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2000W Redundant Power Supply

Model No. TC-2000RVN4

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1. INTRODUCTION

First of all, thank you for purchasing RVN4 Series High-Density Redundant power supply for 4U~8U chassis.

The RVN4 is a 3+1, Hot-swappable/Hot-pluggable, High-Density Redundant power supply set, it consists of:

(1) complete metal frame (nickel-plated)
(2) compact size (smaller than PSII form factor) 3+1 power modules
(3) backplane board

The RVN4 Series of hot swappable high-density redundant power supply offer a maximum 2000watts of output power. The RVN4 series provide Active Power Factor correction (PFC) at full range AC Input complies with EN 61000-3-2/3 for critical applications.

The power unit's size is compact which smaller than PSII form factor and both power modules built two interior 38X38 m/m ball bearing DC fans. Each power module has designed with 5 outputs including +3.3V, +5V, +12V, -12V & 5VSB circuits and higher current availability based on Intel ATX12V / EPS12V standards. All you can see on the backplane board is just passive components and this is the key point to a greater Power Supply MTBF.

The unit including LED display, buzzer alarm, TTL signal, etc.

When all the power modules are at normal condition, it balances the load share through its parallel design and results the power system increase reliability.

To really discover the power and ease in using these products, we recommend that you read through this manual carefully.

2. GENERAL

This specification describes the performance characteristics of a 2000watts hot swappable, N+1 power system with +3.3V,+5V,+12V, -12V main DC outputs, and 5V standby outputs. The system is configured to hold four identical 700W power supply modules, SURE STAR Model TC-2000RVN4.

3. ELECTRICAL PERFORMANCE

3.1.INPUT

3.1.1. AC input voltage range

90VAC ～ 264VAC

3.1.2. AC Input frequency

47 ～ 63Hz

3.1.3. Input waveform

The unit is capable of operating with 10% distorted sine wave input. It is measured by a distortion analyzer. Its flat-topping clipped 10% from the peak value of standard sine-wave.

3.1.4. Input current and inrush current

AC INPUT VOLTAGE	MAX.INPUT CURRENT per power supply module	MAX INRUSH CURRENT per power supply module
115Vrms	12Arms	60A pack
230Vrms	6Arms	120A pack

3.2. Input current harmonics

The input current drawn on the power line shall not exceed the limits set by IEC-61000-3-2.

3.3. Input power factor

The minimum power factor at full load shall be 0.98/115V 60 Hz and 0.96/230V 50 Hz.

3.4. Efficiency

76% Typical at full load

3.5.OUTPUT

3.5.1. Stand-by power

The system shall provide a standby output of 5V +/- 5% with a current sourcing capability of 3.0A. The ripple and noise of this output shall be less than 50mVp-p. The output shall be active whenever AC power is applied to the unit. *PSON shall have no effect on this output.

3.5.2. Output current capacity

Each of the 1+1 redundant power supply module shall be capable of supplying the output currents of as below subject to the listed conditions and a total output power of 700watts. Due to the active current share, the actual maximum steady state current from each output shall be about half of the maximum current specified.

OUTPUT VOLTAGE	OUTPUT CURRENT		REGULATION		OUTPUT
	TC-2000RVN4		LOAD	LINE	RIPPLE & NOISE max. (P-P)
	Min.	Max.			
+5V	4A	91A	±5%	±1%	50mV
+3.3V	4A	70A	±5%	±1%	50mV
+12V	6A	145A	±5%	±1%	70mV
-12V	0A	2A	±5%	±1%	70mV
+5SB	0.4A	3.5A	±5%	±1%	50mV

REMARKS:

1.Total Max output of +5V AND +3.3V not exceed 580W

2.Power module Total output power not exceed 2000W forTC-2000RVN4

3.Noise bandwidth is from DC to 20MHz.

3.5.3. Output voltage rise time

The rise time shall be less than 20 ms measured from 10% to 90%.

3.5.4. Output voltage hold up time

Upon loss of an ac input at any input voltage between 115/230V, the output voltages of the system shall remain in regulation for at least 16 ms at full output loads.

