



70 Watt Switching Medical Grade Switching Power Supply with Active PFC

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**1. GENERAL**

These new 70W, 3" x 5", medical grade power supplies are designed with Skynet’s patented Ring-Free ZVS (Zero Voltage Switching) technology to ensure high efficiency and compact size.

This series features Active PFC; low leakage current and FCC & VDE class B EMI. Meanwhile, it complies with a wide variety of safety regulations so that it can be used in Medical, Industrial, Information Technology or other equivalent applications.

**2. CIRCUIT TOPOLOGY**

Ring-Free Zero Voltage Switching (ZVS).

**3. AC INPUT**

**3.1. INPUT VOLTAGE**

This power supply is designed to operate continuously over the entire range of AC inputs listed in Table 1 below.

	Minimum	Nominal	Units
Continuous AC Input Range of	90	264	Vrms

Table 1 – Input voltage range

**3.2. INPUT FREQUENCY**

	Minimum	Nominal	Maximum	Units
Range 1	47	60	63	Hz

Table 2 – Input frequency range

**3.3. INPUT CURRENT AND INRUSH CURRENT**

Input current shall meet the limits shown in table 3.

Input Voltage	Maximum Input current	Maximum Inrush current
Range 1 115 VAC	2A	30A <sub>peak</sub>
Range 2 230 VAC	1A	60A <sub>peak</sub>

Table 3 – Input current

Inrush current shall be measured after the power supply has been sitting for a minimum of ten minutes with the input voltage removed at an ambient temperature of 25° C.

**3.4. EFFICIENCY**

The power supply efficiency measured at nominal input voltage (115 V or 230 V) and maximum load shall be  $\geq 83\%$ .

**3.5. BROWNOUT**

The power supply shall not be damaged when AC input voltage is dropped below the minimum specified AC input voltage. Furthermore, when AC input voltage returns to normal, the power supply shall return to normal operation.

**4. DC OUTPUT****4.1. VOLTAGES**

The power supply shall provide dual output voltages of 12VDC and 5VDC.

**4.2. OUTPUT CURRENT CAPACITY**

The voltage outputs shall be capable of supplying the output current shown in table 4.

Output	Nominal Output	Min. Load	Rated Load	Peak Load
1	+12V DC	0.0	5.6A	9A
2	+5V DC	0.0	0.5A	

Table 4 – Output current capacity

\* Note:

- The maximum continuous output load limited at 70W
- Each output is checked at the factory to be within voltage accuracy with a 60% rated load condition.
- Peak load can be supplied up to 8 seconds at nominal line while others at rated load.

**4.3. LINE & LOAD REGULATION, RIPPLE AND NOISE**

The power supply shall meet the regulation, ripple and noise parameters shown in table 5, subject to the loading conditions in section 4.2.

Output	Output voltage limits ( $V_{DC}$ )			Ripple/noise
	Minimum	Nominal	Maximum	Maximum
1	11.88 V	12.0 V	12.12 V	$<120\text{ mV}_{p-p}$
2	4.95 V	5.0 V	5.05V	$<50\text{ mV}_{p-p}$

Table 5 – Output voltage regulation

Output ripple and noise measurement shall be made using the following methods:

- Ripple & Noise test: Use 20 M Hz band width frequency oscilloscope terminated with a 47uF capacitors at output connector terminal.
- Line regulation is defined by changing the input voltage  $\pm 10\%$  from nominal line at rated load.



- c) Load regulation is defined by changing the output load  $\pm 40\%$  from 60% of the rated load while another output is set to 60% of rated load.

#### **4.4. OUTPUT VOLTAGE HOLD-UP TIME**

The hold-up time is longer than 20 mS at nominal line (115VAC) input at rated load, which is measured from the end of the last charging pulse to when the main output drops down to 95% output voltage.

#### **5. LEAKAGE CURRENT**

Line & neutral to Earth < 300uA

Line & neutral to Secondary ground < 100uA

#### **5.1. OUTPUT PROTECTION**

##### **5.1.1. SHORT CIRCUIT AND OVERLOAD PROTECTION**

The power supply will generate a hiccup mode to protect itself against short circuit or over load conditions, and will automatically return to normal after fault conditions are removed.

##### **5.1.2. OVER VOLTAGE PROTECTION**

The built-in crowbar circuit will shut down the outputs to avoid damaging the external circuits. The trip point of over voltage protection is around +13.1V to +15.1V. To recover from over voltage protection, the AC line must be cycled as described in section 5.1.3.

