Desktop PC Power Supply ePCSA-500P Series

Model	Description	Stock
ePCSA-500P-X2S	———	Standard stock
ePCSA-500P-X2C	CCC approved	Standard stock

■Model Name Coding

ePCSA - 500 P - X 2 S
① ② ③ ④ ⑤ ⑥

1. Series name
2. Output power
3. Peak output compliant
4. ATX output
5. +3.3V output equipped
6. S: Standard
   C: CCC approved

Features

- All outputs equipped with voltage regulation circuit individually 0A (Zero amp.) as min. load for all outputs. Driving stably with brand new high performance CPU.
- 500W high power ATX power supply
- 74ms output hold-up time with 200W at instantaneous blackout to cover poor power condition
- By building in the thermal-sensing variable speed fan, noise reduction can be realized. Heat related issue for CPU can be settled with fan speed changeover switch.
- Removable cooling FAN
- Designed to last 10 years min. with continuous rated operation at 45°C
- Active filter (PFC) equipped to meet 99% of power factor at 100 VAC

Ready to use with full option!
'Mina-Motto san' series

Mina-Motto san series
"ePCSA-500P-X2S-MN" contains;

- Power supply
- Output harness set (6 types)
  - WH-M2024-500: 1 pcs
  - WH-M2424-500: 1 pcs
  - WH-V0808-500: 1 pcs
  - WH-VG208-500: 1 pcs
  - WH-PP610-850: 1 pcs
  - WH-PS610-850: 2 pcs

  *Refer to p.131
- AC power cable: WH2753
- 2P conversion plug
- AC power cable coming off prevention clamp: ACC2734
- Mounting screws
- Operation manual
- Warranty

ePCSA-500P-X2S-MN (Standard stock)

Refer to "Product Page Guideline" on p.13

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

*CCC: only ePCSA-500P-X2C

Function

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

Input

AC input	85 - 264V (worldwide range)

Output

Output voltage	*+3.3V*	*+5V*	*+12V*	*-12V*	*+5VSB*
Max. current/ max. power (continuous)	20A	22A	22A	0.5A	2A
	Total 160W				
	Total 334W				
	Total 350W				
Peak current / peak power (5 sec max.)	30A	33A	30A	0.5A	2.5A
	Total 200W				
	Total 482W				
	Total 500.5W				
Min. current	0A	0A	0A	0A	0A

Dimensions

W×H×D (mm)	150×86×140 (PS / 2 size)

Output connector (optional component)

Main 20+4pin | Main 24pin | Main 20pin | AT | AUX | 12V 4pin | 12V 8pin | PCI-E 6pin | PCI-E 6+2pin | HDD | S-ATA | FDD

*Refer to p.131 "Detachable output harness" for details

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

	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		99% typ. (100 VAC), 97% typ. (240 VAC) *Characteristic data: Fig.5					
	Inrush Current		31A peak (100 VAC), 75A peak (240 VAC) *Characteristic data: Fig.6					At rated input/output at cold start (25°C)
	Input VA		513VA max. (100 VAC), 487VA max. (240 VAC) *Characteristic data: Fig.5					At rated input and max. output
			754VA max. (100 VAC), 714VA max. (240 VAC)					At rated input and peak output
Output	Rated Voltage		+3.3V	+5V	+12V	-12V	+5VSB	
	Rated Current		11.5A	16A	18A	0.5A	2A	Rated output power: 350W
	Max. Current / Power		20A	22A	22A	0.5A	2A	Max. output power: 350W
			160W max.					
			334W max.					
	Peak Current / Power		30A	33A	30A	0.5A	2.5A	Peak output power: 500.5W Time: 5 sec or less Duty ratio of repetitive load: 10% or less *Refer to Fig.2
			200W max.					
			482W max.					
	Min. Current		0A	0A	0A	0A	0A	
	Total Voltage Accuracy(%)		±4 max.	±4 max.	±5 max.	±5 max.	±5 max.	Total accuracy of temperature, input, and load fluctuations
	Max. Ripple Voltage (mVp-p)		50 max.	50 max.	120 max.	120 max.	50 max.	Two wires are coming out from the output connector and connected into one at the edge. 10μF electrolytic capacitor and 0.1μF ceramic capacitor are placed on it and it is measured. *Characteristic data: Fig.17
	Max. Spike Voltage (mVp-p)		100 max.	100 max.	170 max.	170 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	31 min.	34 min.	31 min.	105% min. of peak current		All other outputs are at rated input/output
		Method	All outputs except for +5VSB shutdown			Fold back current limiting	Same as +3.3, +5, and +12V	
		At AC Operation	Reclosing AC input or switching PS_ON# signal from 'H' to 'L'			Automatic recovery		
	Overvoltage Protection	OVP Point (V)	3.76 - 4.3	5.74 - 7.0	13.4 - 15.6	-	-	
		Method	All outputs except for +5VSB shutdown			-	-	
		At AC Operation	Reclosing AC input or switching PS_ON# signal from 'H' to 'L'			-	-	
Environment	Operating Temp. / Humidity		0 to 60°C* / 10 to 90%					*Refer to Fig.3 No condensation
	Storage Temp. / Humidity		-25 to 70°C / 10 to 95%					No condensation
	Vibration		Displacement amplitude: 0.075mm (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
Insulation	Dielectric Strength		AC input - DC output/FG: 1500 VAC for 1 minute					
	Insulation Resistance		AC input - DC output/FG: 50MΩ min.					At 500 VDC
	Leakage Current		0.5mA max. (100 VAC) / 1mA max. (200 VAC) *Characteristic data: Fig.7					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 compliant *Characteristic data: Fig.8 and 9					Measured by single unit
	Harmonic Current Regulation		IEC61000-3-2 (Ver.2.1) Class D, EN61000-3-2 (A14) Class D compliant					At rated input/output
Others	Safety Standard		UL60950, CSA C22.2 No.60950 (c-UL), EN60950, CE Marking (LVD, EMC), CCC (S&E)*					*Only for ePCSA-500P-X2C
	Cooling System		Forced air cooling: fan control can be switched between thermal-sensing variable speed and stabilized full rotation modes.					Fan rotates at low speed depending on the internal temperature of power supply even PS_ON# signal 'H'.
	Output Grounding		Connected to chassis (FG)*					*It can be customized to connect to capacitor
	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		96,000H min.					Based on EIAJ RCR-9102
	Weight		1.8kg 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.

