MODEL NO. ENP5100GH

This specification describes the requirements of 300/360/400/460/500W with active P.F.C Switching PowerSupply with an ATX form-factor,+5V standby voltage,fan control,ATX12V Power supply version 2.2, remote on/off control,full range input capability and forced air cooling characteristics.

1.1 Table1. AC INPUT requirements

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

(OP, 300W時)

Parameter	Min	Nom.			Max	Unit
Vin	90	100	-	240	265	VACrms
Vin Frequency	47				63	Hz
Iin		6.5		4		A

(OP, 360/400W時)

Parameter	Min	Nom.			Max	Unit
Vin	90	100	-	240	265	VACrms
Vin Frequency	47				63	Hz
Iin		8		4		A

(OP, 460/500W時)

Parameter	Min	Nom.			Max	Unit
Vin	90	100	-	240	265	VACrms
Vin Frequency	47				63	Hz
Iin		10		5		A

Power factor correction (PF)>0.95 at full load.

1.2 Inrush current limiting

50 A @ 115Vrms
100 A @ 230Vrms (at 25°C ambient cold start).

☞ 2. DC OUTPUT

2.1 Table 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
+12V1	+/-5%	+11.40	+12.0	+12.60	Volts
+12V2	+/-5%	+11.40	+12.0	+12.60	Volts
-12V	+/-10%	-10.80	-12.0	-13.2	Volts
+5VSB	+/-5%	+4.75	+5.0	+5.25	Volts

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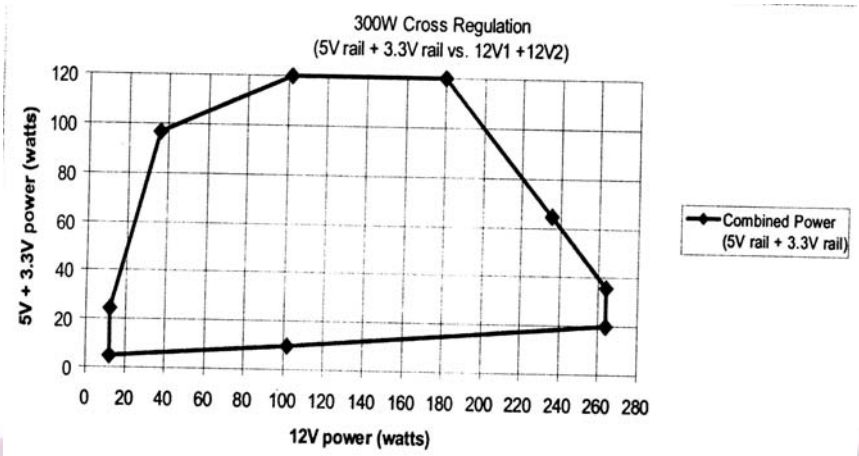
2.2 Load Ranges

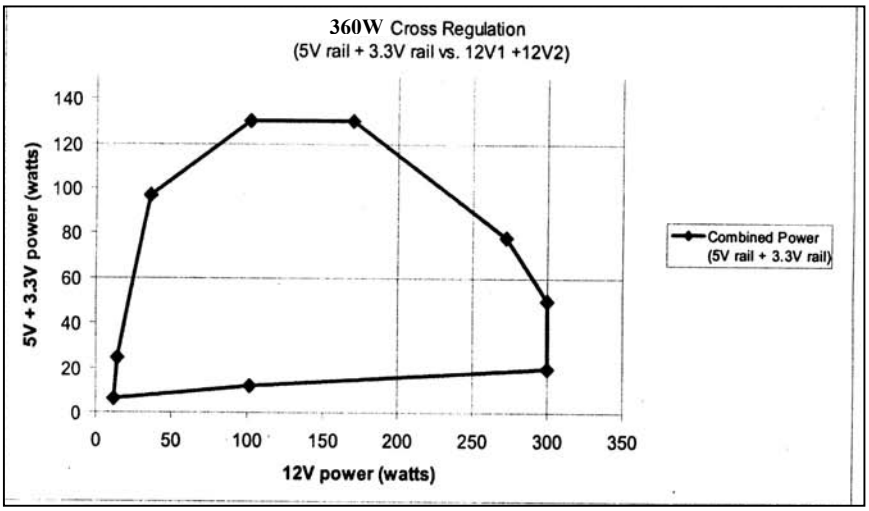
2.2.1 Table3. Output Typical Power Distribution for a 300W ATX12V Configuration

