

Rack Mount Power Supply PC1U-300P-E2S

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High Power 1U Size PC Power Supply



PC1U-300P-E2S

**RoHS
Directive**

1U
Continuous Max. **250W** Peak Power **300W**

BRAIN
Power
Supply

Rack Mount Power Supply

Non-backup Power Supply

Model	Description	Stock
PC1U-300P-E2S	—	Standard stock
Model Name Coding PC1U - 300 P - E 2 S ① ② ③ ④ ⑤ ⑥		
1. Series name 4. EPS output 2. Output power 5. +3.3V output equipped 3. Peak output compliant 6. Standard		

Features

- High reliability is reserved due to 77% typ. of high efficiency even mounted in high density environment such as rack servers.
- +12V dual output allows stable CPU operation.
- All output in stable operation even with no load current
- Connector system for output harness enable flexible selection in specification.

Mass production in motion !
Quantity discount is available.

Refer to "Product Page Guideline" on p.13

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
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Input

AC input	85 - 264V (worldwide range)
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Output

Output voltage	+3.3V	+5V	+12V1	+12V2	-12V	+5VSB
Max. current / max. power (continuous)	16A	14A	16A	10A	0.5A	2A
	Total 90W		Total 216W			
	Total 250W					
Peak current / peak power (+12V1: 0.5 sec, Others: 5 sec max.)	16A	16A	22A	10A	0.8A	2.5A
	Total 100W		Total 264W			
	Total 300W					
Min. current	0A	0A	0A	0A	0A	0A

Dimensions

W×H×D (mm)	106×41×260
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Output connector (optional component)

Main 20+4pin	Main 24pin	Main 20pin	AT	AUX	12V 4pin	12V 8pin	PCE 6pin	PCE-E 6+2pin	HDD	S-ATA	FDD
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Refer to p.305 "Detachable Output Harness" for details

General Specification Condition: at normal temperature and humidity unless otherwise specified

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Items		Specification						Measurement conditions, etc.	
AC Input	Rated Voltage	100 - 240 VAC (85* - 264 VAC)						Worldwide range *Refer to Fig.1	
	Input Frequency	50 / 60Hz						47 - 63Hz	
	Efficiency	73% typ. (100 VAC), 77% typ. (240 VAC) *Characteristic data: Fig.4						At rated input/output	
	Power Factor	96% typ. (100 VAC), 90% typ. (240 VAC) *Characteristic data: Fig.5							
	Inrush Current	31A peak (100 VAC), 75A peak (240 VAC) *Characteristic data: Fig.6						At rated output, at cold start (25°C)	
	Input VA	3.4A typ. (100 VAC), 1.4A typ. (240 VAC) *Characteristic data: Fig.5							
Output	Rated Voltage	+3.3V	+5V	+12V1	+12V2	-12V	+5VSB		
	Rated Current	8A	8A	8A	6A	0.5A	2A		
	Max. Current / Power	16A	14A	16A	10A	0.5A	2A	Max. output power: 250W	
		90W max.		216W max.					
		250W max.							
	Peak Current / Power	16A	16A	22A	10A	0.8A	2.5A	Peak output power: 300W Time: 5 sec or less (only +12V1 is 0.5 sec) Duty ratio of repetitive load: 10% or less *Refer to Fig.2	
		100W max.		264W max.					
		300W max.							
	Min. Current	0A	0A	0A	0A	0A	0A		
	Total Voltage Accuracy (%)	±5 max.	±5 max.	±5 max.	±5 max.	±5 max.	±5 max.	Total accuracy of temperature, input, and load fluctuations	
Max. Ripple Voltage (mVp-p)	50 max.	50 max.	80 max.	80 max.	80 max.	50 max.	Measured on a test board connected with a 10µF electrolytic capacitor and 0.1µF ceramic capacitor by 100MHz oscilloscope. The test board shall be away from load wire and within 150mm from output terminals. *Characteristic data: Fig.17		
Max. Spike Voltage (mVp-p)	100 max.	100 max.	200 max.	200 max.	200 max.	100 max.			
Protection	Overcurrent Protection	OCP Point (A)	17 min.	17 min.	17 min.	12 min.	Short protection	When measuring +12V1 and +12V2, no load on other outputs. Each other outputs are having rated current at the time for measuring other output	
		Method	Hold down current limiting → All outputs shutdown except for +5VSB				Hold down current limiting/ All outputs shutdown	All other output shutdown when +5VSB is shorted. (Automatic recovery)	
		Recovery	Reclosing AC input (10 sec min. interval)				Automatic recovery*	* +5VSB: Or AC input reclosing	
	Overvoltage Protection	OVP Point (V)	3.76 - 4.3	5.74 - 7.0	13.4 - 15.6	-	-	-	
		Method	All outputs shutdown except for +5VSB				-	-	Zener clamp
Recovery		Reclosing AC input (10 sec min. interval)				-	-		
Environment	Operating Temp. / Humidity	0 to 60°C* / 10 to 90%						*Refer to Fig.3 No condensation	
	Storage Temp. / Humidity	-20 to 70°C / 10 to 95%						No condensation	
	Vibration	Acceleration amplitude: 2G (10-55Hz), Sweep cycles: 10, Test duration: 45 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	
	Dielectric Strength	AC input - DC output/FG: 1500 VAC for 1 minute						Cut-off current: 20mA	
Insulation	Insulation Resistance	AC input - DC output/FG: 50MΩ min.						At 500 VDC	
	Leakage Current	0.5mA max. (100 VAC) / 1mA max. (200 VAC) / 1.2mA max. (240 VAC) *Characteristic data: Fig. 7						YEW, TYPE3226 (1kΩ) or equivalent	
	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							
EMC	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.8 and 9							
	Harmonic Current Regulation	IEC61000-3-2 Class D compliant						At rated input/output	
	Safety Standard	UL60950-1, CSA C22.2 No. 60950-1, EN60950-1, CE Marking (LVD, EMC), CCC (S&E)							
	Cooling System	Forced air cooling						Fan rotates at low speed depending on the internal temperature of power supply even PS_ON# signal 'H'.	
	Output Grounding	Connected chassis (FG)*						*It can be customized to connect to capacitor	
Others	Output Hold-up Time	PWR_OK holds up 16ms min. after AC failure. *Characteristic data: Fig.14						At rated output	
	Reliability Grade	FA (industrial equipment grade, double-sided through hole PCB)						Follow our standard	
	MTBF	70,000H min.						Based on EIAJ RCR-9102	
	Weight	1.25kg 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	

