

**MODEL NO. ENP7200 SERIES (ACTIVE PFC)**

This specification describes the requirements of 200/300/350Watt with full range voltage, switching power supply with an FLEX-ATX form-factor and, +5Vsb standby voltage, remote on/off .

**1.0 AC INPUT****1.1 AC input requirements**

The input voltage, current, and frequency requirements for continuous operation are stated below.

Table 1 AC Input Line Requirements

Parameter	Min	Nom	Max	Unit
Vin	90	100-240	264	VACrms
Vin Frequency	47	60---50	63	Hz
Iin (200W)		3---1.5		Arms
Iin (300W/350W)		5---2.5		Arms

Power factor correction (PF)>0.9 at full load.

**1.2 Inrush current regulation**

The power supply must meet inrush requirements for any rated AC voltage, during turn on at any phase of AC voltage, during a single cycle AC dropout condition, during repetitive ON/OFF cycling of AC, and over the specified temperature range (Top). The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device).

**2.0 DC OUTPUT****2.1 DC voltage regulation**

Parameter	Range	Min	Nom.	Max	Unit
+3.3V	±5%	+3.14	+3.3	+3.47	Volts
+5V	±5%	+4.75	+5.0	+5.25	Volts
+12V	±5%	+11.4	+12.0	+12.6	Volts
+50V	±10%	+45.0	+50.0	+55.0	Volts
+5Vsb	±5%	+4.75	+5.0	+5.25	Volts

**2.2 LOAD RANGE****2.2.1 LOAD RANGE (200W)**

Parameter	Min	Nom.	Max	Peak	Unit
+3.3V	0.3	-	7		Amps
+5V	0.3	-	8		Amps
+12V	0.5	-	10		Amps
+50V	0.1	-	4		Amps
+5Vsb	0.0	-	2.5		Amps

Notes:

( 1 ) The maximum combined load on +5V and +3.3V outputs shall not exceed 60W.

( 2 ) The maximum continuous average DC outputs power shall not exceed 200W.

**2.2.2 LOAD RANGE (300W)**

Parameter	Min	Nom.	Max	Peak	Unit
+3.3V	0.3	-	7		Amps
+5V	0.3	-	8		Amps
+12V	0.5	-	10		Amps
+50V	0.1	-	4		Amps
+5VSb	0.0	-	2.5		Amps

Notes:

- ( 1 ) The maximum combined load on +5V and +3.3V outputs shall not exceed 60W.
- ( 2 ) The maximum continuous average DC outputs power shall not exceed 300W.

**2.2.3 LOAD RANGE (350W)**

Parameter	Min	Nom.	Max	Peak	Unit
+3.3V	0.3	-	7		Amps
+5V	0.3	-	8		Amps
+12V	0.5	-	12		Amps
+50V	0.1	-	4		Amps
+5VSb	0.0	-	2.5		Amps

Notes:

- ( 1 ) The maximum combined load on +5V and +3.3V outputs shall not exceed 60W.
- ( 2 ) The maximum continuous average DC outputs power shall not exceed 350W.

