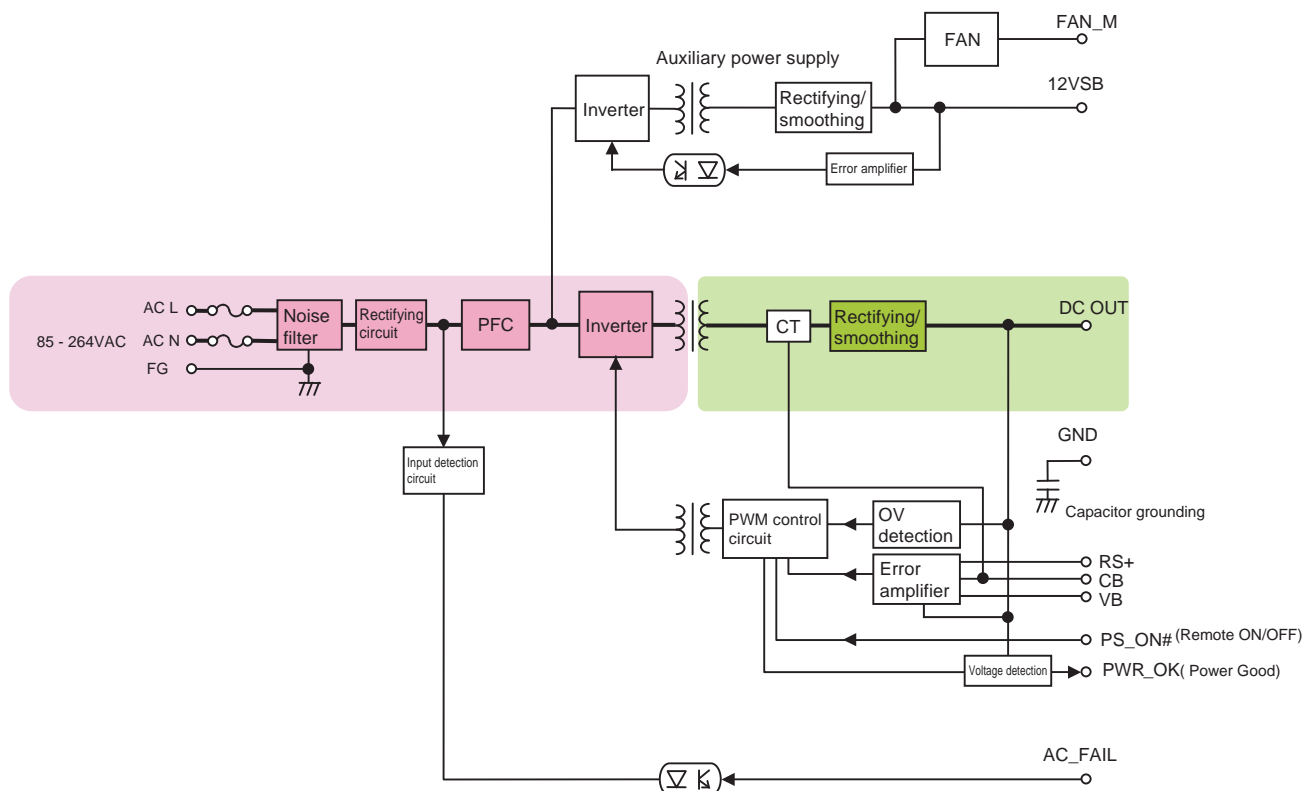


*1 At 1000W output power. If it exceeds 1000W (lower than the continuous rated power), the period shall be 10ms min.

(1) All outputs start up by being supplied AC input under the condition of PS_ON# 'H'. PWR_OK 'H (OPEN)' is delivered at 100 - 500ms after the output has risen.

