Single Output High Capacity Power Supply GPSA-1500 Series

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

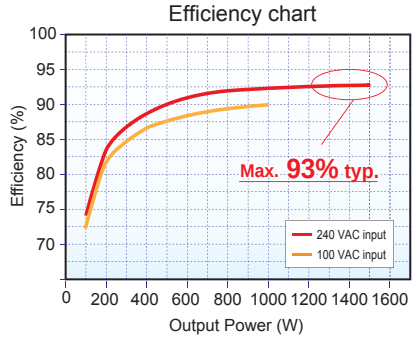
GPSA-1500-*P-* * *

① ② ③④ ⑤⑥⑦

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.

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

DC start | RS 232C | USB | TTL | PFC | Silence | 5VSB FAN | TSFC FAN | Connection | RoHS

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

Dimensions

W×H×D (mm)	128×82×250 (Width 2U / Height 3U size)

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） Outout >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)
	Input Current		13A max. (100 VAC, GPSA-1500-24P), 14A max. (100 VAC, GPSA-1500-48P), 8.5A max. (200 VAC)			At rated input and max. output
			16A max. (100 VAC), 10.5A max. (240 VAC)			At rated input and peak output
Output	Model		GPSA-1500-24P	GPSA-1500-48P	Common for all models	
	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
	Static Load Fluctuation		150mV max.	300mV max.	600mV max.	terminal block, connector, or copper bar.
	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.

Fig.1 Derating for Low Input Voltage

When the input voltage is 90 VAC or less, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

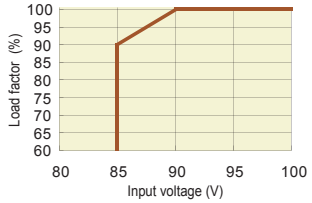


Fig.2 Duty Ratio

Peak current/power shall be 5 sec. or less continuously. For repetitive loads, duty ratio shall be 10% or less.

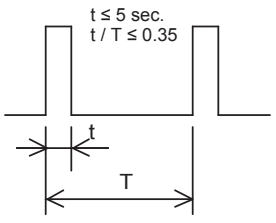


Fig.3 Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 50°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

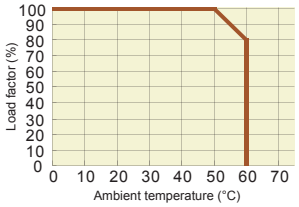
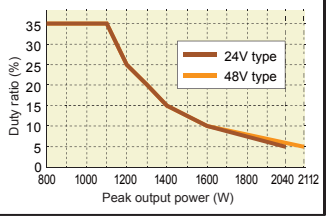


Fig.4 Duty Ratio vs. Output Voltage

Peak output power shall follow the curve below and the Duty Ratio (Fig. 2). Refer to below average output power in use of peak output power.
GPSA-1500-24P: 1000W max. at 100 VAC input and 1400W max. at 200 VAC input GPSA-1500-48P: 1500W max.



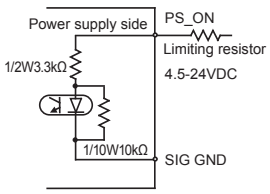
Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

	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

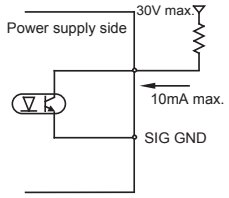
(PS_ON#)



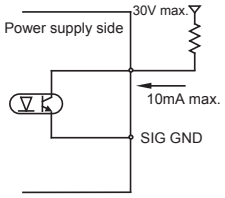
('L'≤0.8V, 4.5V≤'H'≤24V)

Output Signal Circuit

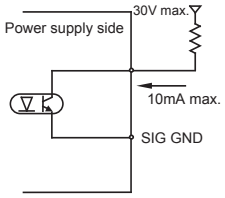
(PWR_OK)



(FAN_M)



(AC FAIL)



