

2021 June

Power Supply for Desktop PC

HPCSA-1500P series



ATX Power Supply

CONTINUOUS MAX: 1200 W
PEAK POWER: 1500 W

Large capacity ATX PSU suitable for GPU server

HPCSA-1500P-E2S

Reliable product built to provide continuous service, 24/7/365

Peak: 1500W Continuous: 1200W



Large capacity PSU for GPU server suitable for deep learning and rendering

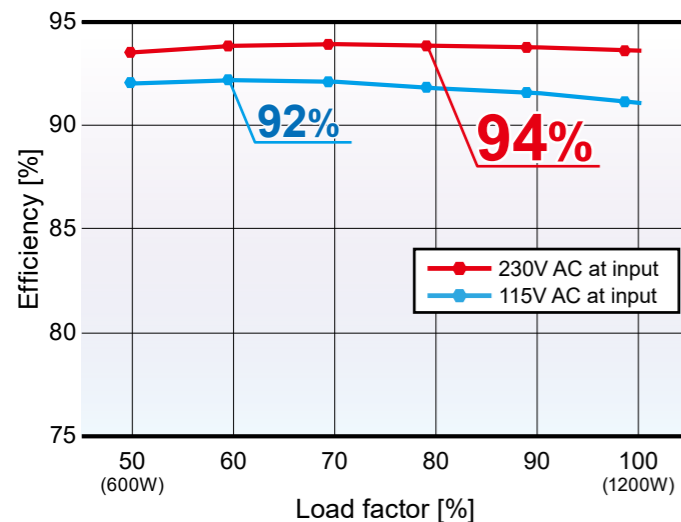
Long life design with expected life of more than 10 years

High efficiency

HPCSA-1500P is designed to attain the highest efficiency with a high load factor of 50% to 100% and enables highly reliable and stable operation of GPU servers, constantly running under a high load, as in the application of deep learning.

Efficiency graph

*An example measurement



Low sound noise by adopting a temperature controlled variable-speed fan.

When internal temperature of a power supply unit is low, fan speed is reduced to achieve low sound noise and save energy. In addition, operation settings are possible according to the usage environment and purpose, such as a semi-fanless mode in which the fan turns when the internal temperature rises, and a forced maximum turn mode in which the fan always turns at the maximum speed for cooling.

High efficiency of 94% typ. with 230V AC input attained

Silent design with the adoption of a temperature controlled variable-speed fan

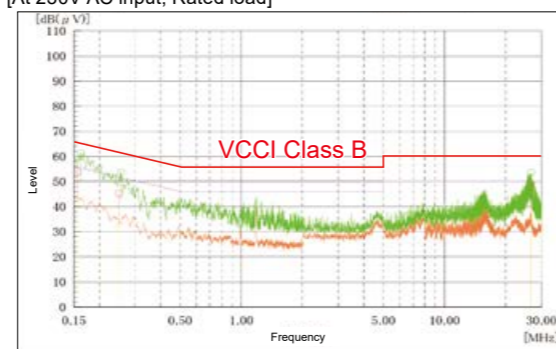
Low noise

With the enhancement of noise filter circuits and optimization of component arrangement, the power supply unit clears VCCI Class B for conducted emissions. No need for an external noise filter, helping to save associated work and costs.

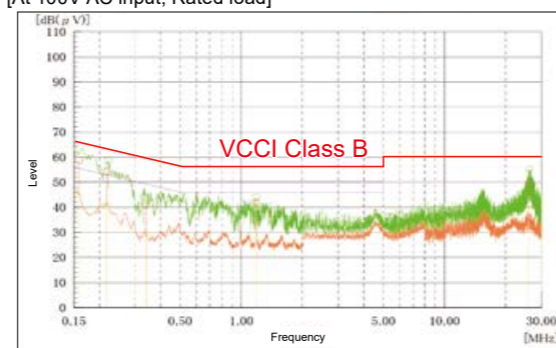
Conducted emission characteristics

*An example measurement

[At 230V AC input, Rated load]

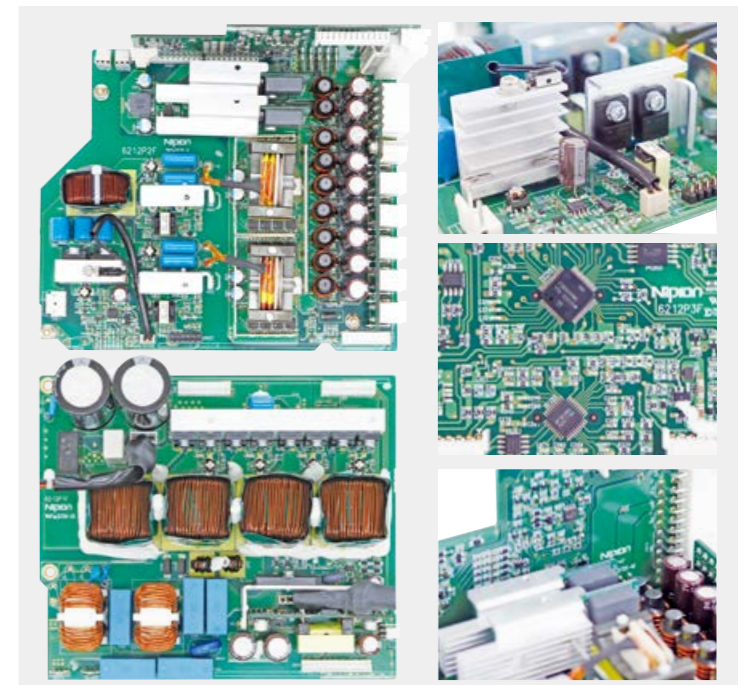
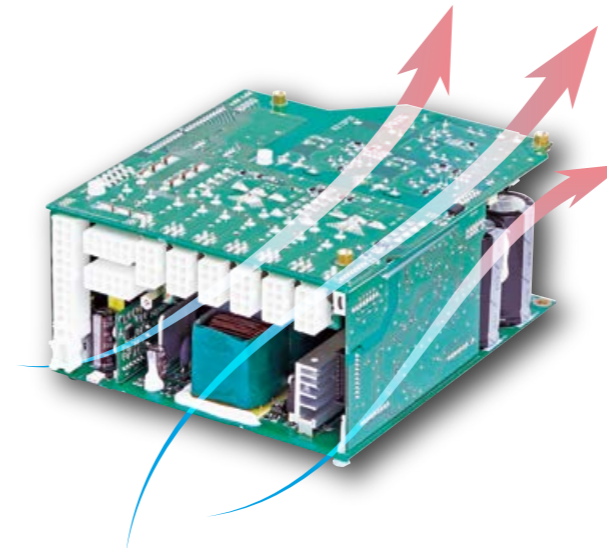


[At 100V AC input, Rated load]



High quality and high reliability manufacturing

The power supply is designed with an optimum component layout which is utilizing a unique thermal analysis/simulation, and produced in Japan. Also, in order to satisfy a variety of requirements for the power supply units from customers around the world, product evaluation tests are conducted thoroughly to find weaknesses. High reliability is achieved to enable long-term severe 24/7 operation at the rated power.

