

# 規格書



## SPECIFICATION

品名                    REDUNDANT SWITCHING POWER SUPPLY  
 STYLE NAME :

型號                    R2W-6500P  
 MODEL NO. :

料號  
 PART NO. :

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新巨企業股份有限公司  
 電源事業處  
 ZIPPY TECHNOLOGY  
 CORP.,  
 POWER DIVISION

10F, NO. 50 MIN CHYUAN RD.,  
 SHIN-TIEN CITY, TAIPEI HSIEN,  
 TAIWAN, R.O.C.  
 TEL. : +886(2)29188512  
 FAX. : +886(2)29134969

## Revision

Rev.	Page	Item	Date	Description
A2	All	All	MAR-04-2003	spec revise
A3	5	3.4	APR-28-2003	Revise overshoot range
A4	5	3.5	2004/11/30	Add remote on/off control
A5	4	2.0	JUL-25-2006	Update voltage range

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1.0 Scope

This specifications defines the functional mechanical and electrical characteristics of a grounded, single-phase, 500watt, 6 DC outputs redundant switching power supply with the active power factor correction.

2.0 Input requirements

2.1 Voltage (sinusoidal)

Full range 115~240 VAC (With  $\pm 10\%$  tolerance)

2.2 Frequency

The input frequency range : 47Hz~63Hz.

2.3 Steady-state current

8.0A/4A, (Excluding AC output current) at any low/high range of input voltage.

2.4 Inrush current

60/80 amps @115/230 VAC (at 25 degree C ambient cold start for one power supply)

2.5 Power factor correction

The power supply modules shall incorporate universal power input with active power factor correction, which shall reduce the line harmonics in accordance with the IEC61000-3-2 standards.  
PFC:up to the target of 95% @230V, full load.

2.6 Efficiency

Power supply efficiency typical 67% at 115V, full load.

2.7 AC Line Transient

AC line transient conditions shall be defined as “sag ” and “surge” conditions. Sag conditions (also referred to as “brownout” conditions) will be defined as the AC line voltage dropping below nominal voltage. Surge will be defined as the AC line voltage rising above nominal voltage.

AC Line Sag Transient Performance

AC Line Sag

Duration	Sag	Operating AC Volatgc	Performance Criteria
Continuous	10%	110/220V	No loss in function or performance
0 to 16ms	100%	110/220V	No loss in function or performance
16ms	20%	110/220V	Loss in function acceptable, self recoverable

## AC Line Surge Transient Performance

## AC Line Surge

Duration	Sag	Operating AC Voltage	Performance Criteria
Continuous	10%	110/220V	No loss in function or performance
0 to 1/2 AC cycle	20%	110/220V	No loss in function or performance

## 3.0 Output requirements

## 3.1 DC load requirements

Normal Output voltage	Load current		Regulation tolerance	
	Min.	Max	Min.	Max.
+5V	3.5A	30A	-5%	+5%
+12V	2.0A	32A	-5%	+5%
-5V	0.05A	0.7A	-10%	+5%
-12V	0.05A	0.7A	-10%	+5%
+3.3V	1.0A	24A	-5%	+5%
+5Vsb	0.1A	2A	-5%	+6%

+5V and +3.3V total current : 43A

Total power : 500W (Max)

## 3.2 Regulation

Output DC voltage	Line regulation	Load regulation	Cross regulation
+5V	±50mV	±250mV	±250mV
-5V	±50mV	+250/-500mV	+250/-500mV
+12V	±120mV	±600mV	±600mV
-12V	±120mV	+600/-1200mV	+600/-1200mV
+3.3V	±50mV	±165mV	±165mV
+5Vsb	±50mV	-300mV / +250mV	-300mV / +250mV

In a cross regulation test(one output channel at high load and the other output channels at low load) it is recommended to set the higher output channel at 80% max. of its spec., and the lower output channels at 20% max. of theirs.