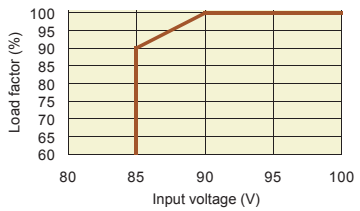


Fig.2 Duty Ratio

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

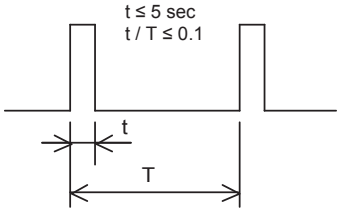
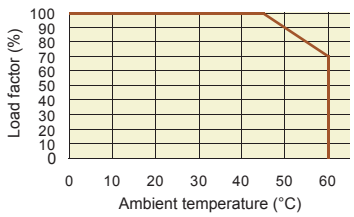
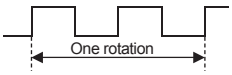


Fig.3 Temperature Derating

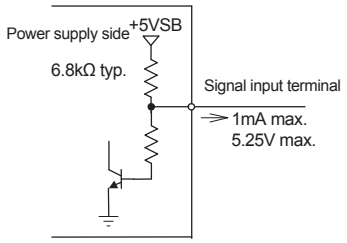
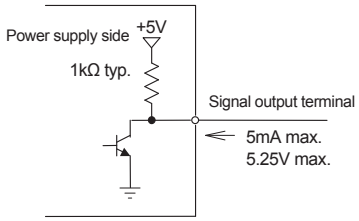
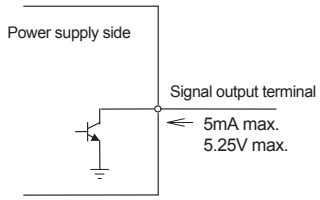
When the ambient temperature (near the airflow inlet) exceeds 45°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