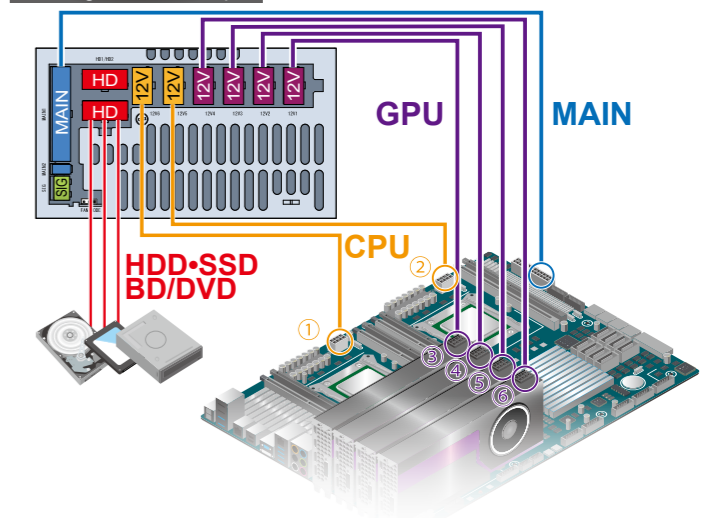


Long-term 24/7 operation at the rated power in a severe condition

Output specification

Output voltage	MAIN/HD		12V							MAIN/HD	
	+3.3V	+5V	+12V1	+12V2	+12V3	+12V4	+12V5	+12V6	+12V7	-12V	+5VSB
Continuous max. current/power	25A	25A	24A	24A	24A	24A	24A	24A	24A	1A	3A
	Total 207.5W		Total 1200W							15W	
	Total 1200W										
Peak current/power (within 5 s)	30A	30A	32A	32A	32A	32A	32A	32A	32A	1.2A	4A
	Total 207.5W		Total 1500W							20W	
	Total 1500W										
Minimum current	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A

Configuration concept

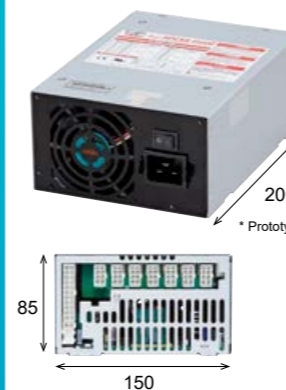


ATX12VO-standard-compliant model

ATX12VO-standard-compliant model coming soon

Peak: 1500W Continuous: 1200W

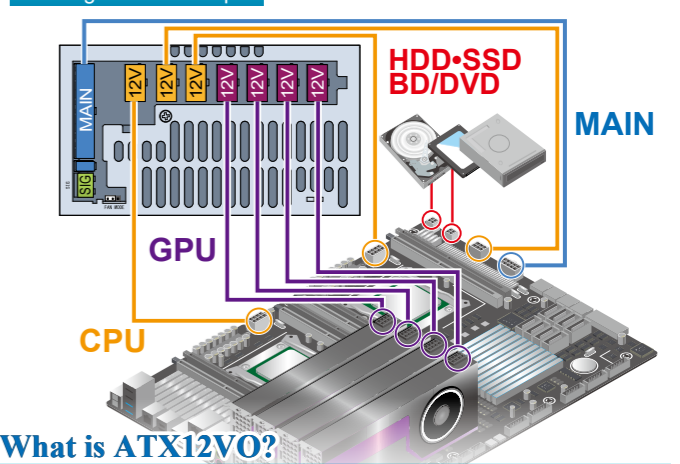
Max. efficiency: 94% (An example measurement at 230V)



CH	CH1-7	CH8*
Output voltage	+12V	+12VSB
	each 24A	1A
Continuous max. current/power	Total 1200W	12W
	Total 1200W	
Peak current/power (within 5 s)	each 32A	2A
	Total 1500W	24W
	Total 1500W	
Minimum current	0A	0A

* Standby is selectable from 5V/12V.

Configuration concept



What is ATX12VO?

ATX12VO is a new power supply standard regulating output voltage is only +12V and SB power supply. It simplifies the system by making the power supplies simpler. Devices requiring except +12V are powered by DC/DC converters embedded on motherboards.

Desktop PC Power Supply HPCSA-1500P-E2S

D62K10h LC LOM6L 20hh1A HPC2V-J200h-E2S

Large capacity, high efficiency ATX power supply!



RoHS Directive

ATX
Continuous 1200W **Peak 1500W**

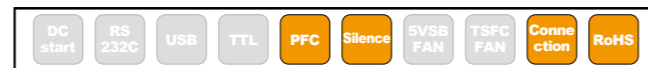
Model	Description
HPCSA-1500P-E2S	-
Model Name Coding HPCSA-1500P-E2S ① ② ③ ④ ⑤ ⑥	① Series name ② Output power ③ Peak power available ④ EPS output ⑤ +3.3V output equipped ⑥ Standard

Features

- Max. efficiency 94% (at 230VAC, an example measurement)
- Double-sided PCB with plated through hole suitable for industrial use.
- High efficiency achieved by the use of a synchronous rectifier and SiC diode
- Min. load current is 0A for all outputs.
- By building in the thermal-sensing variable speed fan, noise reduction can be realised.
- Safety standards certified (IEC/UL/CSA62368)

Safety standards	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

Function



Input

AC input	85-264V AC (Worldwide range, with PFC)
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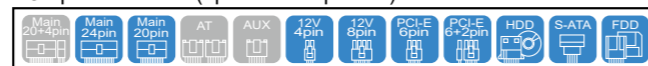
Output

Output voltage	+3.3V	+5V	+12V1	+12V2	+12V3	+12V4	+12V5	+12V6	+12V7	-12V	+5VSB
Max. current/ max. power (continuous)	25A Total 207.5W	25A	24A	24A	24A	24A	24A	24A	24A	1A	3A 15W
Peak current/ peak power (within 5s)	30A Total 207.5W	30A	32A	32A	32A	32A	32A	32A	32A	1.2A	4A 20W
Min. current	0A	0A	0A	0A	0A	0A	0A	0A	0A	0A	