## 3.3 Ripple and noise

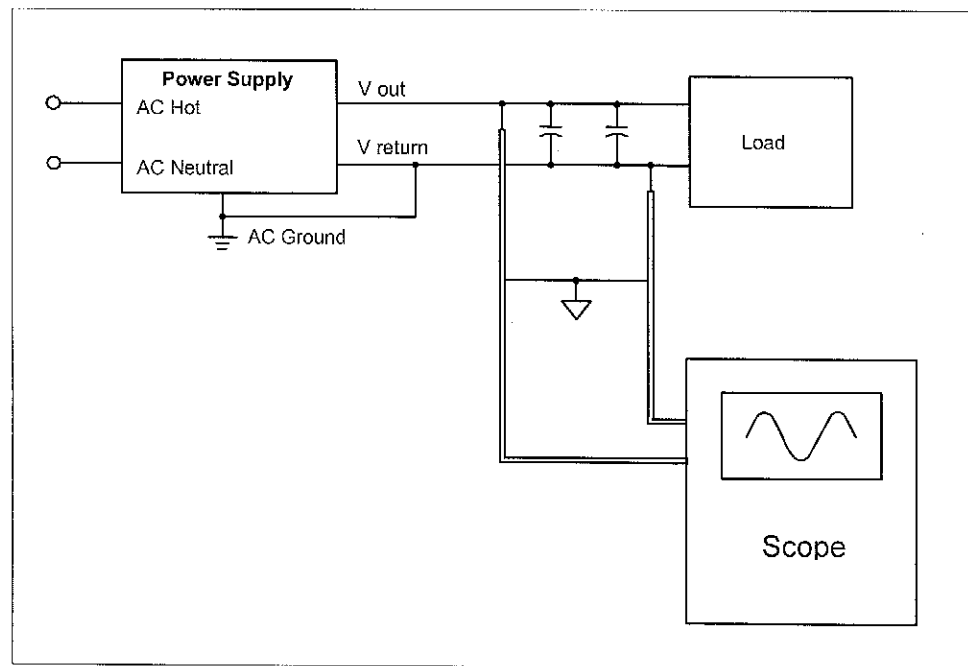
## 3.3.1 Specification

Parameter	Ripple	Noise
+5V	50mV (P-P)	70mV(P-P)
+12V	120mV(P-P)	120mV(P-P)
-5V	120mV(P-P)	120mV(P-P)
-12V	120mV(P-P)	120mV(P-P)
+3.3V	50mV(P-P)	70mV(P-P)
+5Vsb	50mV(P-P)	70mV(P-P)

## 3.3.2 Ripple voltage test circuit

The output ripple/noise is measured at the pins of the output connector terminated with a 0.1 $\mu$ F ceramic capacitor and a 220 $\mu$ F electrolytic capacitor to simulate system loading, per shown in Figure 1. The test can be performed under any condition of line voltage, output load, line frequency, operation temperature.

### 3.3.3 Ripple & noise voltage test circuit



Noise bandwidth is from DC to 20MHZ

### 3.4 Overshoot

Any overshoot voltage less than 15% of the nominal value at turning on or off, all DC outputs shall be within the regulation limit in section 3.2 before sending the power good signal per of section 6.0.

### 3.5 Remote on/off control

The power supply DC outputs (with the exception of +5Vsb) shall be enabled with an active-low, TTL-compatible signal ("ps-on")

When ps-on is pulled to TTL low, the DC outputs are to be enabled.

When ps-on is pulled to TTL high or open circuited, the DC outputs are to be disabled.

The DC output enable circuit shall be SELV compliant.

## 4.0 Protection

### 4.1 Input (primary)

The input power line must have an over power protection device in accordance with safety requirements of section 8

### 4.2 Output (secondary)

#### 4.2.1 Over power protection

The power supply shall be provided with over power protection

circuit latching all DC output into a shutdown condition which cause no any damage to power supply, and can be restarted after the overload is removed and power on cycle is initiated. Trip point shall be 110% min. and 160% max. of the total power (one unit of power supply only)

#### 4.2.2 Over voltage protection

All DC outputs of the power supply shall be latched into a shutdown state.

	Min	Typical	Max
+3.3V	3.9V	4.1V	4.4V
+5V	5.7V	6.1V	6.6V
+12V	13.6V	14.3V	15.0V

#### 4.2.3 Over current protection

The power supply shall be latched off if any of the +5V,+12V, +3.3V output current is over their 110~170% limited value at each power module and shall be restarted after the over current removed and power on cycle to be initiated.

#### 4.2.4 Short circuit

A short circuits placed on any DC output to DC return shall latch off the power supply without any damage.

#### 4.2.5 No load operation

The power supply shall be latched off into a shutdown state without any damage or hazardous condition while AC Power is on but no any load at DC outputs.

### 5.0 Power supply sequencing

#### 5.1 Power on (see fig.1)

#### 5.2 Hold up time

The 5V DC output must be maintained in a normal values for another 16 msec in case of any power failure suddenly.

#### 5.3 Power off sequence (see fig. 1)

### 6.0 Signal requirements

#### 6.1 Power good signal ( Figure 1)

The power supply shall be provided with power good signal, to reset system logic, indicating proper operation of power unit and advance warning of impending loss of regulation at turn off. This signal shall be off TTL compatible, of the up level (2.4V to 5.25V) whenever a +5V output is present and above the minimum UV sense levels per specified in paragraph 6.2 or of the down level (0.0V to 0.8V) when any output is below the minimum UV sense level.

Power good signal shall have a turn on delay of at least 100ms, but no more than 500ms, after the output voltage up to their minimum sense level.



