深圳欧陆通电子股份有限公司 SHENZHENHONOR ELECTRONIC CO.,LTD ASPOWER Electrical Specification	Model Name	U1D-D10800-DRB
	Version	S0
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Electrical Specification

(With +12V&+12Vsb output for optimized and QD-SI01)

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REV	Description	Date
S0	Release	2021/01/27

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1.0 SCOPE

This specification defines the key characteristics for the 800W power supply, which is intended for worldwide use in IT equipment such as server application. This unit contains +12V and +12Vsb output ports. All the specifications are applicable under all operating conditions when installed in the end used system unless other noted.

2.0 INPUT PARAMETER

2.1 Input Voltage/Input Current/Frequency

The power supply shall operate within input limited voltage range as defined as Table 1, which includes the limited value of input current, input voltage. The power supply shall be capable of start up from min load to max load at line input.

Table1.

	Min	Rated	Max	Units
DC input voltage	-36	-48	-72	VDC
Input current	<23A@-36~-41VDC @600W <23A@-42~-72VDC @800W			

2.2 Inrush Current

Cold start at normal input voltage at 25℃, when input power is applied to the power supply and any initial inrush current surge or spike longer than 1ms shall not exceed 55A peak @-72Vdc.

The inrush shall be less than the ratings of the critical components. Any inrush current of the DC line shall not cause damage to the power supply. Surge current does not contain the current spike due to X-Cap and Y-Cap, but the peak current de-rating time should< 0.2ms.

2.3 Efficiency

The power supply achieves the table level by testing at the -48Vdc, 18degC-27degC ambient temperature and the loading condition show in Table 2.

Table2.

Load	+12V	+12Vsb	EFF
20%	13.0A	0.33A	>88%
50%	32.5A	0.88A	>91%
100%	65.0A	1.67A	>88%

Note:

1. Add external +12Vcc for fan and the fan power is not included in efficiency calculation.

2.4 Hold up Time

Hold up time is defined length of time from DC input drops to 0V to +12V dropping out of voltage regulation range at any phase of the DC input, the power supply should meet dynamic voltage range.

1. Hold up time +12Vout>=2ms@100% load (-42~ -72VDC).

3.0 OUTPUT PARAMETER

3.1 Output Current

The following table defines the output current ratings. The combined output power of all outputs shall not exceed the rated output power (800W). The power supply shall meet both static, dynamic voltage regulation and timing requirements for all loading conditions defined in specification.

Table3.

Output Voltage	Min Current	Max current
+12V	1A	66A
+12Vsb	0A	3.0A

Table4. Combine load table

Input Range	Output			
	+12V	+12Vsb	Total Load	Remark
-36Vdc~ -41Vdc	48A	3.0A	600W	600W full load
-42Vdc~ -72Vdc	66A	3.0A	800W	800W full load

Note:

1. The continuous total output power is 800W max for -42~-72Vdc input.

2. The continuous total output power is 600W max for -36~-41Vdc input. Any over derating power operation at lower input will trigger the power supply protected.

3.2 Voltage Regulation

The power supply output voltages must stay within the following voltage limits shown in below table when operating at steady state, dynamic loading conditions. All outputs are measured with reference to the return remote sense (ReturnS) signal.

Table5.

Output Voltage	Min	Rated	Max	Tolerance
+12V	11.4V	12.0V	12.6V	+/-5%
+12Vsb	11.4V	12.0V	12.6V	+/-5%

3.3 Ripple & Noise

Table6.

Output voltage	Ripple & noise
+12V	<120mV
+12Vsb	<120mV

Note:

1. The ripple & noise is measured over a bandwidth of 20MHz at the power supply output connectors. A 10μF Electrolytic capacitor in parallel with a 0.1μF ceramic capacitor is placed at the point of measurement. To help reduce switching ripple further, an additional 2,200uF low ESR electrolytic capacitor may be placed in parallel.

3.4 Timing

These timing requirements for power supply operation include alone module's output and multi modules' outputs. All outputs shall rise and fall monotonically. In additional, PSU timing must meet the requirement of mother board. The timing characteristics must be evaluated and verified when in design stage and system test stage.

Table7. Turn On/Off Timing

Item	Description	Min	Max	Units
Tvout _rise	Output voltage rise from 10% to 90% time for 12V.	5	70	ms
Tvout _rise	Output voltage rise from 10% to 90% time for 12Vsb.	1	25	ms
Tsb_on_delay	Delay from DC being applied to 12Vsb being within regulation.		1500	ms
Tdc_on_delay	Delay from DC being applied to 12V being within regulation.		3000	ms
Tsb_vout	Delay from 12Vsb being in regulation to 12V being in regulation at DC turn on.	50	1000	ms
Tpson_on_delay	Delay from PSON active to output voltages being within regulation limits.	5	400	ms
Tpwok_on	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	500	ms
Tvout_holdup	Time 12V output stay within regulation after loss of DC input.	2		ms
T12Vsb_hold up	Time the 12Vsb output voltage stays within regulation after loss of DC.	2		ms
Tpwok_low	Duration of PWOK being in the de-asserted state during an OFF/ON cycle using DC or the PSON signal.	100		ms
Tpson_pwok	PWOK being de-asserted delay from PSON deactivate.		5	ms

Note:

1. Rise Time (Tvout _rise): The 12V must rise from 10% to 90% within regulation limits within 5 to 70ms.

For 12Vsb, it is allowed to rise up within 1.0 to 25ms.

All outputs must rise monotonically.

2. Tsb-on & Tdc-on Delay Time: The Tsb-on delay time for 12Vsb should be ≤ 1.5s.

The Tdc-on delay time for 12V should be ≤ 3s.

3. Main Output Delay Time (Tsb_vout): The 12V main output being in regulation delay from 12Vsb being in regulation should be 50 to 1000ms.

