System rack power supply PS5092/PS5093

Model	Description	Stock	Standard Price (Before Tax)
PS5092	Single type	Lead time: 30 days for 1 to 5 pcs., 100 days for 6 pcs. or more.	¥25, 200
PS5093	Redundant power supply	Lead time: 30 days for 1 to 5 pcs., 100 days for 6 pcs. or more.	¥47, 700

■ Model Name Coding

PS509 ＊
① ②

① Series name
② 2: Single type
3: Redundant power supply

Features

PS5092/PS5093

- Cram-free Design
- Plug-in at the front for easy maintenance
- FAN at the front for easy replacement

PS5093

- Nipron's redundant power supply is much different from easygoing and facile redundant in parallel.
- Hot swappable
- Perfect load balance operation (except -12V)
- Voltage drop compensation for Oring diodes by feedback
- 220W available in parallel operation

Refer to B-B1 "Product page guideline" for icons.

Safety standard	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 | Fit for Pen4 | RoHS Directive

Input

AC input	85V to 132V

● Output

Output voltage	+5V	+12V	-12V
Max.current/ Max.power (continuous)	15A	2A	1A
	Total 111W		
Min. load	2A	0A	0A

● Dimension

W×H×D(mm)	PS5092	138×70×278
	PS5093	135×138×278

● Output connectors

20 Pin | 24 Pin | AT | 12V | AUX | Processor | ×2 | FDD | S-ATA | PCI-E

※ Pinout assignment differs from ATX.

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

Specification for PS5093 is in [].

	Page	Items		Specification			Measurements, etc.
AC input	D-6(1)	Rated voltage		A C100V (AC85 to 132V) Data on B-F38 Fig.7-8			
	D-6(2)	Frequency		50/60Hz			47 to 63Hz
	D-6(3)	Efficiency		68% typical [65% typical] Data on B-F38 Fig.1			at rated Input/Output
	D-6(4)	Power factor		70% min. Data on B-F38 Fig.2			
	D-6(5)	Inrush current		20A peak Data on B-F38 Fig.3 [40A peak max. (Total current of tow modules)]			at AC 100V input with rated Input/Output Input reclosing interval shall be 10 seconds or longer.
	D-6(6)	Input VA		250VA typical Data on B-F38 Fig.2			at rated Input/Output
Output	—	Rated voltage		+5V	+12V	-12V	
	—	Rated current		15A	2A	1A	
	D-6(8)	Max.Current /Power		15A	2A	1A	Max. output power: 111W
					111W		
	D-6(9)	Peak Current /Power			[4A]	[2A]	Peak output power: 222W Available output peak current and power by two modules ※1
				[30A]	[222W]		
	D-6(10)	Min. load		2A	0A	0A	
	—	Current balancing circuit		Equipped		N/A	See item ※2 below.
	D-6 (11)-⑧	Total Voltage Accuracy (%)		±5 max.	±5 max.	±5 max.	Total accuracy of Temperature, Input, and Load fluctuations.
	D-7(12)	Max. Ripple Voltage (mVp-p)		50 max.	120 max.	120 max.	To be measured on a test board with a 47μF electrolytic capacitor connected. The test board shall be away from load lines and within 150mm from output terminals. Data on B-F40 Fig.21
	D-7(12)	Max. Spike Voltage (mVp-p)		100 max.	170 max.	170 max.	
Protection	D-7(13)	Overcurrent Protection	OCP point (A)	16.5 min. [33 min.]	2.2 min. [4.4 min.]	1.1 min. [2.2 min.]	at Min. load except the output to be measured. [at Peak output current except the output to be measured]
			Method	All outputs shutdown			
			Short circuit	There shall be no malfunction.			Do not conduct rapid short circuit, and long-term overcurrent/short circuit as it may affect lifetime.
			Recovery	Reclosing of AC input (Reclosing interval shall be 60 seconds or longer.)			
	D-7(14)	Overvoltage Protection	OVP point (V)	6.0 [5.6] ~ 7.0	—	—	
			Method	All outputs shutdown	—	—	
			Recovery	Reclosing of AC input Reclosing interval shall be 60 seconds or longer.	—	—	
Environment	D-7(16)	Operating Temp. and Humidity		0-50°C/20-90%			No condensation
	D-7(17)	Storage Temp. and Humidity		-20-70°C/10-95%			No condensation
	D-7(18)	Vibration		To endure for 30 minutes the following conditions of full amplitude: 0.15mm, vibration frequency: 5 to 500Hz,and sweep cycle: 3 minutes in each of X, Y, and Z direction			at no operation
	D-7(19)	Mechanical strength		There shall be no malfunction after the test of acceleration of 98m/s^2 and impact duration of 20ms once in each X-, -Y, and -Z.			at no operation
Insulation	D-7(20)	Dielectric Strength		AC 1500V for 1 minute between AC input and DC-output/FG			Cut-off current: 20mA max. at normal temp. and humidity
	D-7(21)	Insulation Resistance		50MΩ min. between AC input and DC-output/FG, and between DC-output/FG			at DC 500V and normal temp. and humidity
	D-7(22)	Leakage Current		0.5mA [1.5mA] max. at AC 100V Data on B-F38 Fig.4			
EMC	D-7(23)	Line Noise Immunity		2000V (Pulse width: 50/1000ns, Cycle period: 30-100Hz)			There shall be no DC-component fluctuation and malfunction in output.
	D-7(24)	Electrostatic Discharge		EN61000-4-2 compliant			
	D-7(25)	Radiated, radio-frequency, electromagnetic field immunity		EN61000-4-3 compliant			
	D-7(26)	Fast Transient Burst		EN61000-4-4 compliant			
	D-7(27)	Lightning Surge		EN61000-4-5 compliant			
	D-7(28)	Conductive Radio-Frequency Electromagnetic Field		EN61000-4-6 compliant			
	D-7(29)	Power Frequency Magnetic Field Immunity		EN61000-4-8 compliant			
	D-8(30)	Voltage Dips and Fluctuation		EN61000-4-11 compliant compliant Data on B-F39 Fig.)			
	D-8(31)	Conducted Emission		VCCI-A compliant			To be measured on single power supply at rated Input/Output
	D-8(32)	Harmonic Current Regulation		IEC61000-3-2 Class D compliant Data on B-F38 Fig.5			To be measured on single power supply at rated Input/Output
Others	D-8[1-6]	Safety Standard		IEC60950 compliant			Class I embedded type power supply
	D-8(34)	Cooling System		Forced air cooling			
	D-8(35)	Output GND Grounding		Connected to Chassis (FG)			
	D-8(38)	Output Hold-up Time		Hold-up time 16ms or longer before outputs falls down to 95% after AC turns off. Data on B-F39 Fig.12			at rated Output
	F-3	Reliability Grade		OA			To follow our standard
	D-8(41)	MTBF		130.000[180,000] H min.			To be calculated on EIAJ RCR-9102 [To follow EIAJ RCR-9102 and MTBF calculation equation of redundant system for no repair.]
	—	Weight		3.1[5.6] kg typical			
	F-3	Warranty		One year after delivery. However, if any faults belong to us, the defective unit shall be repaired or replaced at our cost.			Except when wrong operation is conducted out of product specification, etc.