Dimension

W×H×D (mm)	150×85×200
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Output connector (optional component)



General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

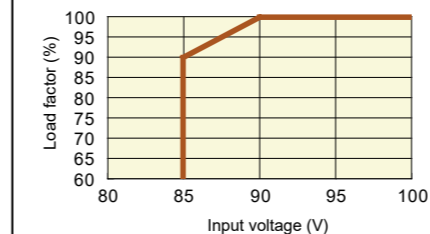
Items	Specification	Measurements conditions, etc.		
AC Input	Rated Voltage	100-240VAC (85~264VAC)*1	Worldwide range *See <Fig.1> Low input voltage derating below.	
	Input Frequency	50/60Hz	Frequency range 47-63Hz	
	Efficiency	90% typ (100VAC), 91% typ (240VAC) *Characteristic data: Fig.5	At rated output	
	Power Factor	96% min. (100VAC), 90% min. (240VAC) *Characteristic data: Fig.6		
	Inrush Current*2	31A peak (100VAC), 75A peak (240VAC) *Characteristic data: Fig.7	At rated output, cold start (25°C)	
	Input Current	13.3A typ (100VAC), 5.5A typ (240VAC) *Characteristic data: Fig.5	At rated output	
Output	Rated Voltage	+3.3V +5V +12V1 +12V2 +12V3 +12V4 +12V5 +12V6 +12V7 -12V +5VSB		
	Rated Current	8A 9A 13.5A 13.5A 13.5A 13.5A 13.5A 12A 0.5A 1A	Reference value during the measurement of input/output characteristics	
	Max. Current / Power	25A 25A 24A 24A 24A 24A 24A 24A 24A 1A 3A 82.5W 125W 288W 288W 288W 288W 288W 288W 288W 12W 207.5W max. 1200W max. 15W	Max. output power: 1200W Refer to the derating condition	
	Peak Current / Power	30A 30A 32A 32A 32A 32A 32A 32A 32A 1.2A 4A 99W 150W 384W 384W 384W 384W 384W 384W 384W 14.4W 20W 207.5W max. 1500W max. 20W	Peak output power: 1500W Time: 5 sec or less Duty ratio of repetitive load: 10% or less	
	Min. Current	0A 0A 0A 0A 0A 0A 0A 0A 0A 0A 0A		
	Total Voltage Accuracy (%)	±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max. ±5 max.	The point of voltage measurement is the output connector terminal on the power supply and the voltage drop due to the contact resistance of paired connector is not included.	
	Max. Ripple Voltage (mVp-p)	50 max. 50 max. 100 max. 100 max. 100 max. 100 max. 100 max. 100 max. 100 max. 100 max. 50 max.	Two wires are coming out from the output connector and connected into one at the edge. 47µF electrolytic capacitor and 0.1µF ceramic capacitor are placed on it and it is measured.*Characteristic data: Fig. 18	
	Max. Spike Voltage (mVp-p)	100 max. 100 max. 200 max. 200 max. 200 max. 200 max. 200 max. 200 max. 200 max. 200 max. 100 max.		
	Over Current Protection	OCP point (A)	31 min. 31 min. 33 min. 33 min. 33 min. 33 min. 33 min. 33 min. 33 min. 33 min.	Measurements done with no load except for the voltage measurement
		Method	All outputs of +3.3V, +5V, +12V1, +12V2, +12V3, +12V4, +12V5, +12V6, +12V7 and -12V are shut down.	All outputs shut down with a +5VSB short-circuit (automatic recovery)
Over Voltage Protection	OVP point (V)	3.8-4.3 5.7-7.0 13.4-15.6	Estimated input re-input interval at 100VAC: 10s or more, at 240VAC: 20s or more. (Reset time is not specified for +5VSB)	
	Method	All outputs of +3.3V, +5V, +12V1, +12V2, +12V3, +12V4, +12V5, +12V6, +12V7 and -12V are shut down.	All outputs shut down	
Environment	Operating Temp./ Humidity	0-60°C/10-90%	*Refer to <Fig.3> Temperature derating below. There shall be no condensation	
	Storage Temp./Humidity	-20-70°C/10-95%	There shall be no condensation	
Insulation	Dielectric Strength	AC input - FG/DC output: 1500VAC for 1 minute	Cut-off current 10mA	
	Insulation Resistance	AC input - FG/DC output: 50MQ min.	At 500VDC	
EMC	Leakage Current	0.5mA max. (100VAC) /1.0mA max. (200VAC) /1.2mA max. (240VAC) *Characteristic data: Fig.8	IEC62368 compliant	
	Line Noise Immunity	±2000V (pulse width of 100/1000nS, cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)	There shall be no fluctuation of DC output or malfunction.	
	Electrostatic Discharge	EN61000-4-2 compliant		
	Radiated, Radio-Frequency, Electromagnetic Field	EN61000-4-3 compliant		
	Fast Transient Burst	EN61000-4-4 compliant		
	Lightning Surge	EN61000-4-5 compliant		
	Radio Frequency Conducted Immunity	EN61000-4-6 compliant		
	Power-Frequency Magnetic Field Immunity	EN61000-4-8 compliant		
Others	Voltage dips/Regulation	EN61000-4-11 compliant		
	Conducted Emmission	VCCI-B, FCC-B, CISPR32-B, EN55032-B compliant *Characteristic data: Fig.9, 10	Measured by single unit	
	Harmonic Current Regulations	IEC61000-3-2 class A compliant	At rated input/output	
	Safety Standards	UL62368, CSA62368-1 (c-UL) certified, EN62368, PSE (ordinance clause 2) compliant, CE Marking (LVD,EMC)		
Cooling System	Output Grounding	Connected chassis (FG)		
	Output Hold-up Time	AC cut-off → PWR_OK holds up 16ms min. *Characteristic data: Fig.15	At rated output	
	Reliability Grade	FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard	
	MTBF	70,000 H min	Based on EIAJ RCR-9102	
	Weight	2.6 kg typ		
	Warranty	Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except for errors caused by operation not specified in this specification.	

*1 Input voltage limit at rated output

*2 Inrush current, 100µs or less, into X-capacitors of input noise filter and transient current after PS_ON=L input are not specified here.