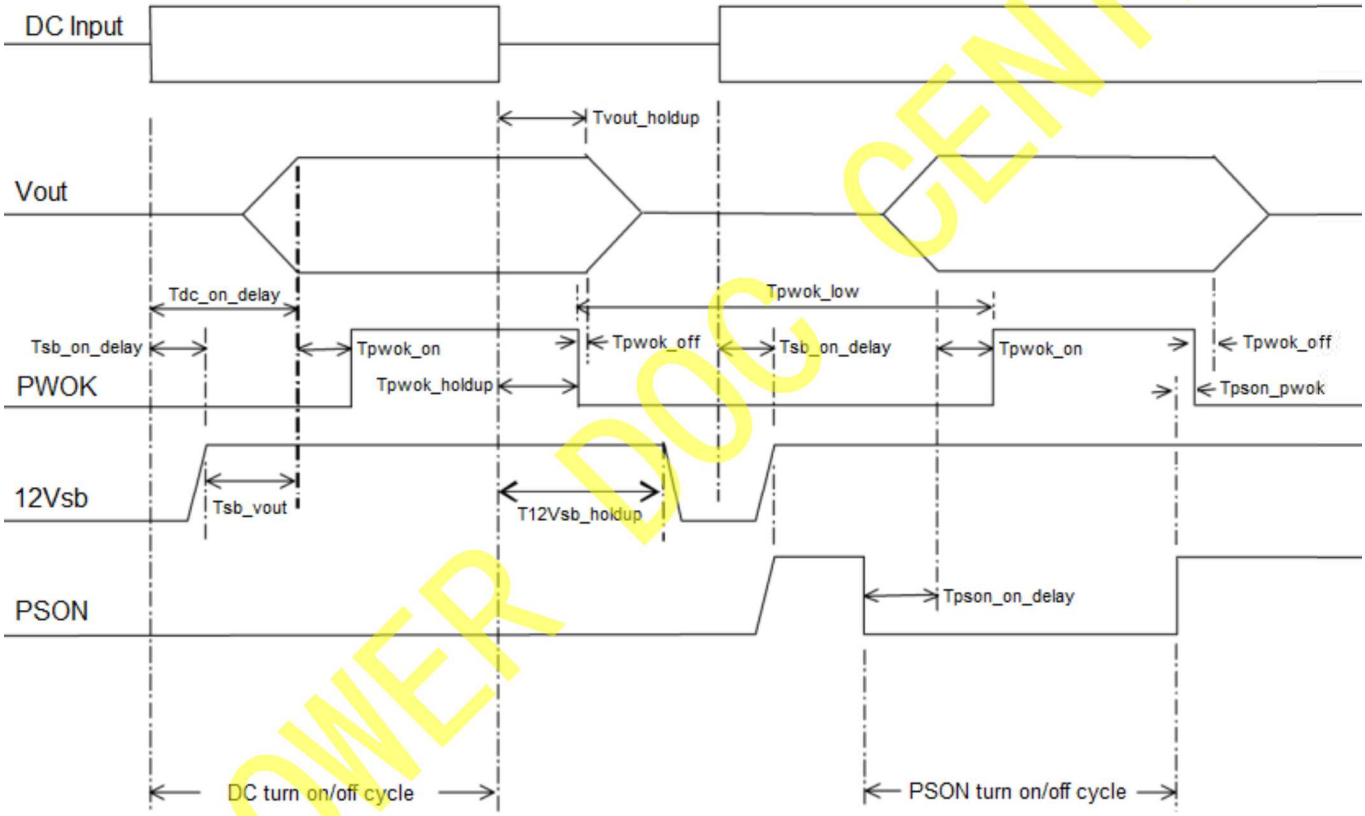
4. Tpson_on_delay: The12V output must be within regulation after PSON active for 5 to 400ms.

5. Power Work OK Delay (Tpwok_on): PWOK should delay from 12V output within regulation for 100 to 500ms.

6. Hold up Time (Tvout_holdup): The holdup time for 12V and12Vsb should ≥ 2ms.

7. Duration Time for PWOK (Tpwok_low): During time of PWOK when OFF/ON cycle by DC input or by PSON signal should ≥ 100ms.

8. PWOK Delay PSON Deactivate (Tpson_pwok): PWOK being de-asserted should delay from PSON deactivate ≤ 5ms.



3.5 Overshoot

The turn-on overshoot due to application of DC input or remote enable shall be < 5% of the nominal output voltage for any application of input voltage within the specified range.

Overshoot/undershoot on turn on or restart must be meet 800W full load and 600W full load, including minimum output capacitance on all output voltages.

Table8.

Output Voltage	Overshoot (Max)
+12V	12.6V

3.6 Dynamic

The output voltage shall remain within limits specified for the step loading, slew rate, and capacitive loading in below table.

The load transient repetition rate shall be tested between 50Hz to 5KHz at 50% duty cycles. And the min load of +12V output is 1A during dynamic loading test. The test shall be at least in 50 Hz/5KHz condition. The output current transient repetition rate is only a test specification.

Table9.

Output Voltage	Transient Step (A) Percent of Rated Current	Slew rate (A/us)	Frequency (Hz)	Cap (uF)
+12V	60% of max load	0.5	50-5K	2200
+12Vsb	1.0	0.25	50-5K	20

3.7 Capacitive Loading

The power supply shall be stable and meet all requirements with the following capacitive loading range. The PSU is not damaged include normal turn on timing, running under all load conditions.

Table10.

Output Voltage	+12V	+12Vsb
Capacitive loading (uF)	20000	1000

3.8 Current Sharing

The +12V current sharing shall be a single wire type for module. Connecting the load share bus pins of each power supply together shall enable the current share feature. With the current share pins tied together, the +12V output load current shall be balanced to within 5% when output 25% to 100% 800W full load ,For example 1+1 redundant mode the current sharing precision calculating formula is ｜Iout1-Iout2｜/(Iout1+Iout2). From 25% to 100% 800W full load the LS voltage must be linear change and at 800W full load the LS voltage shall be 8.0 ±0.4V for one single power supply. Shorting or opening of a current share pin shall not cause the output voltage to go out of steady state regulation.

3.9 Hot Swap Requirement

Hot swapping is the process of inserting and extracting a power supply from an operating power system. During this process the output voltage shall remain within the limits. The hot swap test must be conducted when the system is operating under static, dynamic and no loading conditions. The power supply shall use a latching mechanism to prevent insertion and extraction of the power supply when the

DC power cord is inserted into the power supply. The power supplies must be able to operate in a hot-swap configuration.

3.10 Output Terminal

Table11. Output Terminal

Signal	Description	Note
GND	Outputs' return and it's also connected with the case.	
+12V	The main output voltage.	
PMBus*SDA	I2C Data bus.	
PMBus*SCL	I2C Clock bus, 100kHz Max.	
A0(SMBus*address)	Address set Pin.	
A1(SMBus*address)	Address set Pin.	
PSON	Remote ON/OFF control signal: When the PSON signal is low, the power supply will turn on the 12V main output, and turn off when it's high.	
12Vsb	The auxiliary output voltage.	
SMBAlert	Warning signal: When this pin is low will notice system the power supply has some fault occurred.	
SM- Bus	Power supply cold redundancy control signal.	
GND Sense	12V output GND return sense for feedback.	
+12V Sense	12V output voltage sense for feedback.	
Present	The power on line signal. This pin connect a resistor to +3.3V in the power when PSKILL; when the Present is connect to GND.	Alternative
LS	12V output load sharing bus.	
PWOK	Power supply work OK signal.	
Input ok	The Input voltage is ok signal.	