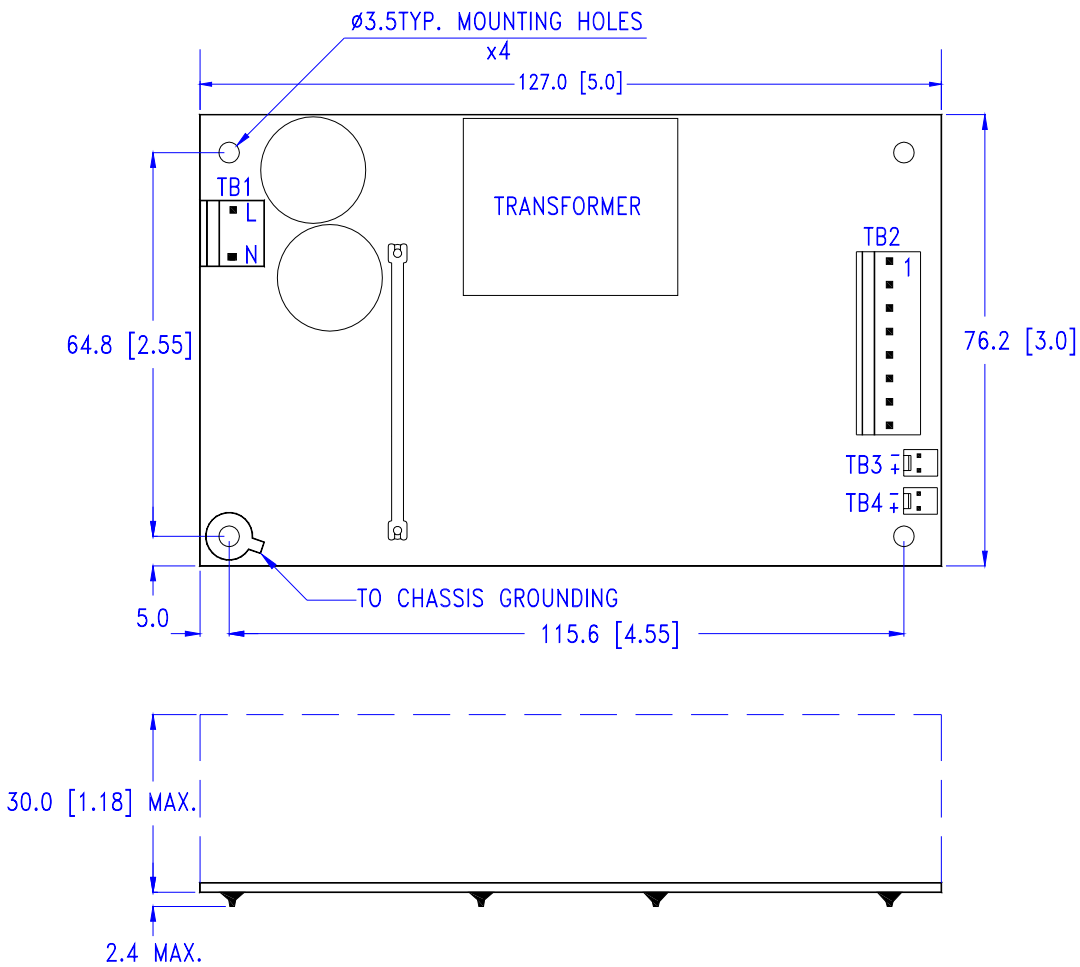
##### **5.1.3. RECOVERING FROM FAULT**

The latch off state shall be cleared after the fault is removed and the AC input power is removed for  $\geq 10$  seconds.

## 6. MECHANICAL

### 6.1. DIMENSIONS

Dimensions are shown in mm [inch]. Tolerance specified is + -0.4mm.



### 6.2. CONNECTORS

TB1—AC input	Molex 5277-02 or equivalent.
TB2—DC output	Molex 5273-08 or equivalent.
TB3—for LED use only	Molex 5045-2 or equivalent.
TB4—for FAN use only	Molex 5045-2 or equivalent.

### 6.3. DC OUTPUT PIN ASSIGNMENT

Pin	Voltage	Pin	Voltage
1	+12 V	5	GND
2	+12 V	6	GND
3	+12 V	7	GND
4	GND	8	+5 V



## 7. ENVIRONMENTAL

The power supply shall operate normally, show no degradation of performance, and sustain no damage as a result of the environmental conditions listed in paragraphs 7.1 through 7.4.

### 7.1. TEMPERATURE

Operating: 0 to 70° C. Derate linearly from 100% load at 40° C to 50% load at 70° C

Non-operating: -40 to 75° C

### 7.2. HUMIDITY

Operating: 10 % to 95 % non-condensing

### 7.3. ALTITUDE

Operating: Sea level to 10,000 feet

Non-operating: Sea level to 40,000 feet

### 7.4. VIBRATION

Operating: 10 Hz to 300Hz sweep at a constant acceleration of 1 G for 1 hour for each of the perpendicular axes X, Y, Z.

Non-operating: 10 Hz to 300 Hz sweep at 2 G constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.

## 8. INTERNATIONAL STANDARDS

### 8.1. SAFETY STANDARDS

Designed to meet the following regulations:

- UL 60950
- CSA 22.2 NO.234
- EN 60950
- UL2601
- CSA 22.2 NO.601.1
- EN 60601-1

### 8.2. EMI STANDARDS

Designed to meet the following limits:

- FCC docket 20780 curve "B"
- EN55011 class "B"
- EN61000-3-2 class "A"

### 8.3. EMS STANDARDS

Designed to meet the following limits:



EN61000-4-2	4KV contact, 8KV air discharge Criterion A
EN61000-4-3	10V/M with 80% A/M Criterion A
EN61000-4-4	4KV Criterion A
EN61000-4-5	Line to Line 1KV Line to ground 2KV. Criterion A
EN61000-4-6	10V with 80% AM Criterion A
EN61000-4-8	30A/M Criterion A
EN61000-4-11	30 % dips 10 ms, Criterion A 60 % dips 100 ms, Criterion C 95 % dips 5000 ms, Criterion C