**2.3 Output Ripple**

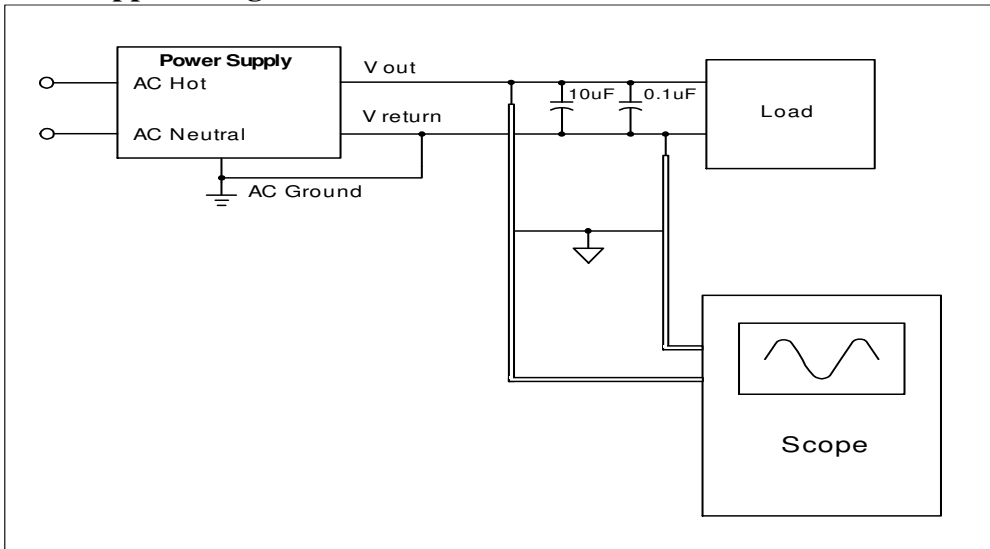
**2.3.1 Ripple regulation**

Parameter	Ripple&Noise	Unit
+3.3V	50	mVp-p
+5V	50	mVp-p
+12V	120	mVp-p
+50V	500	mVp-p
+5VSb	50	mVp-p

**2.3.2 Definition**

The ripple voltage of the outputs shall be measured at the pins of the output connector when terminated in the load impedance specified in figure1. Ripple and noise are measured at the connectors with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading. Ripple shall be measured under any condition of line voltage, output load, line frequency, operation temperature.

**2.3.3 Ripple voltage test circuit**



**Figure 1. Ripple & Noise test circuit**

**2.4 Overshoot at Turn-on / Turn-off**

The output voltage overshoot upon the application or removal of the input voltage, or the assertion / de-assertion of PS\_ON#, under the conditions specified in section 2.1, shall be less than 10% above the nominal voltage. No voltage of opposite polarity shall be present on any output during turn-on or turn-off.

**2.5 Efficiency**

Power supply efficiency typical 80% at normal AC main voltage and full load on all outputs.

**2.6 Remote on/off control**

When the logic level "PS-ON" is low, the DC outputs are to be enabled.

When the logic level is high or open collector, the DC outputs are to be disabled.

**3.0 PROTECTION**

**3.1 Over-power protection**

The power supply will be shutdown and latch off when output power over 110% ~ 150% of rated DC output.

**3.2 Over current protection**

The power supply shall have current limit to prevent the +3.3V,+5V,+12V,+50V outputs from exceeding the values shown in the following Table. If the current limits are exceeded the power supply shall shutdown and latch off.

Voltage	Over Current Limit (Iout limit)
+12V	13A minimum; 20A maximum
+5V	10A minimum; 15A maximum
+3.3V	10A minimum; 15A maximum
+50V(200W)	3A minimum; 6A maximum
+50V(300W/350W)	5A minimum; 9A maximum

**3.3 Over voltage protection**

The over voltage sense circuitry and reference shall reside in packages that are separate and distinct from the regulator control circuitry and reference. No single point fault shall be able to cause a sustained over voltage condition on any or all outputs. The supply shall provide latch-mode over voltage protection as defined in Table.

Output	Minimum	Nominal	Maximum	Unit
+12 VDC	13.4	15.0	16.7	Volts
+5 VDC	5.74	6.3	7.0	Volts
+3.3 VDC	3.76	4.2	4.8	Volts
+50V	55.0	62.5	65.0	Volts

**3.4 Short circuit**

An output short circuit is defined as any output impedance of less than 0.1 ohms. The power supply shall shut down and latch off for shorting the +3.3 VDC,+5 VDC,or+12 VDC rails to return or any other rail. Shorts between main output rails and +5VSB shall not cause any damage to the power supply. The power supply shall either shut down and latch off or fold back for shorting the negative rails.+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 of withstanding a continuous short-circuit to the output without damage or overstress to the unit

**3.5 No load operation**

No damage or hazardous condition should occur with all the DC output connectors disconnected from the load. The power supply may latch into the shutdown state.