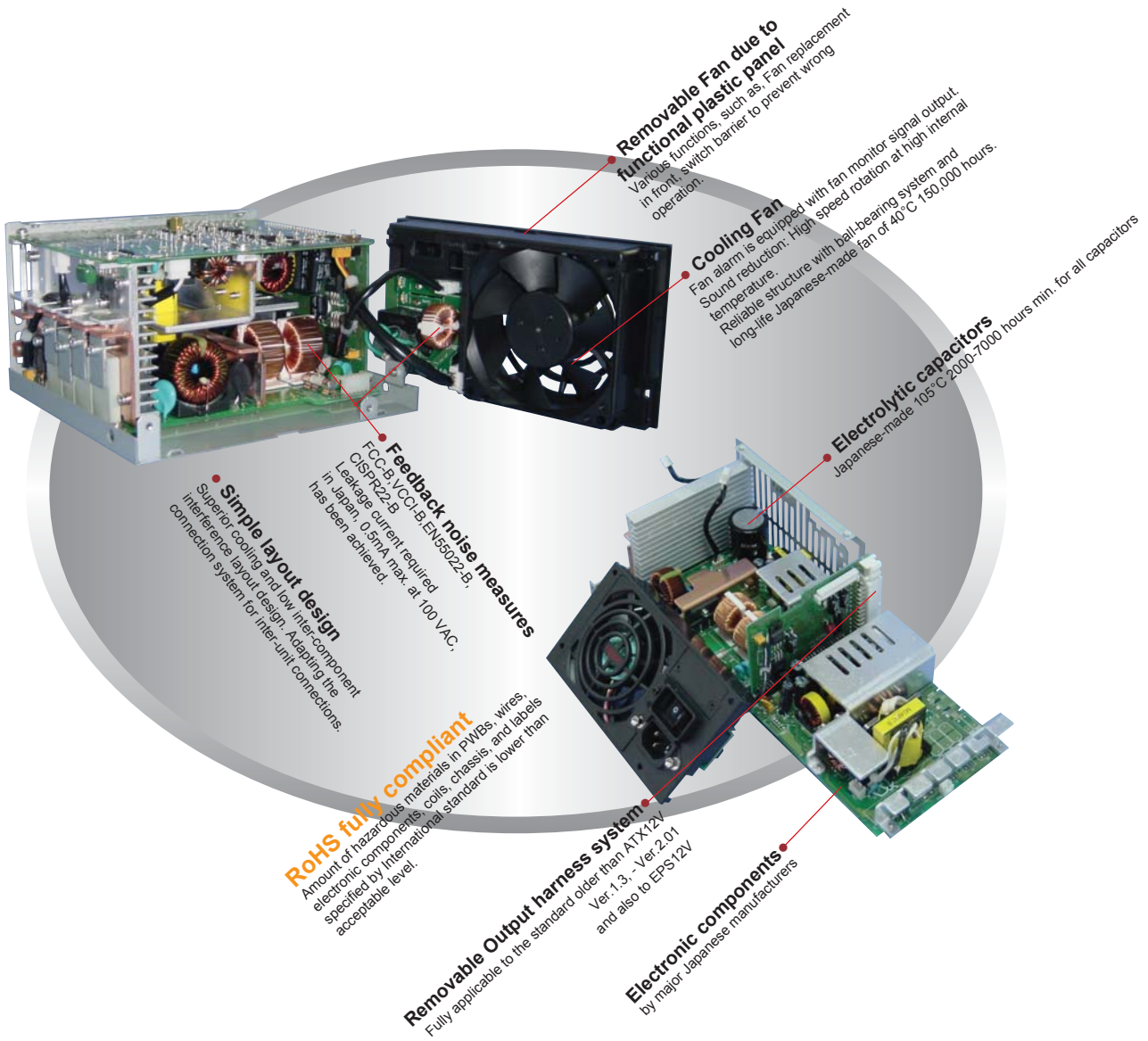


Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

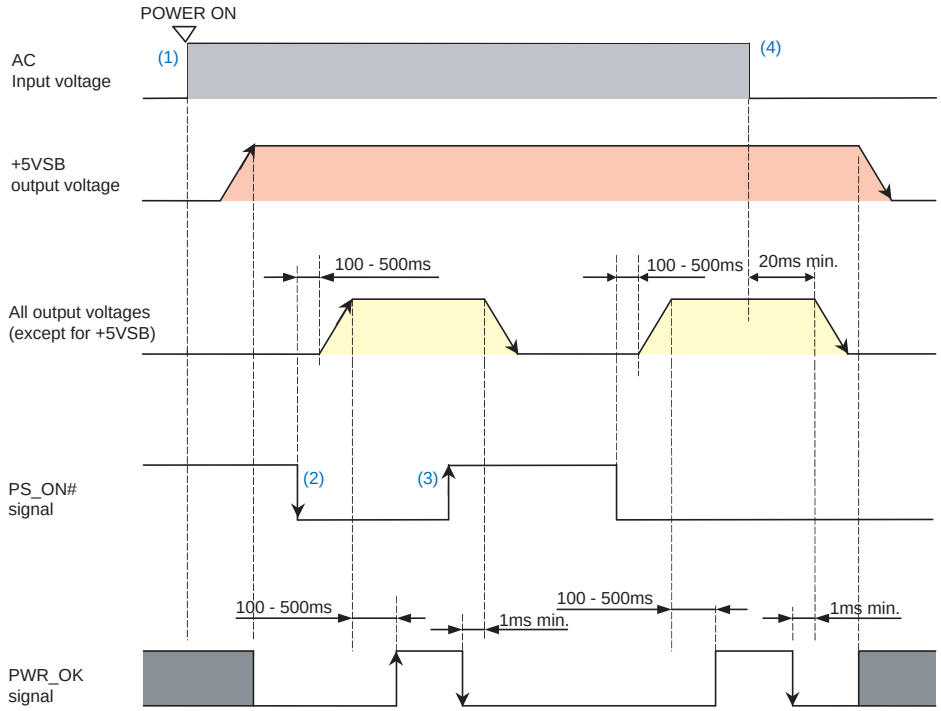
	Items	Specification	Note
Input Signal	Output ON / OFF Control Signal (PS_ON#)	+3.3V, +5V, +12V, and -12V outputs shutdown with 'H' or 'OPEN' input.	The pin 16 of MAIN connector and the pin 6 of SIG connector
Input Signal	+3.3V SENSE	The input terminal to detect the voltage of +3.3V output; by connecting to the load terminal, only the line drop of the + side of the output cable is compensated.	The pin 1 of MAIN connector and the pin 8 of SIG connector
Output Signal	Normal Output Signal (PWR_OK)	'H'signal is delivered at normal output (detection delay time: 100 - 500ms).	The pin 8 of MAIN connector
Output Signal	Fan Monitor Signal (FAN M)	Two cycle pulses per one rotation of the fan motor are delivered.	The pin 5 of SIG connector 

