SPECIFICATION FOR APPROVAL

CUSTOMER: GP
DESCRIPTION: 2U PDB (2000W 1+1 redundant power supply)
CUSTOMER Part No:
Safety Model No:
GOSPOWER Model No: G1392-2000WNA
DATE:2021-12-30
PCB REV No.:0.3 SPEC REV No.:0.0

CUSTOMER

GOSPOWER

APPROVE	CHECK	PREPARE	QA
BOBOO	Liu Caiming	Hu Yaqi	Wang WQ

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT	DESCRIPTION: SPECIFICATION
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	Model No.: G1392-2000WNA

DATE	PREPARED	CHECKED	APPROVED	Document No.:	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo	N200000xxx	0.0

REV	Date	Records History	Approved
V0.0	2021-12-30	Original	boboo

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

CONTENTS

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT	DESCRIPTION: SPECIFICATION
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	Model No.: G1392-2000WNA

DATE	PREPARED	CHECKED	APPROVED	Document No.:	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo	N200000xxx	0.0

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT	DESCRIPTION: SPECIFICATION
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.	Model No.: G1392-2000WNA

DATE	PREPARED	CHECKED	APPROVED	Document No.:	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo	N200000xxx	0.0

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

1. GENERAL

The specification has defines the key characteristics for the power supply PDB specification that supports server systems, Storage, Networking. This power supply PDB output voltage include +12V/+3.3V/+5V/-12V and +5VSB voltage; The max output power is 2000W.

This is a multiple function power supply backplane assembly providing the following features:

- ✧ 12V to +3.3V DC to DC converter
- ✧ 12V to +5V DC to DC converter
- ✧ 12VSB to 5VSB DC to DC converter

2. MECHANICAL OVERVIEW

Module:The physical size of the power supply enclosure is 39/40mm*73.5mm*185mm.The power supply contains a single 40mm fan. The power supply has a card edge output that interfaces with 2*25 card edge connector in the system. The AC plugs directly into the external face of the power supply.

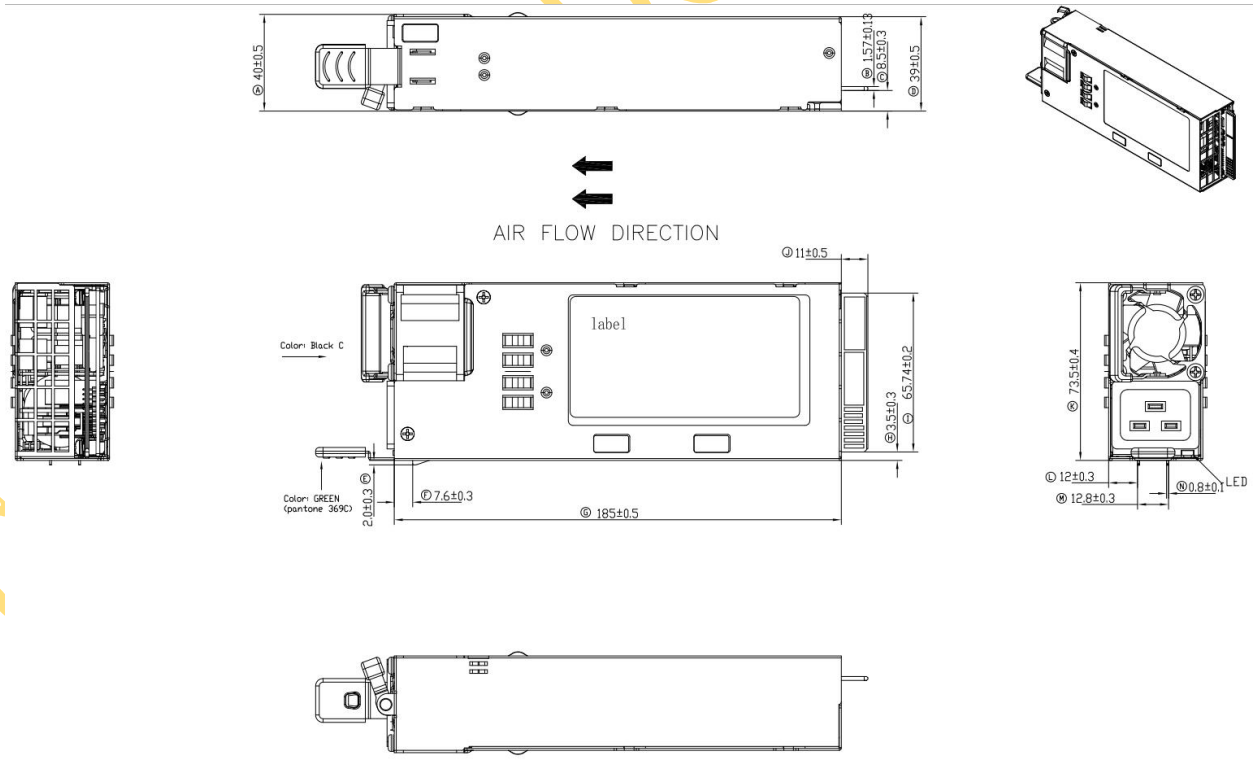


Figure 1: Power Supply Outline Drawing(185mm*73.5mm*39/40mm)

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

The power supply PDB Outline Drawing:(265mm*77mm*84mm)

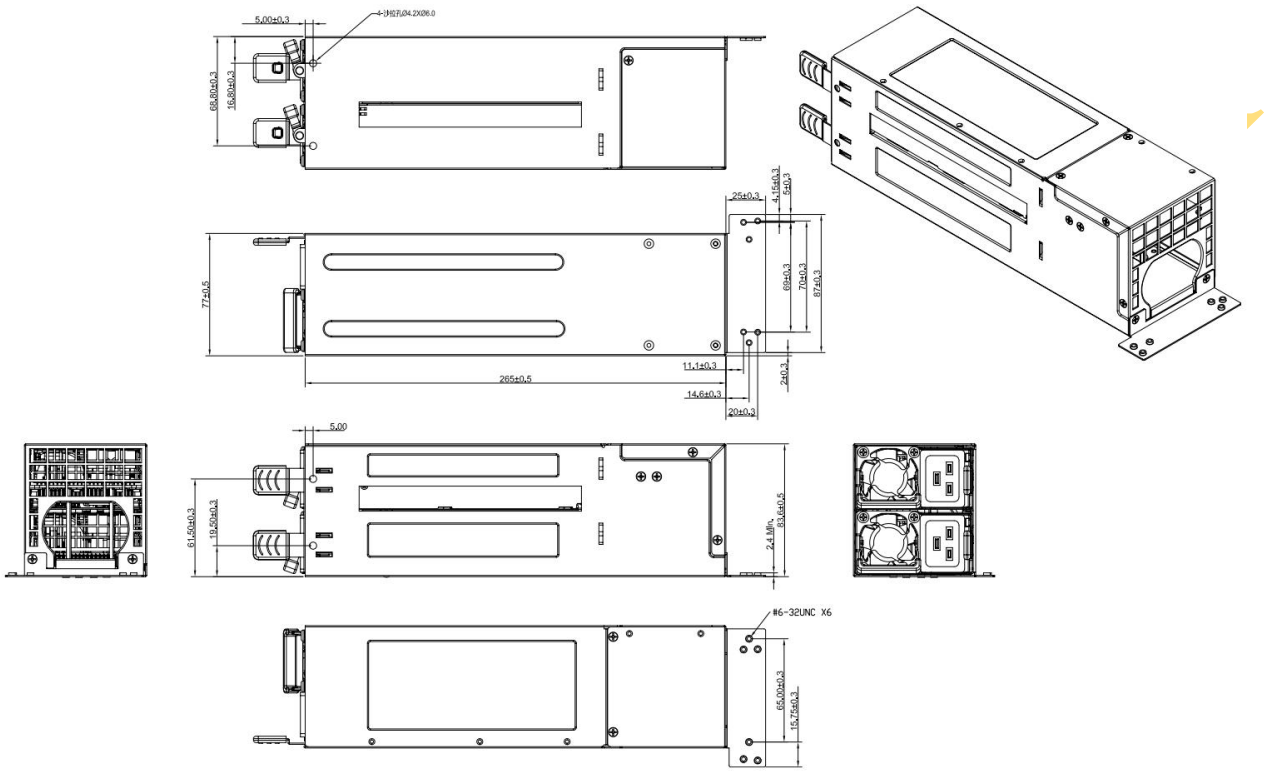
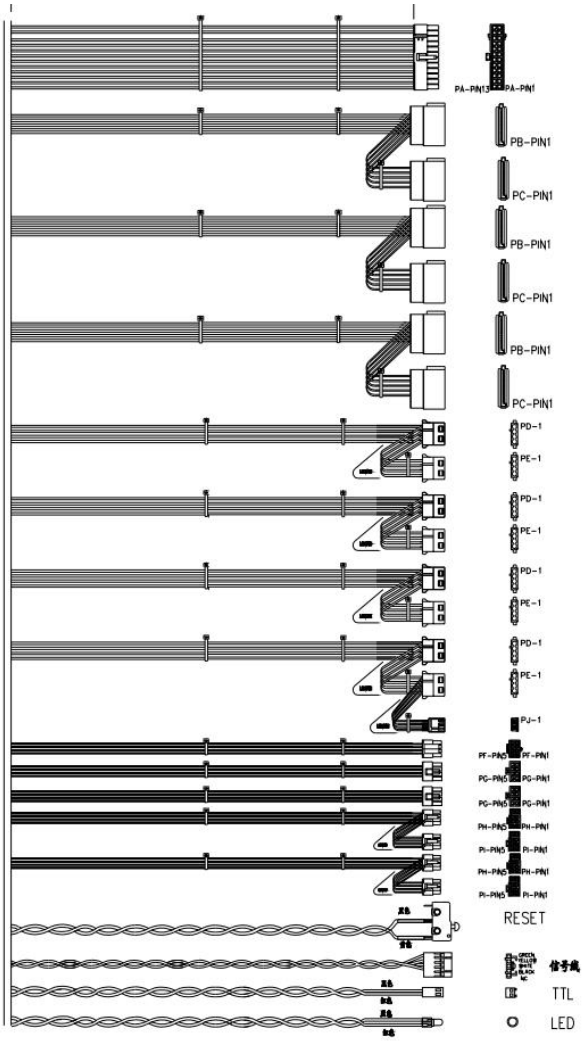


