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SPECIFICATION



FSP500-60APN,(85)

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Bronze

DATE:DEC, 22, 2008

REV : 1

表單編號：7000P-0105

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1.0 GENERAL REQUIREMENTS

This specification describes a **500** watts power supply. With +5V stand-by, second 12V rail and remote ON/OFF control for ATX-12V system and a “Power factor collector (PFC)” circuit to meet EPA requirement of input range with in 230V/50Hz.

2.0 INPUT REQUIREMENTS

The AC mains steady-state input voltage shall be **200 to 240** Vrms

The power supply shall operate from **180 to 264** Vrms.

The power supply shall operate from an AC mains frequency of 47-63Hz.

The AC mains steady-state RMS input current shall be:

4Amp (maximum) at 230 Vrms/ 50 Hz.

3.0 OUTPUT REQUIREMENTS

3.1 OUTPUT VOLTAGE AND CURRENT

	MINIMUM LOAD	NORMAL LOAD	MAXIMUM LOAD	LOAD REG.	LINE REG.	RIPPLE & NOISE
+3.3V	0.5A	14.77A	24A	±5%	±1%	50mV P-P
+5V	0.3A	12.31A	20A	±5%	±1%	50mV P-P
+12V1	0.5A	15.62A	18A	±5%	±1%	120mV P-P
+12V2	0.5A	15.62A	18A	±5%	±1%	120mV P-P
-12V	0A	0.28A	0.3A	±10%	±2%	200mV P-P
+5Vsb	0A	2.3A	2.5A	±5%	±1%	50mV P-P

- (1) **+3.3V & +5V** total output not exceed **120W**.
When **+5V** is load to **20A**, the **+3.3V** maximum load is **6A**.
When **+3.3V** is load to **24A**, the **+5V** maximum load is **8A**.
- (2) **+12V1 & +12V2** total output not exceed **408W**
- (4) All outputs shall be safety-isolated from the AC mains and share a common return. This common return must be connected to supply chassis.
- (5) Voltages and ripple are measured at the load side of mating connectors with a 0.1uF monolithic ceramic capacitor paralleled by a 10uF electrolytic capacitor across the measuring terminals.

LOAD REGULATION CHARACTERISTICS

NO.	LOAD CONDITION	OUTPUT LOAD					
		+3.3V	+5V	+12V1	+12V2	-12V	+5Vsb
1	COND.1	X	X	X	X	X	2.5A
2	COND.2	X	X	X	X	X	0A
3	COND.3	0.5A	0.3A	0.5A	0.5A	0A	0A
4	COND.4	24A	0.5A	4A	4A	0.1A	2A
5	COND.5	6A	15A	8A	0.5A	0A	2.5A
6	COND.6	0.5A	4A	18A	0.5A	0A	2.5A
7	COND.7	0.5A	4A	0.5A	18A	0A	2.5A
8	COND.8	11A	6.8A	13.5A	13.5A	0.2A	1.5A
9	COND.9	24A	6A	1A	11A	0.3A	0A
10	COND.10	0.5A	8A	17A	17A	0.3A	1A
11	COND.11	14.77A	12.31A	15.62A	15.62A	0.26A	2.2A

3.2 REMOTE ON/OFF CONTROL

The power supply shall accept a logic open collector level which will disable/enable all the output voltage (exclude +5V standby).

As logic level is low, outputs voltage were enabled.

As logic level is high, outputs voltage were disabled.

- Note:
1. Logic high level: 2.0-5.25V while sourcing 0.2mA maximum.
 2. Logic low level: 0-0.5V while sinking 1.6mA maximum.
 3. Rise Time: 15ms maximum (10%-90%).

3.3 OUTPUT VOLTAGE HOLD-UP TIME

16.0 mS minimum : at 230V / 50 Hz. (80%LOAD COND.8)

3.4 OPERATION AT NO LOAD

The power supply shall be capable of being operated with no load on any or all outputs without damage. For no load on +3.3V & +5V, the output shall not exceed +4.3V & +6.5Vdc and the power supply may shutdown and require by remote-control or remove AC power restart.

3.5 PROTECTION**3.5.1 Over-voltage protection**

In the event of an over-voltage condition on +3.3 & +5Vdc & +12V the power supply shall shutdown and require remote control or remove the AC mains input to reset the system.

+5V : **6.5V** (maximum)

+3.3V : **4.3V** (maximum)

+12V : **15.5V** (maximum)

3.5.2 OVER- CURRENT PROTECTION

There shall be protection from an output over-current event. The PSU may shutdown from such an event and require power-on restart.

The overload currents should be ramped at a minimum rate of 10 A/s starting from full load.