※1 In the case that AC input is turned on with peak load, output startup times of each module may differ. Make sure to conduct peak load after startup time (1ms max.) from AC input because a power supply module that has started up earlier may detect overcurrent protection to shut down outputs.

※2 For measurement, connect one norm module and another module in parallel. Output current shall be 2 times of rated current per module in measurement. At this time, output current of each module shall be within ±20% of rated output current per module.

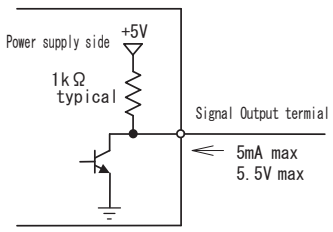
Signal Input/Output Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

		Items	Specification	Note
Output signal	PS5092	Output ON/OFF control signal (PWR_OK)	'H' is delivered when +5V,+12V, and -12V are normal. 'L' is delivered when +5V,+12V, and -12V are abnormal.	P1 connector pin 8
		POWER FAIL	'L' is delivered when +5V,+12V, and -12V are normal. 'H '(OPEN) is delivered when +5V,+12V, and -12V are abnormal.	P5 connector pin 2
		FAN ALARM	'L' is delivered when fan is normal. L 'H' (OPEN) is delivered when fan is abnormal.	P5 connector pin 1
	PS5093	Normal output signal (PWR_OK)	'H' is delivered when output of any module is normal. 'L' is delivered when all modules shut down.	P1 connector pin 8
		POWER FAIL 1, 2	'L' is delivered when output is normal. When either module shut down due to failure, output display LED corresponding to the failed module turns off and 'H' (OPEN) is delivered.	POWER FAIL1: P5 connector pin 2 POWER FAIL2: P5 connector pin 4
		FAN ALARM 1, 2	'L' is delivered when fan is normal. When either fan has stopped due to failure, 'H' (OPEN) is delivered from the module with failed fan.	FAN ALARM1: P5 connector pin 1 FAN ALARM2: P5 connector pin 3

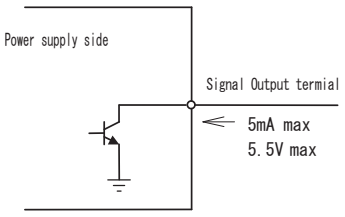
Signal Circuit

Output signal circuit

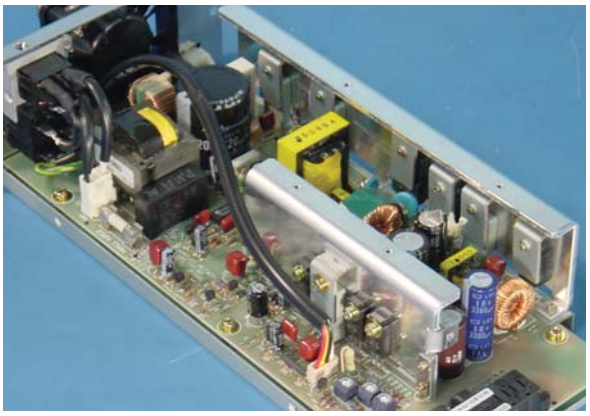
(PWR_OK)



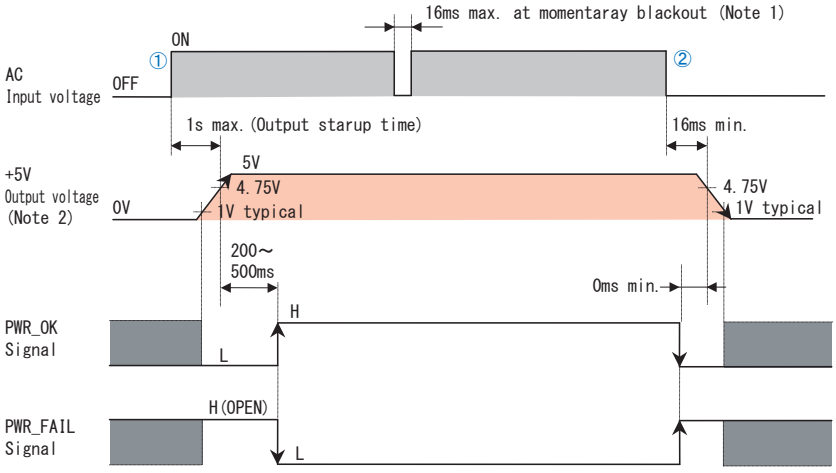
(POWER FAIL), (FAN ALARM)



Interior View



Sequence Timing Chart



Note 1 Max. momentary blackout period for which output voltages of +5V,+12V, and -12V are guaranteed to be within the total voltage regulation in the specification at rated Input/Output. Additionally, Max. momentary blackout period at rated Input and 50% of rated load shall be 32ms. Output signal shall not be provided.