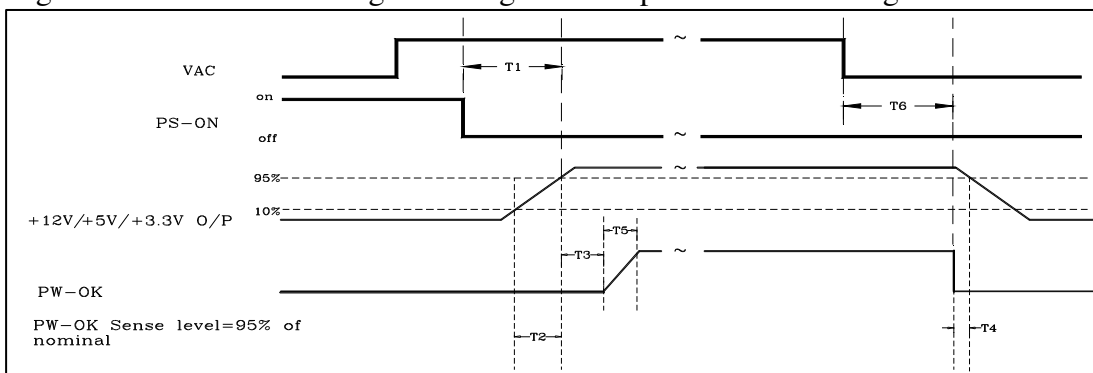
**3.6 Output Capacitive Loads**

Output	Max
+12V	4700uF
+5V	10000uF
+3.3V	6000uF
+5Vsb	350uF
+50V	4700uF

**4.0 TIMING**

**4.1 Signal timing drawing**

Figure 2 is a reference for signal timing for main power connector signals and rails.



**Figure 2. PS-OK Timing Sequence**

- (1)T2: Rise time (0.1ms~25ms)
- (2)T3: Power good signal turn on delay time (100ms~500ms)
- (3)T4: Power good signal turn off delay time (1ms min)
- (4)T5: Rise time (10ms max)

**4.2 Output Transient Response**

Table 13. summarizes the expected output transient step sizes for each output. The transient load slew rate is =0.5A/us.

Table 13. DC Output Transient Step Sizes

Output	Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30%of max load	0.5A/uS	1000uF
+5V	30%of max load	0.5A/uS	1000uF
+12V	40%of max load	0.5A/uS	2200uF
+50V	40%of max load	0.5A/uS	2200uF
+5VSB	25%of max load	0.5A/uS	350uF

<sup>(1)</sup> For example, for a rated +5 VDC output of 12A,the transient step would be 30% x 12A=3.6A

Output voltages should remain within the regulation limits of Section 2.1,and the power supply should stable when subjected to load transients per Table 13. from any steady state load, including any or all of the following conditions:

Simultaneous load steps on the +12 VDC,+5 VDC,and +3.3 VDC outputs

(all steps occurring in the same direction)

Load-changing repetition rate of 50 Hz to 10 kHz

AC input range per Section 1.0

**4.3 Hold up time**

When the power loss its input power, it shall maintain 16ms in regulation limit at nominal input voltage. (AC:115V/60Hz or 230V/50Hz)

**5.0 ENVIRONMENT**

**5.1 Operation**

**200W/300W**

Temperature	0 to 50°C
Relative Humidity	20 to 80%,on-condensing

AUDIT: 李復新 CHECK: \_\_\_\_\_ DESIGN: 杜娟

**350W**

Temperature	0 to 40°C
Relative Humidity	20 to 80%,on-condensing

**5.2 Shipping and Storage**

Temperature	-40 to 70°C
Relative Humidity	to 95%,non-condensing

**5.3 Altitude**

Operating	10,000FT max.
Storage	50,000FT max.