Signal Circuit

Input Signal Circuit	(PS_ON#)	Input Signal Circuit	(PWR_OK)	(FAN M)
	 ('L'≤0.8V, 2.0V≤'H')		 ('L'<0.4V)	 ('L'<0.4V)

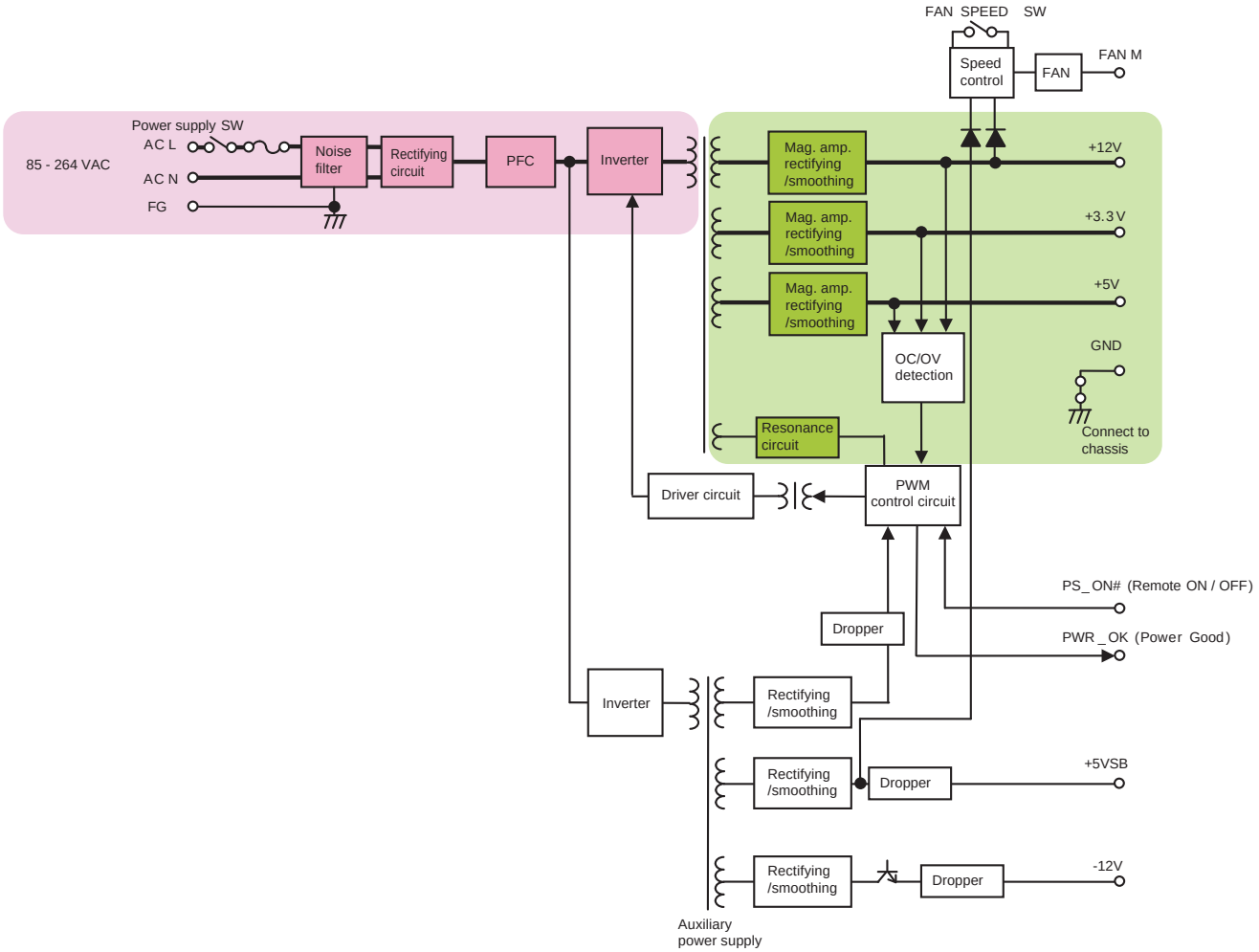


Sequence Diagram

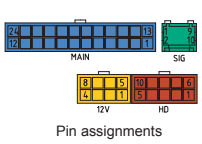


(1) With PS_ON# 'H (OPEN)', only +5VSB output starts up at AC input.
(2) All outputs start up at PS_ON# 'L' input. Also, PWR_OK goes to 'H' at 100 - 500ms after the +5V output has risen.
(3) At PS_ON# 'H (OPEN)' input, outputs except for +5VSB shut down.
(4) All outputs except for +5VSB shut down after 20ms or longer from blackout Before 1ms or longer than this event, PWR_OK turns to 'L'.

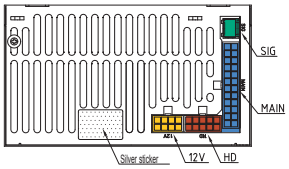
Block Diagram



Outline Drawing



Pin assignments

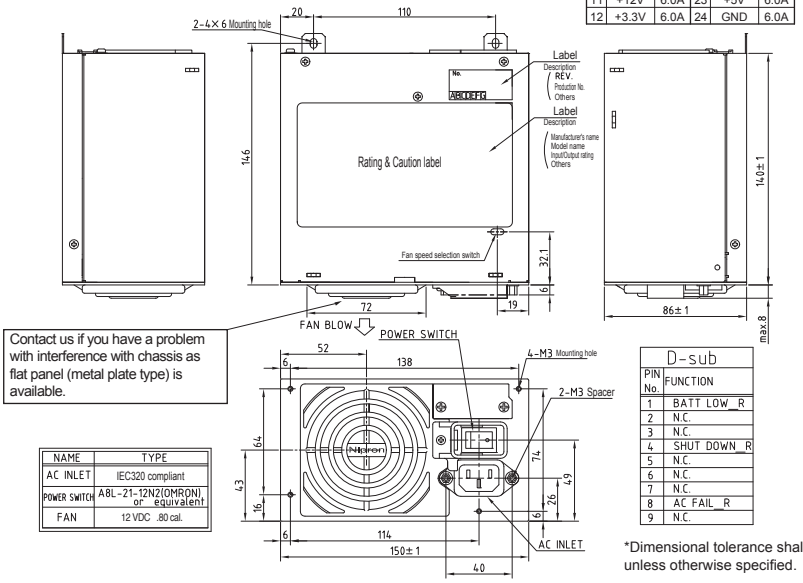


MAIN					
PIN No.	FUNCTION	MAX CURRENT	PIN No.	FUNCTION	MAX CURRENT
1	+3.3V SENSE	10mA	13	+3.3V	6.0A
2	+3.3V	6.0A	14	-12V	0.5A
3	GND	6.0A	15	GND	6.0A
4	+5V	6.0A	16	PS_ON#	1mA