3.5.5. Dynamic load response time

The following shall apply to the 3.3 V, 5 V, and 12 V outputs:

Output voltage for each output shall recover to within 5 % of its steady state level in less than 1 ms under the following conditions:

AC INPUT VOLTAGE: 90VAC ~ 264VAC		
Repetition rate of 100Hz with 50 % duty cycle		
OUTPUT	**Step Load Size**	**Load Slew Rate**
+3.3V	75% to 100% to 75% load	0.5 A/u sec
+5V	75% to 100% to 75% load	0.5 A/u sec
+12V	75% to 100% to 75% load	0.5 A/u sec

3.5.6. Remote On/Off Control

The main outputs of this power supply (3.3V,5V,12V,-12V) shall be energized when input signal*PSON is active. *PSON is an active low TTL compatible signal referenced to the +5V standby common. This input signal shall be an open collector signal capable of sinking a minimum of 4mA. When *PSON becomes inactive, the main outputs shall be disabled.

	Power on	**Power off**
PSON	LOW (0.8V max)	HI (2V max)

3.5.7. Power good signal

The system shall have an active high TTL compatible signal capable of sinking 1mA and sourcing 100uA. The signal shall become active within 100 to 500 ms from the instant +5V output reaches a steady state level within the specified regulation limits. It shall become inactive at least 1 ms before +5V drops to below the lower regulation limit.

3.6. PROTECTION

3.6.1. Over voltage protection

OUTPUT	Min	Max
+3.3V	3.75V	4.3V
+5V	5.7V	6.9V
+12V	13V	14.3V

3.6.2. Over power protection

OVER 110% ~ 150% of rated load Shut down latch off.

3.6.3. Short circuit protection

All output equipped with short circuit.(Shut down o/p voltage, re-power on to recover).

3.6.4. Over temperature protection

When power supply temperature over 115±5℃, power supply will shut down
As it cools down to 85±5℃, the power supply will re-start in auto-recovery.

3.7. Power system fault signal

When one of the power supply module in the system fails to provide output, the system shall provide:

3.7.1. Audible buzzer

When the warning buzzer sounds, the user can reset the warning buzzer by pressing the buzzer reset or use the reset switch of the system chassis. The reset switch can be connected by wires lead provided from the power supply system (please refer to Sec. 3.7.2./3.7.3.). Insert the power module which is removed for testing earlier, the sound of the warning buzzer will disappear, the external warning LED will turn Green again. The LED indicating the status of the power supply will light again when testing another power supply by performing the similar procedure.

3.7.2. Buzzer status

POWER SUPPLY CONDITION	Buzzer status
No AC power to all PSU	OFF
AC present/Only Standby Output On	OFF
Power supply DC outputs ON and OK	OFF
Power supply failure	Beeping

3.7.3. LED indicator status

POWER SUPPLY CONDITION	Power system status		Per Power Module status
LED COLOR	RED	GREEN	ORANGE
No AC power to all PSU	OFF	OFF	OFF
AC present/Only Standby Output On	ON	OFF	OFF
Power supply DC outputs ON and OK	OFF	ON	ON
Power supply failure	OFF	Blinking	OFF

3.7.4. TTL signal

POWER SUPPLY CONDITION	OUTPUT CONDITION
NORMAL	HIGH
FAILURE	LOW

3.8 Load sharing

3.8.1. Forced Load Sharing

The +3.3V, +5V and +12V outputs shall have forced load sharing. The corresponding output shall share within 5% at full load when operated in a redundant 1+1 configuration. The 5VSB and –12V outputs shall not have forced load sharing between power modules.

Example of load share accuracy: Power supply #1 = 20A

Power supply #2 > 19A and < 21A

3.8.2. Load Sharing Signal

The power supplies load share shall use a single load share bus signal connected between each corresponding output. If the load sharing is disabled by shorting the bus to ground, the power system shall continue to operate within regulation limits for loads less than or equal to the full load rating of each power supply. The failure of one power supply shall not effect the output voltages of the other supply still operating.

3.9 Hot-swap procedures

Please refer to the following when either power module or the fan found defective.

A) Locate the defective power module by examining the individual LED (if LED without light, it indicates the power module is defective).

WARNING:

Please perform the above step carefully otherwise it may cause shut down the whole system.

WARNING:

Please do not remove the defective power module until you have worn gloves to keep from be burned. This is due to the cover of the power module is used as heat sink for cooling, usually the temperature is around 50 ~ 60 degree Celsius under full load condition.