Figure 2: 1+1 Redundant Power Supply Outline Drawing

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

Output Line outline:(11307549)



CONN.	PIN	WIRE COLOR	OUTPUT	WIRE SPECIFICATION	LENGTH (mm)
PA	1	ORANGE	+3.3VDC	UL/CSA 1007 18AWG 80°C 300V	550±20mm
		ORANGE	+3.3V REMOTE SONSE	UL/CSA 1007 22AWG 80°C 300V	
	2	ORANGE	+3.3VDC	UL/CSA 1007 18AWG 80°C 300V	
	3	BLACK	GND		
	4	RED	+5VDC		
	5	BLACK	GND		
	6	RED	+5VDC		
	7	BLACK	GND		
	8	GRAY	PG	UL/CSA 1007 20AWG 80°C 300V	
	9	PURPLE	+5 VSB	UL/CSA 1007 18AWG 80°C 300V	
	10	YELLOW	+12VDC		
		YELLOW	+12V REMOTE SONSE	UL/CSA 1007 22AWG 80°C 300V	
	11	YELLOW	+12VDC	UL/CSA 1007 18AWG 80°C 300V	
	12	ORANGE	+3.3VDC		
	13	ORANGE	+3.3VDC		
	14	BLUE	-12VDC		
	15	BLACK	GND		
	16	GREEN	PS-ON	UL/CSA 1007 20AWG 80°C 300V	
	17	BLACK	GND	UL/CSA 1007 18AWG 80°C 300V	
	18	BLACK	GND		
	19	BLACK	GND		
	20	N/C	N/C		
	21	RED	+5VDC	UL/CSA 1007 22AWG 80°C 300V	
		RED	+5V REMOTE SONSE		
	22	RED	+5V	UL/CSA 1007 18AWG 80°C 300V	
	23	RED	+5V		
	24	BLACK	GND		
PB PC	1 2 3	ORANGE	+3.3VDC	UL/CSA 1007 18AWG 80°C 300V	PB: 550±20mm PC: 150±10mm
	4 5 6	BLACK	GND		
	7 8 9	RED	+5VDC		
	10 11 12	BLACK	GND		
	13 14 15	YELLOW	+12VDC		
PD PE PJ	1	YELLOW	+12VDC	UL/CSA 1007 18AWG 80°C 300V	PD: 550±20mm PE: 150±10mm PJ: 150±10mm
	2	BLACK	GND		
	3	BLACK	GND		
	4	RED	+5V		
PF PG	1	BLACK	GND	UL/CSA 1007 18AWG 80°C 300V	550±20mm
	2	BLACK	GND		
	3	BLACK	GND		
	4	BLACK	GND		
	5	YELLOW	+12VDC		
	6	YELLOW	+12VDC		
	7	YELLOW	+12VDC		
	8	YELLOW	+12VDC		
PH PI	1	YELLOW	+12VDC	UL/CSA 1007 18AWG 80°C 300V	PH: 550±20mm PI: 150±10mm
	2	YELLOW	+12VDC		
	3	YELLOW	+12VDC		
	4	BLACK	GND		
	5	BLACK	GND		
	6	BLACK	GND		
	7	BLACK	GND		
	8	BLACK	GND		
RESET	1	BLACK	GND	UL/CSA 1007 22AWG 80°C 300V	450±20mm
	2	YELLOW	RESET		
信号线		GREEN	I²C SCL	UL/CSA 1007 24AWG 80°C 300V	600±20mm
		YELLOW	I²C SDA		
	3	WHITE	PS_ALERT		
	4	BLACK	GND		
	5	NC	NC		
TTL	1	BLACK	GND	UL/CSA 1007 22AWG 80°C 300V	650±20mm
	2	RED	TTL		
LED		BLACK	GND	UL 1007 22AWG 80°C 300V	650±20mm
		RED	LED		

Figure 3: The PDB Output wire drawing

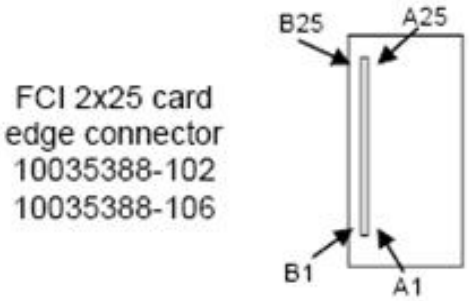
GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0

2.1 DC OUTPUT CONNECTOR

Module:The power supply shall use a card edge output connection for power and signal that is compatible with a 2x25 Power Card Edge connector (equivalent to 2x25 pin configuration of the FCI power card connector 10035388102LF).

Table:DC Output Connector Pinout

Pin-out	Definition	Pin-out	Definition
A01-09	GND	B01-09	GND
A10-18	+12V	B10-18	+12V
A19	PMBus SDA	B19	A0(SMBus address)
A20	PMBus SCL	B20	A1(SMBus address)
A21	PSON	B21	12V stby
A22	SMBAlert#	B22	SMART_ON
A23	Return Sense	B23	12V load share bus
A24	+12V remote Sense	B24	PRESENT#(Reserved)
A25	PWOK	B25	NC or Vin-good or PS-KILL



Back DC output golden finger port

The PDB output Terminals:

Signal	Definition	Wire color
GND	The outputs' voltage return	Black wire
+12V	The main output voltage	Yellow wire
+5V	+5V output voltage	Red wire
+3.3V	+3.3V output voltage	Orange wire
-12V	-12V output voltage	Blue wire
+5Vsb	The auxiliary output voltage	Purple wire
PSON	Power enable input: When PSON signal is low, the power supply will turn on , and turn off when it's high	Green wire
PWOK	PSU OK output signal.	Gray wire
+12V Sense	+12V output voltage remote sense	Yellow wire
+5V Sense	+5V output voltage remote sense	Red wire
+3.3V Sense	+3.3V output voltage remote sense	Orange wire
SMB_Alert	Power supply warning signal	White wire
Reset button	Reset the buzzer warning signal	Yellow\Black wire
Status LED	Lighting warning for the power supply's status	optional

2.2 HANDLE RETENTION

The power supply has a handle to assist extraction. The module can be able to be inserted and extracted without the assistance of tools. The power supply has a latch which retains the power supply into the system and prevents the power supply from being inserted or extracted from the system when the AC power cord is pulled into the power supply.

The handle protects the operator from any burn hazard through the use of the Customer Corporation Industrial designed plastic handle.

2.3 LED MARKING AND IDENTIFICATION

The power supply has a single bi-colored LED for indication of the power supply status.Green&Amber.Below are table showing the LED states for each power supply operating state:

Power Supply Condition	LED State
Output ON and OK	GREEN
No AC power to all power supplies	OFF
AC present / Only 12VSB on (PS off) or PS in Smart on state	1Hz Blink GREEN
AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power.	AMBER
Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan.	1Hz Blink Amber
Power supply critical event causing a shutdown; failure, OCP, OVP, Fan Fail	AMBER
Power supply FW updating	2Hz Blink GREEN

2.4 AIRFLOW DIRECTION

The airflow direction shall be from the card edge connector side to the AC inlet side of the power supply.