Parameter	Min	Nom.	Max	Peak	Unit
+12V1DC	1.0	-	10.0		Amps
+12V2DC	1.0	-	13.0	16.5	Amps
+5VDC	0.0	-	12.0		Amps
+3.3VDC	0.0	-	18.0		Amps
-12VDC	0.0	-	0.3		Amps
+5VSB	0.0	-	3.0	3.5	Amps



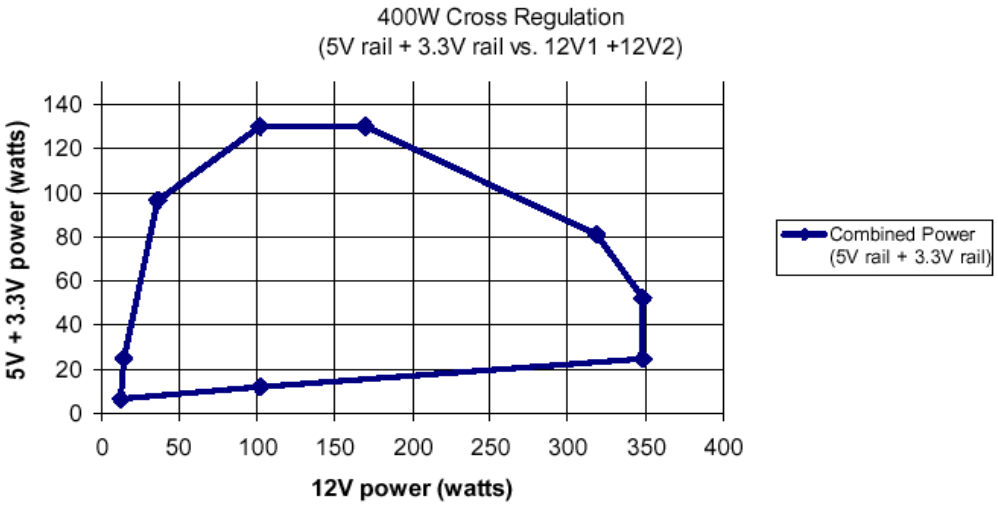
2.2.2 Table4. Output Typical Power Distribution for a 360W ATX12V Configuration

Parameter	Min	Nom.	Max	Peak	Unit
+12V1DC	1.0	-	12.0		Amps
+12V2DC	1.0	-	13.0	16.5	Amps
+5VDC	0.0	-	12.0		Amps
+3.3VDC	0.0	-	20.0		Amps
-12VDC	0.0	-	0.3		Amps
+5VSB	0.0	-	3.0	3.5	Amps



