

MODEL NO. END0927 (80PLUS)

This specification describes the requirements of **275 Watts** switching power supply with a FLEX-ATX form-factor and SFX12V,+5V standby voltage,remote on/off, dual line input capability

1. DC INPUT**1.0 DC input requirements**

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

1.1 Input Voltage : -36 --- -72VDC**1.2 Input Current Output power**

Parameter	Min	Nom	Max	Unit
Vin	36	48	72	VDCrms
Iin(275W)	10	7.5	5	A

1.3 In-Rush Current

The Input In-Rush Current shall be limited to 72A max @ -60VDC cold start. Input Fuse shall not fail during cold up at ambient temperature.

2. 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
+12V1	±5%	+11.40	+12.0	+12.6	Volts
+12V2	±5%	+11.40	+12.0	+12.6	Volts
-12V	±10%	-10.8	-12.0	-13.2	Volts
+5VSb	±5%	+4.75	+5.0	+5.25	Volts

1. At +12V surge, regulation can go to +/-10%.

2. Output power =264W 12V/15A,5V/7A,3.3V/15A -40.5VDC to +72VDC shall be less +/-1% on each output.

2.2 LOAD RANGE

Parameter	Min	Nom.	Max	Peak	Unit
+3.3V	0.5	9	17		Amps
+5V	0.3	9.4	18		Amps
+12V1	1.0	11.0	16	19	Amps
+12V2	1.0	4	7.0	8.0	Amps
-12V	0.0	0.3	0.5		Amps
+5VSb	0.0	2.0	2.0		Amps

Notes

- (1) +5Vsb is a SELV standby voltage that is always present when DC mains voltage is present.
- (2) The maximum combined load on +5V and +3.3V outputs shall not exceed 120W.
- (3) The maximum continuous average DC outputs power shall not exceed 275W.
- (4) The maximum peak total DC outputs power shall not exceed 275W.

2.3 Output Ripple/Noise.

2.3.1 Ripple regulation

Parameter	Ripple&Noise	Unit
+3.3V	60	mVp-p
+5V	60	mVp-p
+12V1	120	mVp-p
+12V2	120	mVp-p
-12V	120	mVp-p
+5VSb	70	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

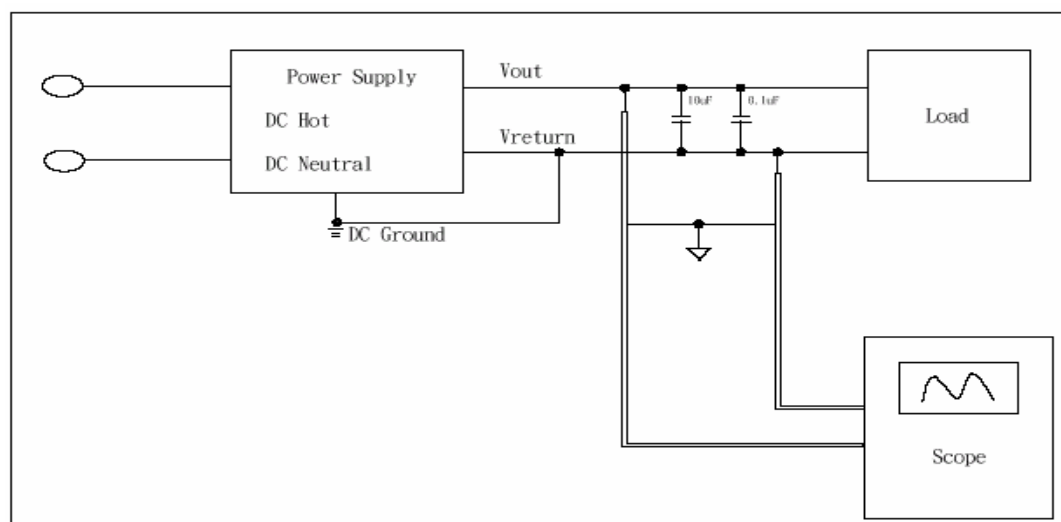


Figure 1. Ripple/Noise voltage test circuit

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 5.

2.5 Efficiency

Power supply typical efficiency is **82%** under full Load at nominal input voltage of **48VDC**.

Loading	+12V1&+12V2	+5V	+3.3V	-12V	+5Vsb
Full(100%)	15A	9.4A	9A	0.3A	2A
Typical(50%)	7.5A	4.7A	4.5A	0.15A	1A
Light(20%)	3A	1.88A	1.8A	0.06A	0.4A

	Full(100%)	Typical(50%)	Light(20%)
36VDC	80%	82%	80%
48VDC	80%	82%	80%
72VDC	80%	82%	80%

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 over 110% ~ 175% of rated DC output.