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.

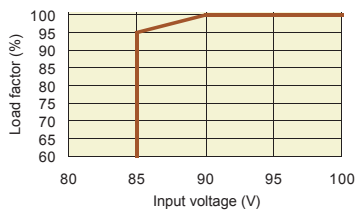


Fig.2 Duty Ratio

Peak current/power shall be 5* sec or less continuously. For repetitive loads, duty ratio shall be 10% or less. *Only +12V1: 0.5 sec or less

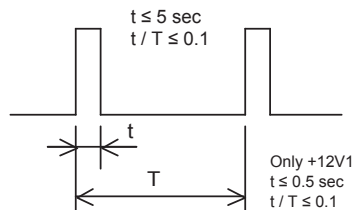
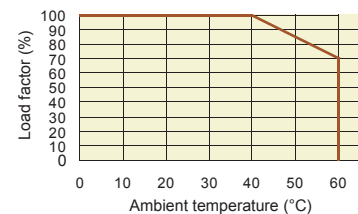
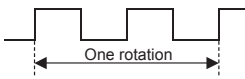


Fig.3 Temperature Derating

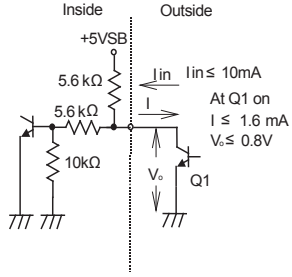
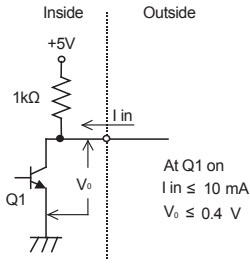
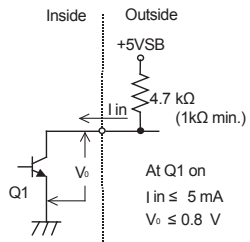
When the ambient temperature (near the airflow inlet) exceeds 40°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.