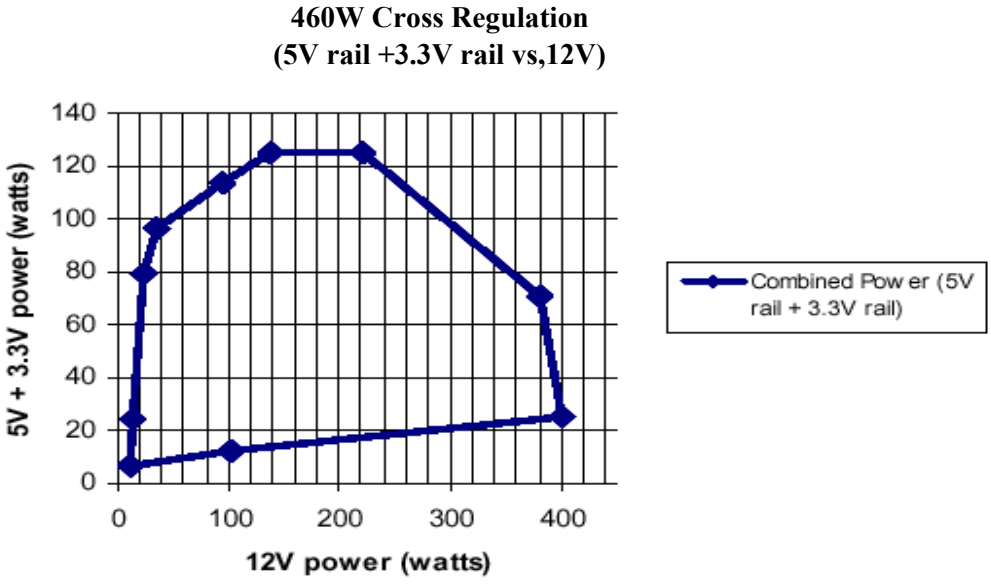
2.2.3 Table5 Typical Power Distribution for a 400W ATX12V Configuration

Parameter	Min	Nom.	Max	Peak	Unit
+12V1DC	1.0	-	16.0		Amps
+12V2DC	1.0	-	18.0		Amps
+5VDC	0.0	-	14.0		Amps
+3.3VDC	0.0	-	20.0		Amps
-12VDC	0.0	-	0.3		Amps
+5VSB	0.0	-	3.0	3.5	Amps



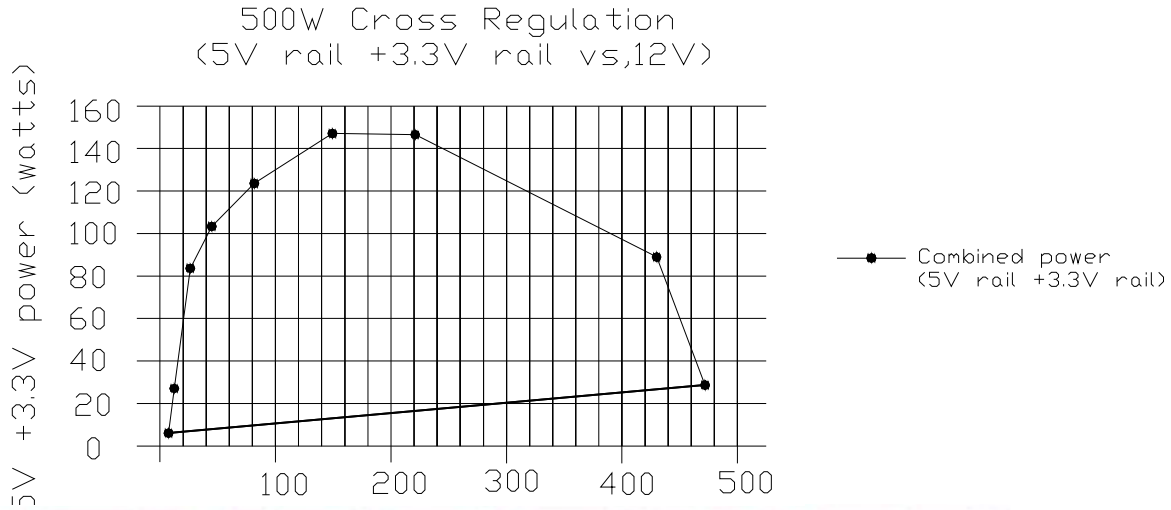
2.2.4 Table5 Typical Power Distribution for a 460W ATX12V Configuration