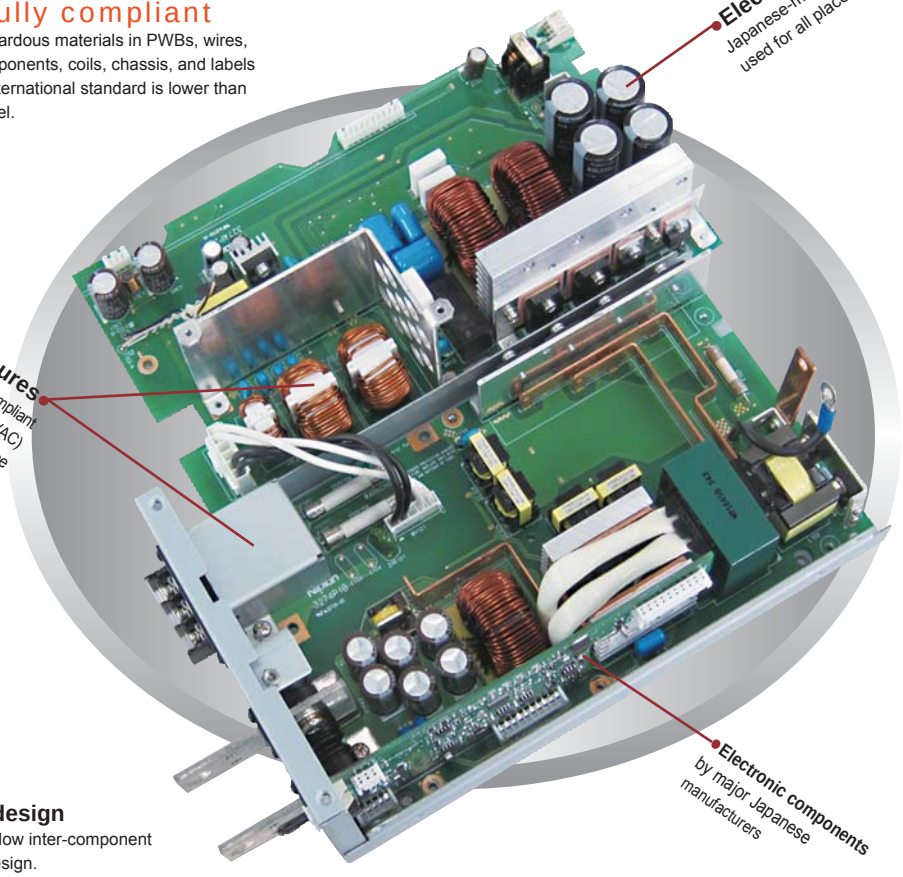
Internal Structure

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.