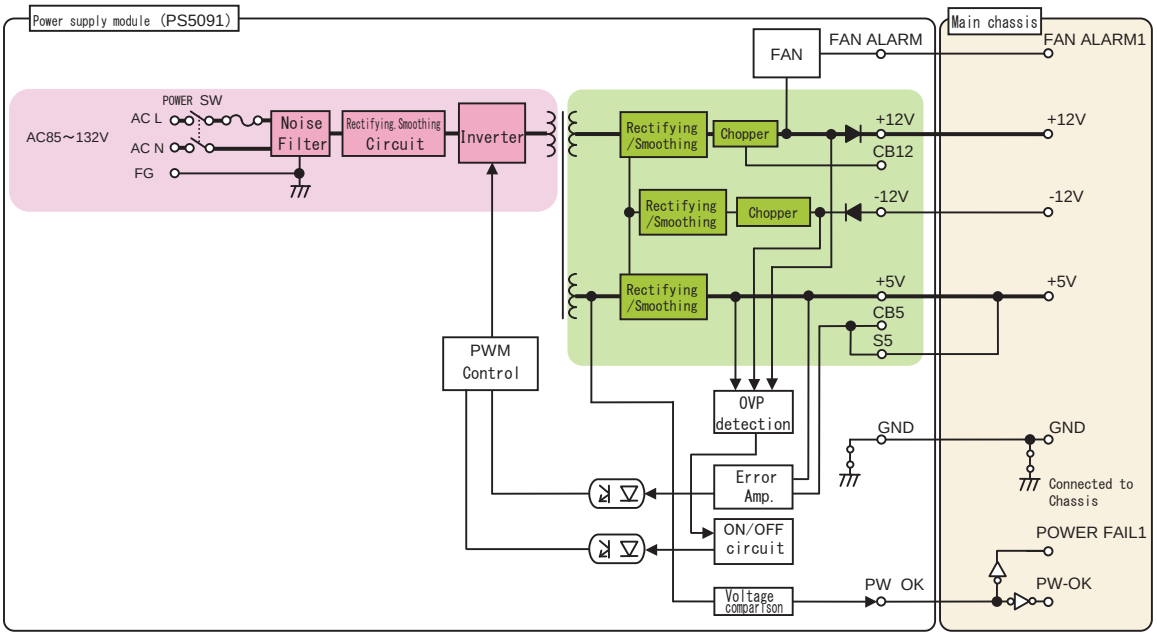
Note 2 All other outputs shall follow the timing except voltage values.

Undefined

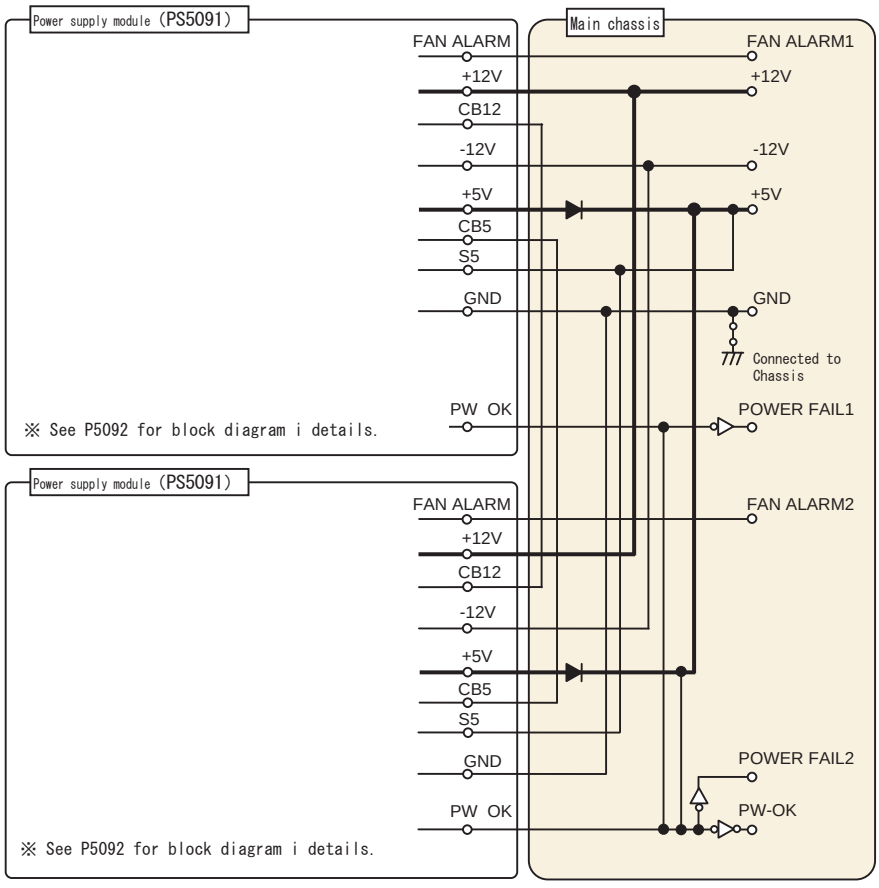
① +5V output shall startup within 1 second after AC is turned on. PWR_OK 'H' and PWR_FAIL 'L' are delivered 200～500ms later than that.