2.5 ACOUSTIC REQUIREMENTS

The power supply incorporates variable speed fan(s). The declared sound power levels (LwAd) of the power supply must meet the requirements shown in the table.Sound power will be measured according to ECMA 74 (www.ecma-international.org) and reported according to ISO 9296.

Table: Sound Power Requirement

Acoustic Operating Condition	% of Maximum Loading Condition	Altitude	Ambient(Inlet Temperature Condition)	LWA (dBA)
Idle	20%	900m	35°C	TBD
Operating	60%	900m	40°C	TBD
Performance	100%	900m	50°C	TBD

2.6 TEMPERATURE REQUIREMENTS

Table: Environmental Requirements

Description	Min	Max
Operating temperature range	0°C	45°C
Non-operating temperature range	-40°C	70°C

3. AC INPUT REQUIREMENTS

3.1 POWER FACTOR

The power supply have greater the power factor requirements stated in the Energy Star® Program Requirements for Computer Servers.Power factor specification as below.

Output power	10%load	20%load	50%load	100%load
Power factor	> 0.85	> 0.90	> 0.98	> 0.99
Input conditions	230Vac/50Hz and 115Vac/60Hz			

3.1.1iTHD

The below table shown the power supply "Total Harmonic Distortion" limits which according EN61000-3-2 standard:

Output power	⩾10%	> 20%&< 30%	≥ 30%	≥ 50%	≥ 100%
Current iTHD	< 20%	< 15%	≤10%	≤8%	≤5%
Input conditions	200VAC /240VAC &50Hz/60Hz				

3.2 AC INLET CONNECTOR

The AC input connector shall be an IEC 320C-20 power inlet. This inlet is rated for 16A / 250VAC.(Or IEC 320C-14,10A/250VAC.It depends on the type of power module you use).

3.3 AC/DC INPUT VOLTAGE SPECIFICATION

The power supply must operate within all specified limits over the following input voltage range. Harmonic distortion of up to 10% of the rated line voltage must not cause the power supply to go out of specified limits. Application of an input voltage below 175VAC shall not cause damage to the power supply, including a blown fuse. The voltage level between shutdown and recovery shall have a minimum of 5 VAC of voltage hysteresis, so that the power supply will not oscillate on and off due to voltage change condition.

AC/DC input voltage range

PARAMETER	MIN	RATED	VMAX	Start Up VAC	Power Off VAC
Low Voltage AC range(1000W)	90Vrms	100-127Vrms	140Vrms	85VAC ±5VAC	75VAC ±5VAC
High Voltage AC range(1600W)	180Vrms	200-240Vrms	264Vrms	NA	NA
High Voltage AC range(2000W)	220Vrms	220-240Vrms	264Vrms	NA	NA
Frequency	47 Hz	50/60	63 Hz	NA	NA
HVDC (240V)	180	240	300	170VDC ±5VDC	160VDC ±5VDC

Note: The Brown IN/OUT Hysteresis min is 5Vac.

1.Maximum input current at low input voltage range is measured at 90VAC, at max load(1000W).(13.8Arms)

2.Maximum input current at high input voltage range is measured at 180VAC, at max load(1600W).(10Arms)

3.Maximum input current at high input voltage range is measured at 220VAC,at max load(2000W).(10Arms)

4.9.6Arms maximum while input voltage is 240VDC.at max load;

5.AC Brown-in/out loading is 80%load; (low line&high line).

3.3.1DC/DC INPUT VOLTAGE SPECIFICATION

2000W power supply modules.

Input: +12V/166A maximum ;12VSB/2.1A

Card edge for DC output

3.4 AC LINE ISOLATION REQUIREMENTS

The power supply shall meet all safety agency requirements for dielectric strength. Additionally,power supply vendor provide Customer with written confirmation of dielectric withstand test which includes voltage level, duration of test and identification detailing how each power supply is marked to indicate dielectric withstand test had been completed successfully.

Transformers isolation between primary and secondary windings must comply with the 3000Vac (4242Vdc) dielectric strength criteria. If the working voltage between primary and secondary dictates a higher dielectric strength test voltage the highest test voltage should be used.

In addition the insulation system must comply with reinforced insulation per safety standard IEC 60950.

Separation between the primary and secondary circuits, and primary to ground circuits, must comply with the IEC 60950 spacing requirements.

3.5 AC LINE DROPOUT / HOLDUP

An AC line dropout is defined to be when the AC input drops to 0VAC at any phase of the AC line for any length of time. During an AC dropout the power supply must meet dynamic voltage regulation requirements.

An AC line dropout of any duration shall not cause tripping of control signals or protection circuits. If the AC dropout lasts longer than the holdup time the power supply should recover and meet all turn on requirements.

The power supply shall meet the AC dropout requirement over rated AC voltages and frequencies. A dropout of the AC line for any duration shall not cause damage to the power supply.

Loading	Hold up time
70%	7msec

Note: This test condition loading is70% of max loading.

3.5.1 AC LINE 12VSB HOLDUP

Module:The 12VSB output voltage should stay in regulation under its full load (static or dynamic) during an AC dropout of70ms min (=12VSB holdup time) whether the power supply is in ON or OFF state (PSON asserted or de- asserted).

3.6 AC LINE FUSE

The power supply shall have one line fused in the single line fuse on the line (Hot) wire of the AC input. The line fusing shall be acceptable for all safety agency requirements. The input fuse shall be a slow blow type. AC inrush current shall not cause the AC line fuse to blow under any conditions. All protection circuits in the power supply shall not cause the AC fuse to blow unless a component in the power supply has failed. This includes DC output load short conditions.

3.7 AC INRUSH

AC line inrush current shall not exceed 50A peak, for up to one-quarter of the AC cycle, after which the input current should be no more than the specified maximum input current. The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device). The power supply must meet the inrush requirements for any rated AC voltage, during turn on at any phase of AC voltage, during a single cycle AC dropout condition as well as upon recovery after AC dropout of any duration, and over the specified temperature range (Top).Inrush current caused by x- or y-caps is not considered.

3.8 AC LINE TRANSIENT SPECIFICATION

AC line transient conditions shall be defined as “sag” and “surge” conditions. “Sag” conditions are also commonly referred to as “brownout”, these conditions will be defined as the AC line voltage dropping below nominal voltage conditions. “Surge” will be defined to refer to conditions when the AC line voltage rises above nominal voltage.

The power supply is required to meet Performance Criterion A with the exception of IEC61000-4-11 Voltage Interruptions (>95% reduction 250 periods) where the power supply is required to meet Performance

Criterion C.

The power supply shall meet the requirements under the following AC line sag and surge conditions.

Ac line sag transient performance

AC Line Sag (10sec interval between each sagging)				
Duration	Sag	Operating AC Voltage	Line Frequency	Performance Criteria
0 to 1/2 AC cycle	95%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
> 1 AC cycle	>30 %	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance

Ac line surge transient performance

AC Line Surge				
Duration	Surge	Operating AC Voltage	Line Frequency	Performance Criteria
Continuous	10%	Nominal AC Voltages	50/60Hz	No loss of function or performance
0 to ½ AC cycle	30%	Mid-point of nominal AC Voltages	50/60Hz	No loss of function or performance

3.9 SUSCEPTIBILITY REQUIREMENTS

The power supply shall meet the following electrical immunity requirements when connected to a cage with an external EMI filter which meets the criteria defined in the SSI document EPS power supply specification. For further information on Customer standards please request a copy of the Customer Environmental Standards Handbook.

Performance criteria

Level	Description
A	The apparatus shall continue to operate as intended. No degradation of performance.
B	The apparatus shall continue to operate as intended. No degradation of performance beyond spec limits.
C	Temporary loss of function is allowed provided the function is self-recoverable or can be restored by the operation of the controls.

3.10 ELECTROSTATIC DISCHARGE SUSCEPTIBILITY

The power supply shall comply with the limits defined in EN 55024: 1998/A1: 2001/A2: 2003 using the IEC 61000-4-2: Edition 1.2: 2001-04 test standard and performance criteria B defined in Annex B of CISPR 24.

3.11 FAST TRANSIENT/BURST

The power supply shall comply with the limits defined in EN55024: 1998/A1: 2001/A2: 2003 using the IEC

61000-4-4: Second edition: 2004-07 test standard and performance criteria B defined in Annex B of CISPR 24.