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

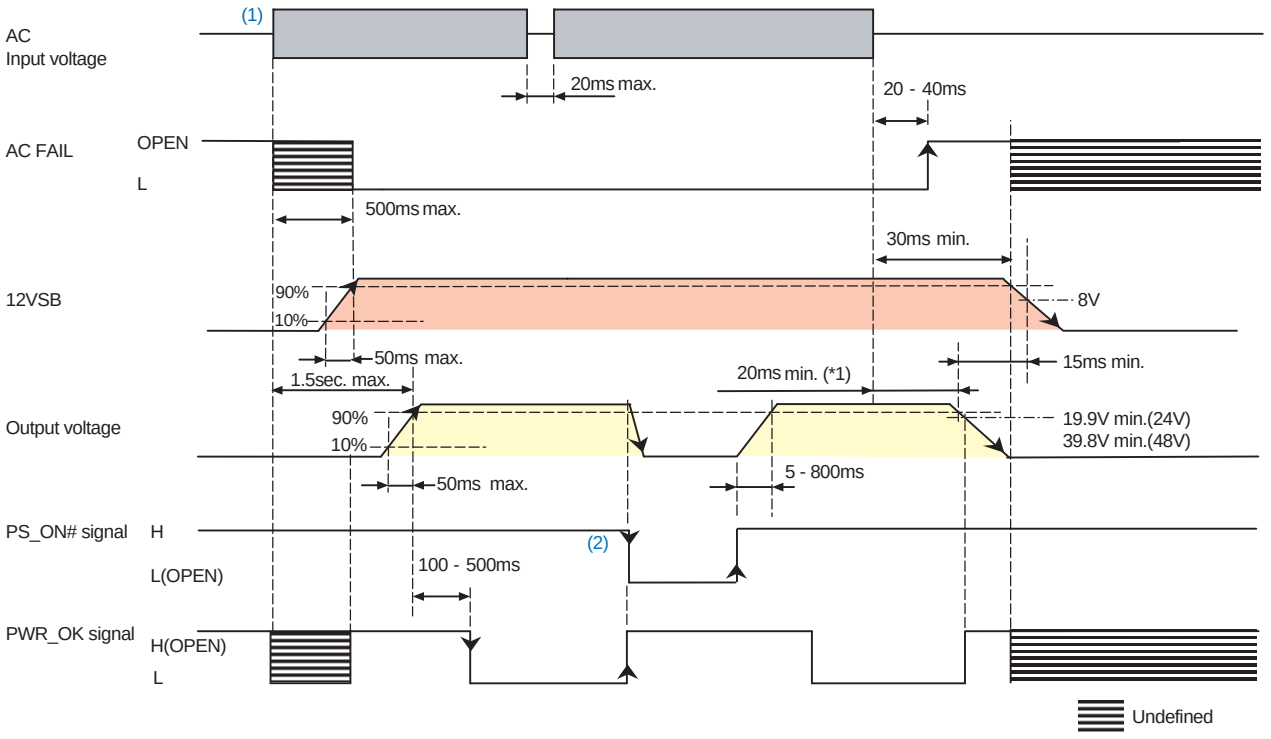
Feedback noise measures
FCC-B, VCCI-B, EN55022-B, CISPR22-B compliant
Low leakage current (0.5mA max. at 100 VAC)
AC input fuses are mounted on both line



Electronic components
by major Japanese manufacturers

Simple layout design
Superior cooling and low inter-component interference layout design.