Over-current test values:

Output Voltage	3.3V	5V	12V1	12V2
Protecting trigger condition	< 60A	< 45A	< 26A	< 26A

3.5.3 Short-Current Protection

An O/P short circuit is defined as any O/P impedance of less than 0.1 ohms. The power supply shall shutdown and latch off for shorting +3.3V, +5V or +12V rail to return or any other rail. and +5VSB shall not cause any damage to the power supply. The power supply shall either shutdown and latch off or fold back for shorting negative rail. +5VSB must be capable of being shorted indefinitely, but when the short is removed, the power supply shall recover automatically or by cycling PS_ON#. The power supply shall be capable withstanding a continuous short-circuit to the O/P without damage or overstress to the unit (for example to components, PCB traces, connectors) under the I/P conditions specified.

3.6 OUTPUT RISE TIME

The cold-start enable main output voltage rise-time of all outputs shall be measured with maximum load on all outputs. (with COND.11)

Rise time:	+3.3V	20mS (maximum)
(10-90%)	+5V	20mS (maximum)
	+12 V 1	20mS (maximum)
	+12 V2	20mS (maximum)
	-12 V	20mS (maximum)

The test condition: 230Vac/50Hz

3.7 OUTPUT OVERSHOOT/UNDERSHOOT

No output voltage shall overshoot / undershoot or generate spikes at turn-on or turn-off, during momentary power loss, output short, or realistic input voltage or output load changes, Overshoot/undershoot is defined as any output that exceeds the voltage tolerance plus or minus an additional 5%. All outputs shall be measured with minimum load (COND.3)

	Overshoot	Undershoot
+3.3V	3.63V	2.97V
+5V	5.5V	4.5V
+12V1	13.2V	10.8V
+12V2	13.2V	10.8V
-12V	-13.8V	-10.2V
+5VSB	5.5V	4.5V

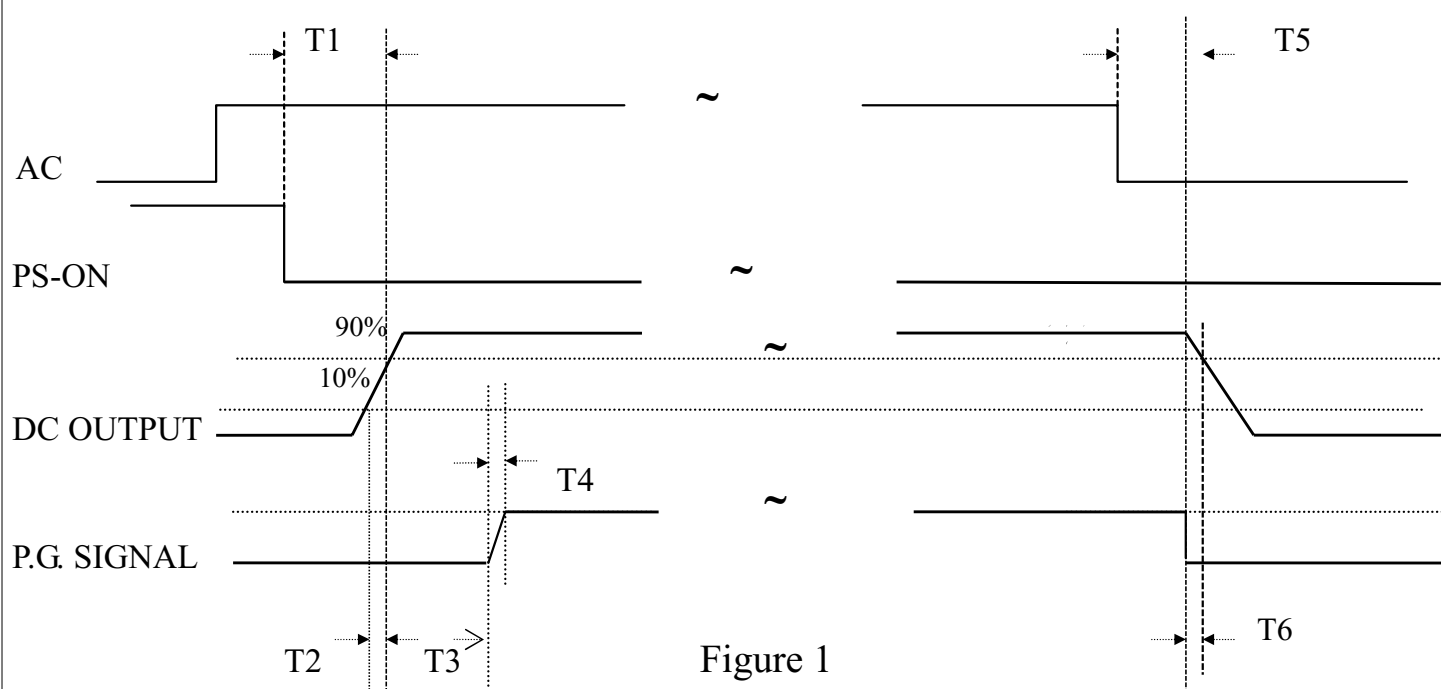
3.8 EFFICIENCY requirement of main output