3.11 Control Signal

3.11.1 Control and Status Signals

All control signals shall be TTL compatible with respect to the output return and shall be isolated from the primary circuit and be SELV (safety extra-low voltage circuit) rated.

3.11.2 Input OK Signal

Input OK signal is an input voltage OK signal and will be asserted low when the power supply to indicate that the input voltage are within range. When input voltage is out of range, the input OK signal will be pulled to a high state. This signal is an output signal pulled up to +3.3Vs with a 1Kohm current limit resistor in module.

Table12. DC Fail Signal Characteristic

Signal Type	Power State	Logic Level (Min)	Logic Level (Max)
Input OK Signal=Low	Input OK	0V	0.4V
Input OK Signal=High	Input Fail of Range	2.4V	3.46V

3.11.3 PSON Input Signal

The PSON signal is required to remotely turn on/off the power supply. PSON is an active low signal that turn on the +12V power rail. When this signal is not pulled low by the system, or left open, the outputs turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply. This signal accepts an open collector/drain input from the system and a 5.1K resistor pull-up to +3.3Vs located in module.

Table13. PSON Signal Characteristic

Signal Type	Power State	Logic Level (Min)	Logic Level (Max)
PSON=Low	ON	0V	1.0V
PSON=High or Open	OFF	2.0V	3.46V

3.11.4 PWOK (Power OK) Output Signal

PWOK is a power OK signal and will be pulled high when 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 DC 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. The start of the PWOK delay time shall inhibited as long as any power supply output is in current limit. This signal is open collector/drain output and a 0.27K resistor pull-up to +3.3Vs located in module.

Table14. PWOK Signal Characteristic

Signal Type	Power State	Logic Level (Min)	Logic Level (Max)
PWOK=Low	Power Not OK	0V	0.4V
PWOK=High	Power OK	2.4V	3.46V
Sink Current (Low)			0.4mA
Source Current (High)			2mA
PWOK Rise and Fail Time			0.1ms

3.11.5 SMBAlert Signal

This is low active, side band and open collector signal indicates that the power supply is experiencing a problem, warning or fault that the user should investigate. 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. It's also to be asserted in parallel with LED turning solid Amber or blink Amber. This signal is open collector/drain output and a 2K resistor pull-up to +3.3Vs located in module.

Table15. SMBAlert Signal Characteristic

Signal Type	Power State	Logic Level (Min)	Logic Level (Max)
SMBAlert=Low	Alert to system	0V	0.4V
SMBAlert=High	Power OK	2.4V	3.46V
Sink Current, SMBAlert=Low			4mA
SMBAlert Rise and Fail Time			0.1ms

3.11.6 SDA and SCL Signal

SDA and SCL pins (for I2C bus) is designed to operate at +3.3 volts. This signal is a 5.1K resistor pull-up to +3.3Vs located in module.

3.11.7 A0, A1 Signal

PSU module address line 0 and line 1. This signal line is provided for determining the address for the specific PSU FRU and SMBus address. Two 10Kohm pull-up resistors should be located in the PSU and the pull-up voltage should be limited to +3.3Vs. The address line should be either float or pull low with equal to or less than 100ohm in the motherboard design.

3.11.8 SM_Bus Signal

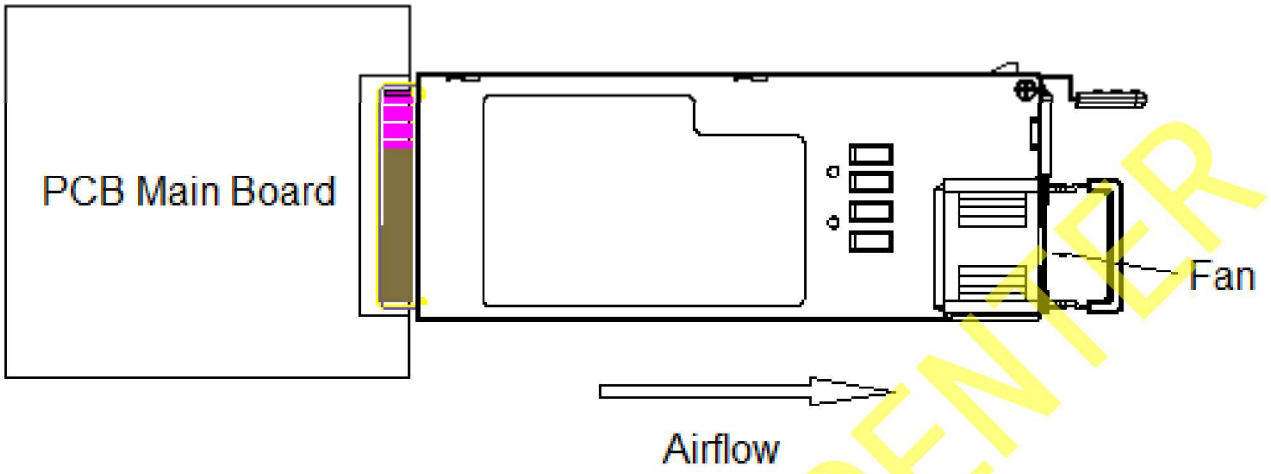
Power supplies that support cold redundancy can be enabled to go into a low power state (that is cold redundant / standby redundant mode state) in order to provide increased power usage efficiency when system loads are such that both power supplies are not needed. When the power subsystem is in cold redundant mode, only the needed power supply to support the best power delivery efficiency is ON. Any additional power supplies; including the redundant power supply, is in cold standby state.