**6.0 SAFETY****6.1 Underwriters Laboratory (UL) recognition.**

The power supply designed to meet UL 60950.

**6.2 The power supply must bear the German Bauart Mark from Nemko .****7.0 ELECTROMAGNETIC COMPATIBILITY (EMC)****7.1 ELECTROSTATIC DISCHARGE (ESD) - IEC 61000 – 4 - 2 : 2008****7.2 ELECTRICAL FAST TRANSIENT / BURST ( EFT/B) – IEC 61000 – 4 - 4 : 2012****7.3 SURGE – IEC 61000 – 4 - 5 : 2005****7.4 POWER FREQUENCY MAGNETIC FIELD – IEC 61000 – 4 - 8 : 2009****7.5 VOLTAGE DIPS – IEC 61000 – 4 - 11 : 2004****7.6 RADIATED SUSCEPTIBILITY – IEC 61000 – 4 – 3 : 2006+A1 : 2007+A2 : 2010****7.7 CONDUCTED SUSCEPTIBILITY – IEC 61000 – 4 - 6 : 2008****7.8 VOLTAGE FLUCTUATION - EN 61000 – 3 – 3 : 2008****7.9 EN61000-3-2 : 2006+A2 : 2009 harmonic current emissions.**

If applicable to sales in Europe, the power supply shall meet the requirements of EN 61000-3-2 Class D and the Guidelines for the Suppression of Harmonics in Appliances and General Use Equipment Class D for harmonic line current content at full-rated power.

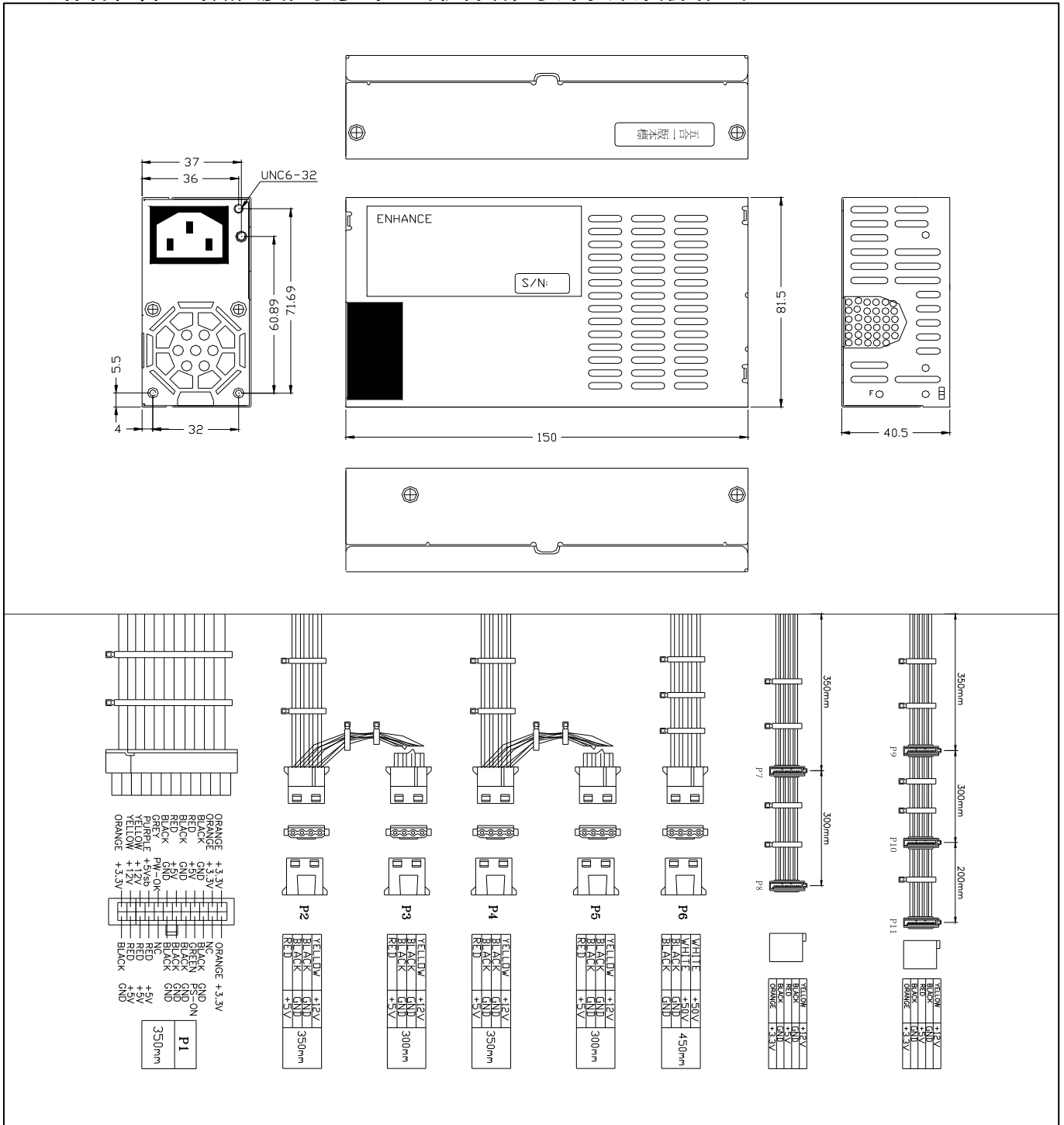
**7.10 EN55022 : 2010/AC : 2011 Class B Radio interference (CISPR 22).****7.11 ANSI C63.4-2009/FCC Part 15, Subpart B/ICE-003 Issue 5 class B 115VAC operation.****8.0 MTBF****8.1 MTBF (mean time between failures) calculation**