Parameter	Min	Nom.	Max	Peak	Unit
+12V1DC	1.0	-	18.0		Amps
+12V2DC	1.0	-	18.0		Amps
+5VDC	0.0	-	15.0		Amps
+3.3VDC	0.0	-	22.0		Amps
-12VDC	0.0	-	0.3		Amps
+5VSB	0.0	-	3.0	3.5	Amps



2.2.5 Table5 Typical Power Distribution for a 500W ATX12V Configuration

Parameter	Min	Nom.	Max	Peak	Unit
+12V1DC	1.0	-	18.0	19.0	Amps
+12V2DC	1.0	-	18.0	19.0	Amps
+5VDC	0.0	-	25.0		Amps
+3.3VDC	0.0	-	25.0		Amps
-12VDC	0.0	-	0.3		Amps
+5VSB	0.0	-	3.0	3.5	Amps



Note:

1. The maximum combined load on +5V and +3.3V output shall not exceeed 130 watts for 5140GH/5146GH, 150 watts for ENP-5150GH.

2. The maximum peak total DC output power shall not exceeed 320 watts for ENP-5130GH 380 watts for ENP-5136GH, 420 watts for ENP-5140GH, 480 watts for ENP-5146GH 520 watts for ENP-5150GH

2.3 DC Output Ripple/Noise.

2.3.1 Talbe6 Ripple regulation

Parameter	Ripple+Noise	Unit
+3.3V	50	mVp-p
+5V	50	mVp-p
+12V1	120	mVp-p
+12V2	120	mVp-p
-12V	120	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 figure 1. 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 Fignre3. Ripple/Noise voltage test circuit

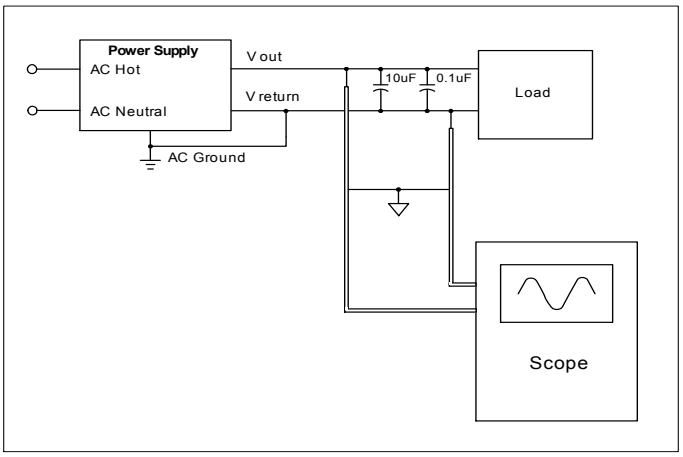


Figure 3. Ripple/Noise voltage test circuit

2.4 Overshoot

Any overshoot at turn on or turn off shall be less 10% of the nominal voltage value, all outputs shall be within the regulation limit of section 2.0 before issuing the power good signal of section 4.0.

2.5 Efficiency

2.5.1 Power supply typical efficiency is 80% min under 20% Load / 50% Load / 100% Load at nominal input voltage of $115V_{AC}$ or $230V_{AC}$.

2.5.2 Other Low Power System Requirements

To help meet the Blue Angel*, RAL-UZ 78, US Presidential executive order 13221, future EPA requirements, and other low Power system requirements, it is recommended that the +5 VSB standby supply should be as efficient as possible. Standby efficiency is measured with the main outputs off (PS_ON# high state). Standby efficiency should be greater than 50% with a minimum loading of 100mA at input 115Vac. Pin< 1W with a minimum loading of 50mA at input 230Vac.

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. PROTECTION**

3.1 Over-power protection

The power supply will be shutdown and latch off when output power is 110%~150%.