B) Loosen the bracket screws of the power module
C) Remove the defective power module by pulling out method

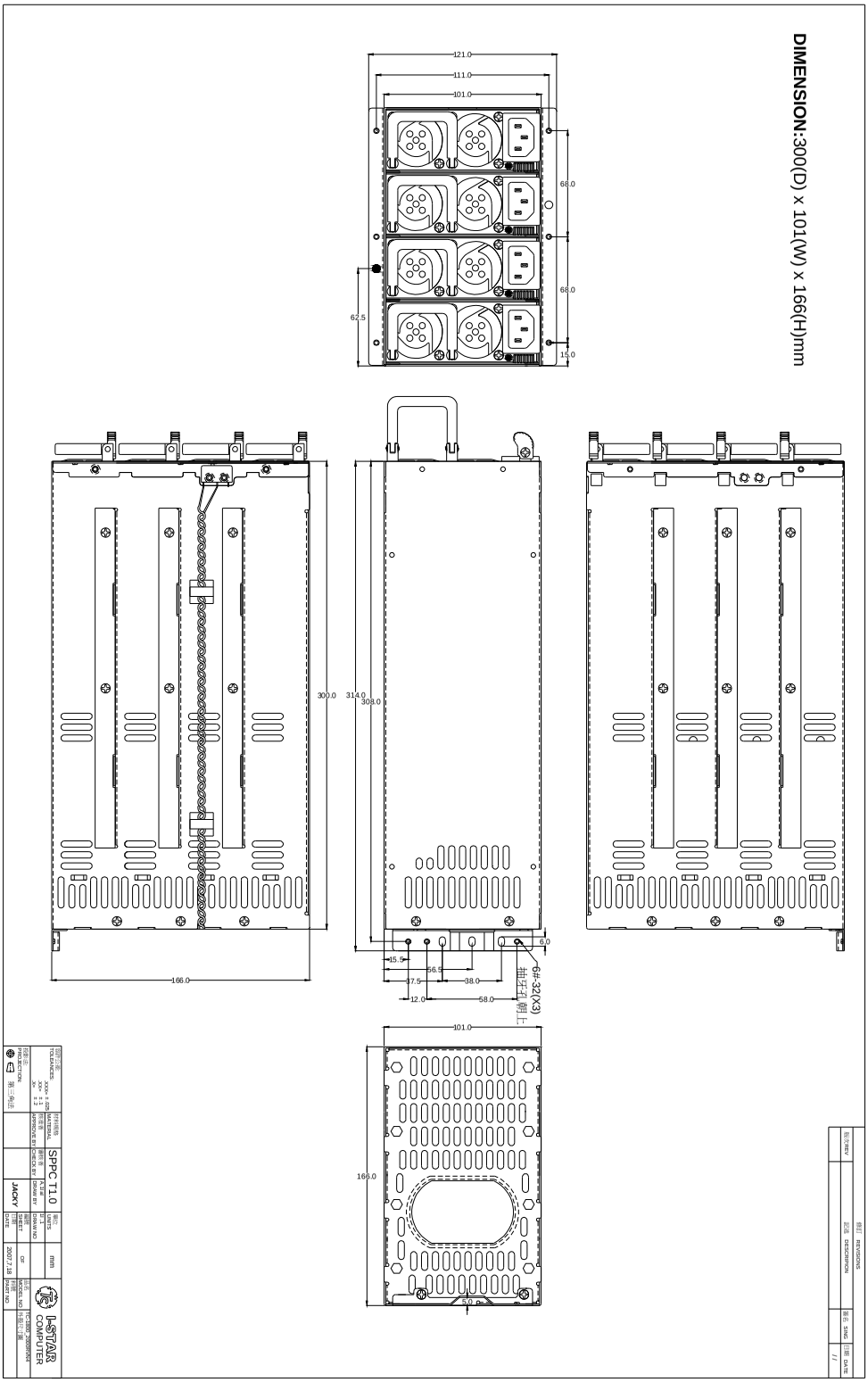
WARNING:

Please put aside the power module await for cooling down. Keep from other people tough it until it is cool.

D) Replace a new Good power module, insert the power module into the power system to the end.
E) Check the LED of the power module light Green.
F) Check the LED indicating the total power system status. It should be from twinkle to Green.
G) Tighten the screws of the power module to fix it.

