Desktop PC Power Supply PCSA-470P-E2J1

Model	Description	Stock	Standard Price (without tax)
PCSA-470P-E2J1	———	Standard stock	¥25,300

■Model Name Coding

PCSA - 470 P - E 2 J 1
① ② ③ ④⑤⑥⑦

1. Series name
2. Output power
3. Peak output compliant
4. EPS output
5. 3.3V output equipped
6. Modification code
7. Modification number

Features

- Four S-ATA connectors equipped
- 12V4-pin connector and processor (12V8-pin) connector equipped
- By building in the thermal-sensing variable speed fan, noise reduction can be realised.
- Having TSFC fan function gets rotate the fan with low speed due to reduce the heat if the internal temperature at standby mode is high soon after PC shutdown.

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

Input

AC input	85 - 264V (worldwide range)

Output

Output voltage	*+3.3V*	*+5V*	*+12V*	*-12V*	*+5VSB*
Max. current / max. power (continuous)	20A	20A	16.7A	0.9A	2.2A
	Total 20A				
	Total 294W				
	Total 305W				
Peak current / peak power (5 sec max.)	30A	30A	23.3A	0.9A	3.0A
	Total 30A				
	Total 150W				
	Total 456W				
Min. current	2A	2A	0A	0A	0A

Dimensions

W×H×D (mm)	150×86×160 (PS/2 +size)

Output connector

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

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, but up to 253V for harmonic regulation *Refer to Fig.1
	Input Frequency		50 / 60Hz					47-63Hz
	Efficiency		67% min. (100 VAC), 71% min. (240 VAC) *Characteristic data: Fig.5					At rated output
	Power Factor		95% min. (100 VAC), 92% min. (240 VAC) *Characteristic data: Fig.6					
	Inrush Current		50A peak (100 VAC) *Characteristic data: Fig.7					Input reclosing interval shall be 10 sec min. at rated load. The inrush current into X-capacitor of input noise filter is not specified unless its period is more than 100µs.
	Input VA	Operation	500VA typ. (at rated load), 700VA typ. (at peak load) *Characteristic data: Fig.6					
		Standby	30VA typ. (at 100V input), 60VA typ. (at 240V input)					PS_ON# signal 'H' or 'OPEN' at rated load of +5VSB
			9VA typ. (at 100V input), 47VA typ. (at 240V input)					PS_ON# signal 'H' or 'OPEN' at no load of +5VSB
Output	Rated Voltage		+3.3V	+5V	+12	-12V	+5VSB	
	Rated Current		10A	10A	16.7A	0.9A	2.2A	
	Max. Current / Power		20A	20A	16.7A	0.9A	2.2A	Max output power: 305W Peak output power: 456W However, it shall be 5 sec max. and duty ratio shall 10% max., in repeated operation *Refer to Fig.2: Duty ratio *Refer to Fig.4: Output power distribution *Refer to Fig.1 and 3: Derating
			20A max.					
			294W max.					
	Peak Current / Power		30A	30A	23.3A	0.9A	3.0A	
			30A max.					
	Min. Current		2A*	2A*	0A	0A	0A	*Or total power of +3.3V, +5V is 17W min.
	Total Voltage Accuracy (%)		+5/-3 max.	+5/-4 max.	+5/-4 max.	+9/-5 max.	+5/-4 max.	*Refer to Fig.4 Accuracy with humidity, temperature, time drift for input/load change within power in range
	Max. Ripple Voltage (mVp-p)		50 max.	50 max.	120 max.	120 max.	50 max.	Measured on the test board with a capacitor (47µF) connected. The test board shall be separated from the load wires and within 150mm from the output terminal. *Characteristic data: Fig.18
	Max. Spike Voltage (mVp-p)		100 max.	100 max.	170 max.	170 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	31 min.	-	-	-	-	At min. output current, except measured output
			-	40 min.	24 min.	0.95 min.	3.1 min.	At max. output power, except measured output *However, only +3.3V is no load
		Method	Hold down current limiting → +3.3V, +5V, +12V, -12V output shutdown			Fold back current limiting	Blocking oscillation	All outputs shutdown when +5VSB is shorted. (automatic recovery)
		Recovery	Reclosing of input (10 sec min. interval) or PS_ON# signal 'H' to 'L'			Automatic recovery		
	Overvoltage Protection	OVP Point (V)	3.7 - 4.3	5.7 - 7.0	13.8 - 15.6	-	-	
		Method	+3.3V, +5V, +12V, -12V output shutdown			-	-	
		Recovery	Reclosing of input (10 sec min. interval) or PS_ON# signal 'H' to 'L'			-	-	
	Overvoltage Protection	OPP Point (V)	Total output power: 300W min. / Delay time: 6 sec min.				-	
		Method	+3.3V, +5V, +12V, -12V output shutdown (Retardation shutdown method)				-	
		Recovery	Reclosing of AC input (10 sec min. interval) or PS_ON# signal 'H' to 'L'					
	Fan Stop Protection		At fan motor stops by failure, +3.3V, +5V, +12V, -12V output shutdown					Reclosing of AC input (10 sec min. interval) or PS_ON# signal reclosing
Environment	Operating Temp. / Humidity		0 to 60°C* / 20 to 90%					*Refer to Fig.3 No condensation
	Storage Temp. / Humidity		-20 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-0040-1999, 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-0043-1995, at no operation
Insulation	Dielectric Strength		AC input - DC output/FG: 1500 VAC for 1 minute					Cut-off current: 20mA max.
	Insulation Resistance		AC input - DC output/FG: 50MΩ min.					At 500 VDC At normal temp. / humidity
			DC output - FG: 50MΩ min.					
	Leakage Current		0.5mA max. (100 VAC) / 1mA max. (200 VAC) *Characteristic data: Fig.8					At normal temp. / humidity
EMC	Line Noise Immunity		± 2000V (pulse width: 100/1000ns, repetitive cycle: 30-100Hz, normal/common modes with pos./neg. polarity for 1 minute)					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 compliant *Characteristic data: Fig.9 and 10					Measured by single unit
	Harmonic Current Regulation		IEC61000-3-2 Class D					At input voltage range of 90 to 253V
Others	Safety Standard		UL60950, CSA60950 (c-UL), EN60950-1					
	Cooling System		Forced air cooling: thermal-sensing variable speed fan embedded					Fan speed changes by temperature and load.
	Output Grouding		Capacitor grounding					
	Output Hold-up Time		PWR_OK holds up 17ms min. after AC failure *Characteristic data: Fig.15					At rated output
	Reliability Grade		HOA					Follow our standard
	MTBF		100,000 H min					Based on EIAJ RCR-9102
	Weight		2.6 kg typ					
	Warranty		1 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