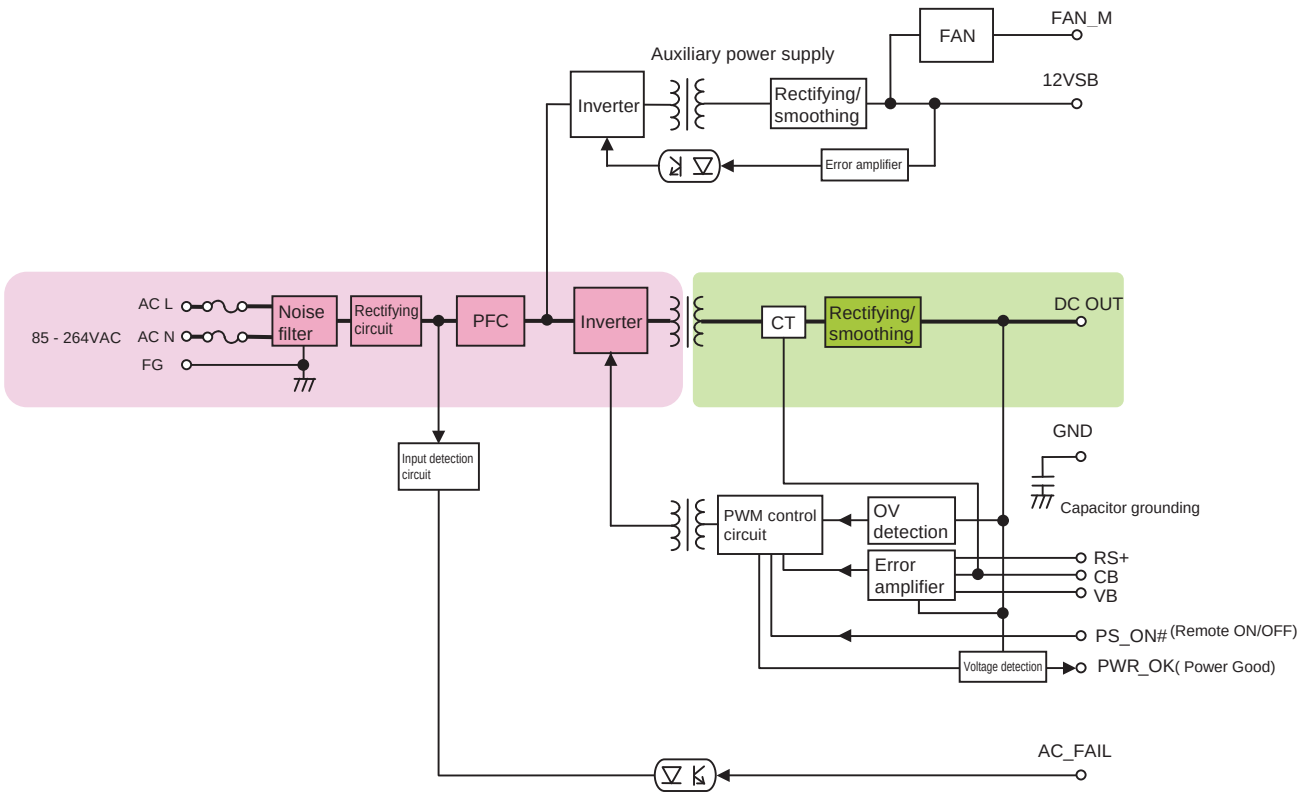
Sequence Diagram



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

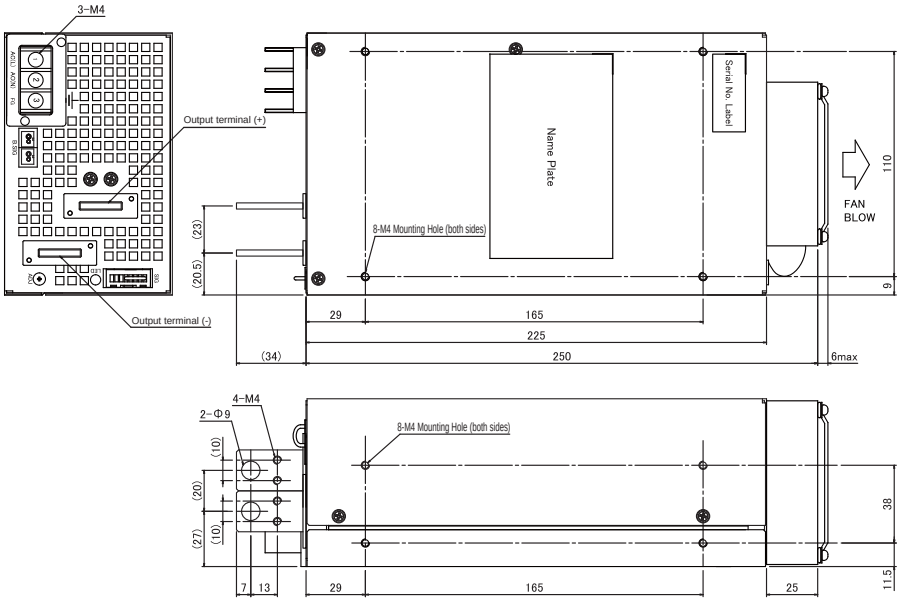
(1) All outputs start up by being supplied AC input under the condition of PS_ON# 'H'. PWR_OK 'H (OPEN)' is delivered at 100 - 500ms after the output has risen.
(2) At PS_ON# 'L' (OPEN) input, outputs except for +12VSB shut down.

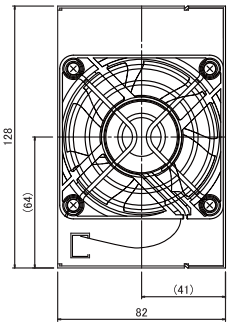
Block Diagram



Outline Drawing

Copper bar type (Fan: Blow out type)