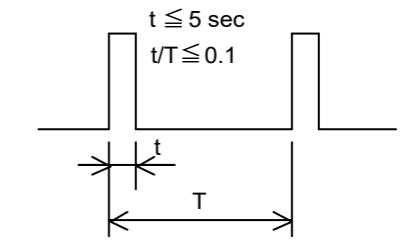
<Fig.1> Low input voltage derating

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



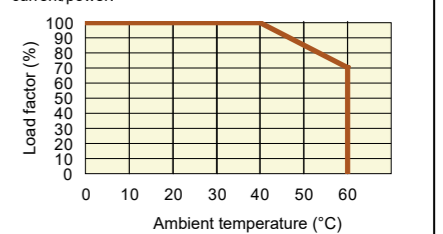
<Fig.2> Duty Ratio

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 40°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.



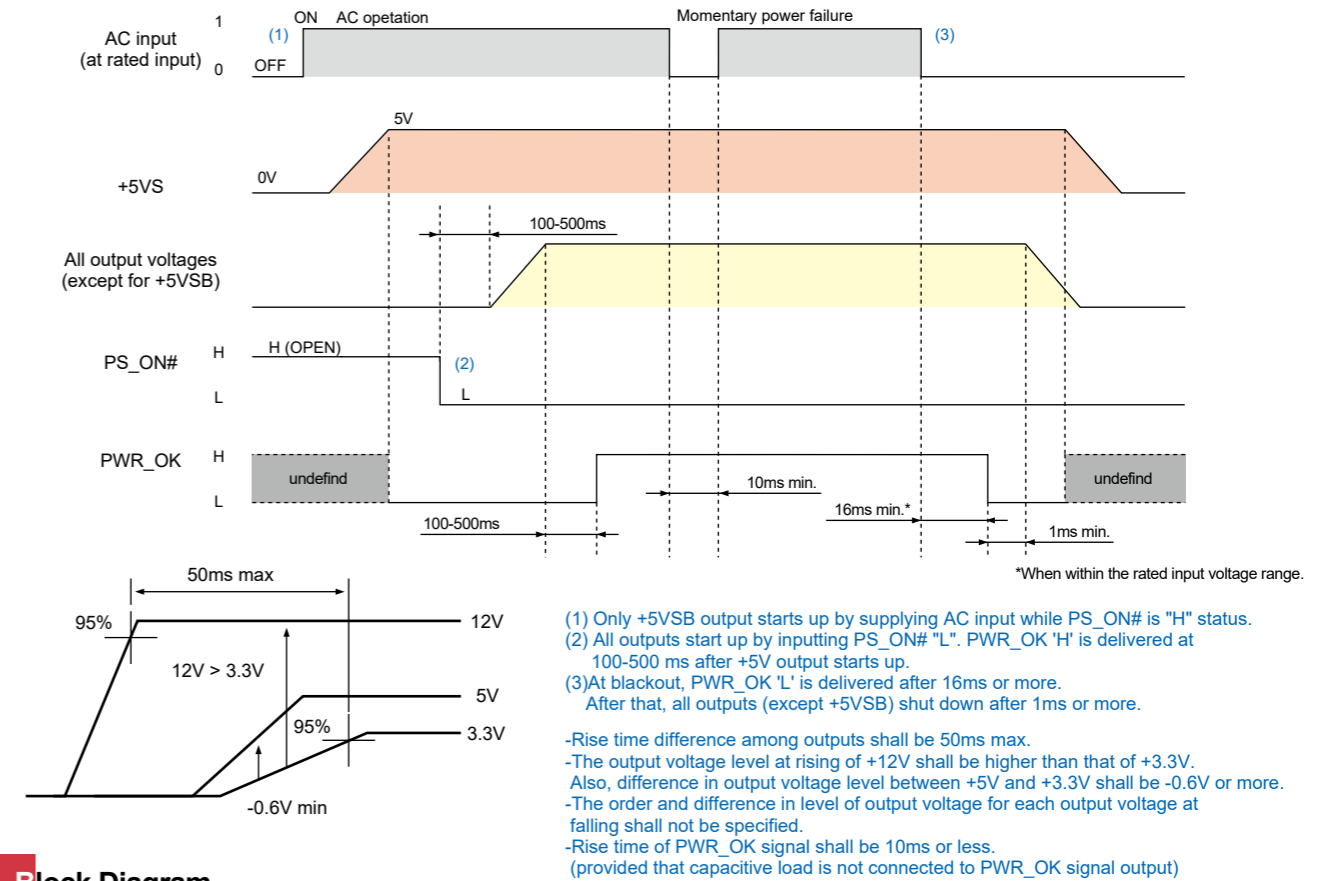
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification	Note
Input Signal	Output ON/OFF control signal (PS_ON#)	+3.3V, +5V, +12V1 to 7, -12V outputs shutdown with 'H' or 'OPEN' input. (PS_ON re-entry interval 10s more)
	+3.3V SENSE *1	The input terminal to detect the voltage of +3.3V output; by connecting to the load terminal, only the line drop of the + side of the output cable is compensated.
	Fan control signal (FAN_C)	The control terminal of fan motor; the fan motor is forcibly rotated at full speed at 'L' input.
Output Signal	Normal output signal (PWR_OK)	'H' signal is delivered at normal output. (detection delay time: 100 to 500ms)
	Fan monitoring signal (Fan_M)	Two cycle pulses per one rotation of the fan motor are delivered. The signal remains 'L' or 'OPEN' when the fan stops caused by any failure or malfunction.