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 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 V1DC	13.4	15.0	17.0	Volts
+12V2 DC	13.4	15.0	17.0	Volts
+5 VDC	5.74	6.3	7.5	Volts
+3.3 VDC	3.76	4.2	4.8(5V)	Volts

3.3 Short Circuit Protection

A short circuit placed on any output shall cause no damage to this unit. The power supply shall shutdown and latch off if the short circuit shown. This latch shall be cleared by toggling the PSON signal or by recycling the DC input voltage for a maximum of 2 seconds.

3.4 No load operation

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

3.5 Over Current Protection

OUTPUT	MIN(A)	MAX(A)
+5V	20	30
+3.3V	20	30
+12V1	20	30
+12V2	10	20

3.6 Dynamic Load Response Time

Transient response is measured by switching the output load from 70 to 100 to 70 percent of its full value at a frequency of 100 Hz and 50% duty cycle, step load change is 0.5A/us, The voltage change is less than +/-5% of +5V, +3.3V and +12V outputs, the recovery time is less than 1ms back to nominal. Measurement condition: Dynamic response readings are measured with 1000uFX3 on 12V output, 560uFX4 on 3.3V output and 820uF on 5V output. (Need to check system capacitance)

4. TIMING

4.1 Signal timing drawing

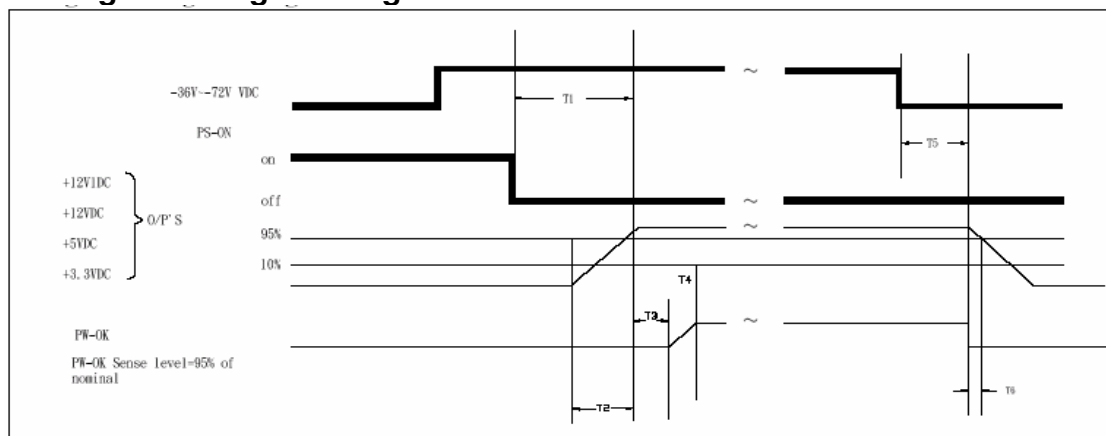


Figure 2. PS-OK Timing Sequence

- (1) T2: Rise time (0.1ms~70ms) ($0.1\text{ms} < T2 < 70\text{ms}$)
- ((2) T3: Power good signal turn on delay time (100ms~500ms)
- (3) T6: Power good signal turn off delay time (1ms min)
- (4) T4: PG Rise time (10ms max)
- (5) T5: Input to pwok hold up time should be $> 2\text{ms}$ (Load condition: 12V/15A, 5V/7A, 3.3V/15A=264)

5. ENVIRONMENT

5.1 Operation

Temperature	-5°C to 45°C at 270W
	50°C at 250W
Relative Humidity	10% to 90%, on-condensing

5.2 Shipping and Storage

Temperature	-40 to 85°C
Relative Humidity	10% to 95%,non-condensing

5.3 Altitude

Operating	-500 to 10000 feet
Storage	-1000 to 40000 feet

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

The power supply designed to meet UL 60950.

7. 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. MTBF****8.1 MTBF (mean time between failures) calculation**