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

Fig.1 Low Input Voltage Derating

When input voltage is 90(100)VAC or lower, follow this chart to derate rated current/power, max. current/power, and peak current/power.

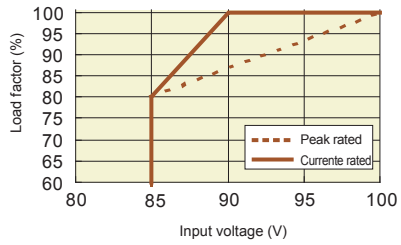


Fig.2 Duty Ratio

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

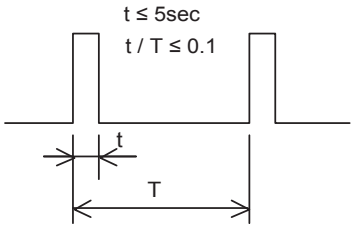


Fig.3 Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 30°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.

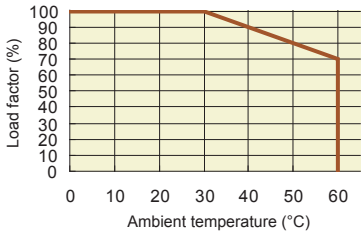
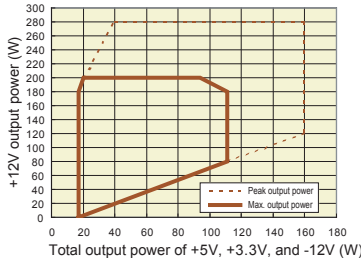
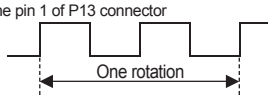


Fig.4 Output Power Cross Regulation

Total of each output (Voltage times Current) shall be within the Output power cross regulation.



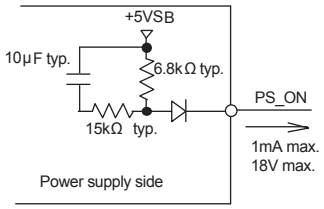
Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

	Items	Specification	Note
Input Signal	Output ON / OFF Control Signal (PS_ON#)	+3.3V, +5V, +12V, and -12V outputs are delivered with 'L' input. +3.3V, +5V, +12V, and -12V outputs shutdown with 'H' or 'OPEN' input and, protection circuit is activated to reset locked latch circuit at output shutdown status.	Signal input between the pin 16 of P1 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 13 of P1 connector
	Fan Control Signal (FAN C)	Fan motor is rotated at full speed at input voltage of 10.5V±5% or higher. Speed control inside the power supply comes first when input voltage is lower than that or open.	The pin 2 of P13 connector
Output Signal	Normal Output Signal (PWR_OK)	'H' signal is delivered when the +5V output is normal (detection delay time: 200 - 500ms).	The pin 8 of P1 connector
	Fan Monitor Signal (FAN M)	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.	The pin 1 of P13 connector 

