



# Revision

Rev.	Page	Item	Date	Description
A2	5 7 9	2.4 3.5 7.4	May-11-2007	Update Inrush current, Update Efficiency Update Leakage current
A3	5 7	3.1 3.6	JUL-04-2007	Update Load Current(A) +12V rating Update Typical Distribution of Efficiency
A4	5 5	1.0 3.1	MAY-14-2008	Update scope Update +12V Load current

# MODEL NO. HG2-5500V

- 1.0 Scope
- 2.0 Input requirements
  - 2.1 Voltage
  - 2.2 Frequency
  - 2.3 Stead-state current
  - 2.4 Inrush current
  - 2.5 Power factor correction
- 3.0 Output requirements
  - 3.1 DC load requirements
  - 3.2 Regulation and protection
  - 3.3 Ripple and noise
    - 3.3.1 Specification
    - 3.3.2 Ripple voltage test circuit
  - 3.4 Overshoot
  - 3.5 Efficiency
- 4.0 Protection
  - 4.1 Input
  - 4.2 Output
    - 4.2.1 OPP
    - 4.2.2 OVP
    - 4.2.3 Short
    - 4.2.4 Restart after protection
- 5.0 Power supply sequencing
  - 5.1 Turn on
  - 5.2 Hold up time
  - 5.3 Power off sequence
- 6.0 Signal requirements
  - 6.1 Power good (POK)
- 7.0 Environment
  - 7.1 Operation
  - 7.2 Insulation resistance
  - 7.3 Dielectric withstanding voltage
  - 7.4 Leakage current
- 8.0 Safety
  - 8.1 UL
  - 8.2 CUL
  - 8.3 TUV
  - 8.4 CCC

9.0 Reliability

9.1 Burn in

10.0 Mechanical requirements

10.1 Physical dimension

11.0 Fan speed control & noise

1.0 Scope

This specification defines the performance characteristics of a grounded, Ac input, 500 watts, 5 output level power supply. This specification also defines world wide safety requirements and manufactures process test requirements.

2.0 Input requirements

2.1 Voltage (sinusoidal) : 100~240 VAC full range(With  $\pm 10\%$  tolerance).

2.2 Frequency

The input frequency range will be 47hz~63hz.

2.3 Steady-state current

8A/4A at any low/high range input voltage.

2.4 Inrush current

20/40 Amps @ 115/230 VAC

2.5 Power factor correction

The power supply shall incorporate universal power input with active power factor correction, which shall reduce line harmonics in accordance with the IEC61000-3-2 standards.

PFC can reach the target of 95% @230VAC, Full load.

3.0 Output requirements

3.1 DC load requirements

Normal Output voltage	Load current(A)		Regulation tolerance	
	Min.	Max.	Max.	Min.
+5V	0.5	20	+5%	-5%
+12V	2	38	+5%	-5%
-12V	0	0.8	+5%	-5%
+3.3V	0.5	20	+5%	-5%
+5Vsb	0.1	3.5	+5%	-5%

Total power : 500W(MAX)

+5V AND +3.3V Total Max.:40A

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

### 3.2 Regulation

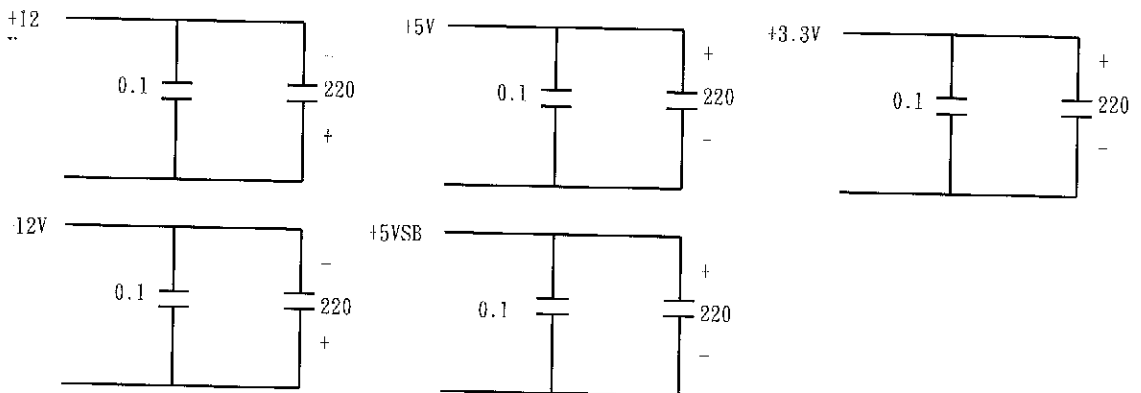
Output DC voltage	Line regulation
+5V	±50mV
-5V	±50mV
+12V	±50mV
-12V	±50mV
+3.3V	±50mV
+5Vsb	±50mV

### 3.3 Ripple and noise

#### 3.3.1 Specification

+5V	50mV (P-P)
+12V	120mV (P-P)
-12V	120mV (P-P)
+3.3V	50mV (P-P)
+5Vsb	50mV (P-P)

#### 3.3.2 Ripple voltage test circuit



0.1uf is ceramic the other is tantalum.  
Noise bandwidth is from DC to 20MHz

### 3.4 Overshoot

Any overshoot at turn on or turn off shall be less 10% of the nominal voltage value › all output shall be within the regulation limit of section 3.2 before issuing the power good signal of section 6.0.