② All outputs shut down 16ms or later than blackout. PWR_OK 'L' and PWR_FAIL 'H' (OPEN) are delivered 0ms earlier than that.

PS5092

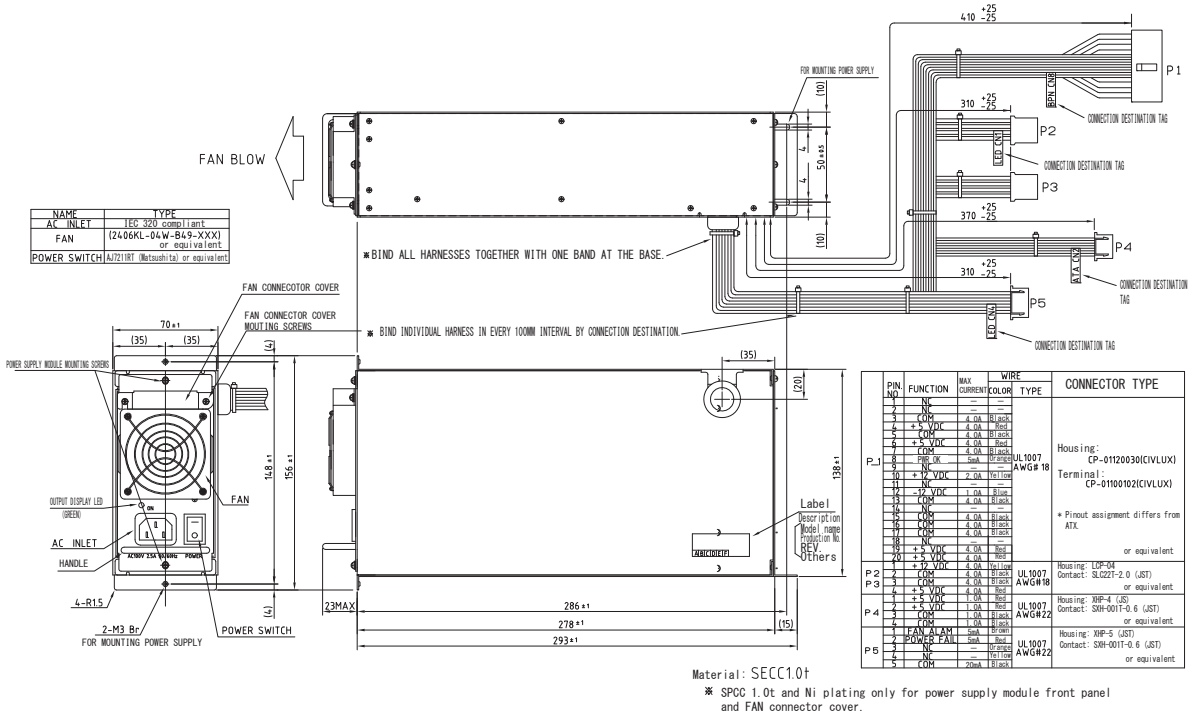


PS5093



Outline and Output Harness Drawing

PS5092

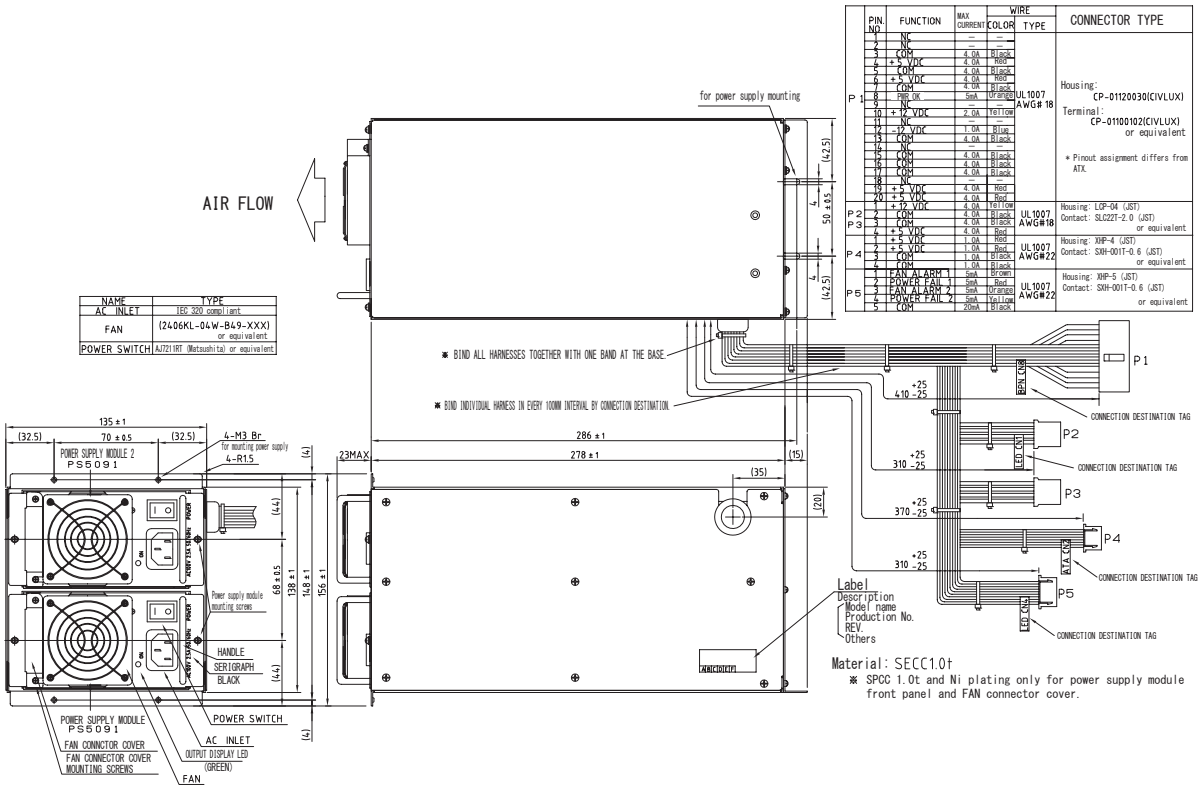


NAME	TYPE
AC INLET	IEC 320 compliant
FAN	(2406KL-04W-B49-XXX) or equivalent
POWER SWITCH	AJ7211RT (Matsushita) or equivalent

	PIN NO	FUNCTION	MAX CURRENT	WIRE COLOR	WIRE TYPE	CONNECTOR TYPE
P1	1	NC	—	—	UL1007 AWG# 18	Housing: CP-01120030(CIVLUX) Terminal: CP-01100102(CIVLUX) or equivalent ※ Pinout assignment differs from ATX. or equivalent
	2	NC	—	—		
	3	COM	4.0A	Black		
	4	+5 VDC	4.0A	Red		
	5	COM	4.0A	Black		
	6	+5 VDC	4.0A	Red		
	7	COM	4.0A	Black		
	8	PWR OK	5mA	Orange		
	9	NC	—	—		
	10	+12 VDC	2.0A	Yellow		
	11	NC	—	—		
	12	-12 VDC	1.0A	Blue		
	13	COM	4.0A	Black		
	14	NC	—	—		
	15	COM	4.0A	Black		
	16	COM	4.0A	Black		
	17	COM	4.0A	Black		
	18	NC	—	—		
	19	+5 VDC	4.0A	Red		
	20	+5 VDC	4.0A	Red		
P2 P3	1	+12 VDC	4.0A	Yellow	UL1007 AWG#18	Housing: LCP-04 Contact: SLC22T-2.0 (JST) or equivalent
	2	COM	4.0A	Black		
	3	COM	4.0A	Black		
	4	+5 VDC	4.0A	Red		
P4	1	+5 VDC	1.0A	Red	UL1007 AWG#22	Housing: XHP-4 (JST) Contact: SXH-001T-0.6 (JST) or equivalent
	2	+5 VDC	1.0A	Red		
	3	COM	1.0A	Black		
	4	COM	1.0A	Black		
P5	1	FAN ALARM	5mA	Brown	UL1007 AWG#22	Housing: XHP-5 (JST) Contact: SXH-001T-0.6 (JST) or equivalent
	2	POWER FAIL	5mA	Red		
	3	NC	—	Orange		
	4	NC	—	Yellow		
	5	COM	20mA	Black		