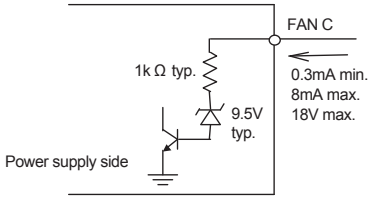
Signal Circuit

Input Signal Circuit

(PS_ON#)

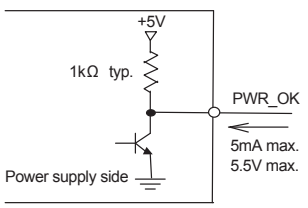


(FAN C)

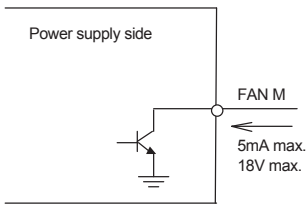


Output Signal Circuit

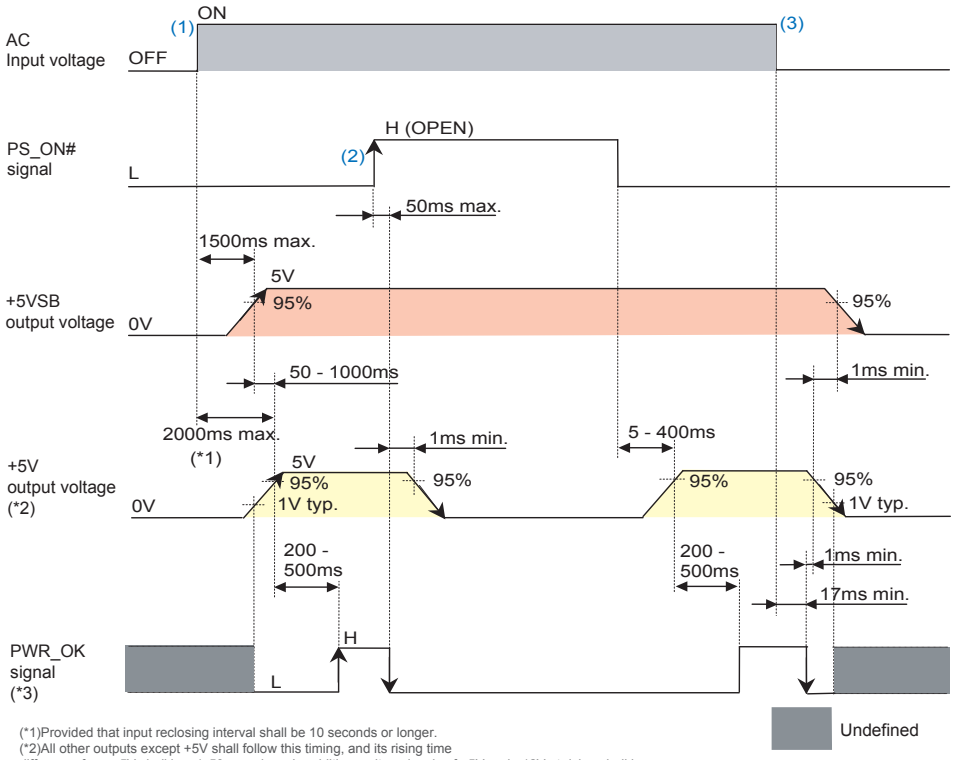
(PWR_OK)



(FAN M)