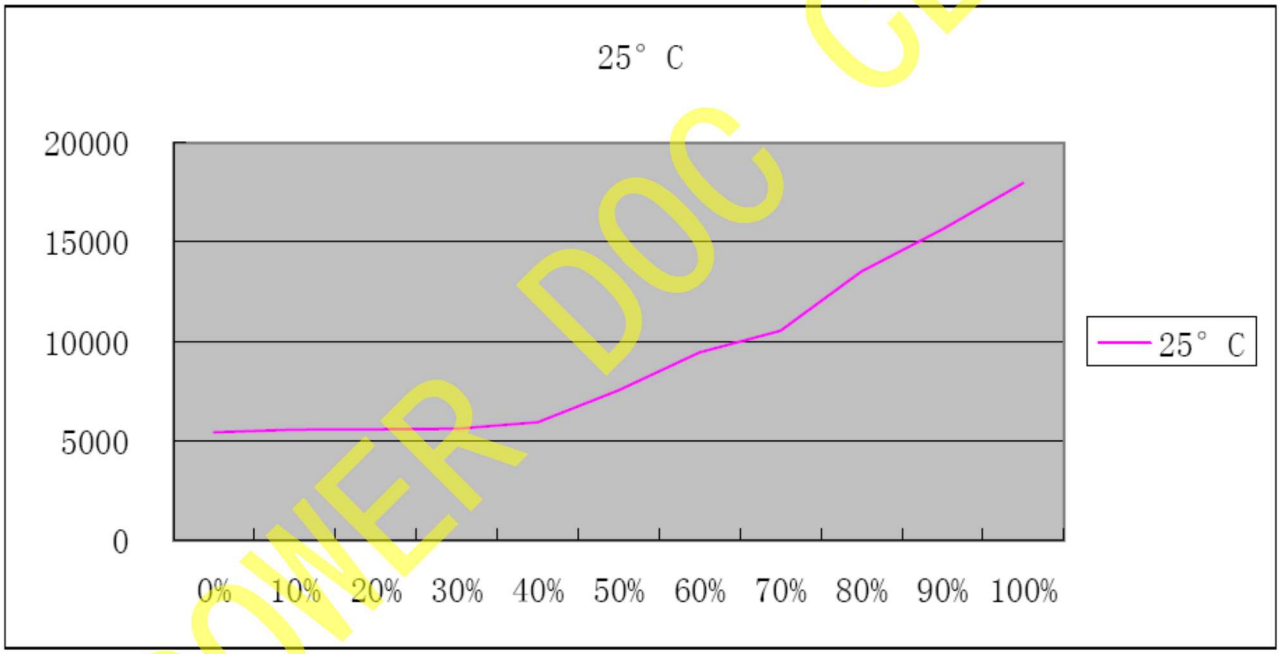
Each power supply has an additional signal (SM_Bus—Standby Mode Bus) that is dedicated to supporting cold redundancy. This signal is a common bus between all power supplies in the system. SM_BUS is asserted when there is a fault in any power supply or the power supplies output voltage falls below the Vfault threshold. Asserting the SM_Bus signal causes all power supplies in cold standby state to power ON. Enabling power supplies to maintain best efficiency is achieved by looking at the load share bus voltage and comparing it to a programmed voltage level through a PMBus command. Whenever there is no active power supply on the cold redundancy bus driving a high level on the bus all power supplies are ON no matter their defined cold redundant roll (active or cold standby). This guarantees that incorrect programming of the cold redundancy states of the power supply will never cause the power subsystem to shut down or become over loaded. The default state of the power subsystem is all power supplies ON. There needs to be at least one power supply in cold redundant active state or standard redundant state to allow the cold standby state power supplies to be cold standby state.

Table16. SM_Bus Signal Characteristic

Signal Type	Power State	Logic Level (Min)	Logic Level (Max)
SM_Bus=Low	Active Redundant Mode	0V	0.4V
SM_Bus=High	Standby Redundant Mode	2.4V	3.46V

3.11.9 Cooling





4.0 PROTECTION

When the main12V output OCP / OVP is triggered, the power supply will shut down and latched off. The latch can be cleared by toggling the PSON signal or by a DC power interruption. When the input UVP/OVP or 12Vsb output's OCP/OVP is triggered, the power supply will shut down and auto recovery when the fault condition removed.

4.1 Input Under and Over Voltage Protection (Input UVP/OVP)

The input UVP should be -32.0Vdc ±1.5Vdc and recover point should be -34.0Vdc ±1.5Vdc.

The input OVP should be -76Vdc ±1Vdc and recover point should be -74Vdc ±1Vdc.

The test condition at min load .

4.2 Over Voltage Protection (OVP)

The power supply should have over voltage protection to prevent the outputs from exceeding limits, if the OVP occurred, the power supply should shut down and latch-off, the latch condition can be cleared by toggling the PSON signal or a DC on/off cycle operation, 12Vsb will be auto-recovered after removing OVP limit.

Table17.

Voltage	Min(V)	Max(V)
+12V	13.3	14.5
+12Vsb	13.3	14.5

4.3 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 shut down. When the power supply temperature drops to within specified limits, the power supply shall restore power automatically, while the 12Vsb remains always on.

The temp sensor is on the main PCB board to sense the air intake to sense the ambient temperature.

Table18

	Over temperature warning(Self-recovery ON)	Over temperature protection	Clear temperature warning
Ambient	59±3℃	62±3℃	56±3℃

4.4 Short Circuit Protection (SCP)

The power supply shall be protected from damage due to faults between output (+12V or +12Vsb) and GND. Short circuit of the power supply outputs shall not result in fire hazard, shock hazard, or damage to the power supply. Components shall not be damaged during the short circuit conditions. If the +12V shorted to GND, the power supply will shut down and latch-off, the latch will be cleared by toggling the PSON signal or a DC on/off cycle operation. All outputs shut down upon a short circuit of the +12Vsb and when the short is removed, the power supply shall self-recovery.

4.5 Over Current Protection (OCP)

The power supply should have over current protection to prevent the outputs from exceeding limits, if the OCP occurred, the power supply should shut down and latch-off, the latch will be cleared by toggling the PSON signal or a DC on/off cycle operation, 12Vsb will be auto-recovered after removing OCP limit.

The 12V&12Vsb OCP should blow table .

Table19. OCP Limited Table

Input Voltage	Condition	+12V	Alert	LED
-36V~ -41V	Over current warning	54±2A~OCP	High	1Hz Blink Amber
	Over current protection	56±2A	Low	Amber
	OCW recovery	52±2A	High	Green
-42V~ -72V	Over current warning	72±2A~OCP	High	1Hz Blink Amber
	Over current protection	76±2A	Low	Amber
	OCW recovery	68±2A	High	Green
Input Voltage	Condition	+12Vsb	Alert	LED
-36V~ -72V	Over current warning	3.6± 0.2A~OCP	High	1Hz Blink Amber
	Over current protection	3.8±0.2A~6A	Low	2.5±0.5s Amber/0.4±0.3s OFF
	OCW recovery	3.4±0.2A	High	1Hz Blink Green

4.6 Output LED Description

Table20. LED Requirement

Power Supply Status	LED Status
Output ON and OK.	Green
No DC power to all power supplies.	OFF
DC present/Only 12Vsb on (PS off).	1Hz Blink Green
DC cord unplugged or DC power lost; with a second power supply in parallels still with DC input power.	Amber
Power supply warning events where the power supply continues to operate: high temperature, Over current.	1Hz Blink Amber
Power supply critical event causing a shutdown: Fan Fail, UVP, OVP, OCP, OTP.	Amber
When the power in cold redundant state.	1Hz Blink Green
Power supply Firmware updating.	2Hz Blink Green

Note:

1. The power supply's LED is on the case's front panel.

5.0 OPERATE ENVIRONMENT

Table21. Environment Limits

Item	Unit	Min	Nominal	Max	Notes
Operating Temperature	℃	0	25	50	The power supply should start up at -40℃, But no electrical property requirement.
Storage Temperature	℃	-40	25	70	Non-operating, maximum rate of change of 20℃/hour.
Relative Humidity	%	10		90	Operating, non-condensing.
		5		95	Non-operating, non-condensing.
Operating Altitude	m	0		5000	The power supply max operating ambient temperature is defined at sea level. The max operating ambient temperature should drops at a slew of 0.33℃/100m altitude raised.
Storage Altitude	m	0		15000	
Mechanical Shock	50G trapezoidal wave, velocity change =170in./sec				Non-operating. Three drops in each of six directions are applied to each of the samples.