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

Items	Specification	Note
Input Signal Output ON / OFF Control Signal (PS_ON#)	+3.3V, +5V +12V1, +12V2, and -12V outputs shutdown with 'H' or 'OPEN' input.	Signal input between the pin 2 of MAIN2 connector and COM pin
+3.3V SENSE	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.	The pin 4 of MAIN2 connector
Output Signal Normal Output Signal (PWR_OK)	'H' signal is delivered at normal output (detection delay time: 100 - 500ms).	The pin 3 of MAIN2 connector
Output Signal FAN_M1 FAN_M2	Two cycle pulses per one rotation of the fan motor are delivered (open collector output). Duty ratio of the pulse shall be 0.5 typ. (Interval between the signals becomes longer at low speed and shorter at high speed.) The signal remains 'L' or 'OPEN' when the fan stops caused by any failure or malfunction.	FAN_M1 : The pin 1 of SIG connector FAN_M2 : The pin 2 of SIG connector 

Signal Circuit

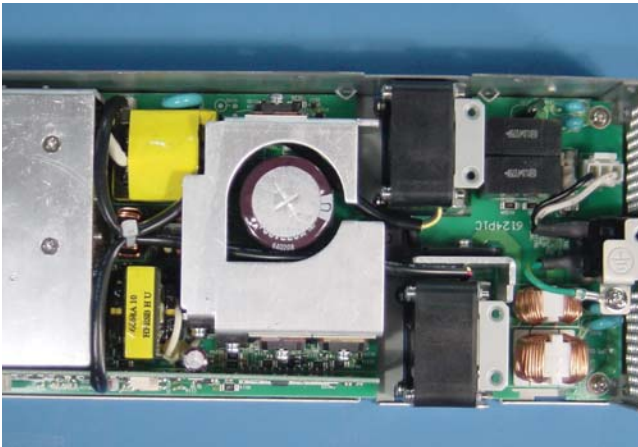
Input Signal Circuit	Output Signal Circuit	Output Signal Circuit
(PS_ON#)	(PWR_OK)	(FAN M1) (FAN M2)
		

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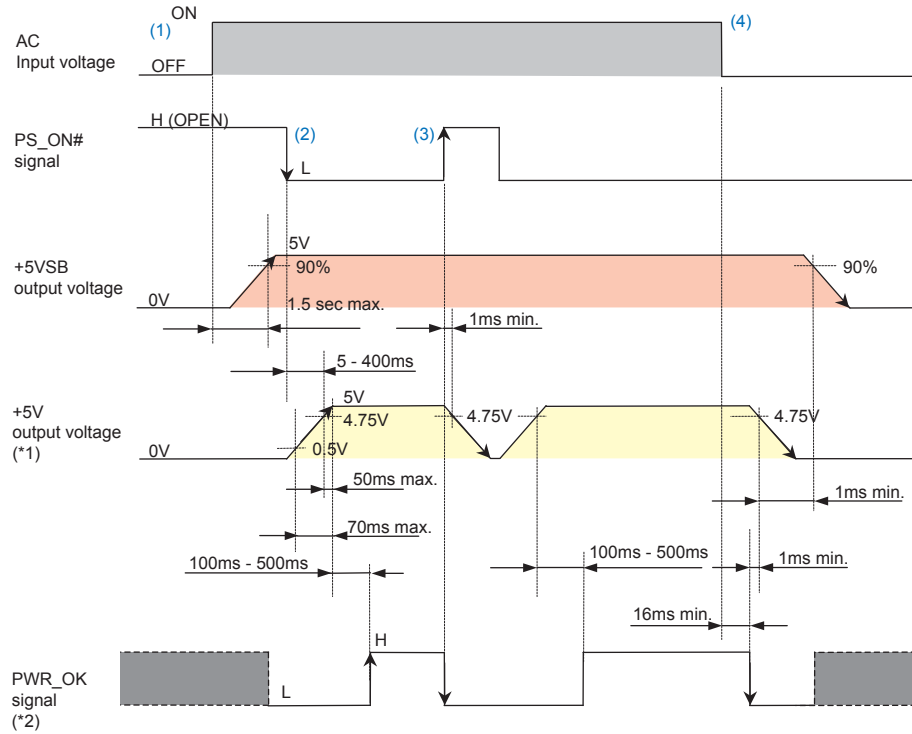
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Internal Structure