5	GND	6.0A	17	GND	6.0A
6	+5V	6.0A	18	GND	6.0A
7	GND	6.0A	19	GND	6.0A
8	PWR_OK	5mA	20	NC	-
9	+5VSB	2.5A	21	+5V	6.0A
10	+12V	6.0A	22	+5V	6.0A
11	+12V	6.0A	23	+5V	6.0A
12	+3.3V	6.0A	24	GND	6.0A

12V					
PIN No.	FUNCTION	MAX CURRENT	PIN No.	FUNCTION	MAX CURRENT
1	GND	7.0A	5	+12V	7.0A
2	GND	7.0A	6	+12V	7.0A
3	GND	7.0A	7	+12V	7.0A
4	GND	7.0A	8	+12V	7.0A

HD					
PIN No.	FUNCTION	MAX CURRENT	PIN No.	FUNCTION	MAX CURRENT
1	+3.3V	7.0A	6	+3.3V	7.0A
2	+5V	7.0A	7	+5V	7.0A
3	GND	7.0A	8	GND	7.0A
4	GND	7.0A	9	GND	7.0A
5	+12V	7.0A	10	+12V	7.0A

SIG		
PIN No.	FUNCTION	MAX CURRENT
1	NC	-
2	NC	-
3	NC	-
4	NC	-
5	FAN M	5mA
6	PS_ON#	1mA
7	GND	2.0A
8	+3.3V SENSE	10mA
9	NC	-
10	+5VSB	2.0A



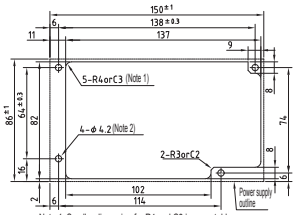
Contact us if you have a problem with interference with chassis as flat panel (metal plate type) is available.

NAME	TYPE
AC INLET	IEC320 compliant
POWER SWITCH	A8L-21-12N2(OMRON) or equivalent
FAN	12 VDC .80 cal.