Material: SECC1.0t
※ SPCC 1.0t and Ni plating only for power supply module front panel and FAN connector cover.

PS5093



NAME	TYPE
AC INLET	IEC 320 compliant
FAN	(2406KL-04W-B49-XXX) or equivalent
POWER SWITCH	AJ7211RT (Matsushita) or equivalent

	PIN NO	FUNCTION	MAX CURRENT	WIRE COLOR	WIRE TYPE	CONNECTOR TYPE
P1	1	NC	—	—	UL1007 AWG# 18	Housing: CP-01120030(CIVLUX) Terminal: CP-01100102(CIVLUX) or equivalent ※ Pinout assignment differs from ATX.
	2	NC	—	—		
	3	COM	4.0A	Black		
	4	+5 VDC	4.0A	Red		
	5	COM	4.0A	Black		
	6	+5 VDC	4.0A	Red		
	7	COM	4.0A	Black		
	8	PWR OK	5mA	Orange		
	9	NC	—	—		
	10	+12 VDC	2.0A	Yellow		
	11	NC	—	—		
	12	-12 VDC	1.0A	Blue		
	13	COM	4.0A	Black		
	14	NC	—	—		
	15	COM	4.0A	Black		
	16	COM	4.0A	Black		
	17	COM	4.0A	Black		
	18	NC	—	—		
	19	+5 VDC	4.0A	Red		
	20	+5 VDC	4.0A	Red		
P2 P3	1	+12 VDC	4.0A	Yellow	UL1007 AWG#18	Housing: LCP-04 (JST) Contact: SLC22T-2.0 (JST) or equivalent
	2	COM	4.0A	Black		
	3	COM	4.0A	Black		
	4	+5 VDC	4.0A	Red		
P4	1	+5 VDC	1.0A	Red	UL1007 AWG#22	Housing: XHP-4 (JST) Contact: SXH-001T-0.6 (JST) or equivalent
	2	+5 VDC	1.0A	Red		
	3	COM	1.0A	Black		
	4	COM	1.0A	Black		
P5	1	FAN ALARM 1	5mA	Brown	UL1007 AWG#22	Housing: XHP-5 (JST) Contact: SXH-001T-0.6 (JST) or equivalent
	2	POWER FAIL 1	5mA	Red		
	3	FAN ALARM 2	5mA	Orange		
	4	POWER FAIL 2	5mA	Yellow		
	5	COM	20mA	Black		

Material: SECC1.0t
※ SPCC 1.0t and Ni plating only for power supply module front panel and FAN connector cover.