Sequence Diagram



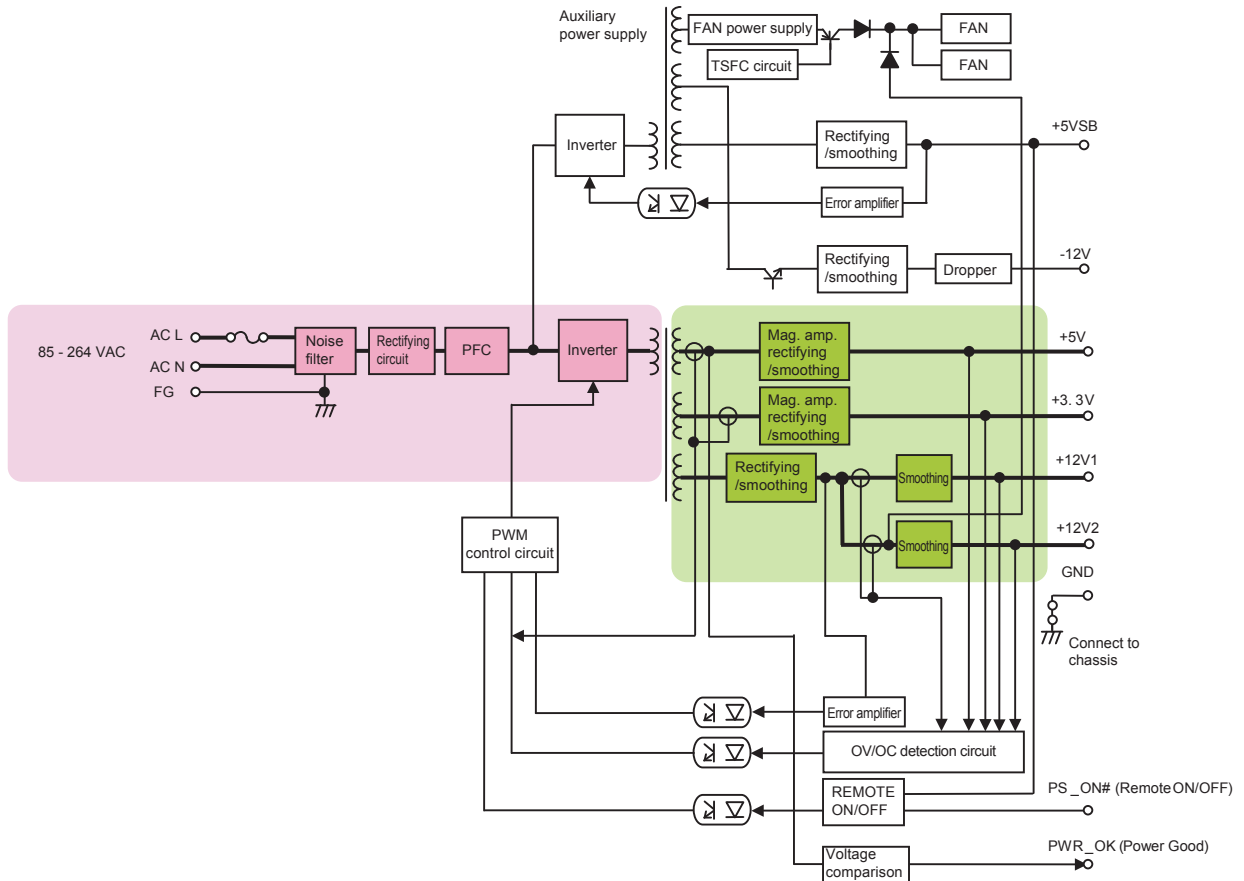
Note 1: All other outputs except for +5V shall follow this timing and the rising time difference from +5V shall be 50ms or less. In addition, output voltage level of +5V and +12V at rising shall be more than the voltage level of +3.3V. The difference of output voltage level of +5V and +3.3V should be less than 2.25V. Each output voltage at the time of trailing rank or level differences are unregulated.

Note 2: A rise and a fall time of PWR_OK signal shall be less than 100µs at the time of the capacitive load is not connected to signal output.

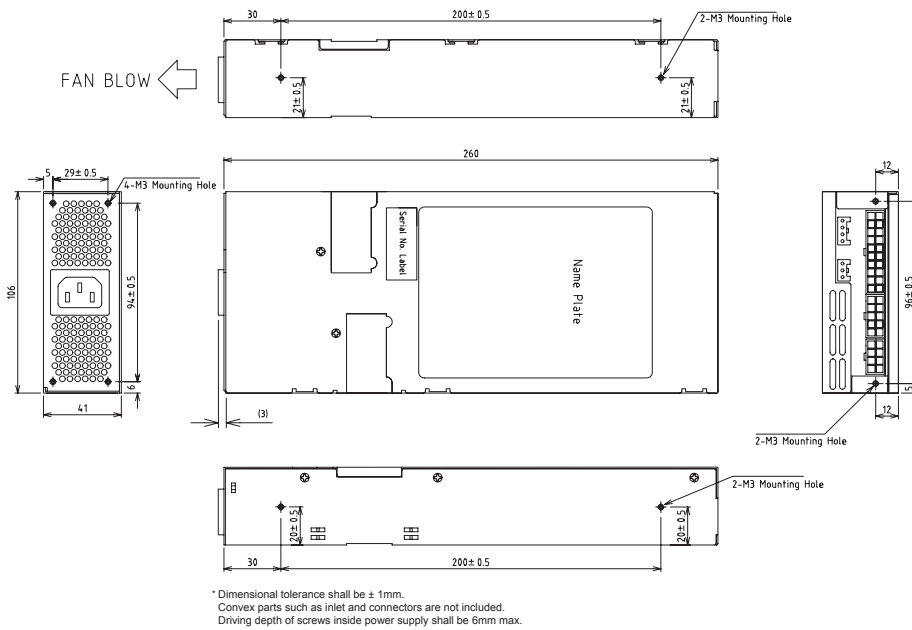
- (1) With PS_ON# 'H (OPEN)', only +5VSB output starts up at AC input.
- (2) All outputs start up at PS_ON# 'L' status. Also, PWR_OK 'H' is delivered 100 - 500ms after +5V has started up.
- (3) Upon receipt of PS_ON# 'H' (OPEN), all outputs shutdown except +5VSB.
- (4) PWR_OK 'L' is delivered 16ms or later after blackout. +5V and +5VSB outputs shut down 1ms or later than that.