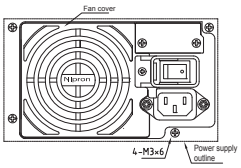
D-sub	
PIN No.	FUNCTION
1	BATT LOW_R
2	N.C.
3	N.C.
4	SHUT DOWN_R
5	N.C.
6	N.C.
7	N.C.
8	AC FAIL_R
9	N.C.

*Dimensional tolerance shall be ± 0.5 unless otherwise specified.

Power supply mounting hole processing drawing (Recommended)



Note 1: Smaller dimension for R4 and C3 is acceptable.
Note 2: Threaded hole for mounting



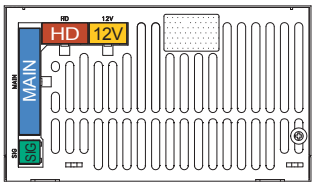
When replacing a fan with power supply mounted to the chassis of PC, etc., process holes as specified.

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

Optional Components Sold Separately

Detachable Output Harness

Model	Length and Type of Connector	
Main power cable MAIN		
WH-M2024-500	MAIN 500±15 → 20-pin	
WH-M2424-500	MAIN 500±15 → 24-pin	
12V power cable 12V		
WH-V0808-500	12V 500±15 → 12V 8-pin	
WH-V0408-500	12V 500±15 → 12V 4-pin	
WH-VG208-500	12V 500±15 → 12V 4-pin, PCI-E 6-pin	
WH-VV208-500-02	12V 500±10 → 12V 8-pin, 12V 8-pin	
WH-VG208-500-02	12V 500±10 → 12V 8-pin, PCI-E 6-pin	
HD power cable HD		
WH-PP610-850	HD 550±15 → 150±15, 150±15	peripheral (HD)
WH-PS610-850	HD 550±15 → 150±15, 150±15	FD
WH-PS710-850	HD 550±15 → 150±15, 150±15; 850±15	S-ATA
SIG cable SIG		
WH-S0610-500	SIG 500±15 → SIG-1	
WH-S0610-500-01	SIG 500±15 → SIG-2	
WH-S0310-500	SIG 500±15 → SIG-3	
Harness set MAIN 12V HD		
WHS2828	[contents] / WH-M2024-500 (1) / WH-M2424-500 (1) / WH-V0808-500 (1) / WH-VG208-500 (1) / WH-PP610-850 (1) / WH-PS610-850 (2)	



Acceptable cable(s)

MAIN	12V	HD	SIG
1 model	1 model	1 model	1 model

Optional Components Sold Separately

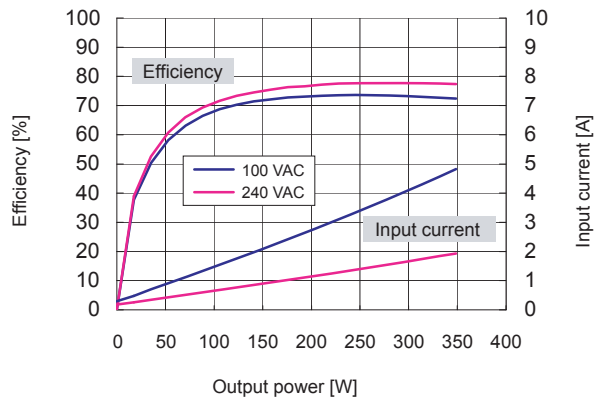
Cable			
Picture	*Model*	*Type*	*Description*
	WH2753	AC power cord	125 VAC 12A [PSE]
	WH2753-02	AC power cord	125 VAC 12A (tracking resistance type) [PSE]

Parts / Unit			
Picture	*Model*	*Type*	*Description*
	ACC2734	AC power cord retention clamp	It prevents the slipping of AC power cord (WH2753, WH2753-02)and operational mistakes of power switch. *In some cases, the clamp (ACC2734) might not be possible mounted to a commercial AC power cord.

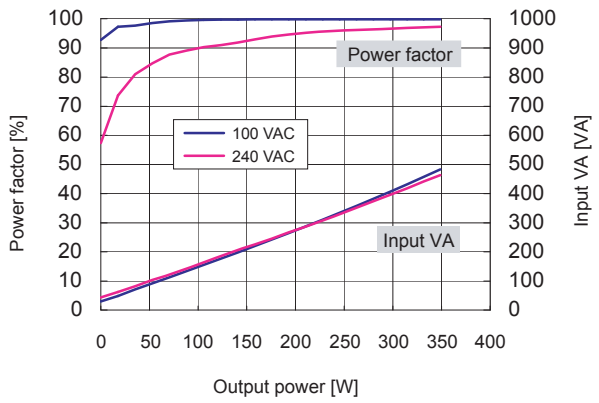
Other Optional Components			
Model	*Description*	*Model*	*Description*
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT 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