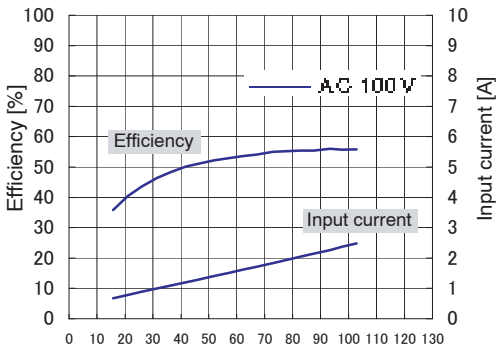
Optional Components (Sold separately)

Cable				
Page	Photo	Model	Category	Description
B-G46		WH2753	AC power cable	AC125V 12A 【PSE】

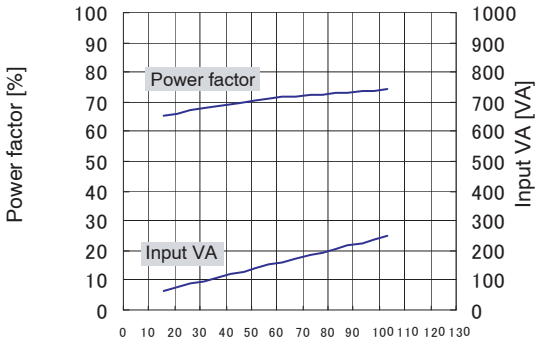
Other options					
Page	Model	Description	Page	Model	Description
B-G49	WH2820	20-pin extension harness (600mm)	B-G50	WH5105	12V 4-pin connector conversion harness (80mm)
B-G49	WH2747	20-pin extension harness (450mm)	B-G50	WH5105-02	12V 4-pin connector conversion harness (320mm)
B-G49	WH2892-02	20-pin extension harness (200mm)			
B-G51	WH2812	PCI-E 6-pin connector conversion harness			

Characteristics data PS5093 (Example of actual measurement)

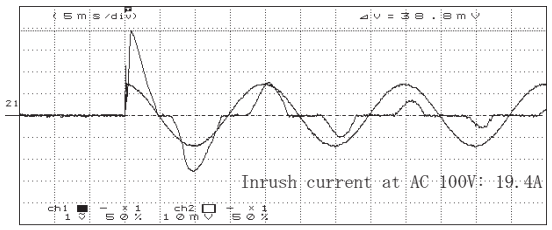
● Fig.1 Efficiency/Input Current Vs. Output Power



● Fig.2 Power Factor/Input VA Vs. Output Power



● Fig.3 Inrush Current

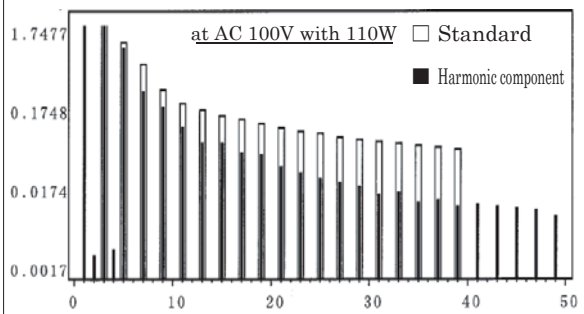


● Fig.4 Leakage Current

Input : AC100, 240V
Load : Rated load and Min. load

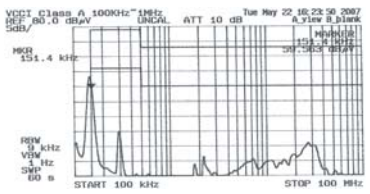
	Rated load	Min. load
AC 100V	0.53mA	0.53mA

● Fig.5 Harmonic Current At AC 100V

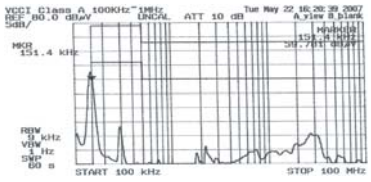


● Fig.6 Conducted Emission At 100V

Input : AC100V
Load : Rated
Mode : QP



Measuring point : L−FG

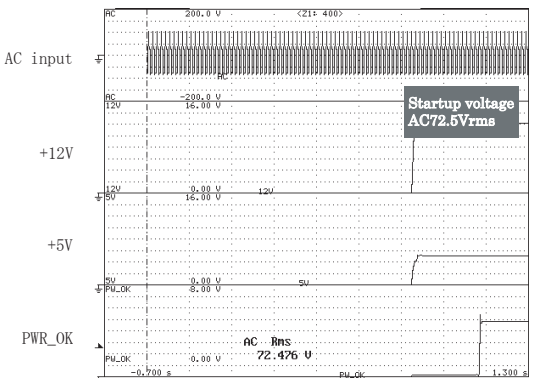


Measuring point : N−FG

In-house measurement data

● Fig.7 AC Startup Voltage (Rated load)

Load : Rated
Time axis : 200ms/DIV



● Fig.8 AC Startup Voltage (Min. load)