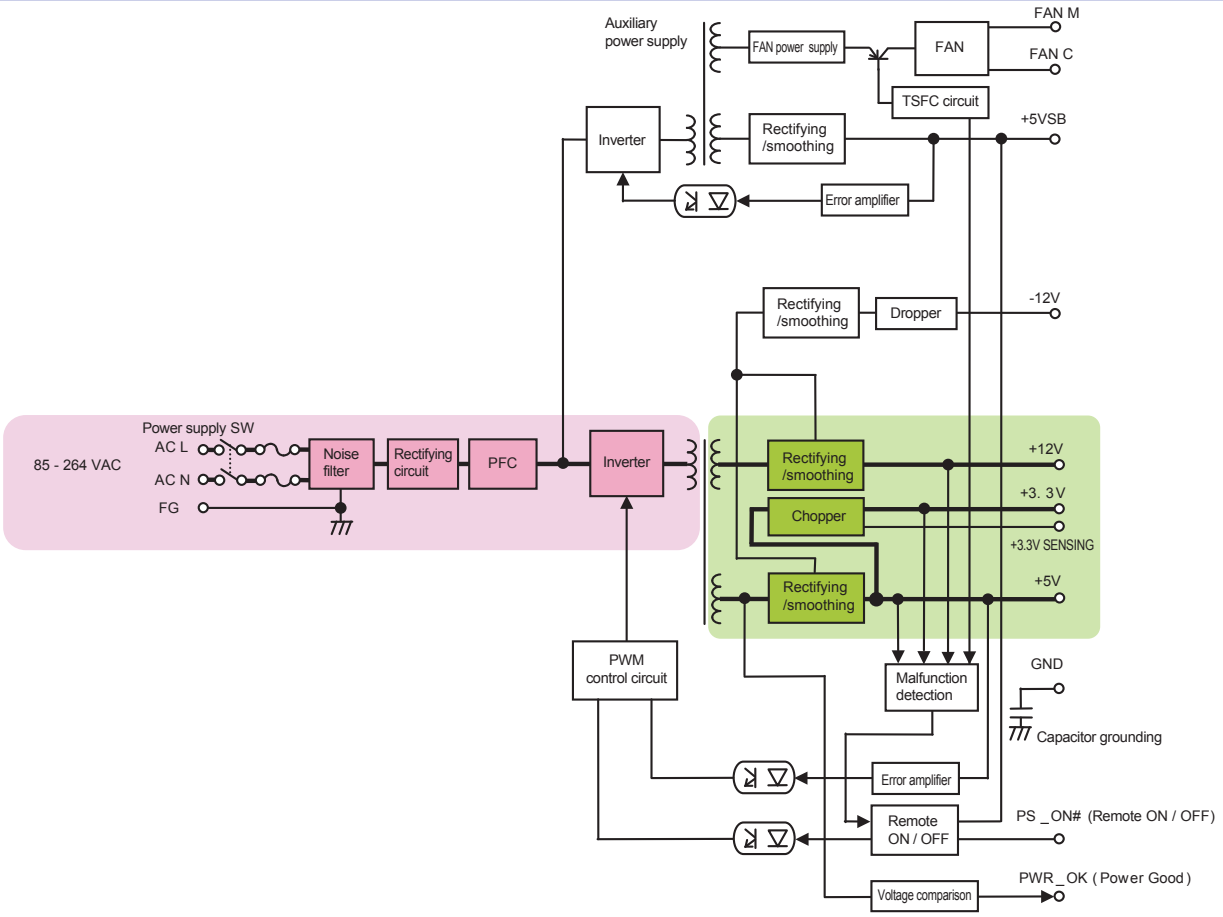
Sequence Diagram



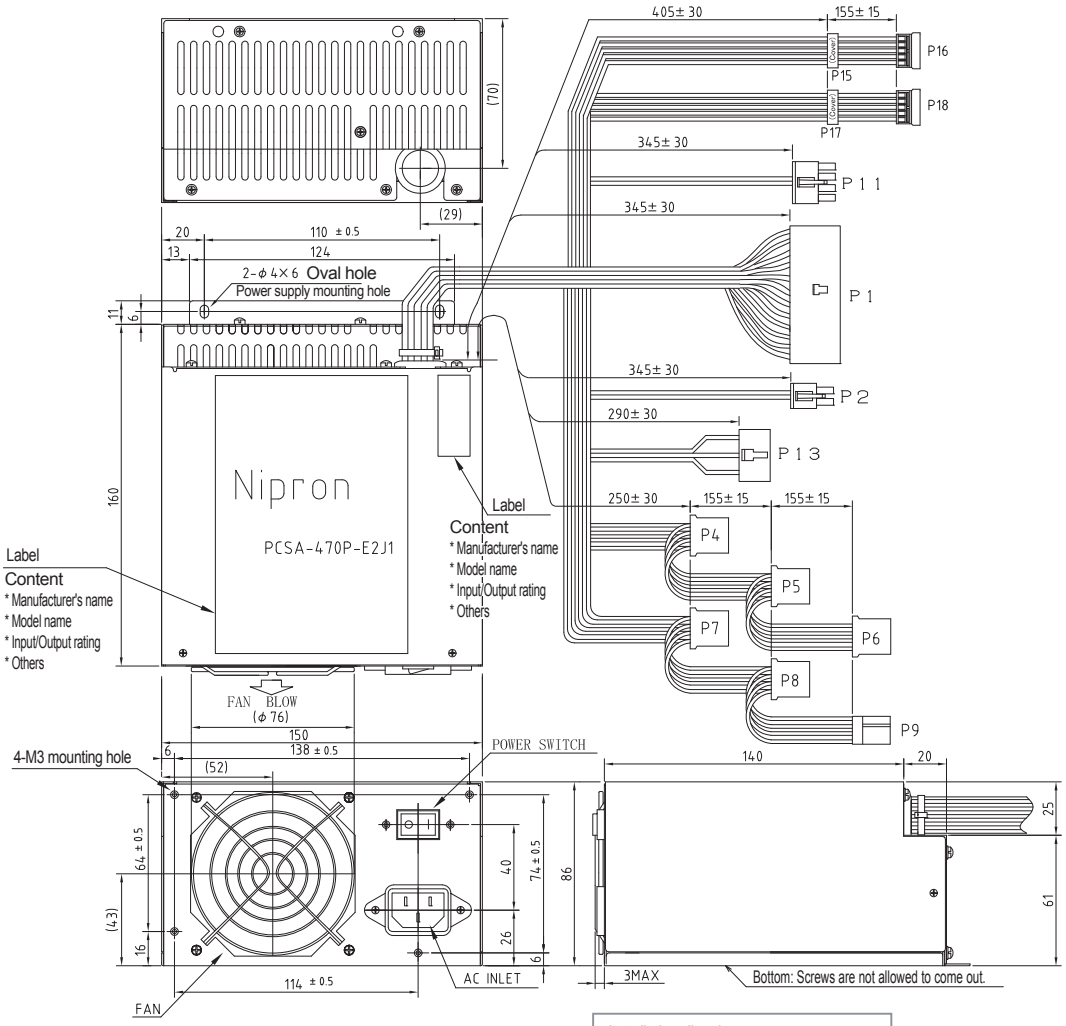
(*1)Provided that input reclosing interval shall be 10 seconds or longer.
(*2)All other outputs except +5V shall follow this timing, and its rising time difference from +5V shall be +/- 50ms or less. In addition, voltage levels of +5V and +12V at rising shall be more than the voltage level of +3.3V, and also voltage level difference between +5V and +3.3V shall be 2.25V max. The order and output voltage level difference of each output at falling shall not be specified.
(*3)Falling and Rising time of PWR_OK signal shall be 100µs or less. (Providing that capacitive load is not connected to signal output).