## 3.5 Efficiency

Power supply efficiency typical 80-85% at 25 °C 115V FULL LOAD .

## 3.6 Typical Distribution of Efficiency

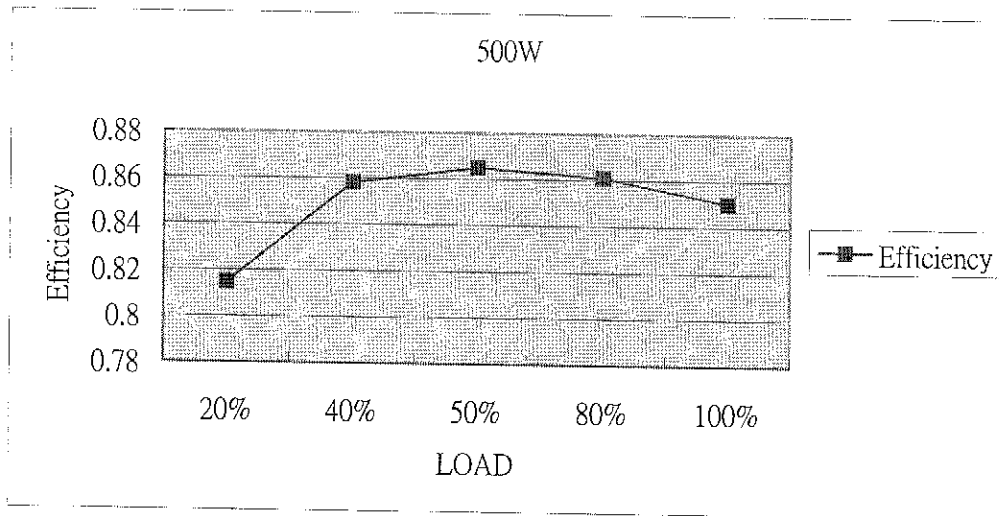
LOAD(20%)					
Output	+5V	+3.3V	+12V	-12V	5VSB
Load Current	3.081A	3.081A	5.854A	0.123A	0.539A
Voltage(Rms)	5.07V	3.34V	12.05V	-12.02V	5.13V
P in(AC in 115V)	123.5W				
EFF.	81.5%				

LOAD(40%)					
Output	+5V	+3.3V	+12V	-12V	5VSB
Load Current	6.162A	6.162A	11.709A	0.246A	1.078A
Voltage(Rms)	5.04V	3.332V	12.03V	-12.02V	5.10V
P in(AC in 115V)	234.0W				
EFF.	85.8%				

LOAD(50%)					
Output	+5V	+3.3V	+12V	-12V	5VSB
Load Current	7.703A	7.703A	14.636A	0.308A	1.348A
Voltage(Rms)	5.03V	3.30V	12.02V	-12.03V	5.09V
P in(AC in 115V)	289.9W				
EFF.	86.5%				

LOAD(80%)					
Output	+5V	+3.3V	+12V	-12V	5VSB
Load Current	12.325A	12.325A	23.417A	0.493A	2.157A
Voltage(Rms)	4.98V	3.26V	12.00V	-12.04V	5.06V
P in(AC in 115V)	463.9W				
EFF.	86.1%				

LOAD(100%)					
Output	+5V	+3.3V	+12V	-12V	5VSB
Load Current	15.406A	15.406A	29.271A	0.616A	2.696A
Voltage(Rms)	4.96V	3.23V	12.00V	-12.03V	5.04V
P in(AC in 115V)	586.4W				
EFF.	85.0%				



P.S Any difference either on the DC output cable (i.e., length, wire gauge) or on the accurate of instruments will conclude different test result.

#### 4.0 Protection

##### 4.1 Input (primary)

The input power line must have an over power protection device in accordance with safety requirement of section 8.0

##### 4.2 Output (secondary)

###### 4.2.1 Over power protection

The power supply shall provide over power protection on the power supply latches all DC output into a shutdown state. Over power of this type shall cause no damage to power supply, after over load is removed and a power on/off cycle is initiated, the power supply will restart. Trip point total power min. 110%, max. 150%.

###### 4.2.2 Over voltage protection

If an over voltage fault occurs, the power supply will latch all DC output into a shutdown state.

	Min	Typical	Max
+3.3V	3.6V	4.1V	4.3V
+5V	5.6V	6.1V	6.5V
+12V	13.2V	14.3V	15.0V

###### 4.2.3 Short circuit

A short circuit placed on +5V, +3.3V, +12V, -5V, -12V output to DC return shall cause no damage and power supply latch.

###### 4.2.4 Restart after protection

After the protection mode (OPP/OVP) or short circuit is removed and a power on/off cycle is initiated, the power supply will restart. If the PSU is using AC power switch to control on/off, it has to be switched off at least for 5 seconds to restart the unit.