4. MECHANICAL

4.1.Outside Dimension: 300(D) x 101(W) x 166(H)mm

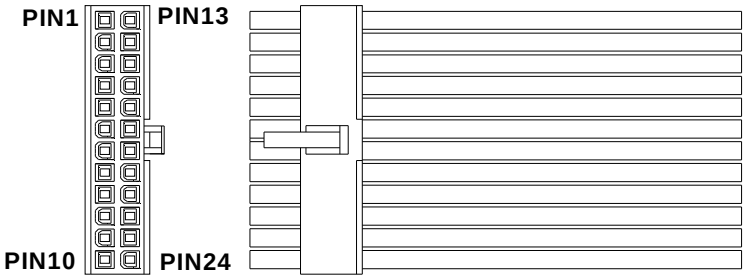


4.2. DC Output cables -- M24P+M8P+M4P, SATA*2, PCI-E 6pin*4, HDD*32, Floppy*2.

Below output harness length start from PCB board.

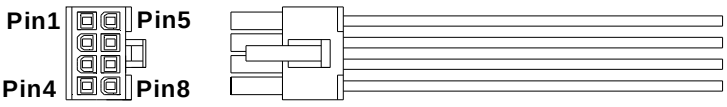
24Pins(EPS12V)
Connector HOUSING: MOLEX 39-01-2240 or equivalent
TERMINAL: MOLEX 39-00-0039 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	ORANGE	+3.3V	18AWG	650mm ±20mm
2	ORANGE	+3.3V	18AWG	
3	BLACK	COM	18AWG	
4	RED	+5V	18AWG	
5	BLACK	COM	18AWG	
6	RED	+5V	18AWG	
7	BLACK	COM	18AWG	
8	GRAY	PW-OK	18AWG	
9	PURPLE	+5SB	18AWG	
10	YELLOW	+12V3	18AWG	
11	YELLOW	+12V3	18AWG	
12	ORANGE	+3.3V	18AWG	
13	ORANGE	+3.3V	18AWG	
	ORANGE	+3.3S	22AWG	
14	BLUE	-12V	18AWG	
15	BLACK	COM	18AWG	
16	GREEN	PS-ON	18AWG	
17	BLACK	COM	18AWG	
18	BLACK	COM	18AWG	
19	BLACK	COM	18AWG	
20	NC	OPTION	18AWG	
21	RED	+5V	18AWG	
22	RED	+5V	18AWG	
23	RED	+5V	18AWG	
24	BLACK	COM	18AWG	



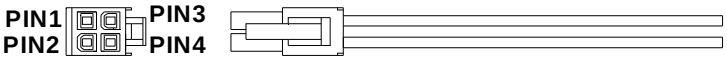
8Pins(EPS12V)
Connector HOUSING: MOLEX 39-01-0280 or equivalent
TERMINAL: MOLEX 39-00-0060 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	BLACK	COM	18AWG	650mm ±20mm
2	BLACK	COM	18AWG	
3	BLACK	COM	18AWG	
4	BLACK	COM	18AWG	
5	YELLOW	+12V	18AWG	
6	YELLOW	+12V	18AWG	
7	YELLOW	+12V	18AWG	
8	YELLOW	+12V	18AWG	



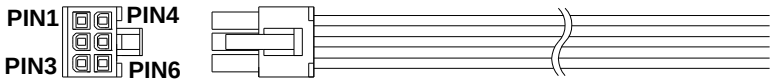
4Pins(ATX12V,FOR P4)
Connector HOUSING: MOLEX 39-01-0280 or equivalent
TERMINAL: MOLEX 39-00-0060 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	BLACK	COM	18AWG	650mm ±20mm
2	BLACK	COM	18AWG	
3	YELLOW	+12V	18AWG	
4	YELLOW	+12V	18AWG	



6Pins(PCI Express)
Connector HOUSING: MOLEX 39-01-0280 or equivalent
TERMINAL: MOLEX 39-00-0060 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	YELLOW	+12V	18AWG	650mm ±20mm
2	YELLOW	+12V	18AWG	
3	YELLOW	+12V	18AWG	
4	BLACK	COM	18AWG	
5	BLACK	COM	18AWG	
6	BLACK	COM	18AWG	