3.2 Over voltage protection

The over voltage sense circuitry and reference shall reside in packages that are separate and distinct from the regulator control circuity 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 V1DC or +12V2DC	---	---	15.6	Volts
+5 VDC	---	---	7.0	Volts
+3.3 VDC	---	---	4.8	Volts

3.3 Under voltage protection

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

output	Minimum	Nominal	Maximum	Unit
+12 V1DC or +12V2DC	9.5	10.0	10.5	Volts
+5 VDC	4.1	4.3	4.47	Volts
+3.3 VDC	2.55	2.69	2.83	Volts

3.3 Over Current Protection

+5VDC','+12V1DC','+12V2DC' and '+3.3VDC' have separate over current protection circuits to meet 240VA safety requirement.

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 Over temperature protection

In the event of a fan failure or the vents being blocked,
the power supply shall have protection such that any over temperature condition caused by these events shall protect the power supply from damage or abnormal and/or dangerous operation.
A shutdown of the power supply is acceptable
A temperature derating factor less than 110% for the critical components is recommended before the power supply is shut down.
Temperature derating factors higher than 110% can be evaluated on a case by case basis.

☞ 4. TIMING

4.1 Signal timing drawing

Figure 4 is a reference for signal timing for main power connector signals and rails.

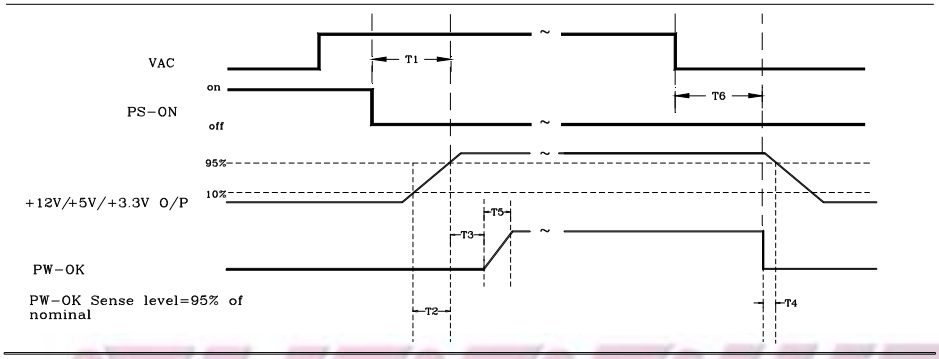


Figure 4. PS-OK Timing Sequence

(1)T2: Rise time (0.1ms~20ms)
(2)T3: Power good turn on delay time (100ms~500ms)
(3)T4: Power good turn off delay time (1ms min)
(4)T5: Rise time (10ms max)

4.2 Hold up time (T6 of figure 4.)

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

☞ 5. ENVIRONMENT

5.1 Operation

Temperature	0°C to 50°C
Relative Humidity	20 to 85%, non-condensing

5.2 Shipping and Storage

Temperature	-40 TO 70°C
Relative Humidity	5 to 90%, non-condensing

5.3 Altitude

Operating	3,000FT max.
Storage	15,000FT max.

☞ 6. SAFETY

6.1 Underwriters Laboratory (UL) recognition.
The power supply designed to meet UL 1950.

6.2 The power supply must bear the German Bauart Mark from TUV.

☞ 7.0 ELECTROMAGNETIC COMPATIBILITY (EMC)

7.1 ELECTROSTATIC DISCHARGE (ESD) - EN 61000 – 4 - 2：1995

7.2 ELECTRICAL FAST TRANSIENT / BURST (EFT/B) – EN 61000 – 4 - 4：1995

7.3 SURGE – EN 61000 – 4 - 5：1995

7.4 POWER FREQUENCY MAGNETIC FIELD – EN 61000 – 4 - 8：1993

7.5 VOLTAGE DIPS – RN 61000 – 4 - 11：1994

7.6 RADIATED SUSCEPTIBILTY – EN 61000 – 4 – 3 ：1996

7.7 CONDUCTED SUSCEPTIBILTY – EN 61000 – 4 - 6：1996

7.8 VOLTAGE FLUCTATION - EN 61000 – 3 – 3 ：1995

7.9 EN61000-3-2 harmonic current emissions.

If applicable to sales in Europe, the power supply shall meet the requirements ofEN 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 Class B Radio interference (CISPR 22).