5.0 Power supply sequencing

5.1 Power on (see fig.1)

5.2 Hold up time

When power shutdown DC output 5V must be maintain 16msec in regulation limit at. normal input voltage

5.3 Power off sequence (see fig. 1)

6.0 Signal requirements

6.1 Power good signal (sce fig. 1)

The power supply shall provide a "power good" signal to reset system logic, indicate proper operation of the power supply.

At power on, the power good signal shall have a turn on delay of at least 100ms but not greater than 500ms after the output voltages have reached their respective minimum sense levels.

7.0 Environment

7.1 Operation

Temperature 0 to 50 degrees centigrade

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

For approval purpose :

Primary to secondary : 3000 VAC for 1min.  
 Primary to Frame Gnd : 2200 VAC for 1 min.

For production purpose: 100% test

Primary to Frame Gnd : 2200VAC for 1 sec  
 Cut off current : 15mA

7.4 Leakage current

1.5 mA max. at nominal voltage VAC.

8.0 Safety

8.1 Underwriters laboratory (UL).

The power supply designed to meet UL 60950.

8.2 Canadian standards association (CUL)

The power supply designed to meet CSA C22.2 No.60950.

8.3 TUV

The power supply shall be designed to meet TUV EN-60950.

8.4 CCC Standards

The power supply shall be designed to meet GB4943-1995, GB9254-1998, GB17625.1-1998.

9.0 Reliability

9.1 Burn in

All products shipped to customer must be burn in. The burn in shall be performed at high line voltage.

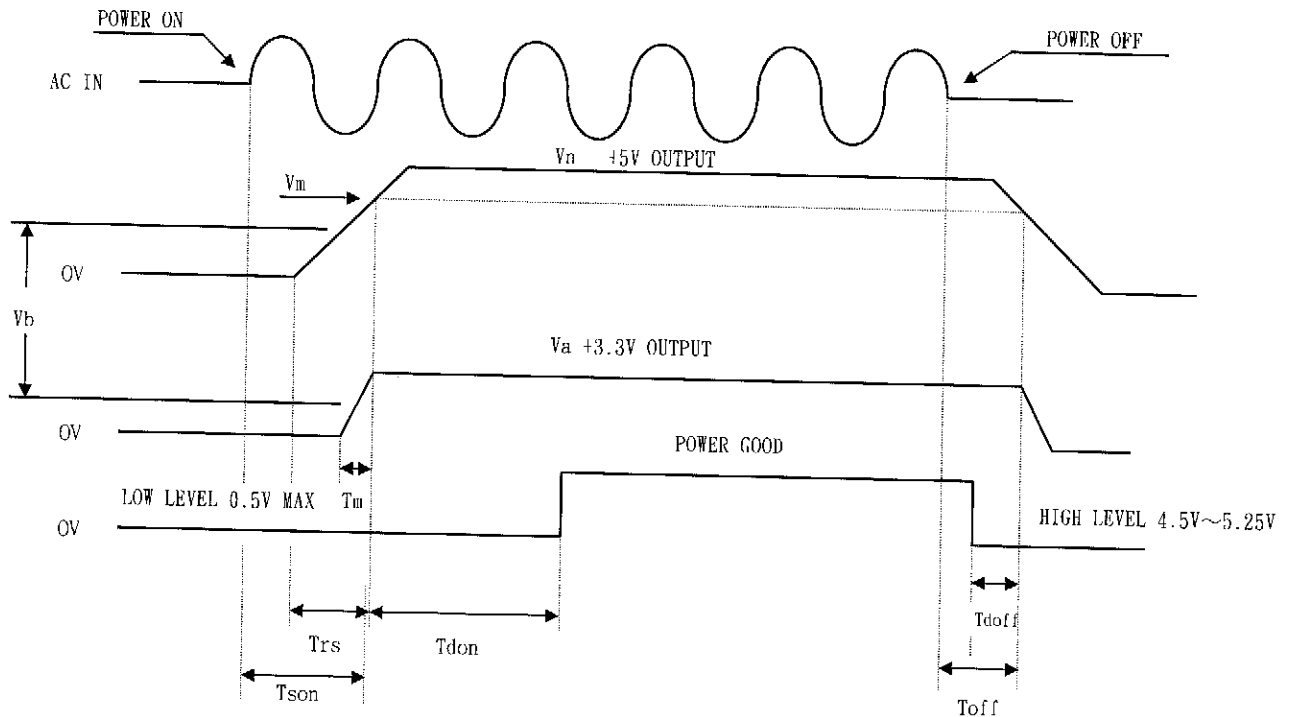
10.0 Mechanical requirements

10.1 Physical dimension : 150 mm(D) \* 140 mm(W) \* 86 mm(H)

11.0 Fan speed control & noise

Fan speed is in varying with different temperature of heatsinks.

The relationship between fan noise and changes in temperature per shown in the following diagram.



- $V_n$  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 (2000 ms. max.)
- $T_{rs}$  +5V rise time (50ms. 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》