Characteristics Data ePCSA-500P-X2S (Examples of actual measurement)

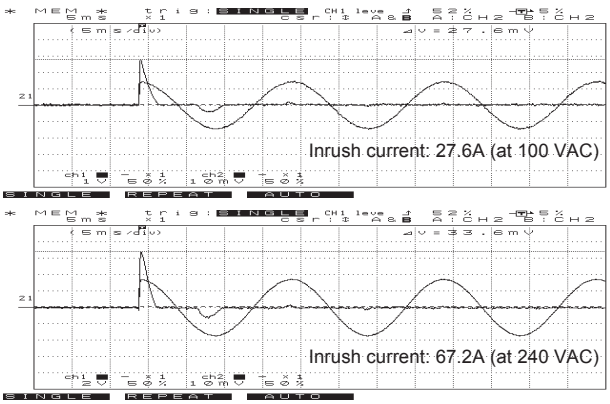
● Fig.4 Efficiency / Input Current vs. Output Power



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



● Fig.6 Inrush Current



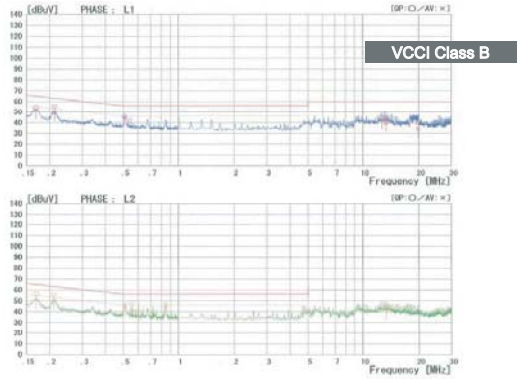
● Fig.7 Leakage Current

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

	Rated load	Min. load
100 VAC	0.28mA	0.23mA
240 VAC	0.45mA	0.45mA

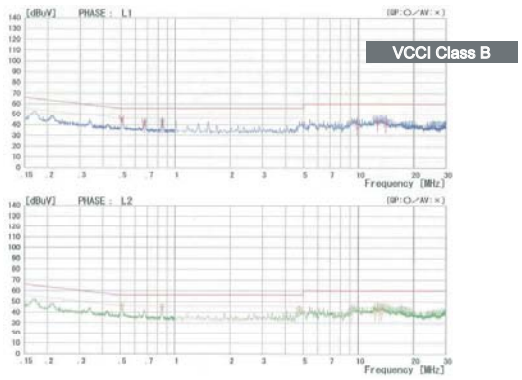
● Fig.8 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode:Peak



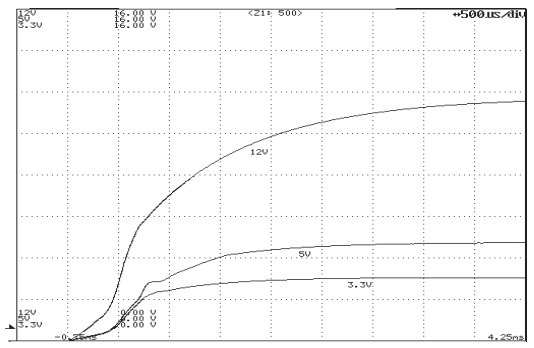
● Fig.9 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode:Peak



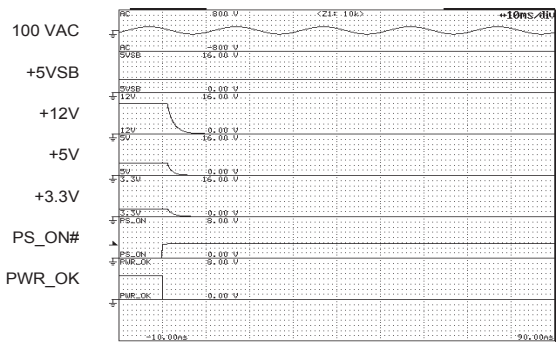
● Fig.10 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 500μs/DIV



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

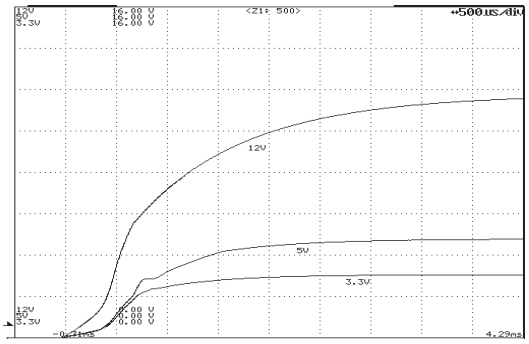
Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV



Characteristics Data ePCSA-500P-X2S (Examples of actual measurement)