Load : Min. load
Time axis : 500ms/DIV

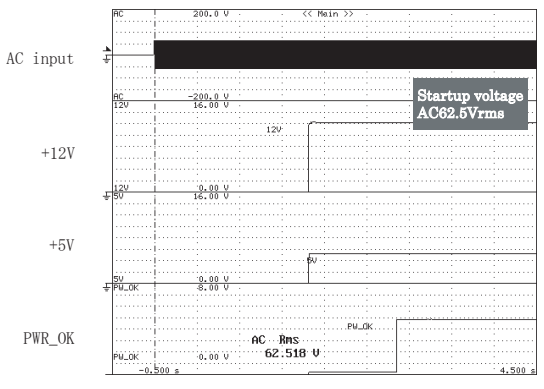


Fig.9 Rising Sequence At AC 100V

Input : AC100V
Load : Rated
Time axis : 200ms/DIV

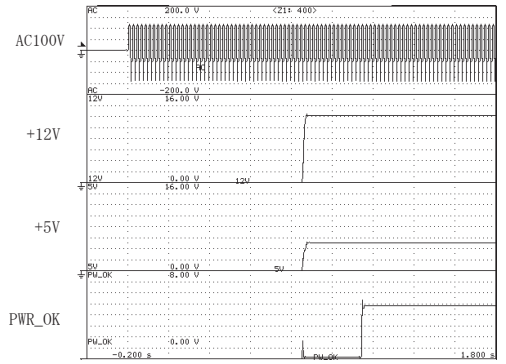


Fig.10 Rising Characteristics At AC 100V

Input : AC100V
Load : Rated
Time axis : 5ms/DIV

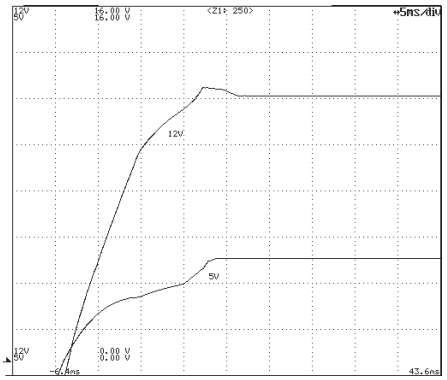


Fig.11 Falling Characteristics At AC 100V When REMOTE Is Off

Input : AC100V
Load : Rated
Time axis : 10ms/DIV

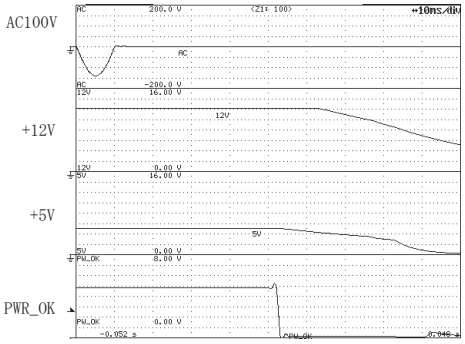


Fig.12 Output Hold-up Time Vs. Output Power

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

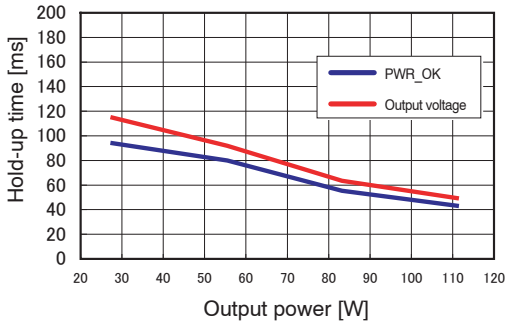


Fig.13 Instantaneous Blackout

Input : AC100V
Load : Rated
Instantaneous blackout period : 41ms
Time axis : 20ms/DIV

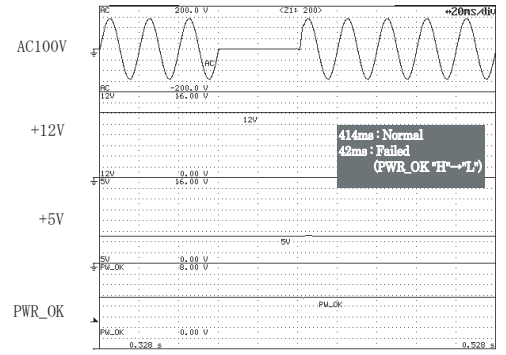


Fig.14 Voltage Dips By 60%

Input : AC100V AC40V
Load : Rated
Dipping period : 40ms
1 cycle : 20ms
Time axis : 20ms/DIV

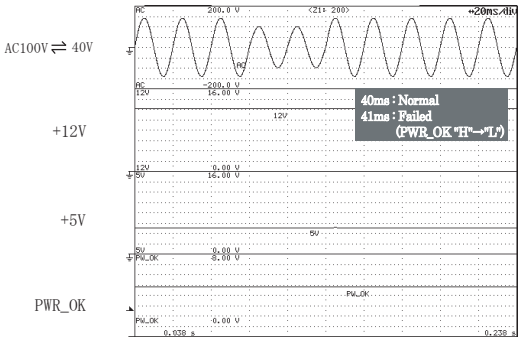


Fig.15 Voltage Dips By 30%

Input : AC100V⇄AC70V
Load : Rated
Dipping period : 40ms
1 cycle : 20ms
Time axis : 20ms/DIV

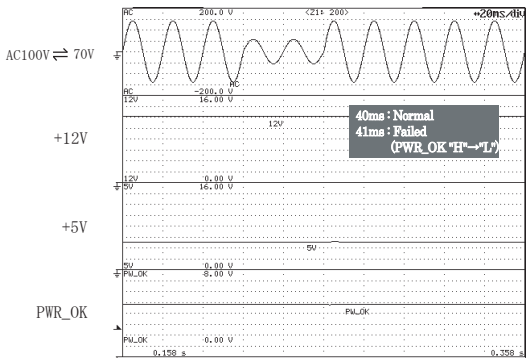
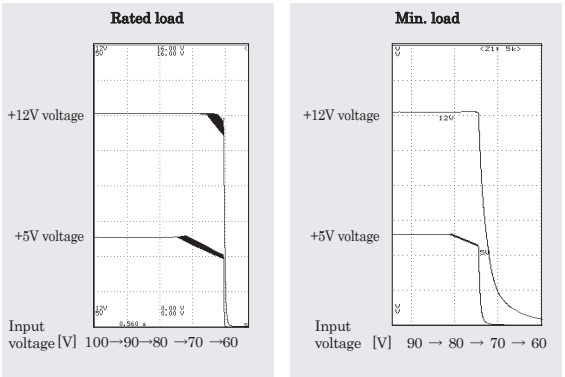