Undefined

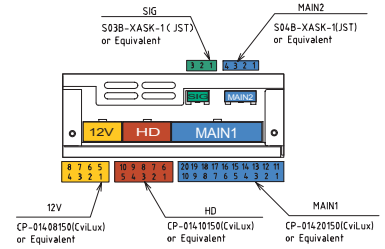
Block Diagram



Outline Drawing



Pin Assignments



Pin	Signal	MAX CURRENT
1	+3.3 V DC	6.0A
2	+3.3 V DC	6.0A
3	+5 V DC	6.0A
4	+5 V DC	6.0A
5	+5 VSB	2.5A
6	+12 V2 DC	6.0A
7	COM	6.0A
8	COM	6.0A
9	COM	6.0A
10	COM	6.0A
11	+3.3 V DC	6.0A
12	+3.3 V DC	6.0A
13	+5 V DC	6.0A
14	+5 V DC	6.0A
15	+5 V DC	6.0A
16	+12 V2 DC	6.0A
17	COM	6.0A
18	COM	6.0A
19	COM	6.0A
20	COM	6.0A

Pin	Signal	MAX CURRENT
1	COM	6.0A
2	COM	6.0A
3	COM	6.0A
4	COM	6.0A
5	+12 V1 DC	6.0A
6	+12 V1 DC	6.0A
7	+12 V1 DC	6.0A
8	+12 V1 DC	6.0A

Pin	Signal	MAX CURRENT
1	+3.3 V DC	6.0A
2	+5 V DC	6.0A
3	COM	6.0A
4	COM	6.0A
5	+12 V2 DC	6.0A
6	+3.3 V DC	6.0A
7	+5 V DC	6.0A
8	COM	6.0A
9	COM	6.0A
10	+12 V2 DC	6.0A

Pin	Signal	MAX CURRENT
1	-12 V DC	0.8A
2	P5_OK	10mA
3	PWR_OK	10mA
4	+3.3 V Sense	10mA

Pin	Signal	MAX CURRENT
1	FAN-M1	5mA
2	FAN-M2	5mA
3	COM	100mA

■ Installation direction
The unit can be installed in any directions.

Optional Components sold Separately



Detachable Output Harness		Output Port Allocation	
Model	Length and Type of Connector		
Main power cable MAIN 1, 2			
WH6113-13	500±15 20-pin	[MAIN 1, 2]	
WH6113-12	500±15 24-pin	[MAIN 1, 2]	
12V power cable 12V			
WH-V0808-500	500±15 12V 8-pin	[12V]	
WH-V0408-500	500±15 12V 4-pin	[12V]	
WH-VG208-500	500±15 12V 4-pin PCI-E 6-pin	[12V]	
WH-VV208-500-02	500±10 12V 8-pin 12V 8-pin	[12V]	
WH-VG208-500-02	500±10 12V 8-pin PCI-E 6-pin	[12V]	
HD power cable HD			
WH-PP610-850	550±15 150±15 150±15	[HD] peripheral (HD)	
WH-PS610-850	550±15 150±15 150±15	[HD] FD	
WH-PS710-850	550±15 150±15 150±15 850±15	[HD] SATA	
SIG cable SIG			
WH-S0603-500	500±15	[SIG]	
WH-S0303-500	500±15	[SIG]	

Acceptable cable (s)

[MAIN 1, 2] [12V] [HD] [SIG]

1 model 1 model 1 model 1 model

Optional Components Sold Separately

Cable			
Picture	Model	Type	Description
	WH2753	AC power cord	125 VAC 12A [PSE]
	WH2753-02	AC power cord	125 VAC 12A (tracking resistance type) [PSE]