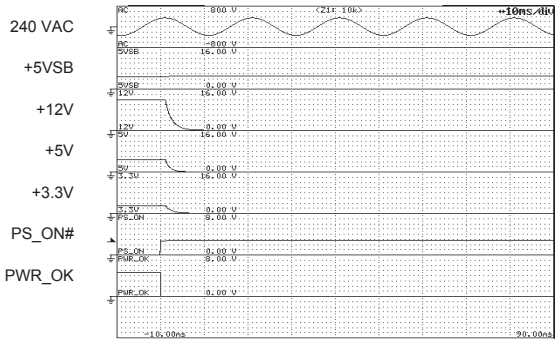
● Fig.12 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 500μs/DIV



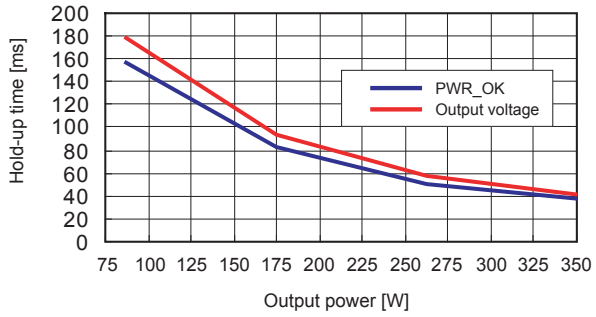
● Fig.13 Falling Characteristics at 240 VAC when REMOTE goes Off

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



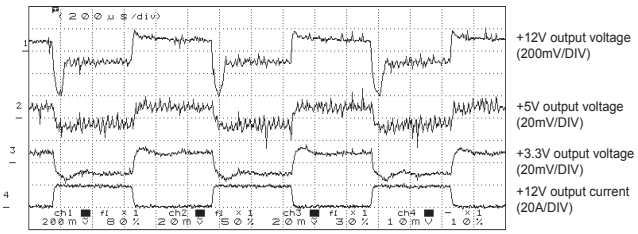
● Fig.14 Output Hold-up Time vs. Output Power

PWR_OK: the point that PWR_OK signal goes to "L"
Output voltage: the point any output voltage decreases to 95% except +5VSB



● Fig.15 Dynamic Load Fluctuation Characteristics at 1kHz

Input: 100 VAC
Load: Rated
Time axis: 200μs/DIV



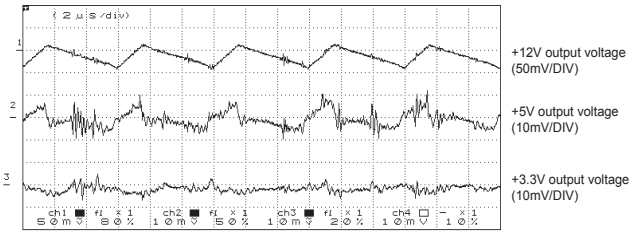
● Fig.16 Output Voltage Regulation

Output	Min. load	Rated load	Peak load
+12V output	0A	18A	30A
+5V output	0A	16A	33A
+3.3V output	0A	11.5A	30A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V output(min. load)	12.086 V	12.088 V	12.087 V	12.087 V	12.087 V	12.087 V
+12V output(rated load)	11.955 V	11.956 V	11.954 V	11.955 V	11.955 V	11.955 V
+12V output(peak load)	11.896 V	11.896 V	11.895 V	11.896 V	11.896 V	11.896 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)	5.005 V	5.005 V	5.005 V	5.005 V	5.005 V	5.005 V
+5V output(peak load)	4.914 V	4.914 V	4.914 V	4.914 V	4.914 V	4.914 V
+3.3V output(min. load)	3.402 V	3.402 V	3.402 V	3.402 V	3.402 V	3.402 V
+3.3V output(rated load)	3.307 V	3.307 V	3.307 V	3.307 V	3.307 V	3.307 V
+3.3V output(peak load)	3.239 V	3.239 V	3.239 V	3.239 V	3.239 V	3.239 V

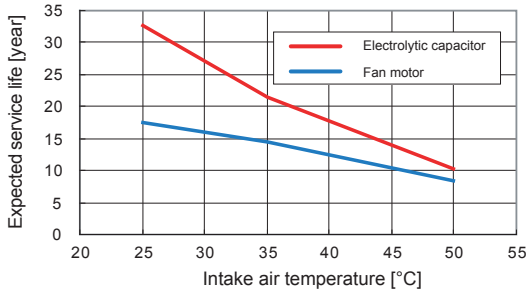
● Fig.17 Ripple and Spike Voltage

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



● Fig.18 Ambient Temperature vs. Expected Service Life

Input: 100 VAC
Load: Rated
Operating time: 24 consecutive hours



*Load is reduced based on the temperature derating curve at 45°C or higher.
*Life span for electrolytic capacitor shall be 15 years max. considering the degradation of the sealing plate.

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

Input: 100 VAC