7.11 FCC Part 15, Subpart J class B 115VAC operation.

☞ 8. MTBF

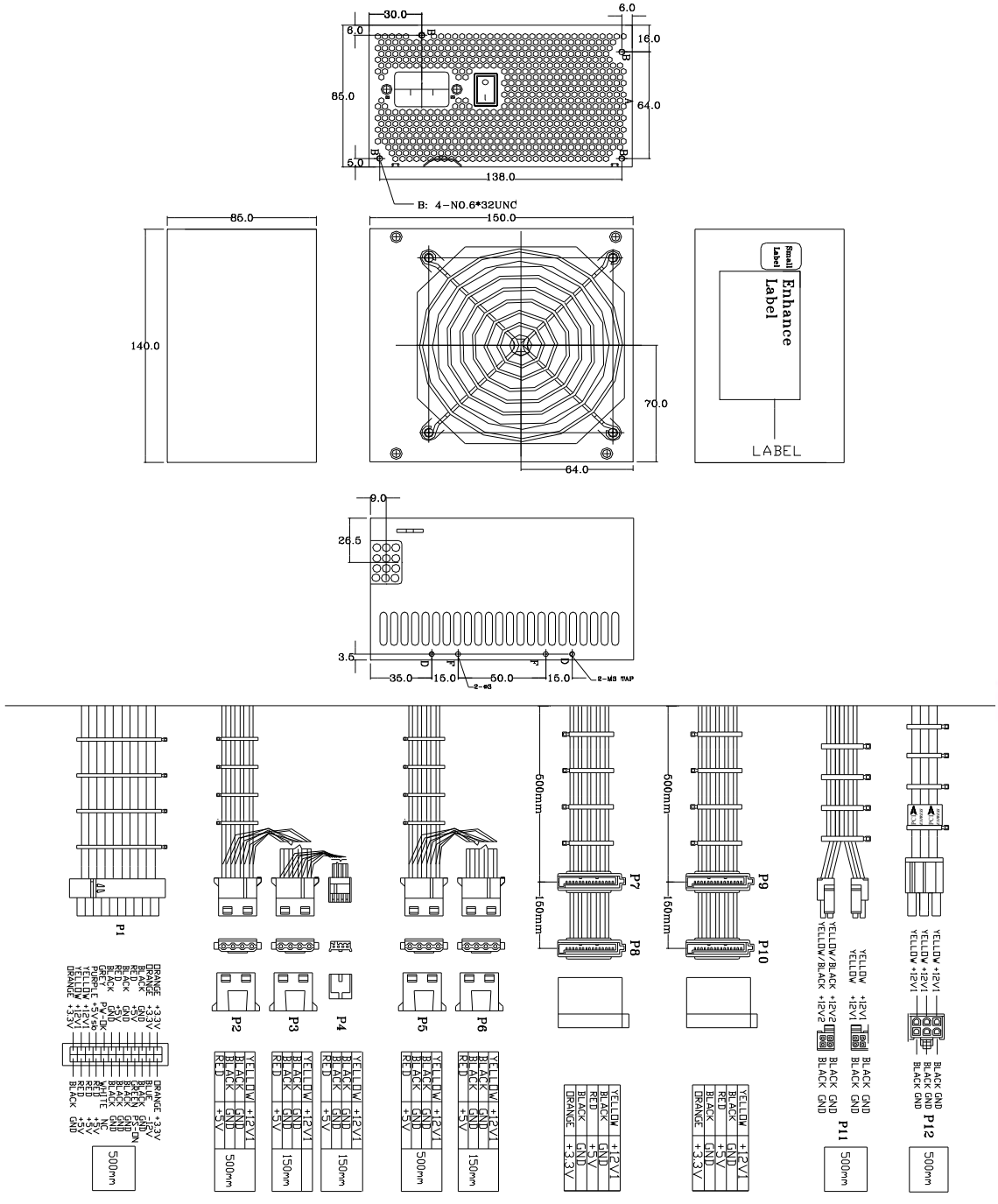
8.1 MTBF (MEAN TIME BETWEEN FAILURES) CALCULATION

The demonstrated MTBF shall be 100,000 hours of continuous operation at 25^{o}C,full load, 80% confidence limit and nominal line. The MTBF of the power supply shall be calculated in accordance with MIL-STD-217D/E. The DC FAN is not included.

☞ 9. MECHANICAL REQUIREMENTS

9.1 Physical Dimension

（ 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 39-01-2240 or equivalent) (OP,300W/360W/400W時用)

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Orange	+3.3V	11	1	+3.3V	Orange
Orange(22AWG)	3.3 sense	11	2	+3.3V	Orange
Blue	-12VDC	12	3	COM	Black
Black	COM	13	4	+5VDC	Red
Green(20AWG)	PS-ON	14	4	+5V sense	Red(22AWG)
Black	COM	15	5	COM	Black
Black	COM	16	6	+5VDC	Red
Black	COM	17	7	COM	Black
White	NC	18	8	POK	Grey(20AWG)
Red	+5VDC	19	9	+5VSB	Purple
Red	+5VDC	20	10	+12V1DC	Yellow
Red	+5VDC	J3	J1	+12V1DC	Yellow
Black	COM	J4	J2	+3.3VDC	Orange

P1 connector (Molex 39-01-2240 or equivalent) (OP,460W/500W時用)

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Orange	+3.3V	11	1	+3.3V	Orange
Orange(22AWG)	3.3 sense	11	2	+3.3V	Orange
Blue(18AWG)	-12VDC	12	3	COM	Black
Black	COM	13	4	+5VDC	Red