Other Optional Components			
Model	Description	Model	Description
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT connector conversion harness
WH2892-02	20-pin extension harness (200mm)	ACC5046	Harness with PS_ON switch
WH2812	PCI-E 6-pin connector conversion harness	ACC5077	PS_ON terminal short connector
		WH5073	PS_ON terminal short 20-pin harness

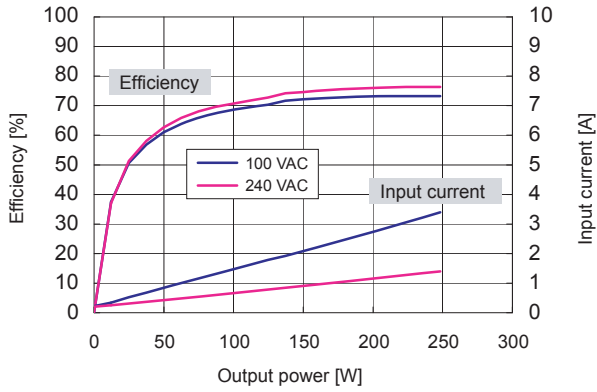
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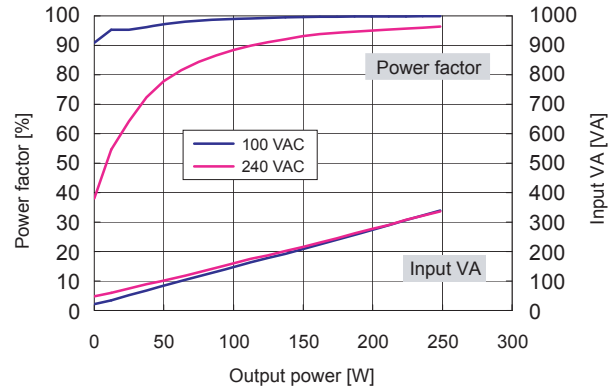
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Characteristics Data (Examples of actual measurement)

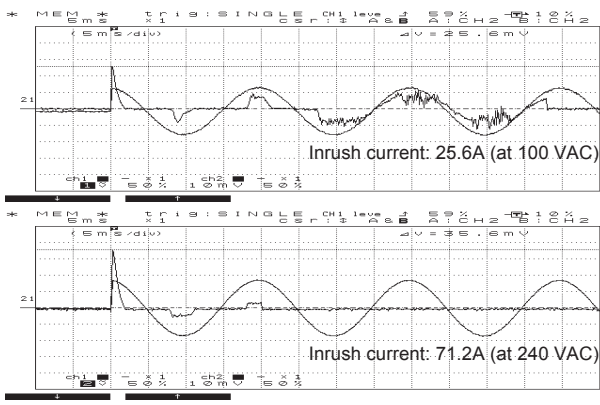
● Fig.4 Efficiency / Input Current vs. Output Power



● Fig.5 Power Factor / Input VA vs. Output Power



● Fig.6 Inrush Current



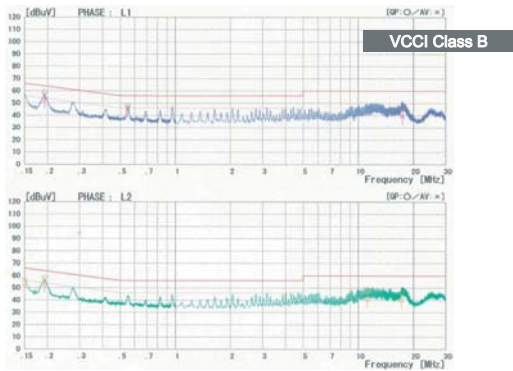
● Fig.7 Leakage Current

Input: 100 / 240 VAC
Load: Rated and min. load

	Rated load	Min. load
100 VAC	0.30mA	0.32mA
240 VAC	0.73mA	0.83mA

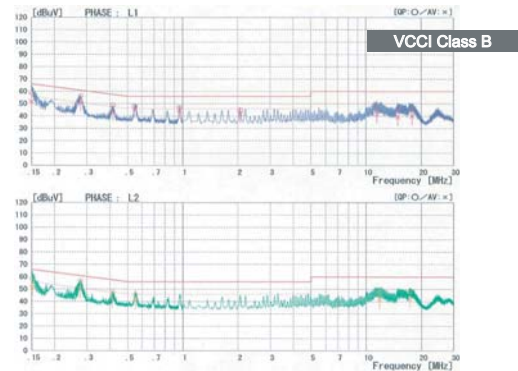
● Fig.8 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: Peak