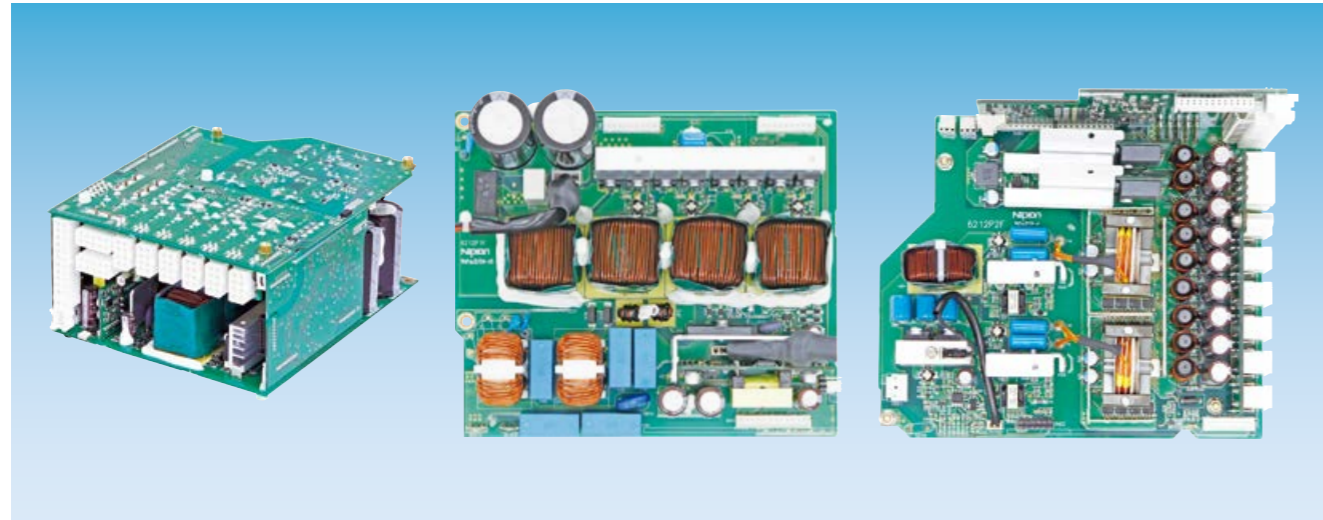
Signal Circuit			
Input Signal Circuit	(PS_ON#)	FAN_C signal input circuit	Output Signal Circuit
	<p>Inside: +5VSB, 4.7kΩ, I_{in} ≤ 10mA, Q1 ON, I ≤ 1.6mA, V₀ ≤ 0.8V, (L' ≤ 0.8V, 2.0V ≤ H')</p>	<p>Inside of power supply: Max. 12V, Q1 OFF, V₀ ≤ 6V, Q1 ON, V₀ ≤ 0.8V</p>	<p>Power supply side: 1kΩ typ, +5V, Signal output terminal: 5mA max, 5.25V max, (L' < 0.4V)</p>

*1 Connect the +3.3 V SENSE signal to +3.3 at the load end because +3.3 V output may not be satisfied the specification.