3.12 RADIATED IMMUNITY

The power supply shall comply with the limits defined in EN55024: 1998/A1: 2001/A2: 2003 using the IEC 61000-4-3: Edition 2.1: 2002-09 test standard and performance criteria A defined in Annex B of CISPR 24.

3.13 SURGE IMMUNITY

The power supply shall be tested with the system for immunity to AC Unidirectional wave; 2kV line to ground and 1kV line to line, per EN 55024: 1998/A1: 2001/A2: 2003, EN 61000-4-5: Edition 1.1:2001-04. The pass criteria include: No unsafe operation is allowed under any condition; all power supply output voltage levels to stay within proper spec levels; No change in operating state or loss of data during and after the test profile; No component damage under any condition. The power supply shall comply with the limits defined in EN55024: 1998/A1: 2001/A2: 2003 using the IEC 61000-4-5: Edition 1.1:2001-04 test standard and performance criteria A defined in Annex B of CISPR 24.

3.14 POWER FREQUENCY MAGNETIC IMMUNITY

The power supply shall comply with the limits defined in EN55024: 1998/A1: 2001/A2: 2003 using the IEC 61000-4-8:2009 Power Frequency Magnetic Field Immunity Test standard.

3.15 POWER RECOVERY

The power supply shall recover automatically after an AC power failure.AC power failure is defined to be any loss of AC power that exceeds the dropout criteria.

4.EFFICIENCY

The following stable provides the required minimum efficiency level at various loading conditions at 25 degrees condition stated. These are provided at different load levels; 100%, 50%, 20% and 10%. Output load according to the proportional loading method defined by 80 Plus in Generalized Internal Power Supply Efficiency Testing Protocol Rev 6.7. The fan losses are not included in the efficiency calculation and measurements.

The Power Module(PSU) Efficiency requirement

Loading	100% of maximum	50% of maximum	20% of maximum	10% of maximum
230Vac/60Hz	91%	94%	90%	85%

PSU+PDB Efficiency Test Loading Form

load	+12.2V	+3.3V	+5V	-12V	+5VSB	EFF
100%	146.708A	19.698A	31.188A	0.442A	2.651A	NC
50%	73.354A	9.849A	15.594A	0.221A	1.326A	NC
20%	29.342A	3.940A	6.238A	0.088A	0.530A	NC

Test condition:1. 230Vac/60Hz;25 degrees condition;

2. Test with one module+PDB(1+0); The fan losses are not included;

5. DC OUTPUT SPECIFICATION

5.1 OUTPUT CURRENTS

The following tables define the power and current ratings. The power supply must meet both static and dynamic voltage regulation requirements for all conditions.

Output voltage	Minimum current	Maximum current	Peak current
+3.3V	0.1A	24A	30A
+5V	0.1A	38A	40A
+12.2V1	0.5A	83A	/
+12.2V2	0.5A	83A	
-12V	0A	0.5A	/
+5VSB	0.1A	3A	/

Notes:

1. The total max continuous output power is 2000W(High Voltage AC range);
2. +3.3V&+5V max combined output power is 250W .

5.2VOLTAGE REGULATION

The power supply output voltages must stay within the following voltage limits when operating at steady state and dynamic loading conditions. These limits include the peak-peak ripple/noise. +3.3V&+5V output voltages are measured at the remote sense point, all others voltages shall be measured at the output connectors.

Voltage Regulation Limits

PARAMETER	TOLERANCE	MIN	NOM	MAX	UNITS
+3.3V	- 5% / +5%	+3.135	+3.3	+3.465	Vrms
+5V	- 5% / +5%	+4.75	+5	+5.25	Vrms
+12V	- 5% / +5%	+11.4	+12	+12.6	Vrms
-12V	- 10% / +10%	-13.2	-12	-10.8	Vrms
+5VSB	- 5% / +5%	+4.75	+5	+5.25	Vrms

5.3DYNAMIC LOADING

The output voltages shall remain within limits specified for the step loading and capacitive loading specified in the tables below. The load transient repetition rate shall be tested between 50Hz and 10kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The Δ step load may occur anywhere within the MIN load to the MAX load conditions.

Transient load requirements

Output	Δ Step Load Size (See note)	Load Slew Rate	Test capacitive Load
+3.3V	30% of max load	0.5 A/μs	1000μF
+5V	30% of max load	0.5 A/μs	1000μF
+12V	50% of max load	0.5 A/μs	2200μF
+5VSB	1A	0.5 A/μs	100μF

Note: For dynamic condition +12V min loading is 1A;+3.3V/0.3A;+5V/0.3A;

5.4 CAPACITIVE LOADING

The power supply shall be stable and meet all requirements with the following capacitive loading ranges.

Capacitive loading conditions

Output	MIN	MAX	Units
+3.3V	1000	10000	μF
+5V	1000	10000	μF
+12V	2200	21000	μF
-12V	10	330	μF
+5VSB	100	3100	μF

5.5GROUNDING

The output ground of the pins of the power supply provides the output power return path. The output connector ground pins shall be connected to the safety ground (power supply enclosure). This grounding should be well designed to ensure passing the max allowed Common Mode Noise levels.

The power supply shall be provided with a reliable protective earth ground. All secondary circuits shall be connected to protective earth ground. Resistance of the ground returns to chassis shall not exceed 0.1Ω. This path may be used to carry DC current.

5.6CLOSED LOOP STABILITY

The power supply shall be unconditionally stable under all line/load/transient load conditions including capacitive load ranges specified in contents 5.4 stable. A minimum of: 45 degrees phase margin and -10dB gain margin is required. The power supply manufacturer shall provide proof of the unit's closed-loop stability with local sensing through the submission of Bode plots. Closed-loop stability must be ensured at the maximum and minimum loads as applicable.

5.7RESIDUAL VOLTAGE IMMUNITY IN STANDBY MODE

The power supply should be immune to any residual voltage placed on its outputs (Typically a leakage voltage through the system from Standby output) up to 500mV. There shall be no additional heat generated, nor stressing of any internal components with this voltage applied to any individual or all outputs simultaneously. It also should not trip the protection circuits during turn on. The residual voltage at the power supply outputs for no load condition shall not exceed 100mV when AC voltage is applied and the PS_ON signal is de-asserted.

5.8COMMON MODE NOISE

The Common Mode noise on any output shall not exceed 350mV PK-PK over the frequency band of 10Hz to 20MHz. The measurement shall be made across a100Ωresistor between each of DC outputs, including

ground at the DC power connector and chassis ground (power subsystem enclosure). The test set-up shall use a FET probe such as Tektronix model P6046 or equivalent.

5.9 SOFT STARTING

The Power Supply shall contain control circuit which provides monotonic soft start for its outputs without over stress of the AC line or any power supply components at any specified AC line or load conditions.

5.10ZERO LOAD STABILITY REQUIREMENTS

When the power subsystem operates in a no load condition, it does not need to meet the output regulation specification, but it must operate without any tripping of over-voltage or other fault circuitry. When the power subsystem is subsequently loaded, it must begin to regulate and source current without fault.

5.11HOT SWAP REQUIREMENTS

Hot swapping a power supply is the process of inserting and extracting a power supply from an operating power system. During this process the output voltages shall remain within the limits with the capacitive load specified. The hot swap test must be conducted when the system is operating under static, dynamic, and zero loading conditions. The power supply shall use a latching mechanism to prevent insertion and extraction of the power supply when the AC power cord is inserted into the power supply.

5.12FORCED LOAD SHARING

The +12V output will have active load sharing. The output will share within 10% at full load. The failure of a power supply should not affect the load sharing or output voltages of the other supplies still operating. The supplies must be able to load share in parallel and operate in a hot-swap / redundant 1+1 configurations.

The VLs(12V load share bus) pin shell be connected together at user system board for load sharing function of two units.all the remote sense pins of power supplies must to be placed at the same point on +12V and its return path at system side.

The +12VSB output is passive current sharing between power supplies (without active sharing). The +12VSB output of the power supplies are connected together in the system so that a failure or hot swap of a redundant power supply does not cause the output to go out of regulation in the system.

The % of current share error is defined as follows for 1+1 power supplies:

%Error = 100 x |PS1 current – PS2 Current| / (PS1 current + PS2 Current)

Note: In paralleling mode, the system loading shall be gradually increased to the specified max. rating. It

should not greater than one single PSU's max. loading before PWOK asserted during turn on period and the following step loading (include start-up, AC-off and hot- swap).

NOTES: Current sharing has to meet following accuracy at different load range running in 1+1 configuration.