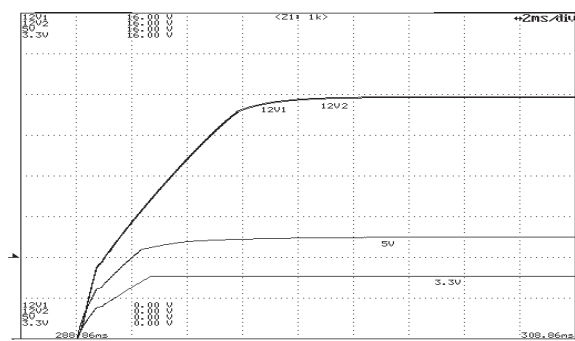
● Fig.9 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode: Peak



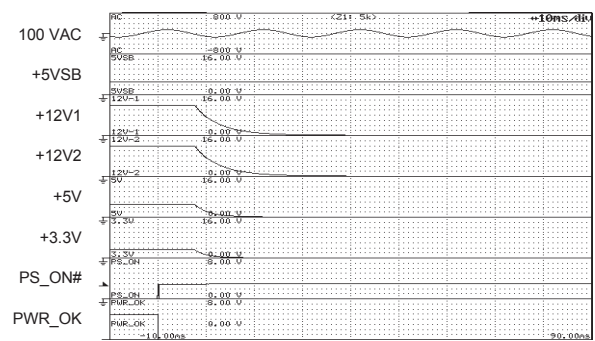
● Fig.10 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 2ms/DIV



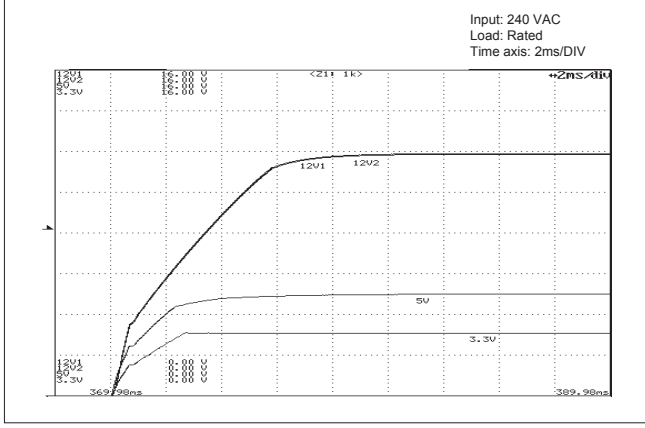
● Fig.11 Falling Characteristics at 100 VAC when REMOTE goes Off

Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV

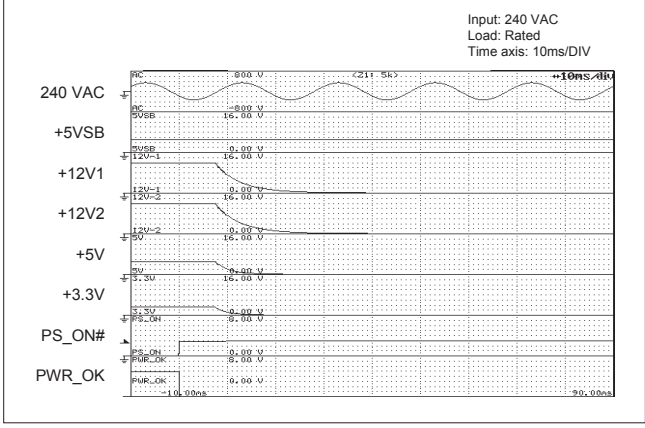


Characteristics Data (Examples of actual measurement)

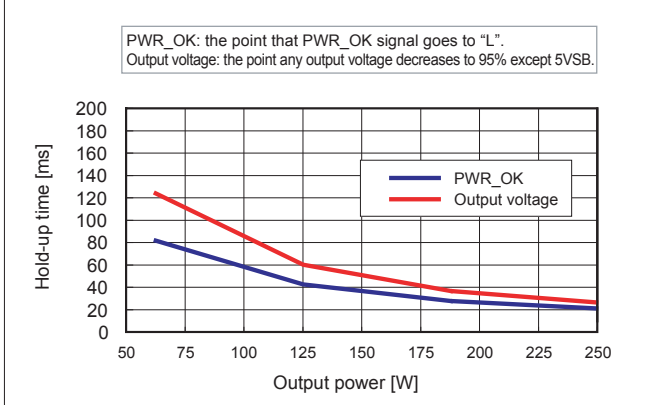
● Fig.12 Rising Characteristics at 240 VAC