4Pins(FLOPPY DISK)
Connector HOUSING: AMP 171822-4 or equivalent
TERMINAL: AMP 170262-2 or equivalent

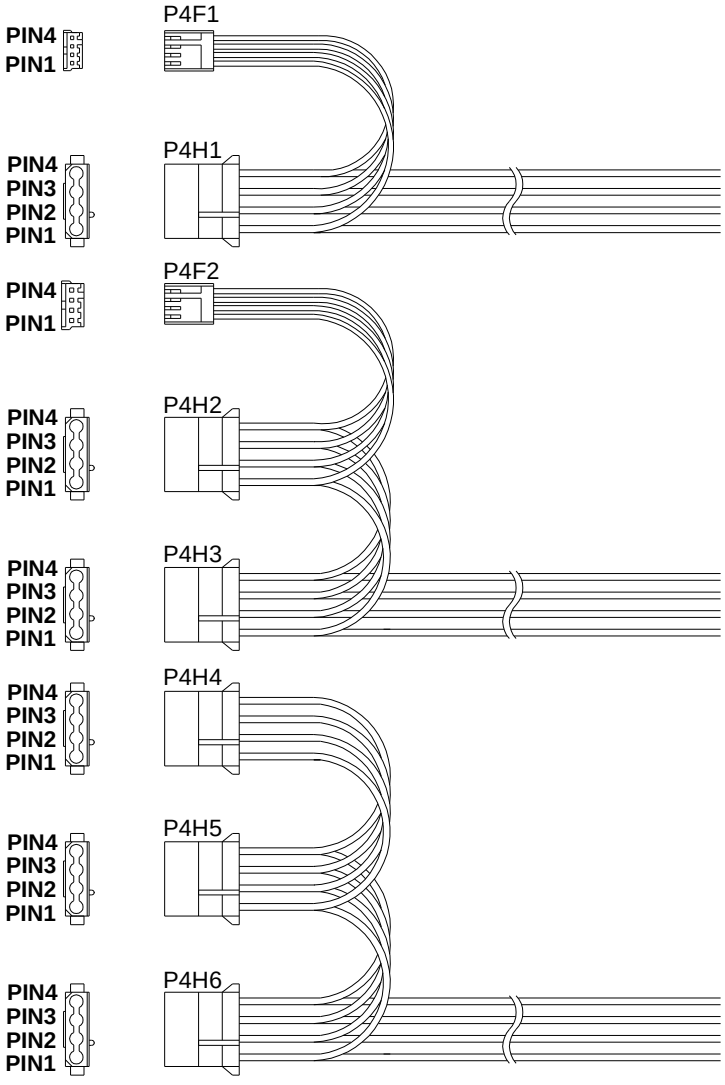
Name	Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
P4F1 P4F2	1	YELLOW	+12V	22AWG	150mm ±10mm
	2	BLACK	COM	22AWG	
	3	BLACK	COM	22AWG	
	4	RED	+5V	22AWG	

4Pins(HD/CD-ROM/RW)
Connector HOUSING: AMP 480424-0 or equivalent
TERMINAL:AMP 60619-4 or equivalent

Name	Pin No.	WIRE COLOR	SIGNAL	WIRE SIZE	LENGTH
P4H2 P4H4 P4H5	1	YELLOW	+12V	18AWG	150mm ±10mm
	2	BLACK	COM	18AWG	
	3	BLACK	COM	18AWG	
	4	RED	+5V	18AWG	

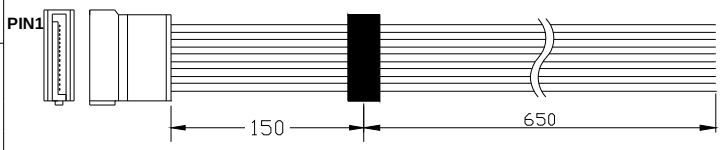
4Pins(HD/CD-ROM/RW)
Connector HOUSING: AMP 480424-0 or equivalent
TERMINAL:AMP 60619-4 or equivalent

Name	Pin No.	WIRE COLOR	SIGNAL	WIRE SIZE	LENGTH
P4H1 P4H3 P4H6	1	YELLOW	+12V	18AWG	650mm ±20mm
	2	BLACK	COM	18AWG	
	3	BLACK	COM	18AWG	
	4	RED	+5V	18AWG	