The demonstrated MTBF shall be 100,000 hours of continuous operation at 25°C, full load and normal AC input. The MTBF of the power supply shall be calculated in accordance with MIL-HDBK-217F. The DC FAN is not included.

9.0 MECHANICAL REQUIREMENTS

9.1 Physical dimension : L150mm\*W81.5mm\*H40.5mm

(線材組合&外露長度僅供參考，可根據客戶要求更改或新增。)



**9.2 Connectors (INTEL approved equivalent)**

**P1 connector (Molex 39-01-2200 or equivalent)**

wire	Signal	Pin	Pin	Signal	wire
Orange	+3.3V	11	1	+3.3V	Orange
Orange(22AWG)	3.3 sense		2	+3.3V	Orange
BLUE	NC	12	3	COM	Black
Black	COM	13	4	+5V	Red
Green (22AWG)	PS-ON	14		+5V sense	(22AWG)Red
Black	COM	15	5	COM	Black
Black	COM	16	6	+5VDC	Red
Black	COM	17	7	COM	Black
White	NC	18	8	POK	(22AWG)Grey
Red	+5VDC	19	9	+5VSB	(22AWG)Purple
Red	+5VDC	20	10	+12VDC	Yellow
Red	+5VDC	B3	B1	+12VDC	Yellow
Black	COM	B4	B2	+3.3V	Orange

**P2,P3,P4,P5 (AMP 1-480424-04 or Molex 8981-04P or equivalent)**

wire	Signal	Pin
Yellow	+12V	1
Black	COM	2
Black	COM	3
Red	+5V	4

**P6 (AMP 1-480424-04 or Molex 8981-04P or equivalent)**

wire	Signal	Pin
White	+50V	1
White	+50V	2
Black	COM	3
Black	COM	4

**P7,P8,P9,P10,P11 SATA Power Connector (Molex\* 88751 or equivalent)**

wire	Signal	Pin
Orange	+3.3V	5
Black	GND	4
Red	+5V	3
Black	GND	2
Yellow	+12V	1

**☛ 10. FAN SPEED CONTROL**

Fan voltage varies with the ambient temperature or output power.