6.0 SAFETY

6.1 Safety Certification

CCC, CE, FCC,BIS,UL

6.2 Hi-pot

Primary to secondary, Hi-pot Withstand voltage: 1500Vdc (PCBA), 60s, leakage current <10mA.

6.3 Grounding Impedance Test

Grounding impedance test using grounding current 32A for 60S and the impedance is less than 100mohm.

6.4 Smokeless

Parts failure in the power supply shall not have smoke and flame. And it is necessary to put a fuse in the front of DC-DC conversion circuit or equivalent circuit to prevent smoke and diffusion. Parts failure will trigger the fuse open. All power components are not limited in safety components, but it should be required to verify in the smoke-less testing.

6.5 Warning

1. The PSU must have insulation protection.
2. To avoid electric shock and injury, the PSU must not be energized before finishing installation.
3. This PSU only allows professional maintenance.

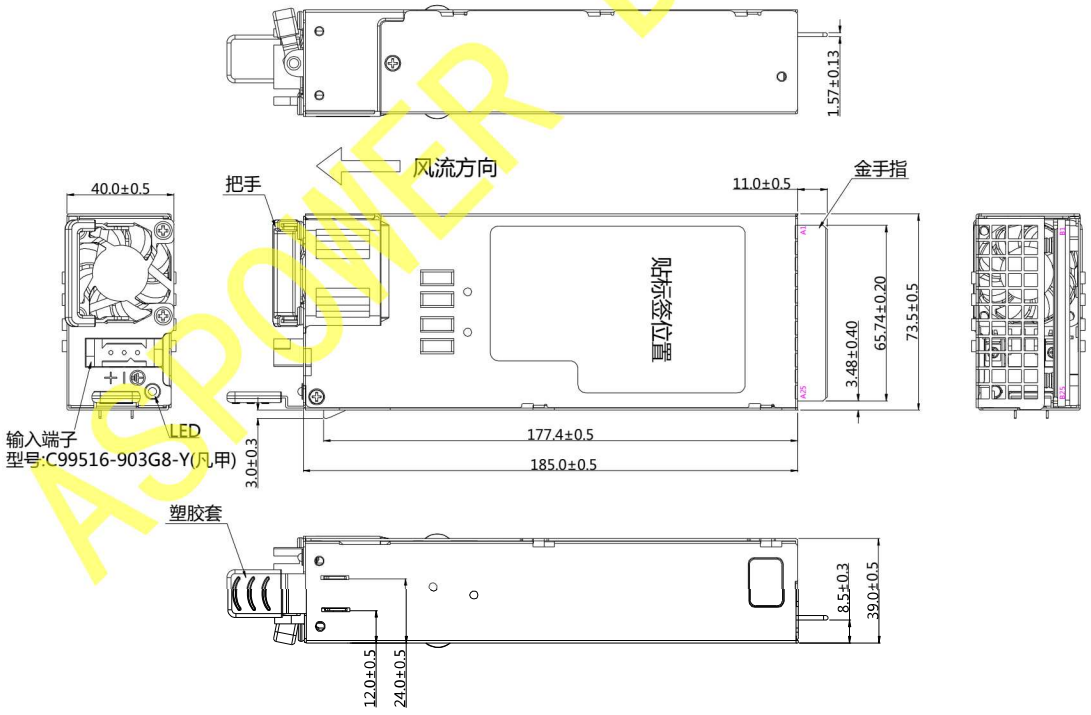
6.6 Insulation Resistance

Primary to Secondary: 500Vdc for 60S, the insulation resistance shall not be less than 100Mohm.

7.0 OUTLINE STRUCTURE

7.1 Outline Dimension

Outline dimension: 185mm (L)*73.5mm (W)* 39mm (T)



Pin	Name	Pin	Name
A1	GND	B1	GND
A2	GND	B2	GND
A3	GND	B3	GND
A4	GND	B4	GND
A5	GND	B5	GND
A6	GND	B6	GND
A7	GND	B7	GND
A8	GND	B8	GND
A9	GND	B9	GND
A10	+12V	B10	+12V
A11	+12V	B11	+12V
A12	+12V	B12	+12V
A13	+12V	B13	+12V
A14	+12V	B14	+12V
A15	+12V	B15	+12V
A16	+12V	B16	+12V
A17	+12V	B17	+12V
A18	+12V	B18	+12V
A19	SDA	B19	A0
A20	SCL	B20	A1
A21	PSON	B21	12Vsb
A22	Alert	B22	SM-Bus
A23	GND Sense	B23	+12Vbus
A24	+12V Sense	B24	Present
A25	PWOK	B25	Input OK

8.0 ROHS

Power supply must meet be Rohs6 compliant including the component, PCB, soldering material, case, wire, and so on.

9.0 EMC

9.1 EMS

Table22. EMS (Electromagnetic Susceptibility) Requirements Table

Item	Description and Requirement	Level	Criterion
Surge	Different Mode: ±1KV Common Mode: ±1KV	B	EN61000-4-5 EN 55024 GR-1089-CORE
Electrical Fast Transient Group (EFT)	±2KV	B	EN61000-4-4 EN 55024 YD/T 1082
Electrical Static Discharge (ESD)	Touch: ±8KV Air: ±15KV	B	EN61000-4-2 EN 55024
Radiated Susceptibility (RS)	80M~800MHz 3V/m 800M~960MHz 10V/m 960M~1GHz 3V/m 1.4G~2GHz 10V/m 2G~2.7GHz 3V/m 80% AM	A	EN 61000-4-3 EN 55024
Conducted Susceptibility (CS)	150KHz~80MHz 3V 80% AM	A	EN 61000-4-6 EN 55024

Performance criterion of the voltage fluctuation immunity test:

A: The power supply should have no loss of function or degradation of performance according to its specification during the test.

B: Temporary loss of function or degradation of performance is acceptable, but all the outputs should be in an acceptable range and should recover to normal after the test. The power supply shouldn't loss any of outputs, reset or any abnormal warning when doing the test with system.

C: Temporary loss of function or shut down is acceptable, but the power supply should restart with an operator intervention or auto-restart normally after the test.

9.2 EMI

Electromagnetic interference (EMI) project basic requirements: radiation interference (RE) and conduction interference (CE), and it shall meet the standard requirements of CLASS A.