6.2 Under voltage (UV) sense levels

Output	Minimum sense voltage
+5V	+4.50V

6.3 Remote on/off control

The power supply DC outputs (except the +5Vsb) shall be enabled with an active-low , TTL-compatible signal(“ps-on”)

When ps-on is pulled to TTL low , the DC outputs are enabled.

When ps-on is pulled to TTL high or open circuited , the DC outputs are disabled.

The DC output enable circuit shall be SELV compliant.

7.0 Environment

7.1 Operation

Temperature	0 to 40 degrees centigrade
Relative Humidity	10 to 85% non-condensing

7.2 Insulation resistance

Primary to secondary	: 30 meg. Ohm min. 500 VDC
Primary to FG	: 30 meg. Ohm min. 500VDC

7.3 Dielectric withstanding voltage

Primary to secondary	: 1800 VAC for 1 sec.
Primary to FG	: 1800 VAC for 1 sec.

7.4 Lcakage current

3.5 mA. max. at nominal voltage 250 VAC

8.0 Safety

The power supply must be certified to the safety standard listed following:

8.1 Underwriters laboratory UL 1950.

8.2 Canadian standard association (CSA) C22.2 & NO950-95.

8.3 TUV approval TUV EN-60950.

8.4 Power Line Transient.

The power supply shall be designed to meet the following standards

- a.) EN 61000-4-2(ESD) Criterion B, ± 4KV by contact, ±8KV by air.
- b.) EN 61000-4-4(EFT) Criterion B, ± 1KV.
- c.) EN 61000-4-5(SURGE) Criterion B, Line-Line ± 1KV  
Line-Earth ± 2KV.

### 8.5 RFI / EMI Standards

The power supply shall comply with the following radiated and conducted Emissions standards,

- a.) FCC part 15.
- b.) CISPR 22 (EN 55022).

### 9.0 Reliability

#### 9.1 Burn In

All power supply shall be burn in at high line voltage before shipping to customer.

#### 9.2 Mean Time Between Failures (MTBF)

MTBF =102,579 Hours at 25° C 115/230 VAC input and Full load.

### 10.0 Mechanical requirements

10.1 Physical dimension : 84 mm(H) \*101 mm (W) \* 300 mm (D)

### 11.0 Warning method

#### 11.1 Audio alarm(buzzer sound , resettable).

If any one of the power modules fails, the built-in buzzer will alarm. It can be reset by pressing the buzzer reset switch.

#### 11.2 Fault LED.

If any one of the power modules fails, the Green LED indicating the power status of the corresponding power modules will extinguish, and the total power LED will turn from Green to Red.

#### 11.3 Power defective signal delivery(TTL , low active).

### 12.0 Hot Swap Requirements

The power supply shall be hot swappable, all DC outputs remain within the limit per specified in section 3.1 during inserting or extracting a power unit from an operating system. Hot swap must be conducted at sub-system in operating under any static or dynamic conditions, but not exceeding the maximum inrush current per specified in section 2.4, details per following:

12.1 AC power is connecting to each module separately, and is disconnected from power unit before extracting from the subsystem in either standby mode or powered on mode, modules shall be inserted before connecting AC power source.

12.2 For power modules with AC docking at the same time as DC.

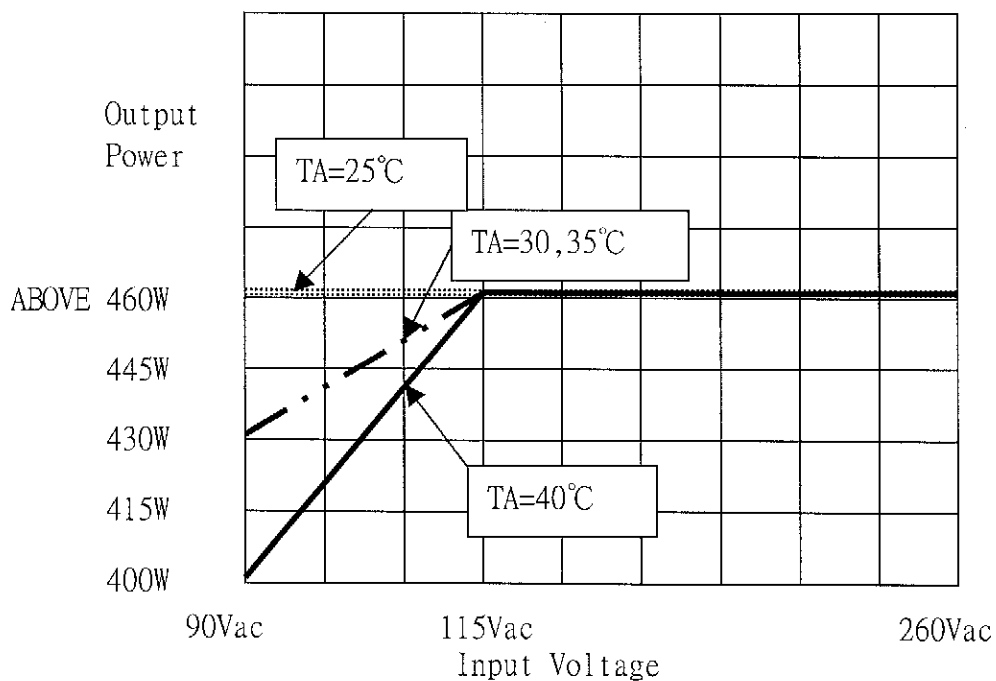
Extraction: AC and DC power are disconnected simultaneously in either standby mode or powered on mode when module is extracted from cage. No any damage or arcing to AC or DC contacts shall be occurred.