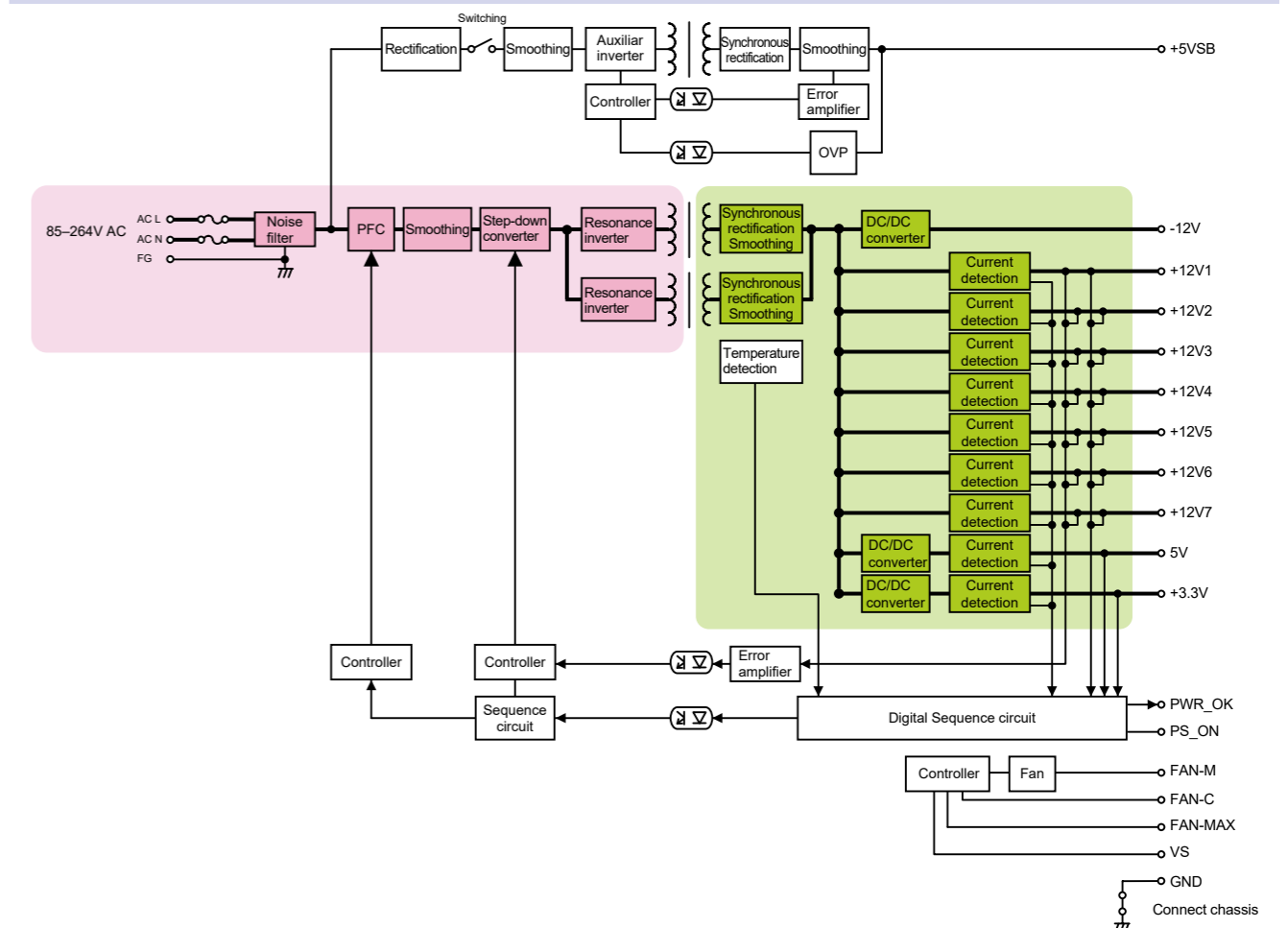
Sequence Timing Chart



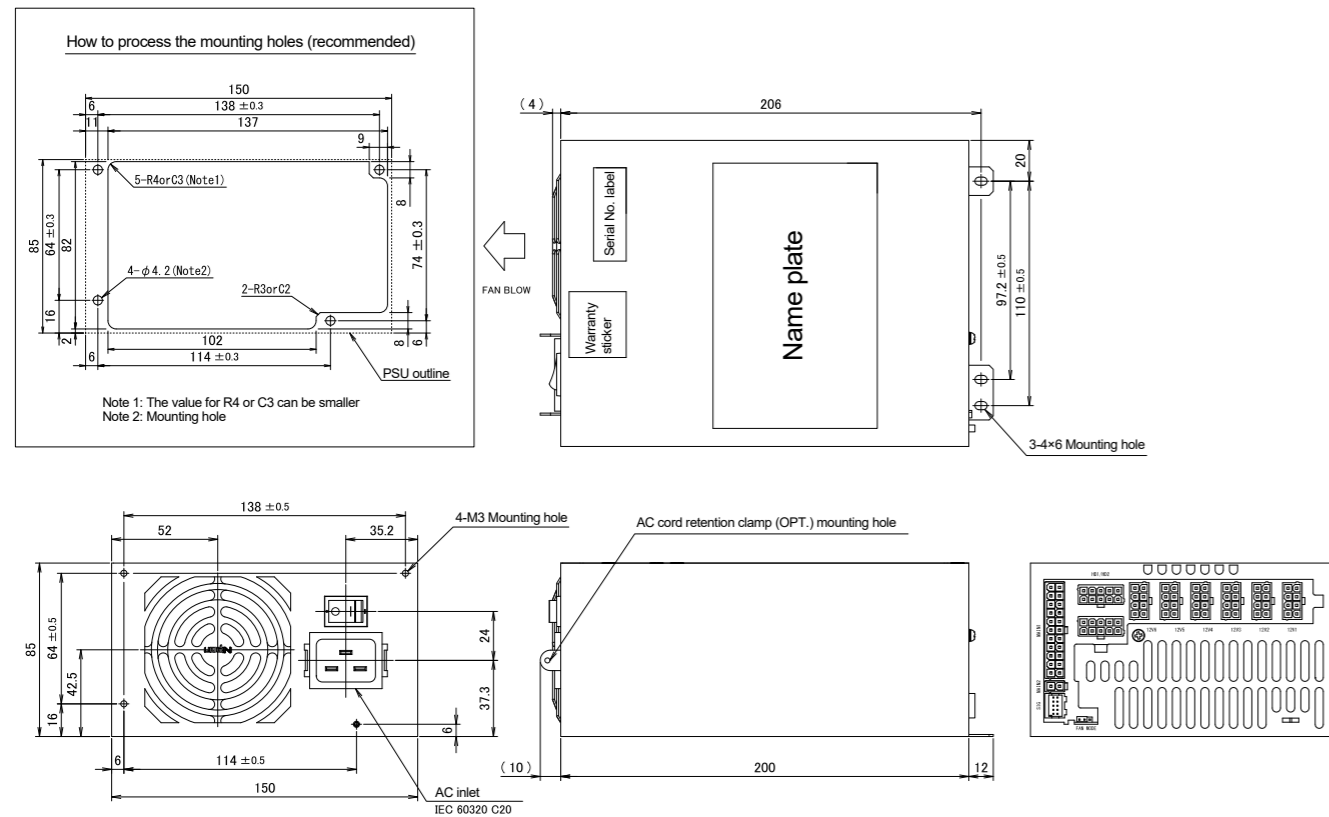
Internal structure



Block Diagram

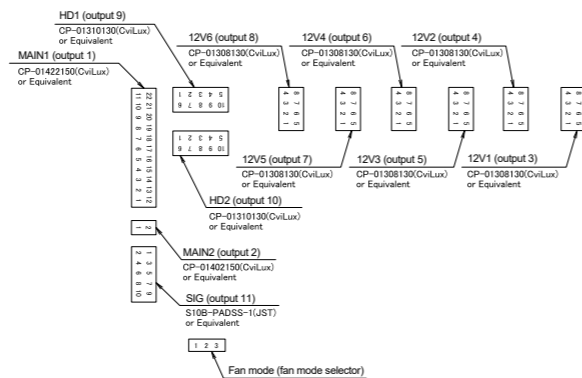


Outline Drawing



*1 Dimensional tolerance shall be ± 1 mm unless otherwise specified.
*2 The screw depth of penetration into PSU is 5mm max.

Pin assignment

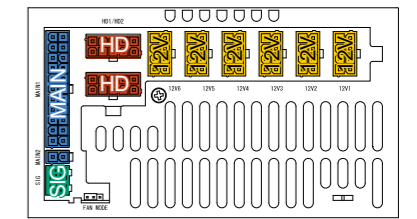


How to Switch the Fan Operation Mode

Continuous operation mode (standard)	Forced max. rotation mode	Semi fanless mode
Short pin 1-2 short	Short pin2-3 short	Without short pin

Options (Sold separately)

Detachable output harness		Output port allocation	
Model	Length and type of connector		
Main power cable MAIN			
WH-M2022-500	500±10 20Pin		
WH-M2022-300	300±10 20Pin		
WH-M2422-500	500±15 24Pin		
12V power cable 12V			
WH-V0808-500	500±15 12V 8Pin		
WH-V0408-500	500±15 12V 4Pin		
WH-VG208-500	500±15 PCI-E 6Pin		
WH-VV208-500-02	500±10 12V 8Pin 12V 8Pin		
WH-VG208-500-02	500±10 12V 8Pin PCI-E 6Pin		
WH-G0808-500	500±10 PCI-E 6+2Pin		
WH-GG208-500	500±10 PCI-E 6Pin PCI-E 6+2Pin		
WH-GG208-500-02	500±10 PCI-E 6+2Pin PCI-E 6+2Pin		
HD power cable HD			
WH-PP610-850	550±15 150±15 150±15		
WH-PS610-850	550±15 150±15 150±15		
WH-PS710-850	550±15 150±15 150±15 850±15		
WH-PS810-1000	550±15 150±15 150±15 150±15		
SIG cable SIG			
WH-S0610-500	500±15 SIG-1		
WH-S0610-500-01	500±15 SIG-2		
WH-S0310-500	500±15 SIG-3		