Table23. Conduction Performance Requirement

Item	Frequency Segment	Reference Standard	Note
Conduction interference	150KHz~30MHz	EN 55022	-48Vdc/800W

Table24. Conduction CLASS A Standard Limitation

Frequency (MHz)	Limitation (dBuV/m)	
	QP	AVG
0.15-0.50	79	66
0.50-30	73	60

Table25. Radiation Index Requirements

Item	Frequency Segment	Reference Standard	Note
Radiation interference	30MHz~1GHz	EN 55022	-48Vdc/800W

Table26. Radiation CLASS A Standard Limitation

FREQ	Limitation (dBuV/m)
30-230MHz	50
230-1000MHz	57

10.0 MECHANICAL PERFORMANCE

Non-operating:

Sine sweep: 5~500Hz @0.5gRMS at 0.5 octave/min; dwell 15 min at each of 3 resonant points;

Random profile: 5Hz @0.01g^2/Hz (slope up); 20~500Hz @0.02g^2/Hz (flat);

Input acceleration = 3.13gRMS; 10min.per axis for 3 axis on all samples.

11.0 MTBF

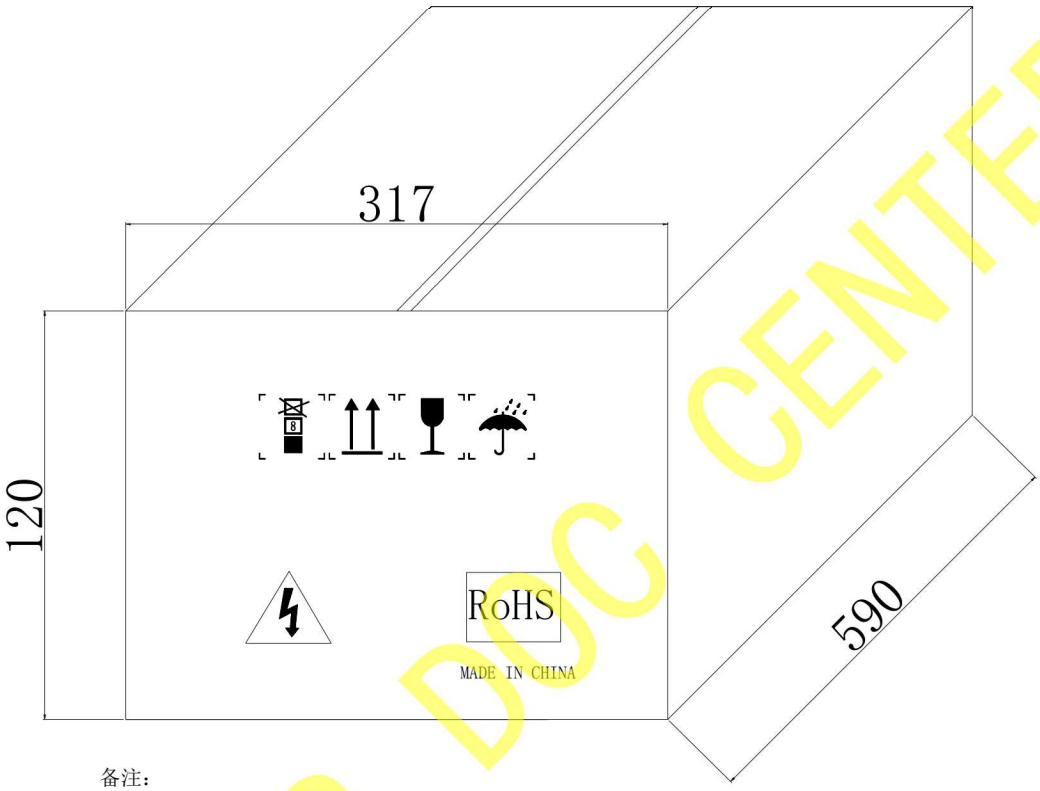
Quantitative reliability (Quantitative) performance requirements: MTBF (MTBF Mean Time between Critical Failure), according to the Bellcore standard: Telcordia Technologies SR-332 (Method I Case 3) at -48Vdc input.

Table27.

Item	Requirement	Notes
Life Time	≧7 years at 25℃ ambient.	Should ≧7 years at 25℃ ambient when mating with the system of customer.
CMTBF (Calculated MTBF)	≧250,000 hours, at 25℃ ambient temperature and 800W full load.	Telcordia Technologies SR-332 (Method I Case 3)
Electrolytic capacitor calculated life	≧7 years at 25℃ ambient.	25℃ ambient at 800W full load using equation of capacitors supplier.
Fan L10 Life	≧7 years at 25℃ ambient.	25℃ ambient at 800W full load.

12.0 PACKAGE

12.1 Outline Diagram of Carton

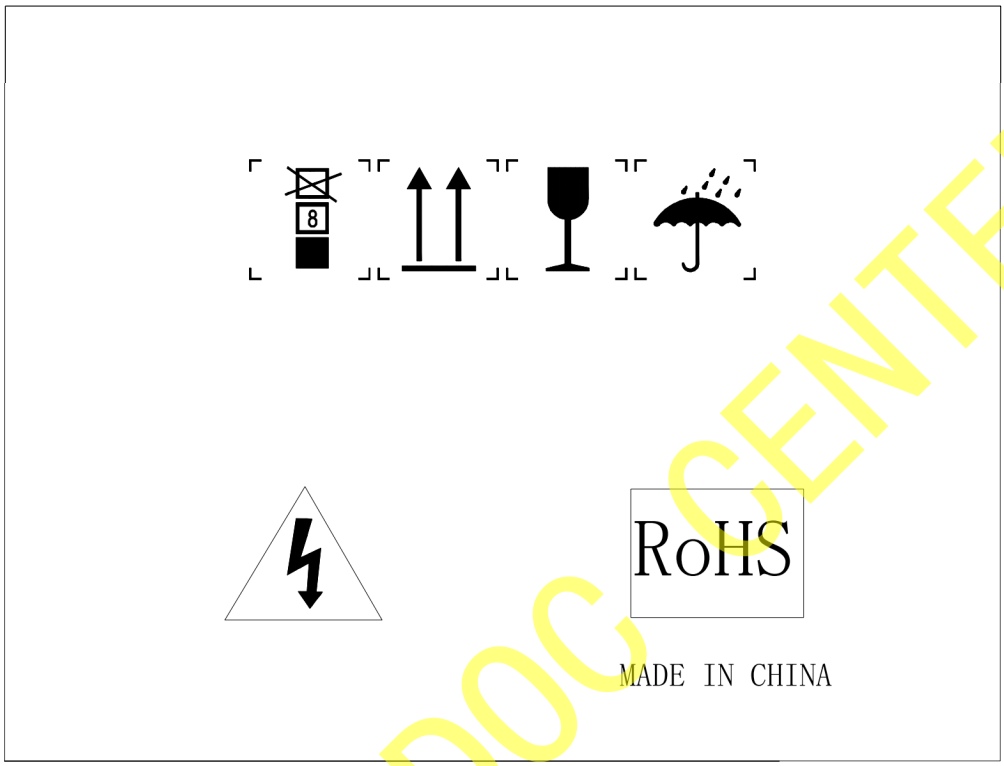


备注：
1. 电源和DC输出线分别装在不同的纸箱
2. 电源纸箱Front Label印刷带EAC字样，DC输出线纸箱不带EAC字样,注意区分。
3. 电源和DC输出线数量1:1配套，两者出货数量要一致。
4. 装栈板时，电源纸箱置放于栈板下4层，DC输出线纸箱置放在栈板上4层。