The PSU should be a minimum of **82%** efficiency under 100% of full load and 50% of full load, and 20% of full load in a “light” load or ideal condition. That should be tested at nominal Input voltage is 230V/50Hz and load conditions defined in below Table.

loading	5V	12V1	12V2	3.3V	-12V	+5Vsb	Pout	Efficiency
20%	2.46A	3.12A	3.12A	2.95A	0.06A	0.46A	100W	82%
50%	6.15A	7.81A	7.81A	7.38A	0.14A	1.15A	250W	85%
100%	12.31A	15.62A	15.62A	14.77A	0.28A	2.3A	500W	82%

3.9 POWER GOOD SIGNAL Time sequence

Measure condition :230V (FULL LOAD)



- T1: PS_ON -- DC O/P within Spec. < 500mS
- T2: RISETIME < 20mS
- T3: Power Good Delay Time 100mS-500mS
- T4: Power Good Rise-time < 10mS
- T5: AC fail hold-up time > 16mS
- T6: Power Fail Delay Time > 1mS

3.10 Output Transient Response

Expected output transient step sizes for each output. The transient load slew rate is = 1.0 A/ μ s.

Table of DC Output Transient Step Sizes

Output	Max. step size (% of rated output amps per Sec 3.1)
+12V1	4.5A (1200uF)
+12 V2	4.5A (1000uF)
+5 V	5A (1000uF)
+3.3 V	6A (680uF)
-12 V	0.12A (350uF)
+5 VSB	0.625A (350uF)

(Adding external capacitor)

Output voltages should remain within the regulation limits of Section 4.1, and the power supply should be stable when subjected to load transients per above table from any steady state load, including any or all of the following conditions:

- Load-changing repetition rate of 50 Hz to 10 kHz

3.11 Capacitive Load

The power supply should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs. This capacitive loading should be used to check all of function test, but without hold-up time.

Output	ATX12V Capacitive load (uF)
+12 V1	5000
+12 V2	3000
+5 V	6000
+3.3 V	6000
-12 V	350
+5 VSB	350

3.12 Closed-loop Stability

The power supply shall be unconditionally stable under all line/load/transient load conditions including capacitive loads specified in Section 3.13. A minimum of 45 degrees phase margin and 10 dB gain margin is recommended at both the maximum and minimum loads.

4.0 Physical Environment

4.1 Temperature

4.1.1 Operating Ambient: +0 to 25°C

The power supply shall be capable of continuous operation and meet all electrical specification. The maximum continuous power rating of supply is : **500W** at 25°C. De-rate 2 W/°C, **450W** at 50°C.

(Burn-in condition: **450W** load at 50°C)

4.1.2 Non-Operating Ambient(Storage): -40°C to +70°C

4.2 Humidity

4.2.1 Operating: To 85% relative humidity (non-condensing)

4.2.2 Non-Operating: To 95% relative humidity (non-condensing)

Note: 95%RH is achieved with a dry bulb temperature of 55°C and a wet bulb temperature of 54°C.

4.3 Altitude

4.3.1 Operating: To 10,000ft

4.3.2 Non-Operating: To 50,000ft

5.0 Regulatory Compliance

5.1 Safety Requirements

-IEC 950

-TUV EN 60950

-NEMKO + CB REPOR

-CUL

5.2 Dielectric Strength

Primary to Frame Ground: 1800 Vac for 1 sec.

Primary to Secondary: 1800 Vac for 1 sec.

5.3 Insulation Resistance

Primary to Secondary: 20 Meg. ohms minimum.

Primary to FRAME GROUND: 20 Meg. ohms minimum.

5.4 Ground Leakage Current

The power supply ground leakage current shall be less than 3.5mA.

5.5 Emission Requirements

The power supply shall comply with CISPR 22, Class B, for both conducted and radiated emissions with a **3dB** margin..

6.0 Other Requirements

6.1 Input Connections

Refer to Mechanical Specifications for placement.

The AC mains input are through a three-circuit IEC type connector mounted on the rear of the power supply chassis.