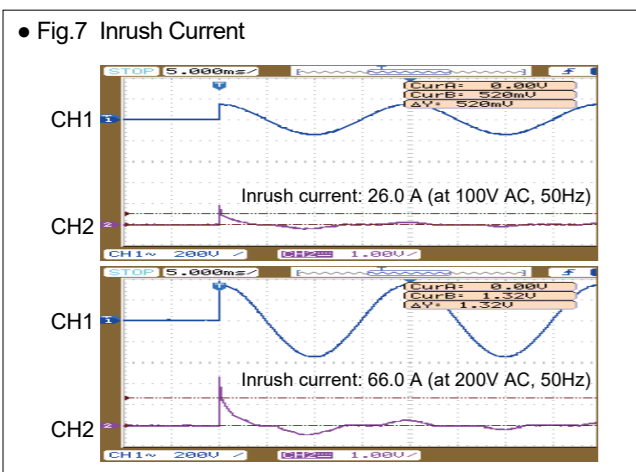
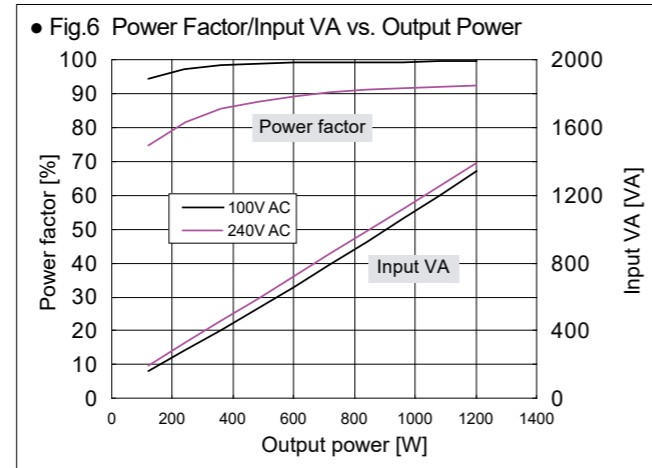
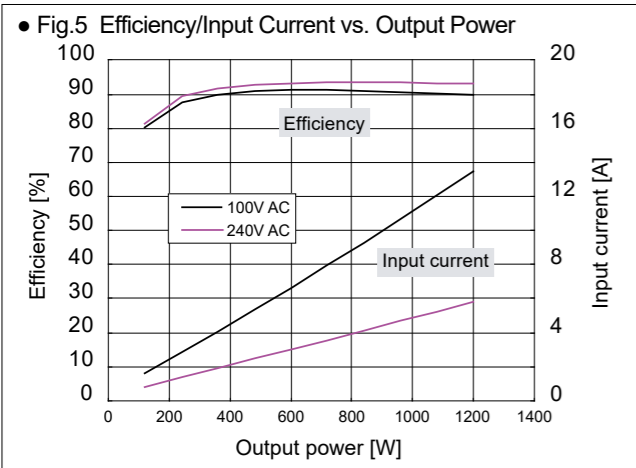


Acceptable cables

MAIN 12V HD SIG
1 model 6 models 2 models 1 model

Options (Sold separately)

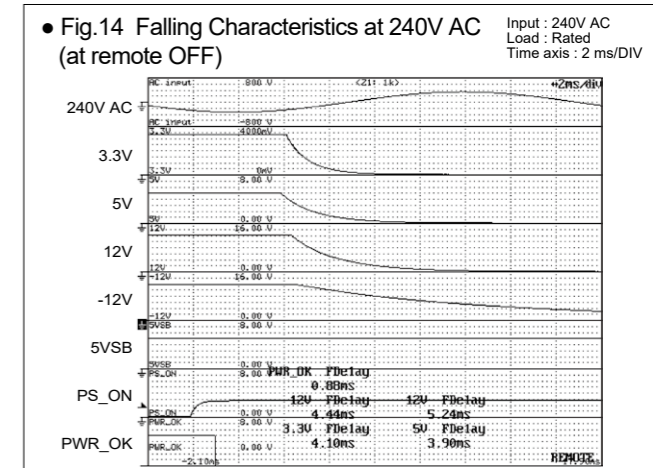
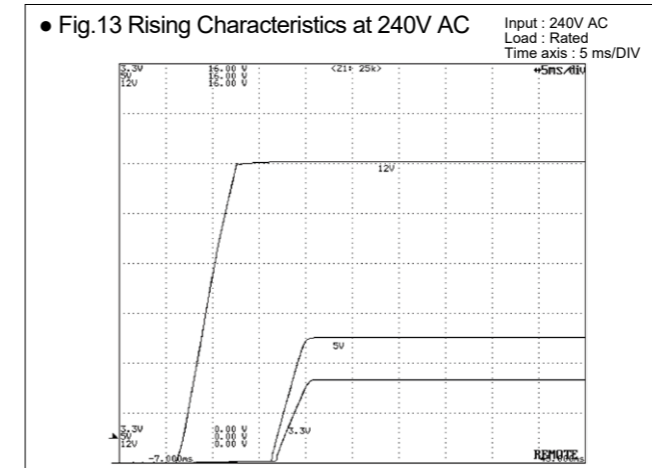
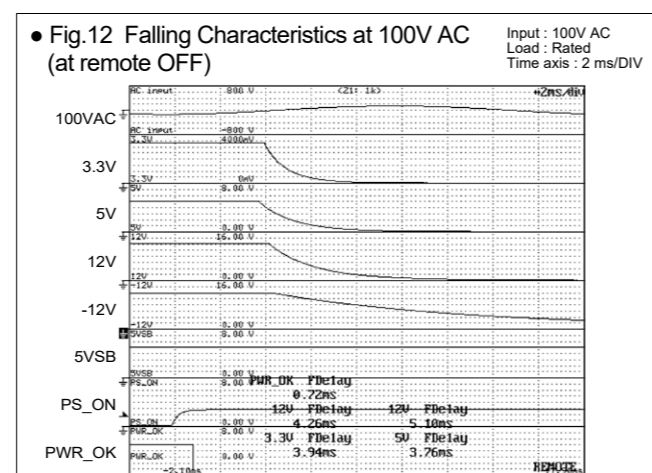
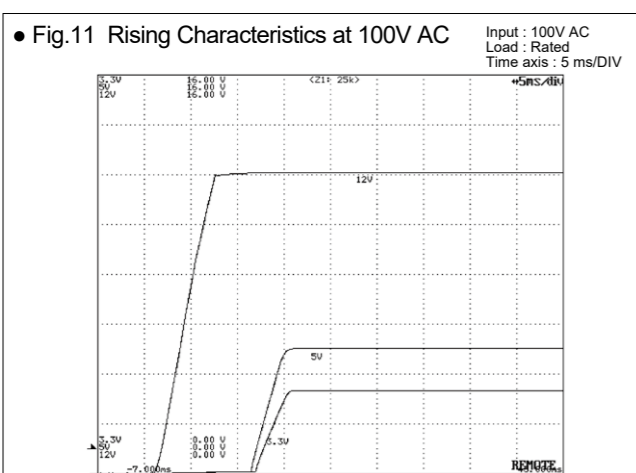
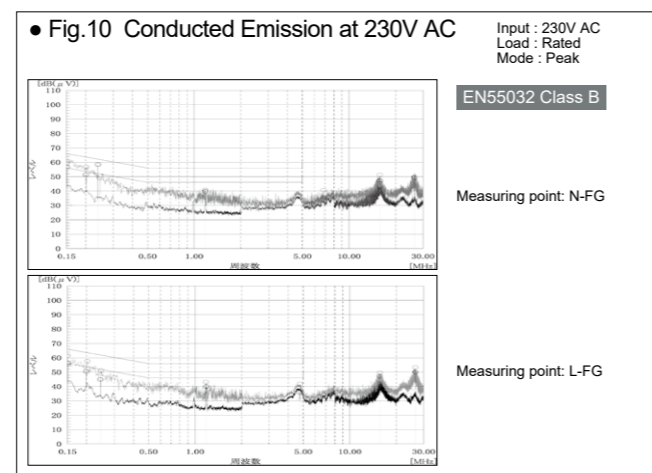
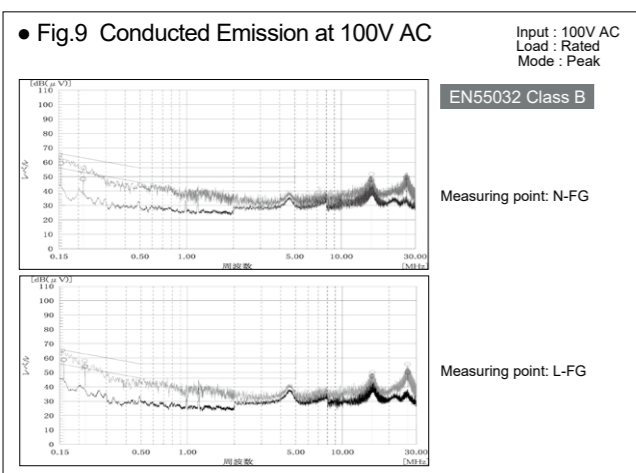
Cable			
Photos	Model	Category	Description
	WH6216-01	AC power cord	125VAC 15V (tracking resistance type) [PSE]
Parts			
Photos	Model	Category	Description
	ACC6212	AC power cord retention clamp	AC power cord (WH6216-01) retention clamp