Green(20AWG)	PS-ON	14	4	+5V sense	Red(22AWG)
Black	COM	15	5	COM	Black
Black	COM	16	6	+5VDC	Red
Black	COM	17	7	COM	Black
White	NC	18	8	POK	Grey(20AWG)
Red	+5VDC	19	9	+5VSB	Purple(18AWG)
Red	+5VDC	20	10	+12V1DC	Yellow
Red	+5VDC	J3	J1	+12V1DC	Yellow
Black	COM	J4	J2	+3.3VDC	Orange

P11 Connector (8(4+4)PIN:Molex 39-01-2080 or equivalent)

18AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Black	COM	B1	B3	+12V1DC	Yellow
Black	COM	B2	B4	+12V1DC	Yellow
Black	COM	A1	A3	+12V2DC	Yellow/Black stripe
Black	COM	A2	A4	+12V2DC	Yellow/Black stripe

P2,P3,P5,P6(AMP 1-480424-0 or Molex 8981-04P or Equivalent)

P4 (AMP 171822-4 or Equivalent)

18 AWG wire	Signal	Pin	Pin	Signal	22AWG wire
Yellow	+12V1	1	1	+5VDC	Red
Black	COM	2	2	COM	Black
Black	COM	3	3	COM	Black
Red	+5V	4	4	+12V1	Yellow

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

18 AWG wire	Signal	Pin
Orange	+3.3V	5
Black	GND	4
Red	+5V	3
Black	GND	2
Yellow or Yellow/Bluck stripe	+12V1 or +12V2	1

P12,P13 PCI 6PIN (Molex 90331-0010 or equivalent)

Pin	Signal	18 AWG wire	Pin	Signal	18 AWG wire
1	+12V1	Yellow	4	COM	Black
2	+12V1	Yellow	5	COM	Black
3	+12V1	Yellow	6	COM	Black

☞ 10. OPTIONS

10.1 FAN SPEED CONTROL

Main fan voltage varies with the ambient temperature or output power.