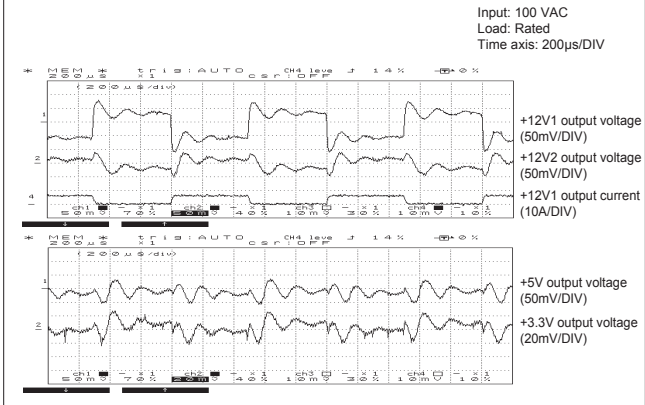
● Fig.13 Falling Characteristics at 240 VAC when REMOTE goes Off



● Fig.14 Output Hold-up Time vs. Output Power



● Fig.15 Dynamic Load Fluctuation Characteristics at 1kHz

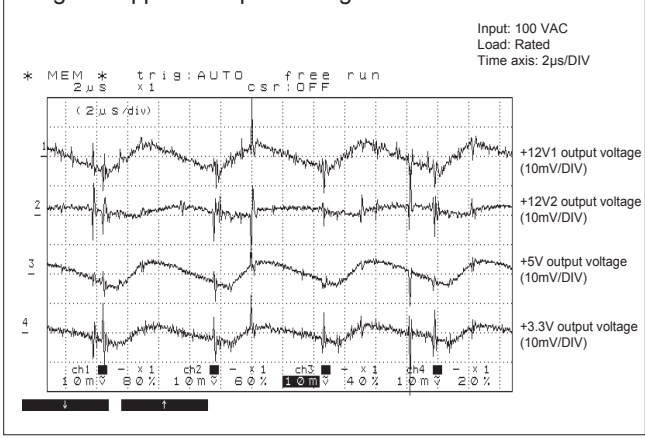


● Fig.16 Output Voltage Regulation

Output	Min. load	Rated load	Peak load
+12V1 output	0A	8A	16A
+12V2 output	0A	6A	10A
+5V output	0A	8A	14A
+3.3V output	0A	8A	16A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V1 output (min. load)	12.009 V	12.008 V	12.007 V	12.007 V	12.006 V	12.006 V
+12V1 output (rated load)	11.820 V	11.818 V	11.818 V	11.819 V	11.818 V	11.820 V
+12V1 output (peak load)	11.553 V	11.552 V	11.553 V	11.555 V	11.553 V	11.554 V
+12V2 output (min. load)	11.998 V	11.997 V	11.996 V	11.995 V	11.994 V	11.994 V
+12V2 output (rated load)	11.902 V	11.900 V	11.900 V	11.899 V	11.900 V	11.899 V
+12V2 output (peak load)	11.870 V	11.870 V	11.869 V	11.869 V	11.868 V	11.869 V
+5V output (min. load)	5.130 V	5.130 V	5.130 V	5.130 V	5.130 V	5.130 V
+5V output (rated load)	5.059 V	5.060 V	5.060 V	5.060 V	5.060 V	5.060 V
+5V output (peak load)	5.026 V	5.027 V	5.026 V	5.026 V	5.026 V	5.026 V
+3.3V output (min. load)	3.326 V	3.326 V	3.326 V	3.326 V	3.326 V	3.326 V
+3.3V output (rated load)	3.264 V	3.264 V	3.264 V	3.264 V	3.264 V	3.264 V
+3.3V output (peak load)	3.228 V	3.229 V	3.229 V	3.229 V	3.229 V	3.229 V

● Fig.17 Ripple and Spike Voltage



● Fig.18 Ambient Temperature vs. Expected Service Life

■ Electrolytic capacitors

Input: 85 VAC
Load: Rated
Operating time: 24 consecutive hours

Intake air temp.	20°C	30°C	40°C
Expected service life (yr)	approx. 20	approx. 9.9	approx. 5.0

※ Lifetime shall be 15 years at longest due to deterioration of sealing plates.

■ Fan

Ambient temp.	30°C	40°C	50°C	60°C
Expected service life (yr)	approx. 13	approx. 13	approx. 8.7	approx. 5.8

● Fig.19 Over Current Protection (V-I Characteristic)