5PIN(SERIAL ATA HD)
Connector HOUSING: TKP/H127M2 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	ORANGE	+3.3V	18AWG	650mm ±20mm 150mm ±10mm
2	BLACK	COM	18AWG	
3	RED	+5V	18AWG	
4	BLACK	COM	18AWG	
5	YELLOW	+12V	18AWG	



LED Indicators
Power Module (PW1/PW2/PW3/PW4 LED) & Power System (PWR LED)

Name	WIRE COLOR		LED COLOR	WIRE TYPE	LENGTH
PW1 LED	BROWN	/ WHITE	ORANGE	22AWG	900mm ±20mm
PW2 LED	RED	/ WHITE	ORANGE	22AWG	
PW3 LED	ORANGE	/ WHITE	ORANGE	22AWG	
PW4 LED	YELLOW	/ WHITE	ORANGE	22AWG	
PWR LED	GREEN	/ WHITE	RED/GREEN	22AWG	



TTL Signal
Connector HOUSING: Molex 22-01-3027 or equivalent

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	BLACK	COM	22AWG	900mm ±20mm
2	RED	+5V	22AWG	



ALARM Rest

Pin No.	WIRE COLOR	SIGNAL	WIRE TYPE	LENGTH
1	GRAY	COM	22AWG	900mm ±20mm
2	GRAY	REST	22AWG	



4.3. AC input connector

IEC 320 AC Inlet with EMI Filter, 15A/250V

4.4. Cooling

BY BALL BEARING DC FAN.

5. ENVIRONMENTS

5.1. Temperature

Operating : 0℃to +45℃

Non Operating: -20℃to +70℃

5.2. Humidity

Operating : 5% to 95%, non-condensing

Non Operating: 20% to 90%,non-condensing

5.3. Altitude

Operating: sea level to 7,000 feet

Non-operating: sea level to 40,000 feet

5.4. Shock

5.4.1. Operating

5g for 11ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.

5.4.2. Non-operating

30g for 11ms with a ½ sine wave for each of the perpendicular axes X, Y, and Z.

5.5. Vibration

5.5.1. Operating

10Hz to 500Hz sweep at 0.5g constant acceleration for one hour on each of the perpendicular axes X, Y, and Z.

5.5.2. Non-operating

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

5.6. Power line disturbance

5.6.1. Over voltage

The power supply shall function with no interruption when line input is surged 15 % above nominal for one second. The verification test shall be performed 10 times with a 10 % duty cycle.

5.6.2. Under voltage

The power supply shall function with no interruption when line input is sagged 20%below nominal for one second. The verification test shall be performed10 times with a 10 % duty cycle.

5.6.3. Surviving surge and sag

Power supply shall survive a surge to 147VAC for 0.5 second and a sag to 80VAC for 0.5 second without damage.

6. REGULATORY

6.1. Safety standards

A. UL/cUL60950-1
B. TUV EN60950-1
C. CB
D. CCC

6.1.1. Leakage current

Input leakage current from line to frame ground will be less than 3.5mA rms. for each power module. Condition: 264Vac/60Hz

6.1.2. Isolation resistance

Primary to earth ground 500Vdc , 50M ohms Min.

6.1.3. Dielectric Withstand Voltage

Primary to Secondary : 1500V ac / 50Hz for 1 Minute.
Primary to Safety Ground: 1500V ac / 50Hz for 1 Minute.

6.2. Electromagnetic compatibility

6.2.1. EMI/RFI standards

A. FCC Part 15, class A.
B. CISPR22 (EN55022)class A.

6.2.2. Line noise disturbance

The power supply shall operate normally when installed in a computer system and subjected to power line noise described in EN61000-4-4, level 3 (2 kV open circuit voltage). The power supply shall not cause any failure in the host computer system during line noise testing.

6.2.3. AC line transients

The power supply shall comply with the surge voltage requirements of EN61000-4-5 level 3 (2 kV peak open circuit voltage from line/neutral to GND , and 1 kV from line to neutral)

7. Reliability

7.1. Mean Time Between Failure(MTBF)

Using MIL - HDBK -217F the calculated MTBF＞100,000 hours at 25℃.

*Note:

The description stated herein is subject to change without prior notice.