Fig.16 AC Input Voltage Slow Fluctuation Vs. Output Shutdown

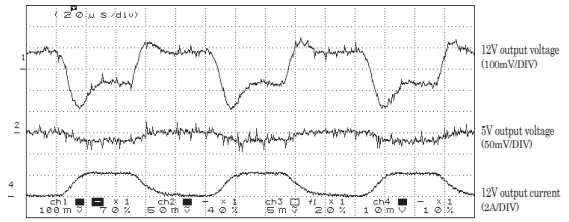
Slow fluctuation period : 10V/1s(1s/DIV)



Characteristics data PS5093 (Example of actual measurement)

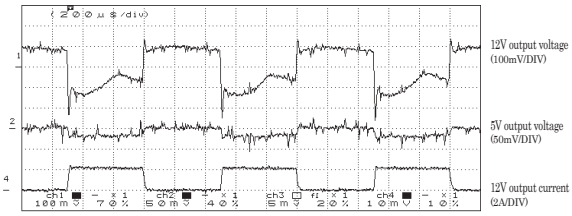
● Fig.17 Dynamic Load Fluctuation Characteristics At 10kHz

Input : AC100V
Load : Rated
Time axis : 20 μ s/DIV



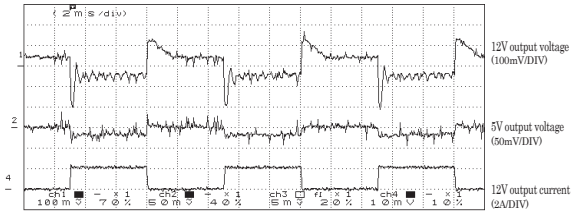
● Fig.18 Dynamic Load Fluctuation Characteristics At 1kHz

Input : AC100V
Load : Rated
Time axis : 200 μ s/DIV



● Fig.19 Dynamic Load Fluctuation Characteristics At 100Hz

Input : AC100V
Load : Rated
Time axis : 2ms/DIV



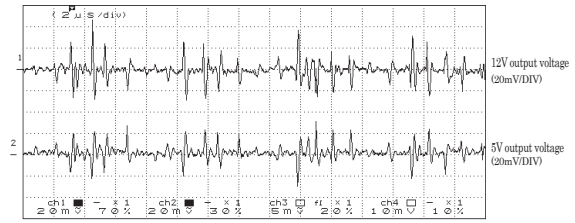
● Fig.20 Output Voltage Regulation

SPEC	Min. load	Rated load	Peak load
5V load	2A	15A	30A
12V load	0A	2A	4A

AC input	AC 85V	AC 100V	AC 132V
12V load (min.)	12.212 V	12.212 V	12.214 V
12V load (rated)	12.130 V	12.131 V	12.132 V
12V load (peak)	12.032 V	12.033 V	12.034 V
5V load (min.)	5.180 V	5.179 V	5.179 V
5V load (rated)	5.075 V	5.074 V	5.071 V
5V load (peak)	4.947 V	4.945 V	4.943 V

● Fig.21 Ripple and Spike Voltage

Input : AC100V
Load : Rated
Time axis : 2 μ s/DIV



● Fig.22 Ambient Temperature Vs. Lifetime Expectancy

■ Electrolytic capacitors (PS5093)

Input : AC100V
Load : Rated

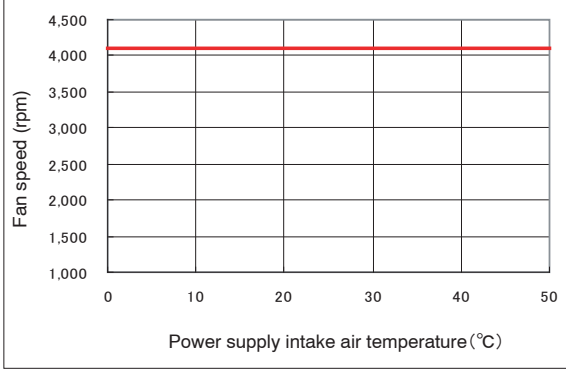
Temp. of intake air	20℃	30℃	40℃	50℃
Lifetime expectancy (yr)	approx. 63	approx. 32	approx. 16	approx. 7.9

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

■FAN

Ambient temp. of Fan	20℃±15℃
Lifetime expectancy (yr)	approx. 3.4

● Fig.32 Intake Air Temperature Vs. Fan Speed



Column 24

Redundant

Redundant means "lengthy" to allow N+1 redundant operation.

N+1 redundant operation is an operation system consisting of min. necessary units plus one unit in parallel connection so that the rest of power supply (ies) can keep on working even when one of them breaks down.

For example, when 100W load is required, two units of 50W (min. required units) can work. By adding another 50W unit (+1), when one unit breaks down, other two units still keep on working to enable you to replace the failed unit during they are working.

However, load balancing circuit is required to balance load current to make each unit burden load current evenly as they are connected in parallel.

Also, we are ready for Primary redundant power supply (pNSP2U series) with non-stop circuit equipped in addition to existing redundant power supply (PCSR series).

The primary redundant power supply corresponds to various power supply environments to bring you higher reliability and lower cost compared with existing power supply by just one primary unit compared with with existing power supply.

We call existing redundant power supply "full redundant", and primary redundant power supply with Nonstop circuit equipped "Primary redundant."