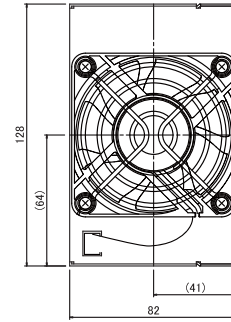
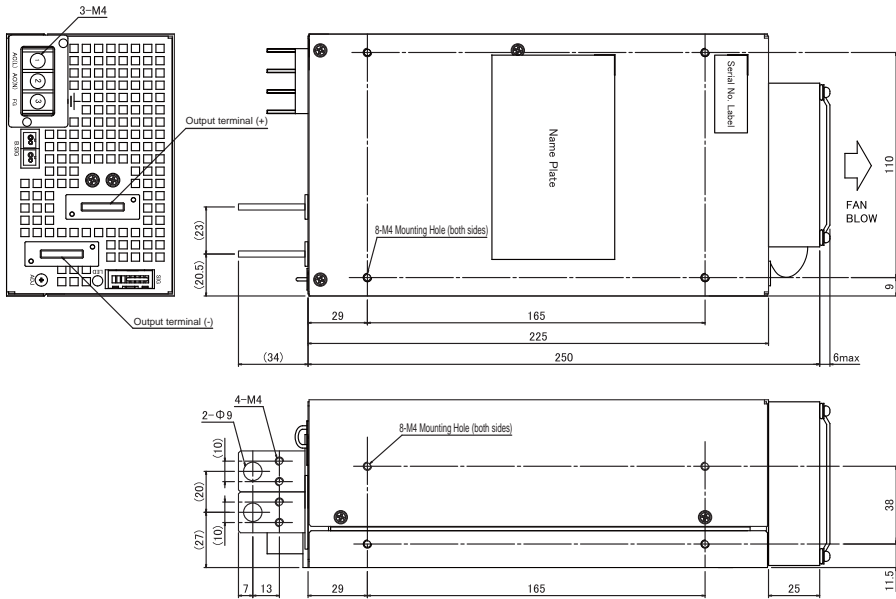
(2) At PS_ON# 'L' (OPEN) input, outputs except for +12VSB shut down.

Block Diagram



Outline Drawing

Copper bar type (Fan: Blow out type)

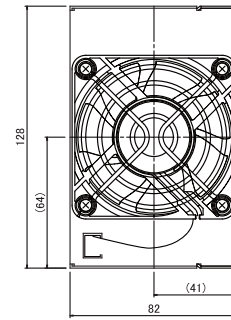
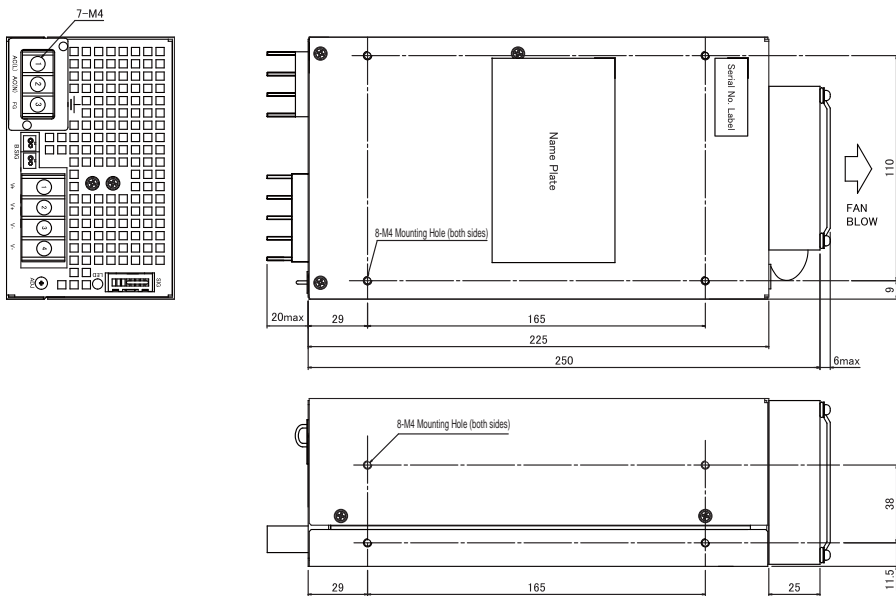


SIG Connector Pin assignments

Connector Pin #	Signal Name	Max. Current	Note
1	COM	0.6A	Common with output GND
2	FAN_M	10mA	
3	RS+	10mA	
4	PS_ON#	10mA	
5	PWR_OK	10mA	
6	AC_FAIL	10mA	
7	SIG_GND	0.1mA	
8	+12VSB	0.5A	

Note: When using the pin 1 COM of the SIG connector, make sure that the current of main output will not be passed to this pin.

Block terminal type (Fan: Blow out type)



SIG Connector Pin assignments

Connector Pin #	Signal Name	Max. Current	Note
1	COM	0.6A	Common with output GND
2	FAN_M	10mA	
3	RS+	10mA	
4	PS_ON#	10mA	
5	PWR_OK	10mA	
6	AC_FAIL	10mA	
7	SIG_GND	0.1mA	
8	+12VSB	0.5A	

Note: When using the pin 1 COM of the SIG connector, make sure that the current of main output will not be passed to this pin.