- 10% - 20% of total load, current sharing accuracy has to be ± 15%
- 21% - 50% of total load, current sharing accuracy has to be ± 10%
- 51% - 100% of total load, current sharing accuracy has to be ± 5%

5.13RIPPLE / NOISE

The maximum allowed ripple/noise output of the power supply measured over a bandwidth of 10Hz to 20MHz at the power supply output connectors.A 10μF tantalum capacitor in parallel with a 0.1μF ceramic capacitor is placed at the point of measurement.To help reduce switching ripple further, an additional 2,200 uF low ESR electrolytic capacitor may be placed in parallel(or add minimum capacitive loading of each output also).

Ripples and Noise

+12V	+3.3V	+5V	-12V	5VSB
120mVp-p	50mVp-p	60mVp-p	120mVp-p	50mVp-p

The test set-up shall be as shown below.

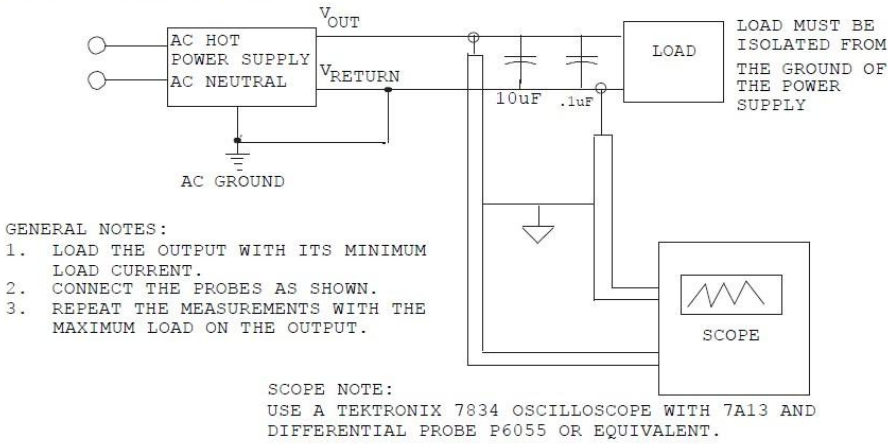
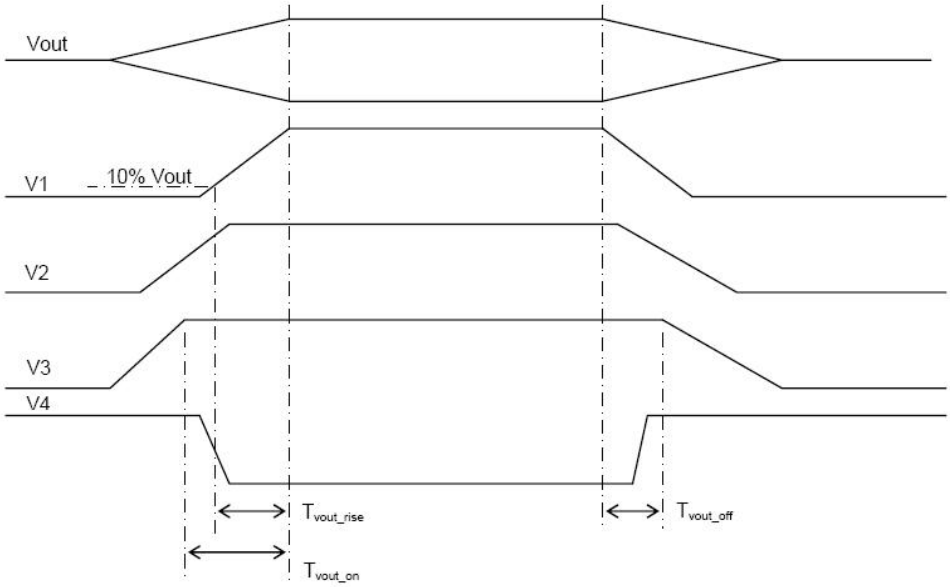


Figure:Differential Noise test setup

Note: When performing this test, the probe clips and capacitors should be located close to the load.

5.14TIMING REQUIREMENTS

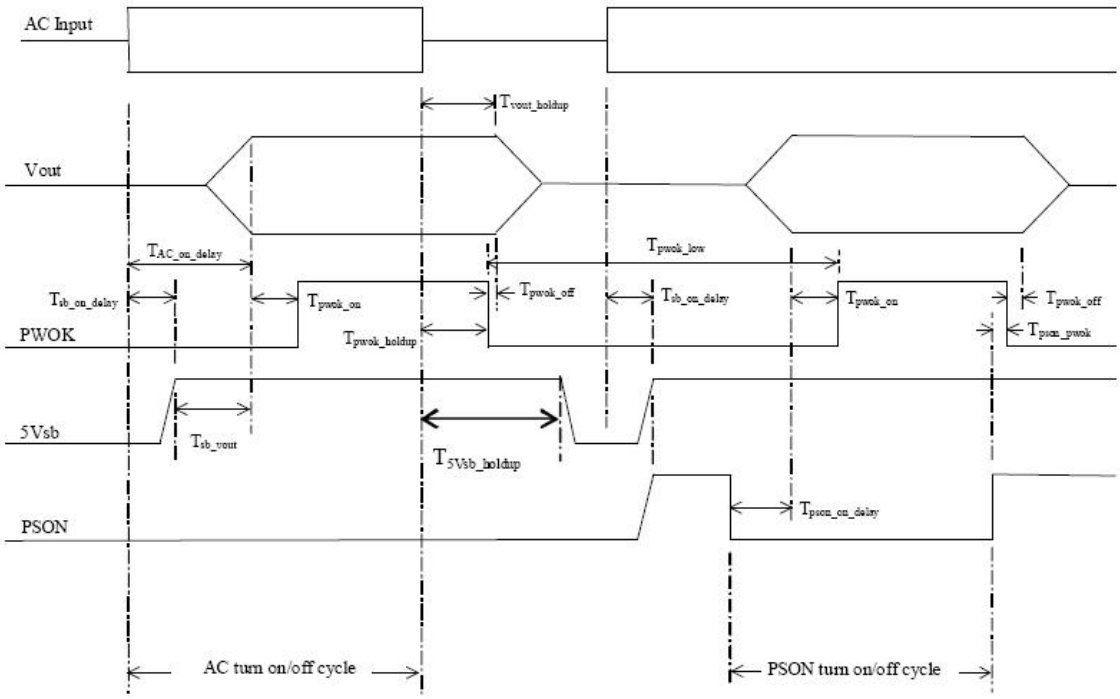
Signal Timing Sequence 1



Timing value:

Item	Description	MIN	MAX	Units
Tvout rise	Output voltage rise time from each main output.(except -12V)	1	70	ms
T5vsb rise	Output voltage rise time for the +5VSB output.	1	50	ms
Tvout_on	All main outputs must be within regulation of each other within this time.		50	ms
Tvout off	All main outputs must leave regulation within this time.		400	ms

Signal Timing Sequence 2:



Timing value:

Item	Description	MIN	MAX	UNITS
$T_{sb\_on\ delay}$	Delay from AC being applied to 5VSB being within regulation.		1500	ms
$T_{ac\_on\_delay}$	Delay from AC being applied to all output voltages being within regulation.		2500	ms
$T_{vout\ holdup}$	Time 12V output voltage dropping to regulation after loss of AC at 70% load condition	11		ms
$T_{pwok\ holdup}$	Delay from loss of AC to desertion of PWOK at 70% load condition.	10		ms
$T_{pson\_on\_delay}$	Delay from PSON#active to output voltages within regulation limits.	5	400	ms
$T_{psonpwok}$	Delay from PSON# deactivate to PWOK being deserted.		50	ms
T_{pwok_on}	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	500	ms
$T_{pwok\ off}$	Delay from PWOK de-asserted to +12V dropping out of regulation limits.	1		ms
T_{pwok_low}	Duration of PWOK being in the deserted state during an off/on cycle using AC or the PSON# signal.	100		ms
T_{sb_vout}	Delay from +5VSB being in regulation to O/Ps being in regulation at AC turn on.	50	2000	ms

5.15MAXIMUM CONTINUOUS OUTPUT POWER

Maximum continuous output power is not exceed to 2000W.(low line 1000W)

6.PROTECTION CIRCUITS

Protection circuits inside the power supply shall cause only the power supply's main outputs to shutdown. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for 15sec and a PSON# cycle HIGH for 1sec shall be able to reset the power supply.