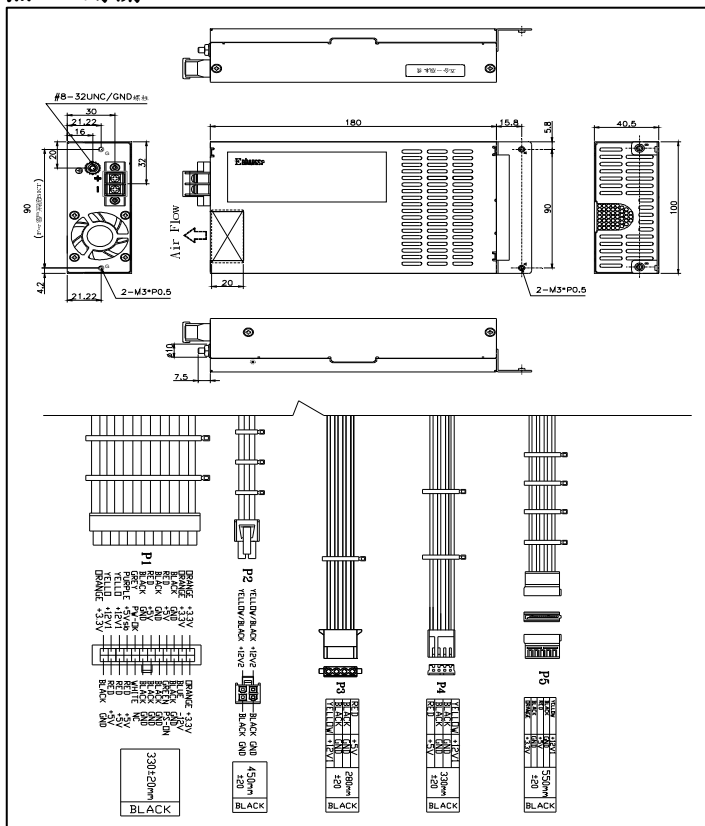
The demonstrated MTBF shall be 200,000 hours of continuous operation at 25°C. 75% of full load and -36V~-72V AC input ,The MTBF of the power supply shall be calculated in accordance with MIL-HDBK-217F. The DC FAN is not included.

9. MECHANICAL REQUIREMENTS

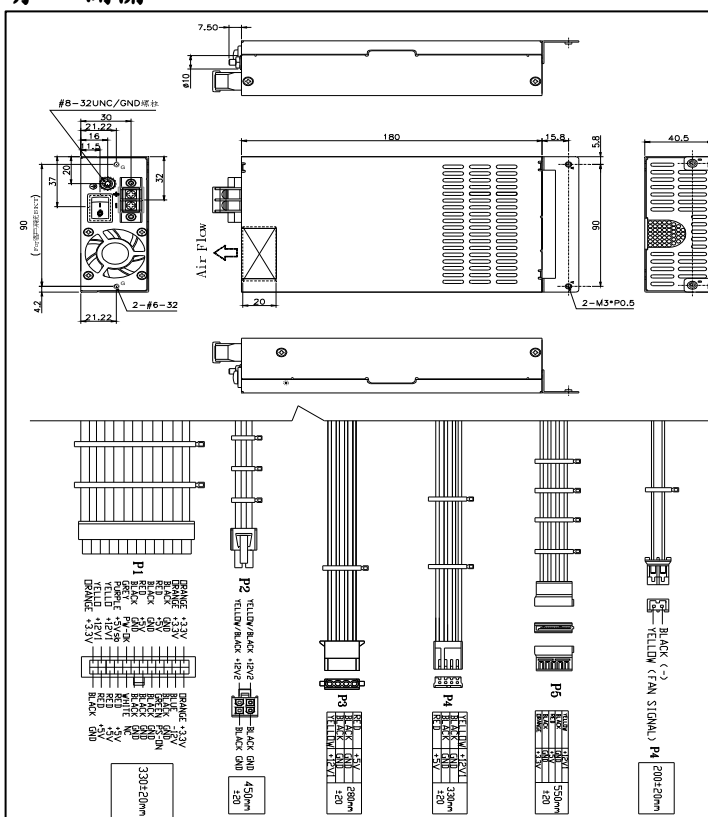
9.1 Physical dimension Dim (L180*W100*H40.5)

(線材組合&外露長度僅供參考，可根據客戶要求更改或新增。)

無0/1開關



有0/1開關



9.2 Connectors (INTEL approved equivalent)

P1 Power Connector

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Orange	+3.3VDC	1	13	+3.3VDC	Orange
				+3.3VDCsense	Orange(22AWG)
Orange	+3.3VDC	2	14	-12 VDC	Blue(20AWG)
Black	COM	3	15	COM	Black
Red	+5VDC	4	16	PS-ON	Green(20AWG)
Red(22AWG)	+5VDCsense				
Black	COM	5	17	COM	Black
Red	+5VDC	6	18	COM	Black
Black	COM	7	19	COM	Black
Gray(20AWG)	PWR-OK	8	20	NC	White
Purple(20AWG)	+5VSB	9	21	+5VDC	Red
Yellow	+12V1	10	22	+5VDC	Red
Yellow	+12V1	11	23	+5VDC	Red
Orange	+3.3VDC	12	24	COM	Black

P2 4PIN Power Connector

18 AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Black	COM	1	3	+12V2	Yellow/Black
Black	COM	2	4	+12V2	Yellow/Black

P3 大4PIN Power Connector

P4 小4PIN Power Connector

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

P5 SATA Power Connector

18AWG wire	Signal	Pin
Yellow	+5VDC	+12V1
Black	COM	2
Red	+5VDC	3
Black	COM	4
Orange	+3.3VDC	5

10. FAN SPEED CONTROL

Fan voltage varies with the ambient temperature and/or output power.