Optional Components (Sold Separately)

Cable			
Picture	Model	Type	Description
	WH-08XA08XA-500	Signal harness	For BATT_LOW, AC_FAIL, FAN_M, PS_ON, PWR_OK, and +12VSB
	WH-02XA02XA-150	Signal harness for parallel operation	For connecting GPSA-1500 in parallel
Parts / Unit			
Picture	Model	Type	Description
	ACC3368-2	Output bar for parallel operation	For connecting 2 pieces of GPSA-1500 (block terminal type) in parallel
	ACC3368-3	Output bar for parallel operation	For connecting 3 pieces of GPSA-1500 (block terminal type) in parallel
	ACC3369-2	Output bar for parallel operation	For connecting 2 pieces of GPSA-1500 (copper bar type) in parallel
	ACC3369-3	Output bar for parallel operation	For connecting 3 pieces of GPSA-1500 (copper bar type) in parallel

Connection in Series and Parallel

Series operation

Series connection is available as shown on the right.

* Series connection with different output voltage of GPSA is available, such as 24V and 48V.

In the case that different voltages are connected in series like

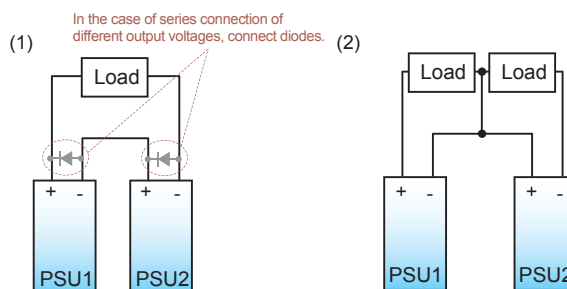
Fig. (1) on the right;

1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.

2. Connect diodes for protection as shown in the Fig. (1).

Current rating of the diode shall be 1.5 times or more of rated output current whose unit has larger rated output current among PSU1 and PSU2.

Also, use Schottky diodes whose forward voltage is lower than the forward voltage of the diodes used in the PSU.



Parallel connection

Parallel connection up to three units is available by the connecting method as shown below.

*By connecting the outputs of N power supplies in parallel, output capacity "Rated output × N units × 0.9" will be obtained.

In this case, please beware of the followings.

1. Current balancing:

Output current of each parallel connected power supply will be balanced.

Connect each B.SIG terminal with WH-02XA02XA-150.

(Refer to parallel connecting diagram)

2. Wiring:

Load wires from each power supplies should be wired to make both impedance equal as much as possible.

- Connecting by the output bar for parallel operation, ACC3368-2/ACC3369-2 (for two units in parallel) or ACC3368-3/ACC3369-3 (for three units in parallel) is recommended.

3. Parallel operation is not available for 12VSB.

4. Output voltage adjustment:

EXCEPT master power supply, set output voltage adjusting knob to minimum (to the leftmost).

Adjust output voltage with master power supply output voltage adjusting knob.

5. Starting time:

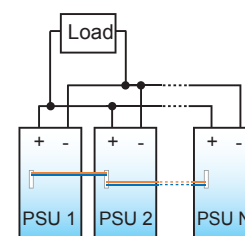
When starting up the power supply by AC input, operating waveform of output voltage may be tiered or dropped down (caused by the operation of over current protection circuit) due to dispersion of start up time of the power supplies connected in parallel. It can be prevented by starting up each output at the same time using output ON/OFF control signal of both power supplies connected in parallel.

6. Power supply failure:

Because it does not include ORing diode in the output terminal, output power does not remain when one of the power supplies is damaged due to short mode etc. In addition, output power does not remain normally when power supply in operation is connected to the one in shutdown condition in parallel.

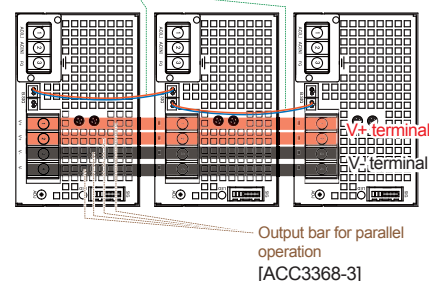
7. Please turn ON/OFF AC voltage or input PS_ON signal at the same time.

8. Please set the min. output current "more than 5% of number of units connected × rated current". (eg. More than 4.4A when connecting two 24V output models in parallel)



Parallel connecting diagram for block terminal type

Signal harness for parallel operation
[WH-02XA02XA-150]



As in above picture, connect each output terminal with ACC3368-3 and each B.SIG terminal with WH-02XA02XA-150.

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