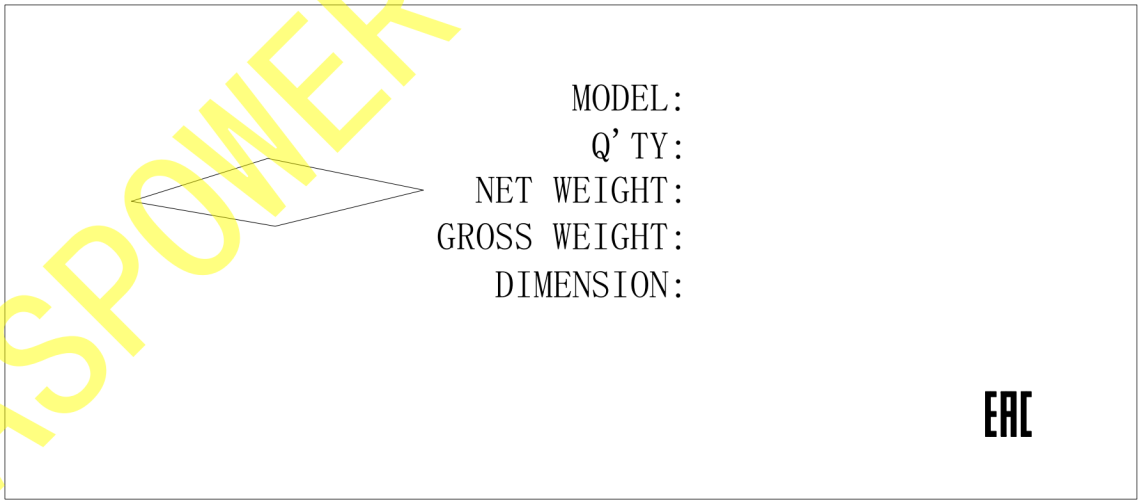
Note:

1. Material: outside the box: K=K, five layers of corrugated paper.

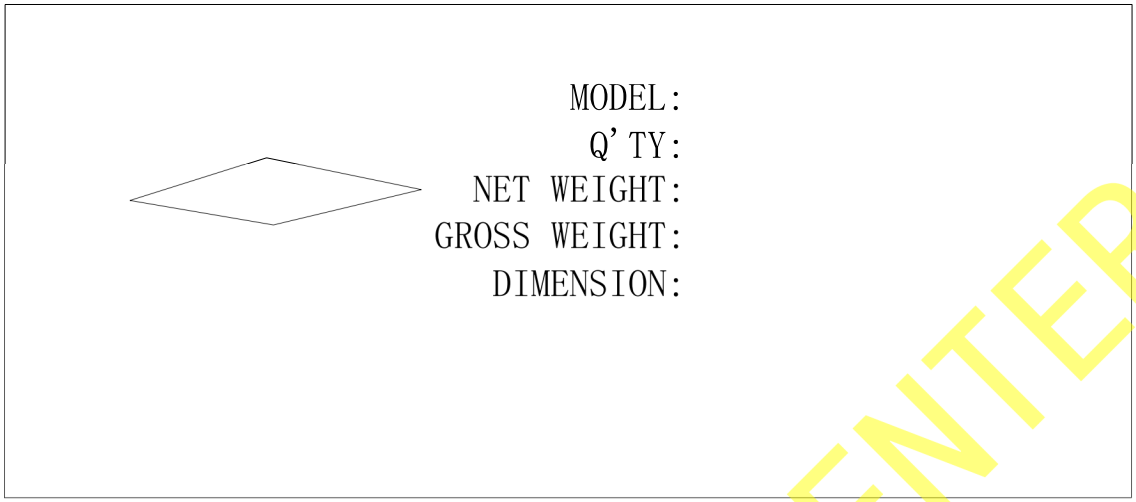
12.2 Side Label



12.3 Front Label



电源纸箱 Front Label



3PIN DC INPUT WIRE 纸箱 Front Label

13.0 SOFTWARE

13.1 PMBus and EEPROM

The EEPROM storage capacity is 256 bytes, communication with system via IIC bus.

13.2 PMBus Communication

There is 3.3V voltage to supply the EEPROM and MCU's Vcc in power supply. The MCU and EEPROM in power supply can communication with system via PMBus1.2 protocol or IIC protocol bus. The power supply output terminal has two signals, one is SCL (clock bus), the other is SDA (data bus), and they are bidirectional communication and can get a continuous signal bus. The supply voltage of bus is 3.3, so SDA (data bus) and SCL (clock bus) needs to be pulled up a 3.6K~10K resistor from system board's 3.3V voltage.

Table28. IIC Address

Equipment	Address	Address Bit (From high to low order)							
MCU	0xBx	1	0	1	1	0	A1	A0	R/W
EEPROM	0xAx	1	0	1	0	0	A1	A0	R/W

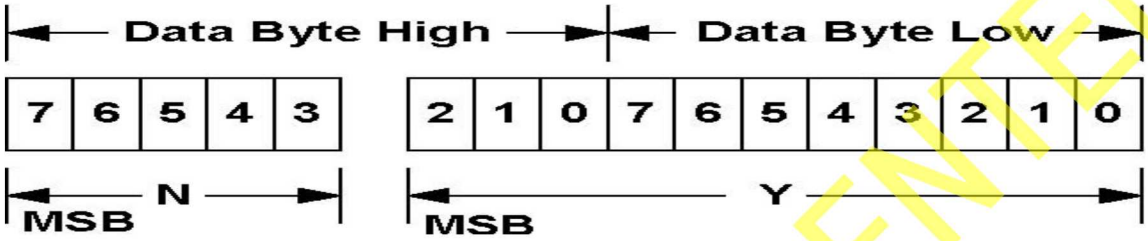
Table29. EEPROM DATA

Byte address (decimal)	Byte address (hex)	Item	Format	Value	Description

13.3 PMBus Specification

Linear Data Formats

The Linear Data Format is a two byte value with: An 11 bit, two's complement mantissa and A 5 bit, two's complement exponent (scaling factor).The format of the two data bytes is illustrated in below Figure.