• Fig.8 Leakage Current

Input : 100, 200, 240V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.20mA	0.22mA
200V AC	0.45mA	0.46mA
240V AC	0.54mA	0.56mA

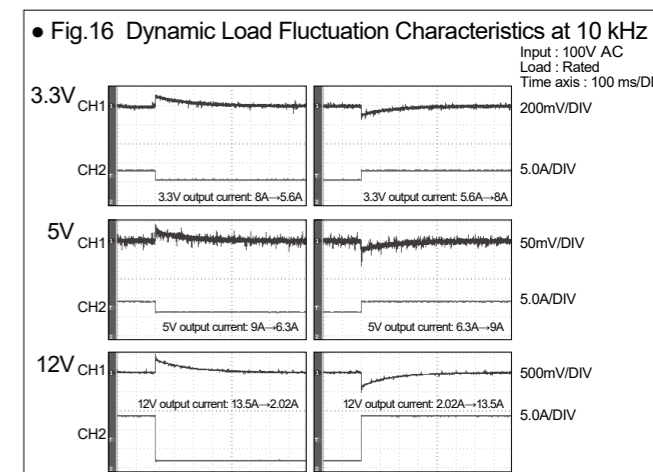


• Fig.15 Output Hold-up Time

Load: Rated (65°C: 70% load)

PWR_OK: the point that PWR_OK signal "L" is delivered.
Output voltage: the point that output voltage except 5VSB falls down to 95%.

Temp.	Input voltage	Hold-up time	
		PWR_OK	Output voltage
-5°C	100V AC	17.42ms	21.50ms
	240V AC	17.96ms	22.08ms
25°C	100V AC	18.36ms	22.62ms
	240V AC	19.72ms	23.78ms
45°C	100V AC	18.78ms	22.90ms
	240V AC	20.02ms	24.08ms
65°C (70% load)	100V AC	24.28ms	30.32ms
	240V AC	25.68ms	31.78ms



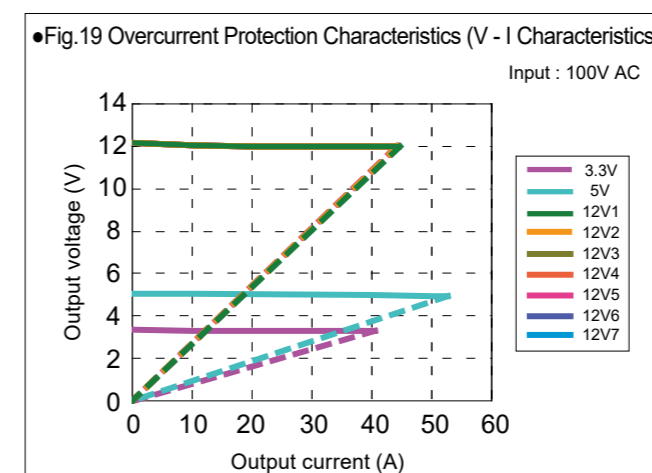
• Fig.17 Output Voltage Regulation (Load Fluctuation)

AC Input	85V	100V	240V	264V	Output	
					Min. load	Rated load
12V4 output (min.)	12.112V	12.112V	12.119V	12.120V	0A	13.5A
12V4 output (rated)	12.057V	12.058V	12.059V	12.059V	0A	9A
5V output (min.)	5.014V	5.014V	5.007V	5.007V	0A	8A
5V output (rated)	4.951V	4.950V	4.949V	4.949V		
12V1 output (min.)	12.119V	12.119V	12.126V	12.126V		
12V1 output (rated)	12.077V	12.078V	12.081V	12.081V		
12V2 output (min.)	12.113V	12.112V	12.120V	12.119V		
12V2 output (rated)	12.054V	12.055V	12.055V	12.056V		
12V3 output (min.)	12.112V	12.113V	12.120V	12.120V		
12V3 output (rated)	12.041V	12.042V	12.044V	12.044V		

• Fig.18 Ripple and Spike Voltage

Load: Rated

Temp.	AC Input voltage	+3.3V		+5V		+12V1		+12V2		+12V3		+12V4	
		Ripple (mV)	Noise (mV)	Ripple (mV)	Noise (mV)	Ripple (mV)	Noise (mV)	Ripple (mV)	Noise (mV)	Ripple (mV)	Noise (mV)	Ripple (mV)	Noise (mV)
25°C	100V	19.6	67.8	13.1	67.8	9.3	54.9	13.6	65.6	28.3	52.6	19.9	66.5
	240V	17.7	49.0	12.1	55.1	8.3	47.9	11.2	51.5	15.2	55.8	12.7	49.8
25°C	100V	13.6	65.5	28.6	53.1	20.0	66.8	16.5	51.8	15.6	57.6		
	240V	11.2	51.4	15.4	56.4	12.8	50.0	17.4	48.7	17.4	79.3		





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