6.2 Reliability

The power supply reliability, when calculated by “Bellcore” latest revision are exceed 100,000 hours with all output at maximum load and an ambient temperature of 25°C.

The special requirement is for cooling fan that MTTF be guarantee over 30,000 hours at 25°C ambient temperature.

7.0 Revision History:

Rev	Description	Date



全漢企業股份有限公司

外觀圖

料號 : 9PA5003601(PILOT
 RUN,G.P,FSP500-60APN,(85),(F04001),PC,ATX(2.3)(85PLUS),SLEEVE,W/NK,W/IO,
 WO/O,WO/SS,FSP(F/S),W/PFC(A),2L1S,OEM,INTEL,230V
 ONLY,9PA5003600,RD1,)

版次 : 2

文件編號 : OAD09032646

附件版本 : 1

研發部門 : RD1

作者 : amy/陳雅慧

Model No/Type :

機密 : N

表單編號 : 7000P-0111

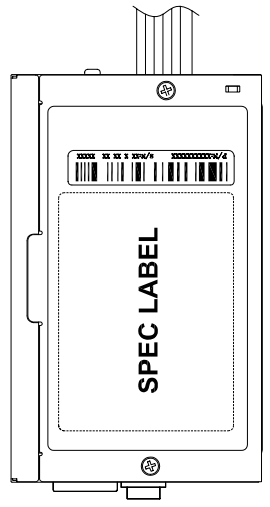
發行日期 : 2009/6/11-11:45:20

備註 :

升版理由 : 客戶要求變更 CASE,ECN09103791

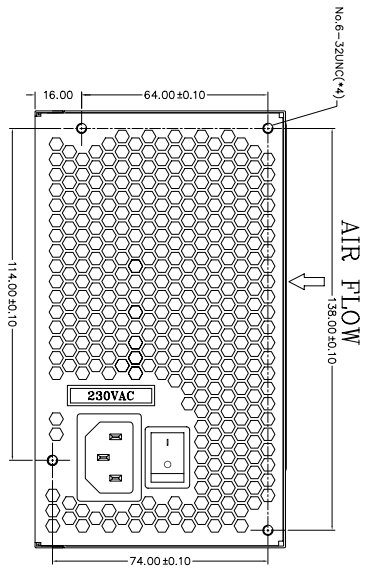
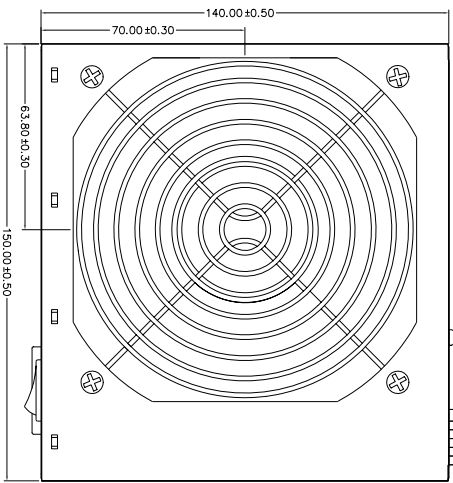
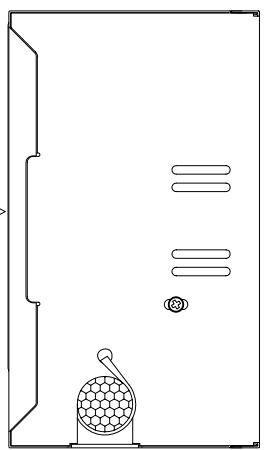
單位	姓名	單位	姓名	單位	姓名
安規 1	Chow 周懿慧	產品工程 1	Chad 蔡南政	主管	Phc 陳炳旭