(1)All outputs start up by being supplied AC input under the condition of PS_ON# 'L'. PWR_OK 'H' is delivered at 200 - 500ms after +5V output has risen.
(2) At PS_ON# 'H (OPEN)' input, outputs except for +5VSB shut down.
(3) PWR_OK turns to 'L' after 17ms or longer from blackout. 1ms later than this event, the +5V output shuts down.

Block Diagram



Outline Drawing / Output Harness



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

	PIN NO	FUNCTION	MAX CURRENT	WIRE COLOR	WIRE TYPE (UL1007)	CONNECTOR TYPE
P1	1	+3.3V	6.0A	Orange	AWG#18	Housing: CP-01124030 (CviLux) or equivalent
	2	+3.3V	6.0A	Orange		
	3	GND	6.0A	Black		
	4	+5V	6.0A	Red		
	5	GND	6.0A	Black		
	6	+5V	6.0A	Red		
	7	GND	6.0A	Black		
	8	PWR_OK	5mA	Gray	AWG#22	
	9	+5V SB	3.0A	Purple	AWG#18	
	10	+12V	6.0A	Yellow		
	11	+12V	6.0A	Yellow		
	12	+3.3V	6.0A	Orange		
	13	+3.3V	6.0A	Orange	AWG#18	
		+3.3V SENSING	6.0A	Brown	AWG#22	
	14	-12V	1.0A	Blue	AWG#20	
	15	GND	6.0A	Black	AWG#18	
	16	PS_ON	1mA	Green	AWG#22	
	17	GND	6.0A	Black	AWG#18	
	18	GND	6.0A	Black		
	19	GND	6.0A	Black		
	20	N.C.	-			
	21	+5V	6.0A	Red	AWG#18	
	22	+5V	6.0A	Red		
	23	+5V	6.0A	Red		
	24	GND	6.0A	Black		
P2	1	GND	5.0A	Black	AWG#20	Housing: CP-01104030 (CivLux) or equivalent
	2	GND	5.0A	Black		
	3	+12V	5.0A(*1)	Yellow		
	4	+12V	5.0A(*1)	Yellow		
P4 ～ P8	1	+12V	6.0A(*2)	Yellow	AWG#18	Housing: LCP-04 (JST) or equivalent
	2	GND	6.0A(*2)	Black		
	3	GND	6.0A(*2)	Black		
	4	+5V	6.0A(*2)	Red		
P9	1	+5V	1.0A	Red	AWG#20	Housing: 171822-4 (AMP) or equivalent
	2	GND	1.0A	Black		
	3	GND	1.0A	Black		
	4	+12V	1.0A	Yellow		
P11	1	GND	6.0A	Black	AWG#18	Housing: CP-01108030 (CviLux) or equivalent
	2	GND	6.0A	Black		
	3	GND	6.0A	Black		
	4	GND	6.0A	Black		
	5	+12V	6.0A(*1)	Yellow		
	6	+12V	6.0A(*1)	Yellow		
	7	+12V	6.0A(*1)	Yellow		
	8	+12V	6.0A(*1)	Yellow		
P13	1	FAN M	5mA	White	AWG#22	Housing: CP-01110030 (CviLux) or equivalent
	2	FAN C	10mA	Blue		
	3	+3.3V SENSING	10mA	Brown		
	4	N.C.	-			
	5	N.C.	-			
	6	N.C.	-			
	7	N.C.	-			
	8	N.C.	-			
	9	N.C.	-			
	10	N.C.	-			
P15 ～ P18	Wire 1	+12V	2.0A(*1,*3)	Yellow	AWG#18	Housing: CI94PF00100 (CviLux) or equivalent
	Wire 2	GND	2.0A(*3)	Black		
	Wire 3	+5V	2.0A(*3)	Red		
	Wire 4	GND	2.0A(*3)	Black		
	Wire 5	+3.3V	2.0A(*3)	Orange		