6.1 CURRENT LIMIT (OCP)

The power supply shall have current limit to prevent the outputs from exceeding the values shown in table below. If the current limits are exceeded the power supply shall shutdown and latch off. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply shall not be damaged from repeated power cycling in this condition. +5VSB will be auto-recovered after removing OCP limit. The test method should under 1+0 status;

OCP Requirements

output	Min	Max
+3.3V	33A	45A
+5V	44A	60A
+12.2V1	91.3A	124.5A
+12.2V2	91.3A	124.5A
-12V	Protected under over current or shorted condition(1.1A-2.5A)	
+5VSB	5.5A	10A

6.2 OVER VOLTAGE PROTECTION (OVP)

The power supply over voltage protection shall be locally sensed. The power supply shall shutdown and latch off after an over voltage condition occurs. This latch shall be cleared by toggling the PSON# signal or by an AC power interruption. The values are measured at the output of the power supply's connectors. The voltage shall never exceed the maximum levels when measured at the power connectors of the power supply connector during any single point of fail. The voltage shall never trip any lower than the minimum levels when measured at the power connector.

Output	Action voltage			Units
	Min	Nom	Max	
+3.3	3.7	4.2	4.7	V
+5V	5.7	6.3	7.5	V
+12V	13.3	15.0	15.6	V

6.3 OVER TEMPERATURE PROTECTION (OTP)

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specified limits, the power supply shall restore power automatically, while the 12VSB remains always on. The OTP circuit must have built in margin such that the power supply will not oscillate on and off due to temperature recovering condition. The OTP trip level shall have a minimum of 5℃ of ambient temperature margin.

6.4 SHORT CIRCUIT PROTECTION (SCP)

The power supply shall shut down and latch off for shorting the main outputs. +5VSB must be capable of being shorted indefinitely. The latch will be cleared by toggling the PSON# signal or by an AC power interruption. The power supply shall not be damaged from repeated power cycling in this condition. +5VSB will be auto-recovered after removing SCP limit.

6.5 OVER POWER PROTECTION (OPP;TBD)

The power supply shall support over power protection (OPP) level low enough to protect the power supply running in this mode for repeated 1msec durations at a 1% duty cycle. The power supply shall be stable operating at any load point from rated power up to the OPP point.

CRPS-185 Load Requirement: OPP Threshold=(Imax+49A) +/-50W

SMBAlert shall always assert ahead of the OPP threshold being exceeded

6.6 WARNING

	state	Power LED	Buzzle	SMB_ALT
1+0 (only one power)	Normal	green	quietly	high
	Only +5Vsb(PS-OFF)	Green Blink	quietly	high
	+12V OCP；ac Power output OVP 、OTP、Fan Fail	orange	quietly	low
	Ac power input UVP input OVP	Orange	quietly	low
	+5V、+3.3V、-12V OCP；+5V、+3.3VOVP；PDB OTP	Green Blink	quietly	low
1+1	Normal	Green	quietly	low
	Only +5Vsb(PS-OFF)	Green Blink	quietly	high
	Ac power input UVP、 input OVP	Orange	quietly	high
	One unit input ac fail	Orange	Alarm	low
	ac Power output OVP 、OTP、Fan Fail	Orange	Alarm	low
	+12、+5V、+3.3V、5VSB、-12V OCP；+5V、+3.3V OVP；PDB OTP	Green Blink	quietly	low

7.CONTROL AND INDICATOR FUNCTIONS

The following sections define the input and output signals from the power supply. Signals that can be defined as low true use the following convention: Signal# = low true

7.1 DEVICE ADDRESS LOCATION (A0; A1)

Address Bit 0:A 10kΩ pull-up resistor pulled to internal +3.3V in the PSU.

Address Bit 1: A 10kΩ pull-up resistor pulled to internal +3.3V in the PSU.

Locations	PSU#1	PSU#2
PBD addressA1/A0	0/0	0/1
Power supply FRU device	A0h	A2h
Power supply PSMI device	B0h	B2h
Signal type	10k ohm pull up resistor from +3.3Vdd device.	
A1 or A0=low	A1 or A0 address bit=0	
A1 or A0=high	A1 or A0 address bit=1	
	Minimum	Maximum
Logic level low voltage	0V	0.4V
Logic level high voltage	2.4V	3.46V

7.2 I2C BUS(SCL; SDA)

Each module shall provide SCL/SDA bus for EEPROM read/write of system. It’s pull up from +3.3Vdd

device by a 10K ohm resistor. System should be has 1k~2k ohm pull high resistor on the SCL/SDA bus. SCL/SDA pin should be link together and closer. The SCL/SDA bus total capacitance must lower 100pF from system and PDB. The max I2C bus speed is 100KHz and the mcu of PSU is slave device in I2C bus .The time interval of I2C command is 1ms.

7.3 SMBAlert# INDICATE(SMBAlert#)

This is an active low signal and indicates that the power supply is experiencing a problem that the user should investigate.This shall be asserted due to Critical events or Warning events. The signal shall activate in the case of critical component temperature reached a warning threshold, general failure, over-current, over-voltage, under-voltage, failed fan. This signal may also indicate the power supply is reaching its end of life or is operating in an environment exceeding the specified limits.

This signal is to be asserted in parallel with LED turning solid Amber or blink Amber.

Signal Type(ActiveLow)	Open collector/ drain output from power supply.Pull-up to VSB located in system.	
Alert#=High	OK	
Alert#=Low	Power Alert to system	
	MIN	MAX
Logic level low voltage,Isink=4 mA	0V	0.4V
Logic level high voltage,Isink=50uA		3.46V
Sink current,Alert#= low		4 mA
Source current,Alert#= high		50uA

7.4 PS-ON INPUT SIGNAL (PS-ON)

The PS-ON signal is required to remotely turn on/off the power supply. PSON# is an active low signal that turns on the +12V power rail. When this signal is not pulled low by the system, or left open, the outputs (except the +5VSB) turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply.

Signal Type	Accepts an open collector/drain input from the system. Pull-up to3.3VSB located in power supply.	
PSON#= Low	ON	
PSON#=High or Open	OFF	
	MIN	MAX
Logic level low(power supply ON)	0V	1.0V
Logic level high(power supply OFF)	2.0V	3.46V
Source current,Vpson=low		4mA
Power off delay: Tpson_off_delay		5msec
Power up delay:Tpson_on_delay	5msec	400msec
PWOK delay:Tpson_pwok		5msec

7.5 PWOK OUTPUT SIGNAL (PWOK)

PWOK is a power OK signal and will be pulled HIGH by the power supply to indicate that all the outputs are within the regulation limits of the power supply. When any output voltage falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PWOK will be de-asserted to a LOW state. See Table: for a representation of the timing characteristics of PWOK. The start of the PWOK delay time shall inhibited as long as any power supply output is in current limit.

Signal Type	Open collector/drain output from power supply. Pull-up to VSB located in the power supply.	
PWOK =High	Power OK	
PWOK =Low	Power Not OK	
	MIN	MAX
Logic level low voltage,Isink=400uA	0V	0.4V
Logic level high voltage,Isource=200uA	2.4V	3.46V
Sink current,PWOK =low		400uA
Source current,PWOK= high		2mA
PWOK delay:Tpwok_on	100ms	500ms
PWOK rise and fall time		100usec

7.6 SMART ONCONTROL (enable by system)

Before enabling Smart On function, make sure pin B22 (SMART ON) on output golden finger of each PSU is connected together.When the pin is HIGH in the SmartOn mode, the slave power supply will enter the Smart Standby mode if system total loading under PSU's pre-set load level. When the pin is LOW in the

SmartOn mode, the Smart Standby mode power supplies will work in normal redundancy mode.

Smart On feature supports 1+1, 2+1, and 3+1 redundant configurations. It uses the PMBus manufacturer specific command area to define PMBus commands for the system to communicate with the power supplies for enabling, configuration, and monitoring.

The PMBus manufacturer specific command MFR_SPECIFIC_00 is used to configure the operating state of the power supply related to Smart On. We will call the command SMART_ON_CONFIG (D0h). Below is the definition of the values used with the Read-Write Byte SMBus protocol with PEC.

Cold_Redundancy_Config(D0h)		
Value	**State**	**Description**
00h	Standard Redundancy (default power on state)	Turns the power supply ON into standard redundant load sharing more. The power supply make sure no other PSU enter Smart_On mode.
01h	ColdRedundantActive[1]	Defines this power supply to be the one that is always ON in a cold redundancy configuration.
02h	ColdStandby1[1]	Defines the power supply that is third to turn off in a Smart On configuration (800ms later) and first to turn on as the load increases.
03h	ColdStandby2[1]	Defines the power supply that is second to turn off in a Smart On configuration (600ms later) and second to turn on as the load increases.
04h	ColdStandby3[1]	Defines the power supply that is first to turn off in a Smart On configuration (400ms later) and third to turn on as the load increases.