REF. ID.	PN	SIGNAL	WIRE COLOR	GAUGE	CONNECTOR TYPE	LENGTH
P1 /24	1	+3.3VDC	ORANGE	18	MOLEX 500+30mm	-10
	2	5VDC	ORANGE	18	MOLEX 500+30mm	
	3	CON	BLACK	18	or EQV.	
	4	+5VDC	RED	18	or EQV.	
	5	CON	BLACK	18	or EQV.	
	6	+5VDC	RED	18	or EQV.	
	7	CON	BLACK	18	or EQV.	
	8	PM-OK	GRAY	24	or EQV.	
	9	+5Vsb	PURPLE	18	or EQV.	
	10	+12VDC	YELLOW	18	or EQV.	
	11	+12VDC	YELLOW	18	or EQV.	
	12	+3.3VDC	ORANGE	18	or EQV.	
	13	5VDC	ORANGE	18	or EQV.	
	14	5VDC	BROWN	24	or EQV.	
	15	CON	BLUE	24	or EQV.	
	16	PS-ON	BLACK	18	or EQV.	
	17	CON	GREEN	24	or EQV.	
	18	CON	BLACK	18	or EQV.	
	19	CON	BLACK	18	or EQV.	
	20	CON	BLACK	18	or EQV.	
	21	+5VDC	RED	18	or EQV.	
	22	+5VDC	RED	18	or EQV.	
	23	+5VDC	RED	18	or EQV.	
	24	CON	BLACK	18	or EQV.	
PA	1	+3.3V	ORANGE	18	MOLEX 390+30mm	-10
	2	5V	RED	18	or EQV.	
	3	CON	BLACK	18	or EQV.	
	4	CON	BLACK	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PH	1	+3.3V	ORANGE	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	+5V	RED	18	or EQV.	
	4	CON	BLACK	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PB	1	+3.3V	ORANGE	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	+5V	RED	18	or EQV.	
	4	CON	BLACK	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PC	1	CON	BLACK	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	+12V1	YELLOW	18	or EQV.	
	4	+12V1	YELLOW	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PD	1	CON	BLACK	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	CON	BLACK	18	or EQV.	
	4	+5V	RED	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PE	1	CON	BLACK	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	CON	BLACK	18	or EQV.	
	4	+5V	RED	18	or EQV.	
	5	+12V1	YELLOW	18	or EQV.	
PF	1	CON	BLACK	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	CON	BLACK	18	or EQV.	
	4	+5V	RED	18	or EQV.	
	5	+12V2	YELLOW	18	or EQV.	
PG	1	CON	BLACK	18	MOLEX 390+30mm	-10
	2	CON	BLACK	18	or EQV.	
	3	CON	BLACK	18	or EQV.	
	4	CON	BLACK	18	or EQV.	
	5	CON	BLACK	18	or EQV.	

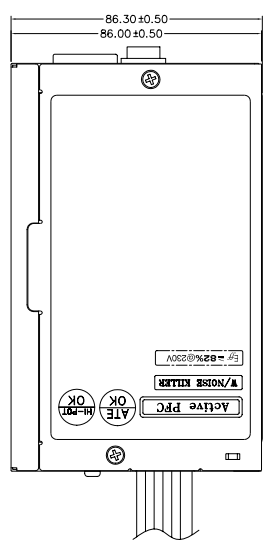
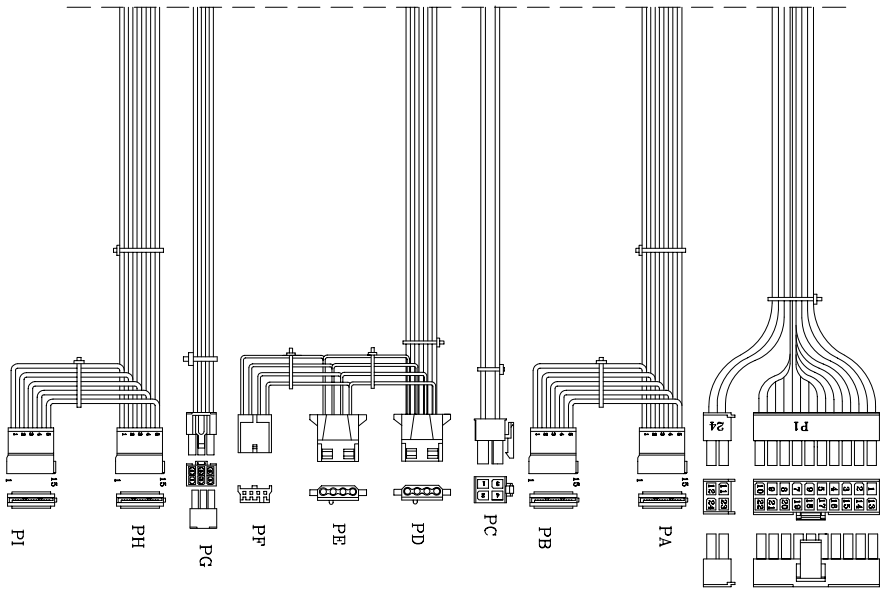


NOTE:
1. ALL THE LENGTH OF OUTPUT WIRES EXCLUDE HOUSING.
2. 產地標籤依業務指示加貼.

UNIT:mm



客戶要求變更風扇網



P/N.:9PA5003601

MODEL NO. : FSP500-60APN,(85)(F04001)	TITLE: ASSY	SHEET: 1 OF 1	REV:02
R&D	PE	DRAWN	DATE
INTERIOR COUNTERSIGN:			JUN.10.2009

Mechanical Drawing外觀/機構圖 表單編號7000P-0111