*1 Total current of P2, P11, and P15 to P18 of +12V output shall be 13A or less.
*2 Total current per the same pin no. of P4, P5, P6, P7, P8, and P9 shall be 9A or less individually.
*3 Total current of P15 and P16, and total current of P17 and P18 shall be 9A or less individually. Also, total current of P2, P11, P15 to P18 of +12V output shall be 13A or less.

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

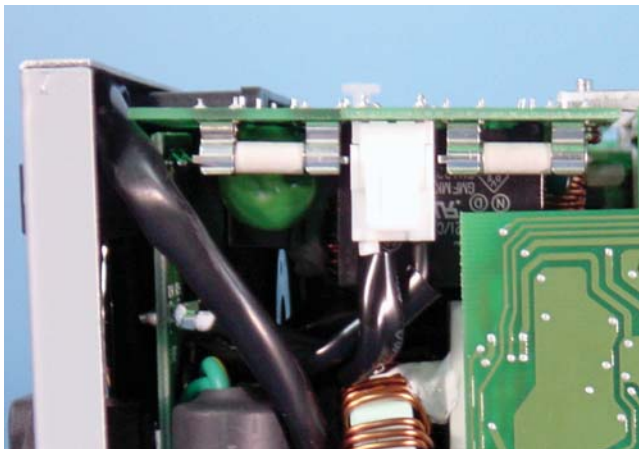
*Dimensional tolerance shall be ± 1.

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]

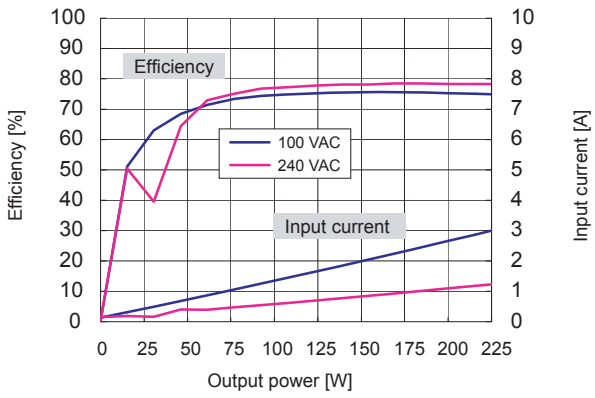
Other Optional Components			
Model	*Description*	*Model*	*Description*
ACC2637	Automatic startup unit	WH5105	12V 4-pin connector conversion harness (80mm)
WH2820	20-pin extension harness (600mm)	WH5105-02	12V 4-pin connector conversion harness (320mm)
WH2747	20-pin extension harness (450mm)	WH5055	AT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

Internal Structure

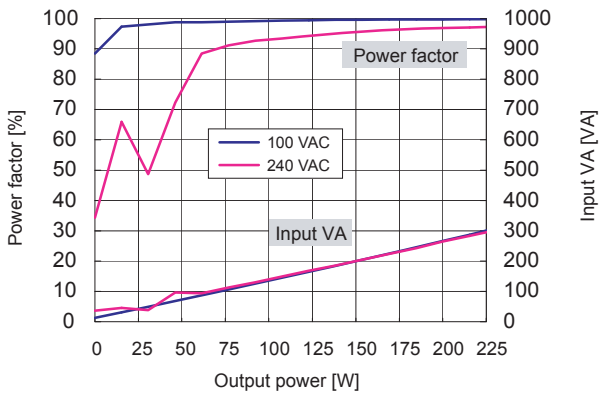


Characteristics Data (Examples of actual measurement)