7.7 PRESENT_N# (Pin B24, Optional)

This signal is an active low type signal and is connected to the power supply's output ground internally. The mating pin of this signal in system side should have a pull-up resistor which limit the max. current 4mA to go through from this signal pin to the power supply. A Low state on this signal indicates the PSU is physically presents.

7.8 PS-KILL (Pin B25, Optional)

The purpose of the PS_KILL pin is to enhance for hot swapping of the power supply. The PS_KILL pin on the power supply is shorter than the other signal pins. When a power supply is operating in parallel with other power supplies and then extracted from the system, the PS_KILL pin will quickly turn off the power supply main output +12V and prevent arcing of the DC output contacts. When the PS_KILL signal pin is not pulled down or left opened (power supply is extracting from the system), the power supply shuts down

regardless of the condition of the PSON# signal. The mating pin of this signal in the system should be tied to ground. Internal to the power supply, the PS_KILL pin is connected to an internal +3.3V voltage through a 10kΩ pull-up resistor. Upon receiving a LOW state signal at the PS_KILL pin, the power supply will be allowed to turn on via the PSON# signal. A LOW state on this pin by itself will not turn on the power supply +12V output. Below table shown the PS_KILL signal characteristics.

Table PS_KILL Signal Characteristics

Signal States	+12V
PS_KILL = LOW,PSON = LOW	ON
PS_KILL = HIGH or OPEN,PSON = LOW	OFF
PS_KILL = LOW, PSON = HIGH or OPEN	OFF

8.ENVIRONMENTAL REQUIREMENTS

8.1 TEMPERATURE

Operating Ambient:0°C to +45°C

Non-operating Ambient:-40°C to +70°C.

8.2 HUMIDITY

Operating:5% to 85% relative humidity (non-condensing)

Non-Operating: 5% to 95% relative humidity (non-condensing)

8.3 ALTITUDE

Operating: 15250 feet above sea level with a 45℃ maximum ambient air temperature;

Non-operating: 50000 feet above sea level

8.4 MECHANICAL SHOCK

Non-operating:50 G Trapezoidal Wave, Velocity change = 170 in. / sec.

Three drops in each of six directions are applied to each of the samples.

8.5 RANDOM VIBRATION

Non-Operating Test

Sinusoidal: Input Acceleration: 1.5G, peak to peak

Frequency Band: 10Hz-500Hz-10Hz

Sweep Rate: 0.5 Octaves/minute

Sweep Time: Two sweeps per axis

Orientation: Three mutually perpendicular axes

Random: Break Point: 2Grms, 10Hz-500Hz frequency content

Dwell Time: 60 minutes per axis

Orientation: Three mutually perpendicular axes

8.6 THERMAL SHOCK (SHIPPING)

Non-operating: -40°C to +70°C, 50 cycles, 30℃/min.≧transition time ≧15℃/min,duration of exposure to temperature extremes for each half cycle shall be 30 minutes.

8.7 AUDIBLE NOISE

Maximum audible noise allowed <90dB at 100% rated DC load at 25 degree Celsius ambient inlet air temperature(Noise test sensor the distance from the fan 1m).

9. FRU REQUIREMENTS

9.1 FRU DATA

The FRU data format shall be compliant with the IPMI ver.1.0 (per rev.1.1 from Sept.25, 1999) specification. The following is the exact listing of the EEPROM content. During testing this listing shall be followed and verified.

9.2 FRU DEVICE PROTOCOL

The FRU device will implement the same protocols, including the Byte Read, Sequential Read, Byte Write, and Page Read protocols.

Four pins will be allocated for the FRU information on the Power Supply connector. One pin is the serial clock (SCL). The second pin is used for serial data (SDA). Two pins are for address lines to indicate to the power supply's EEPROM which position the power supply is located in the system. The SCL and SDA signals are pulled up by system, the address lines are also pulled up by system.

A1 Logical voltage	A0 Logical voltage	PSU address	FRU address
0	0	0xB0	0xA0
0	1	0xB2	0xA2
1	0	0xB4	0xA4
1	1	0xB6	0xA6

10.PMBUS

Refer to the PMBUS application profile for systems for requirements. Note. PMBUS signal should be pull up to 3.3V only inside PSU.

10.1 ACCURACY

For the following PMBus commands a minimum preciseness/accuracy for voltage, current and power readings and settings must be follow below table: Power PMBus Accuracy: (For the AC input voltage:100~127V;200V~240V;DC input:220Vdc-260Vdc);

The maximum deviation for the ambient temperature is +4°C;

READ_VIN READ_IIN READ_VOUT READ_IOUT READ_POUT READ_PIN

Table : Power PMBus Accuracy

	Pin<100W	**Pin>100W**	
Pin	±10W	±5%	
	Iin: 0.25~1.6A	**Iin: >1.6A**	
Iin	**±0.2A or**±5%	±5%	
	10%~20% of Max. Load	**20%~50% of Max. Load**	**50%~100% of Max. Load**
Iout	±10% or ±2A	±5% or ±2A	±5% or ±2A
Pout	±5% or ±10W	±5% or ±10W	±5% or ±10W
	0%~20% of Max. Load	**20%~50% of Max. Load**	**50%~100% of Max. Load**
Vout	±5%	±5%	±5%
Vin	±5%	±5%	±5%

Preferred data format is the “Linear Data Format” as specified by PMBus specification Part II version 1.2.For Power module request;

10.2 PMBUS COMMAND SET

10.2.1Following Table shows mandatory PMBus commands to be supported by the PSU.

Command Name	**Command Code**	**Write**	**Read**
CLEAR_FAULTS	03h	Send Byte	N/A
ON_OFF_CONFIG	02h	Write Byte	Read Byte
PAGE_PLUS_WRITE	05h	Block Write	N/A
PAGE_PLUS_READ	06h	N/A	Block Write – Block Read Process Call
CAPABILITY	19h	N/A	Read Byte
VOUT_MODE	20h	Write Byte	Read Byte
QUERY	1Ah	N/A	Block Write- Block Read Process Call

SMBALERT_MASK	1Bh	Write Word	Block Write- Block Read Process Call
COEFFICIENTS	30h	N/A	Block Write- Block Read Process Call
FAN_CONFIG_1_2	3Ah	Write Byte	Read Byte
FAN_COMMAND_1	3Bh	Write Word	Read Word
STATUS_WORD	79h	Write Word	Read Word
STATUS_VOUT Command	7Ah	N/A	Read Byte
STATUS_IOUT	7Bh	Write Byte	Read Byte
STATUS_INPUT	7Ch	Write Byte	Read Byte
STATUS_TEMPERATURE	7Dh	Write Byte	Read Byte
STATUS_MFR_SPECIFIC	80h	N/A	Read Byte
STATUS_FANS_1_2	81h	Write Byte	Read Byte
READ_EIN	86h	N/A	Block Read
READ_EOUT	87h	N/A	Block Read
READ_VIN	88h	N/A	Read Word
READ_IIN	89h	N/A	Read Word
READ_VOUT	8Bh	N/A	Read Word
READ_IOUT	8Ch	N/A	Read Word
READ_TEMPERATURE_1	8Dh	N/A	Read Word
READ_TEMPERATURE_2	8Eh	N/A	Read Word
READ_FAN_SPEED_1	90h	N/A	Read Word
READ_POUT	96h	N/A	Read Word
READ_PIN	97h	N/A	Read Word
PMBUS_REVISION	98h	N/A	Read Byte
MFR_ID	99h	N/A	Block Read
MFR_MODEL	9Ah	N/A	Block Read
MFR_REVISION	9Bh	N/A	Block Read
MFR_SERIAL	9Eh	N/A	Block Read
MFR_IOUT_MAX	A6h	N/A	Read Word
MFR_POUT_MAX	A7h	N/A	Read Word
MFR_MAX_TEMP_1	C0h	Write Word	Read Word
MFR_MAX_TEMP_2	C1h	Write Word	Read Word
SMART_ON_CONFIG	D0h	Write Byte	Read Byte

11. RELIABILITY / WARRANTY / SERVICE

11.1 COMPONENT DE-RATING

The following component de-rating guidelines shall be followed. Any exceptions are subject to final approval.

Semiconductor junction temperatures shall not exceed 120℃;

Transformer temperature shall not exceed 110℃& not violate safety's requirement;

Inductor case temperature shall not exceed 85% of rated temperature in℃.