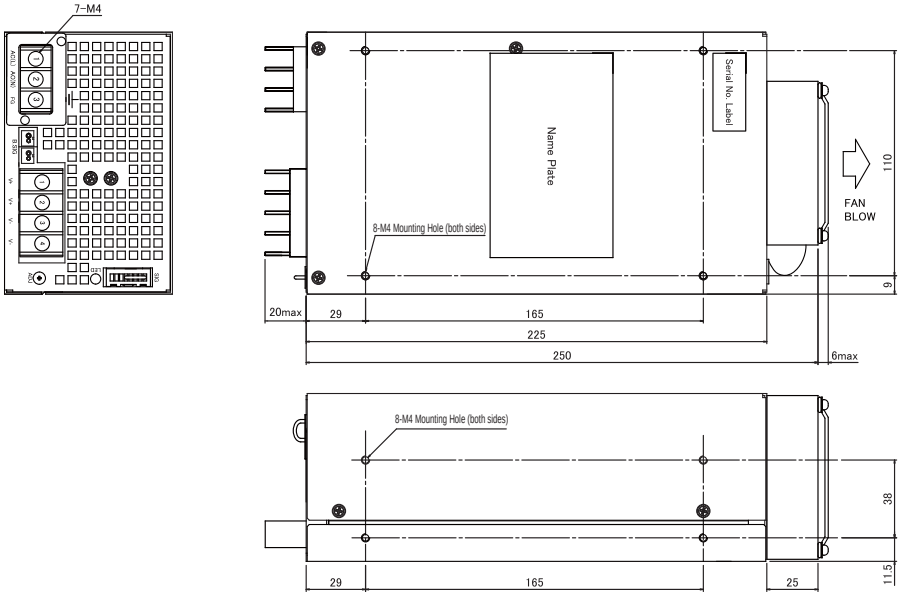


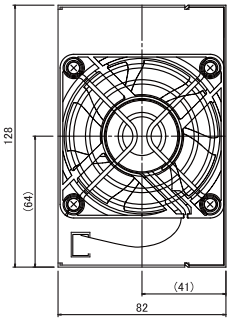
SIG Connector Pin assignments

Connector	Pin #	Signal Name	Max. Current	Note
SIG	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)





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	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
 *Imaging	WH-02XA02XA-150	Signal harness for parallel operation	For connecting GPSA-1500 in parallel
Parts / Unit			
Picture	*Model*	*Type*	*Description*
*Imaging	ACC3368-2	Output bar for parallel operation	For connecting 2 pieces of GPSA-1500 (block terminal type) in parallel
*Imaging	ACC3368-3	Output bar for parallel operation	For connecting 3 pieces of GPSA-1500 (block terminal type) in parallel
 *Imaging	ACC3369-2	Output bar for parallel operation	For connecting 2 pieces of GPSA-1500 (copper bar type) in parallel
*Imaging	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.

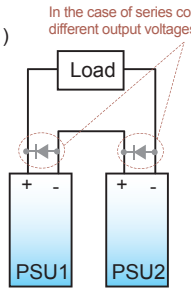
* Series connection with different output voltage of GPSA is available, such as 24V and 48V.

In the case that different voltages are connected in series like
Fig. (1) on the right;

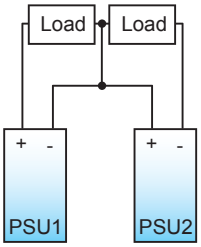
1. The output current shall be the rated current or less of the smaller rated current among the PSU1 and PSU2 connected in series.

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.

(1)



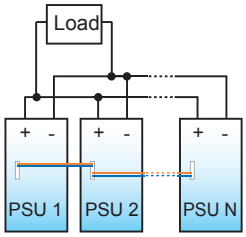
(2)



■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.

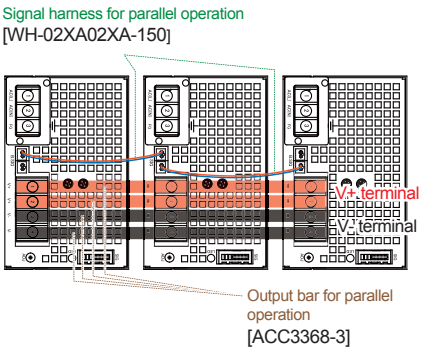
5. Starting time:
When starting up the power supply by AC input, operating waveform of output voltage may be tiered or dropped down (caused by the operation of over current protection circuit) due to dispersion of start up time of the power supplies connected in parallel. It can be prevented by starting 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



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