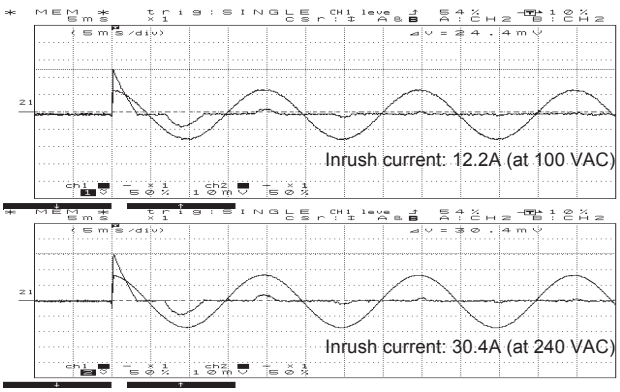
● Fig.5 Efficiency / Input Current vs. Output Power



● Fig.6 Power Factor / Input VA vs. Output Power



● Fig.7 Inrush Current



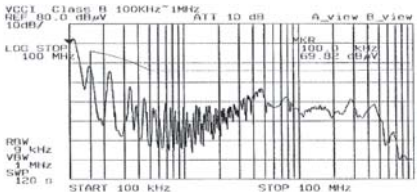
● Fig.8 Leakage Current

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

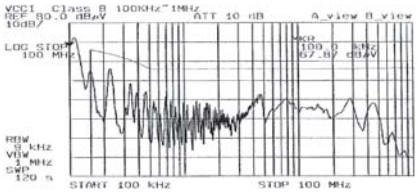
	Rated load	Min. load
100 VAC	0.30mA	0.30mA
240 VAC	0.69mA	0.74mA

● Fig.9 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode:QP



Measuring point: L-FG

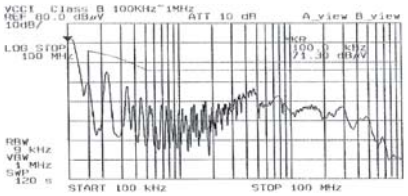


Measuring point: N-FG

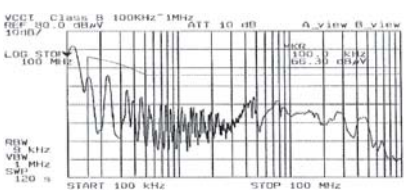
In-house measurement data

● Fig.10 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode:QP



Measuring point: L-FG

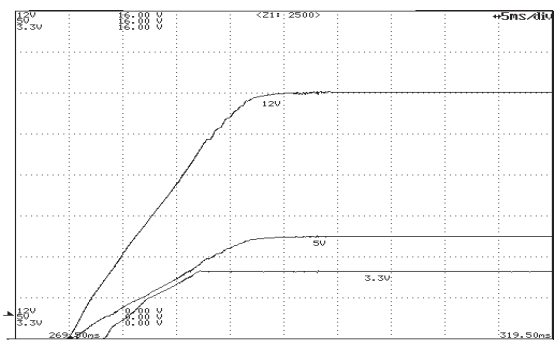


Measuring point: N-FG

In-house measurement data

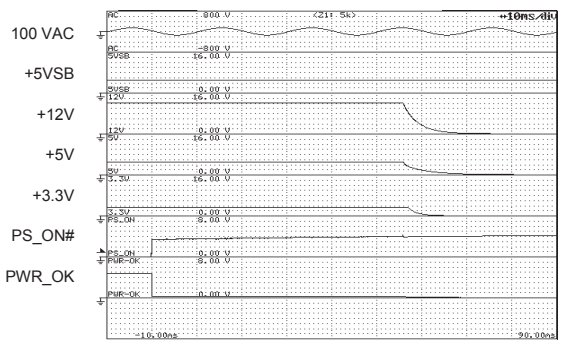
● Fig.11 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 5ms/DIV



● Fig.12 Falling Characteristics at 100 VAC when REMOTE goes Off

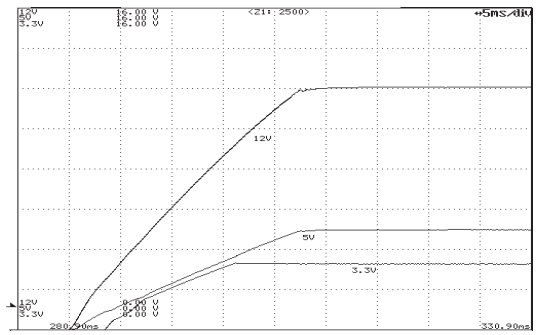
Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV



Characteristics Data (Examples of actual measurement)

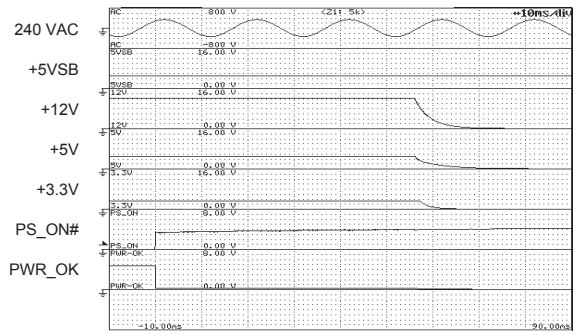
● Fig.13 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 5ms/DIV