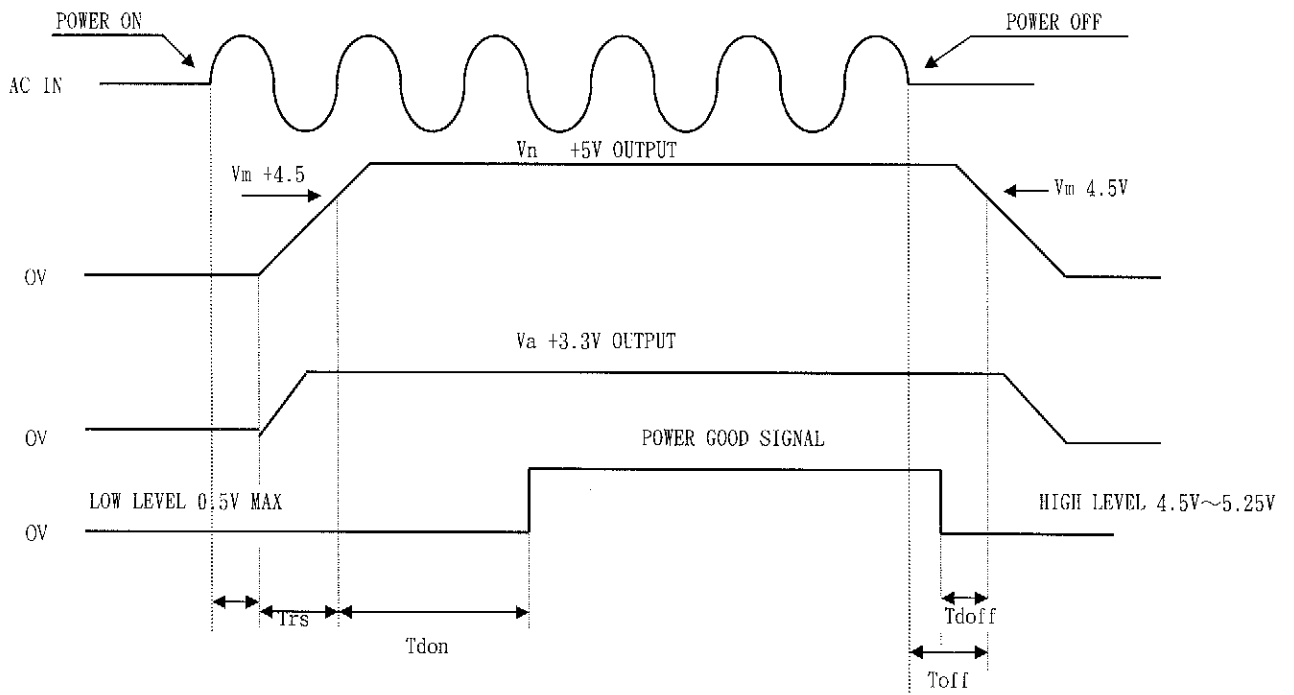
Insertion: AC and DC power are connected simultaneously in either standby mode or powered on mode when modules are inserted into cage. No any damage or arcing to both AC or DC contacts shall be allowed.

Many to the above are possible, power supplies shall be compatible with different variations depending upon the sub-system constructions. In general, a power supply in failure (off by internal latch or external control) may be replaced by a good one, however hot swap needs to sort with operational as well as failed power supply. The newly inserted unit may be turned on by inserting it into system.

13.0 Output power derating characteristics

Output Power Derating Characteristics





- $V_n$  Nominal voltages +5V
- $V_m$  Minimum voltages +4.5V
- $V_a$  Nominal voltages +3.3V
- $V_b$  +2.0V max
- $T_{son}$  Switch on time (500 ms. max.)
- $T_{rs}$  +5V rise time (100ms. max.)
- $T_{don}$  Delay turn-on (100ms. <  $T_{don}$  < 500ms.)
- $T_{doff}$  Delay turn-off (1 ms. min.)
- $T_{off}$  Hold up time (16ms. min.)

《Figure 1》