Capacitor case temperature shall notexceed 85% of rated temperature in ℃.

Resistor wattage de-rating shall be > 30%

Component voltage and current de-rating shall be > 15%

During abnormal conditions (suchas a short circuit and the like) no de-rating is required as long as the max rating is not exceeded.

Note: Bulk Cap is an exception to be able to work at maximum rated voltage.

11.2 COMPONENT LIFE REQUIREMENT

All components life expectancy requirement is min5years,

calculated for: 75% of max continues load @ 40℃ ambient temperature and @ 100Vac line voltage.

11.3 INVESTIGATIVE LIFE REQUIREMENT

The power supply shall support 5 year calculated life with a 90% confidence under the following conditions:

- 100-240VAC input
- 45℃ inlet temperature
- 80% of output max-load

11.4 MEAN TIME BETWEEN FAILURES (MTBF)

The power supply shall have a minimum MTBF at continuous operation of160,000 hours at 100% load and 25℃, as calculated by Bell core Telcordia SR-332- Issue 2.2-250,000 hours demonstrated at 75% load and 40°C.

11.5 WARRANTY PERIOD

Three (3) years.

11.6 ELECTROLYTIC CAP LIFE

The Electrolytic cap shall have a life of minimum 30000 hours @100Vac input/ full load/45℃.

12.PRODUCT REGULATORY REQUIREMENTS

Intended Application – This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations.

The suitability of this product for other product categories and environments (such as: medical, industrial, telecommunications, NEBS, residential, alarm systems, test equipment, etc.), other than an ITE application, may require further evaluation.

12.1 PRODUCT SAFETY COMPLIANCE

UL62368-1/CSA 62368-1 (USA / Canada)

IEC62368-1 (international)

CB Certificate & Report, IEC62368-1 (Report to include all country national deviations)

The following options can be added : (TBD)

CE - Low Voltage Directive 2014/35/EU (Europe)

GB4943- CNCA Certification (China)

12.2 PRODUCT EMC COMPLIANCE – CLASS A COMPLIANCE

Note: The product is required to comply with Class A emission requirements as the end system that it is configured into is intended for a commercial environment and market place. Power supply is to have minimum of 6dB margin to Class A Limits to support Customer's margin requirements.(For conduct EMI, can have a minimum of 6 db margin to class A limits.)

FCC /ICES-003 - Emissions (USA/Canada)

EN55032 – Conducted & Radiated Emissions (Europe)

EN55035 - Immunity (Europe)

- EN61000-4-2 Electrostatic Discharge
- EN61000-4-3 Radiated susceptibility
- EN61000-4-4 Electrical Fast Transients/ burst
- EN61000-4-5 Surge
- EN61000-4-6 Conducted susceptibility
- EN61000-4-8 Power Frequency Magnetic Field
- EN61000-4-11 Voltage Dips and Interruption

*EN61000-3-2 – Power Harmonics (Europe)

*EN61000-3-3 – Voltage Fluctuation and Flicker (Europe)

CE – EMC Directive 2014/30/EU(Europe)

VCCI (Japan)

GB 9254 – (EMC) Certification (China)

GB 17625.1 - (Harmonics) CNCA Certification (China)

12.3 CERTIFICATIONS / REGISTRATIONS / DECLARATIONS

Optional:

cULs/or cTUVus Certification (US/Canada)

CB Certificate & Report

CE Declaration of Conformity (CENELEC Europe)

FCC/ICES-003 Class A Attestation (USA/Canada)

CNCA Certification (China)

BSMI Certification(Taiwan)

Ecology Declaration (International)

KCC-Mark(Korea)--option

Notes:

a. Certification shall be done to the most recent standard editions.

b. To support ALPHA or BETA development power supply shipments, at least one 3rd party Certification is required (e.g. NEMKO, UL, etc.).

c. Power Supply Vendor requires providing copy of each certification.

12.4 COMPONENT REGULATION REQUIREMENTS

A. All Fans shall have the minimum certifications: UL and TUV or VDE

B. All current limiting devices shall have UL and TUV or VDE certifications and shall be suitable rated for the application where the device in its application complies with IEC60950.

C.All printed wiring boards shall be rated UL94V-0 and be sourced from a UL approved printed wiring board manufacturer.

D.All connectors shall be UL recognized and have a UL flame rating of UL94V-0

E.All wiring harnesses shall be sourced from a UL approved wiring harness manufacturer. SELV Cable to be rated minimum 80V, 130C

F.Product safety label must be printed on UL approved label stock and printer ribbon. Alternatively labels can be purchased from a UL approved label manufacturer.

G.The product must be marked with the correct regulatory markings to support the certifications that are

specified in this document

12.5 PRODUCT ECOLOGY REQUIREMENTS

All materials, parts and subassemblies must not contain restricted materials as defined in Customer's Environmental Product Content Specification of Suppliers and Outsourced Manufacturers –Compliance to Customer's content specification incorporates compliance requirements for the European Union's (EU) Restriction of Hazardous Substances (RoHS).

12.6 HARMONICS AND VOLTAGE FLICKER COMPLIANCE INFORMATION

Input Line Current Harmonic Content (PFC)

The power supply shall meet the requirements of EN61000-3-2 Class A and the Guidelines for the Suppression of Harmonics in Appliances and General Use Equipment Class A for harmonic line current content at full rated power.

Table Harmonic Limits for Class A equipment

	Per: EN 61000-3-2		Per: JEIDA MITI
Harmonic Order n	Maximum permissible Harmonic current at230Vac/50Hz inAmps		Maximum permissible Harmonic current at100Vac/50HzinAmps
Odd harmonics			
3	2.3		5.29
5	1.14		2.622
7	0.77		1.771
9	0.4		0.92
11	0.33		0.759
13	0.21		0.483
15≤n≤39	0.15x(15/n)		0.345x(15/n)
Even harmonics			
2	1.08		2.484
4	0.43		0.989
6	0.3		0.69
8≤n≤40	0.23x(8/n)		0.529x(8/n)

12.7 OTHER SAFETY REQUIREMENT NOTATIONS

12.7.1 LEAKAGE CURRENT MAXIMUMS

Maximum leakage current to ground shall be less than 3.5mA at 264Vac, 60Hz.

12.7.2MAX SURFACE TEMPERATURES

The temperature of the power supply chassis shall not exceed 70 ℃ under all circumstances. Otherwise a UL

international HOT SURFACE label is required. If this HOT SURFACE label is required, it shall be placed in such a manner that when the power supply is extracted from the system, the label shall be visible before the operator has a chance to touch the hot surface of the power supply.

12.7.3 DATE CODED SERIAL NUMBERS

Power supply shall be marked with a date-coded number for trace ability purposes and to comply with CSA 950marking requirements.

12.7.4 POWER INPUT ELECTRICAL RATINGS

Power supply shall be tested to allow Nominal AC input operating voltages(100-127VAC and 200-240 VAC) and current rating. 127V is required for countries such as Mexico. The earth safety conductor shall be color-coded green/yellow and suitable sized for the max current of the power supply.

12.7.5 MAXIMUM ALLOWABLE TEMPERATURES ON INLET RECEPTACLES

The inlet receptacle shall be suitably rated for the maximum operating temperature to the power supply, when installed in a rack environment.

12.7.6 MAXIMUM ALLOWABLE TEMPERATURES ON POWER CORDS

The exhaust air of the power supply shall not impose temperatures that will exceed the maximum allowable temperature of the power cord.

12.7.7 INSULATION REQUIREMENT

All the outputs shall be isolated from the AC input to meet safety agency requirements.

The test shall be applied between primary (AC Line and Neutral) and Earth ground (Input receptacle ground terminal).

Voltage: 1800Vac or 2546Vdc

Trip Current Sensitivity: <10mA. Duration: 1 minute

The power supply module in the system shall be test at 500Vdc, insulation resistance shall be more than 100Mohms.

12.8SAFETY MARKINGS

12.8.1 LABEL

Power module label:

TBD

PDB label: Example:

12.8.2 BARCODE LABEL CONTENT DEFINITION

TBD

13.PACKING EXPLODE DRAWING

TBD

GOSPELL DIGITAL TECHNOLOGYCO.,LTD. POWER ENTERPRISE DEPARTMENT				DESCRIPTION: SPECIFICATION	
THESE SPECIFICATION ARE THE PROPERTY OF GOSPELLDIGITAL TECHNOLOGY CO.,LTD。 AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				Model No.: G1392-2000WNA	
DATE	PREPARED	CHECKED	APPROVED	Document No.: N200000xxx	REV
2021-12-30	Hu Yaqi	Liu Caiming	boboo		0.0