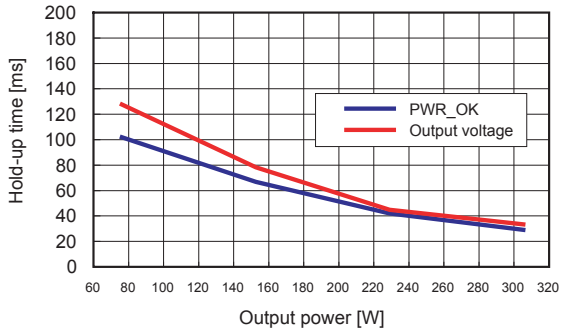
● Fig.14 Falling Characteristics at 240 VAC when REMOTE goes Off

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



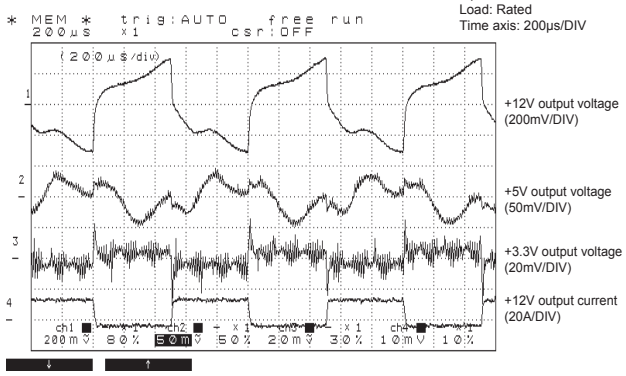
● Fig.15 Output Hold-up Time vs. Output Power

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



● Fig.16 Dynamic Load Fluctuation Characteristics at 1kHz

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



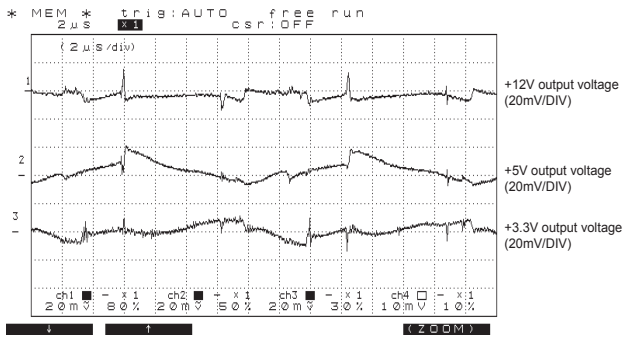
● Fig.17 Output Voltage Regulation

Output	Min. load	Rated load	Peak load
+12V output	0A	16.7A	23.3A
+5V output	2A	10A	30A
+3.3V output	0A	10A	30A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC
+12V output (min. load)	12.296 V	12.301 V	12.302 V	12.302 V
+12V output (rated load)	12.150 V	12.151 V	12.150 V	12.150 V
+12V output (peak load)	12.207 V	12.207 V	12.203 V	12.201 V
+5V output (min. load)	5.023 V	5.021 V	5.021 V	5.021 V
+5V output (rated load)	4.996 V	4.995 V	4.996 V	4.996 V
+5V output (peak load)	4.893 V	4.893 V	4.894 V	4.894 V
+3.3V output (min. load)	3.343 V	3.344 V	3.344 V	3.344 V
+3.3V output (rated load)	3.310 V	3.311 V	3.311 V	3.311 V
+3.3V output (peak load)	3.271 V	3.271 V	3.272 V	3.272 V

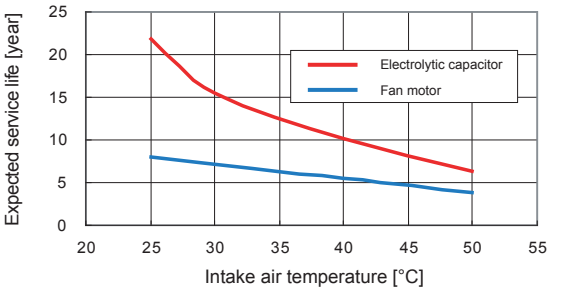
● Fig.18 Ripple and Spike Voltage

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



● Fig.19 Ambient Temperature vs. Expected Service Life

Input: 90 VAC
Load: Rated
Operating time: 24 consecutive hours



*Load is reduced based on the temperature derating curve at 30°C or higher.
*Life span for electrolytic capacitor shall be 15 years max. considering the degradation of the sealing plate.

● Fig.20 Over Current Protection (V-I Characteristic)

Input: 100 VAC