The relation between Y, N and the "real world" value is: $X = Y \cdot 2^{N}$

Where, as described above:

X is the "real world" value being communicated

Y is an 11 bit, two's complement integer;

N is a 5 bit, two's complement integer.

Devices that use the linear format must accept and be able to process any value of N.

13.4 PMBUS Command Supported

Table30. STATUS_WORD Command

Byte	Bit No.	Status Bit Name	Meaning	Support
Low	7	BUSY	A fault was declared because the device was busy and unable to respond.	No
	6	OFF	This bit is asserted if the unit is not providing power to the output, regardless of the reason, including simply not being enabled.	Yes
	5	VOUT_OV	An output over voltage fault has occurred.	Yes
	4	IOUT_OC	An output over current fault has occurred.	Yes
	3	VIN_UV	An input under voltage fault has occurred.	Yes
	2	TEMPERATURE	A temperature fault or warning has occurred.	Yes
	1	CML	A communications, memory or logic fault has occurred.	No

	0	NONE OF THE ABOVE	A fault or warning not listed in bits [7:1] of this byte has occurred.	No
High	7	VOUT	An output voltage fault or warning has occurred.	Yes
	6	IOUT/POUT	An output current or output power fault or warning has occurred.	Yes
	5	INPUT	An input voltage, input current, or input power fault or warning has occurred.	Yes
	4	MFR	A manufacturer specific fault or warning has occurred.	No
	3	POWER_ GOOD#	The POWER_GOOD signal, if present, is negated.	Yes
	2	FANS	A fan or airflow fault or warning has occurred.	Yes
	1	OTHER	A bit in STATUS_OTHER is set.	No
	0	UNKNOWN	A fault type not given in bits [15:1] of the STATUS_WORD has been detected.	No

Table31. STATUS_VOUT Command

Bit	Meaning	Support
7	VOUT Over voltage Fault	Yes
6	VOUT Over voltage Warning	No
5	VOUT Under voltage Warning	No
4	VOUT Under voltage Fault	Yes
3	VOUT_MAX Warning (An attempt has been made to set the output voltage to value higher than allowed by the VOUT_MAX command)	No
2	TON_MAX_FAULT	No
1	TOFF_MAX Warning	No
0	VOUT Tracking Error	No

Table32. STATUS_IOUT Command

Bit	Meaning	Support
7	IOUT Over current Fault	Yes
6	IOUT Over current And Low Voltage Shutdown Fault	No
5	IOUT Over current Warning	Yes
4	IOUT Undercurrent Fault	No

3	Current Share Fault	No
2	Power Limiting	No
1	POUT Overpower Fault	No
0	POUT Overpower Warning	No

Table33. STATUS_INPUT Command

Bit	Meaning	Support
7	VIN Over voltage Fault	Yes
6	VIN Over voltage Warning	Yes
5	VIN Under voltage Warning	Yes
4	VIN Under voltage Fault	Yes
3	Unit Off For Insufficient Input Voltage	No
2	IIN Over current Fault	No
1	IIN Over current Warning	No
0	PIN Overpower Warning	No

Table34. STATUS_TEMPERATURE Command

Bit	Meaning	Support
7	Over temperature Fault	Yes
6	Over temperature Warning	Yes
5	Under temperature Warnings	No
4	Under temperature Fault	No
3	Reserved	No
2	Reserved	No
1	Reserved	No
0	Reserved	No

Table35. STATUS_FAN_1_2 Command

Bit	Meaning	Support
7	Fan 1 Fault	Yes
6	Fan 2 Fault	No
5	Fan 1 Warning	Yes
4	Fan 2 Warning	No

3	Fan 1 Speed Overridden	No
2	Fan 2 Speed Overridden	No
1	Airflow Fault	No
0	Airflow Warning	No

Table36. STATUS _OTHER Command

Bit	Meaning	Support
7	Reserved	No
6	Reserved	No
5	Input A Fuse Or Circuit Breaker Fault	No
4	Input B Fuse Or Circuit Breaker Fault	No
3	Input A OR-ing Device Fault	No
2	Input B OR-ing Device Fault	No
1	Output OR-ing Device Fault	No
0	Reserved	No

Table37. Supported Command Summary

CMD Code	Name	Type	Bytes	Conditions
01h	OPERATION	Write Byte Read Byte	1	
02h	ON_OFF_CONFIG	Read Byte	1	
03h	CLEAR_FAULTS	Send Byte	0	
19h	CAPABILITY	Read Byte	1	
1Ah	QUERY	Block Read	1	
20h	VOUT_MODE	Read Byte	1	
30h	COEFFICIENTS	Block Write- Block Read Process Call		
3Bh	FAN_COMMAND_1	Write Word Read Word		
78h	STATUS_BYTE	Read Byte	1	
79h	STATUS_WORD	Read Word	2	

7Ah	STATUS_VOUT	Read Byte	1	
7Bh	STATUS_IOUT	Read Byte	1	
7Ch	STATUS _INPUT	Read Byte	1	
7Dh	STATUS_TEMPERATURE	Read Byte	1	
7Fh	STATUS _OTHER	Read Byte	1	
80h	STATUS_MFR_SPECIFIC	Read Byte	1	
81h	STATUS_FANS_1_2	Read Byte	1	
86h	READ_EIN	Block Read	6	
87h	READ_EOUT	Block Read	6	
88h	READ_VIN	Read Word	2	
89h	READ_IIN	Read Word	2	
8Bh	READ_VOUT	Read Word	2	
8Ch	READ_IOUT	Read Word	2	
8Dh	READ_TEMPERATURE_1	Read Word	2	
8Eh	READ_TEMPERATURE_2	Read Word	2	
90h	READ_FAN_SPEED_1	Read Word	2	Rpm value
96h	READ_POUT	Read Word	2	
97h	READ_PIN	Read Word	2	
98h	PMBUS_REVISION	Read Byte	1	
99h	MFR_ID	Read Block	Variable	See MFR Data table
9Ah	MFR_MODEL	Read Block	Variable	See MFR Data table
9Bh	MFR_REVISION	Read Block	Variable	
A0h	MFR_VIN_MIN	Read Word	2	See MFR Data table
A1h	MFR_VIN_MAX	Read Word	2	See MFR Data table
A4h	MFR_VOUT_MIN	Read Word	2	See MFR Data table
A5h	MFR_VOUT_MAX	Read Word	2	See MFR Data table
A6h	MFR_IOUT_MAX	Read Word	2	See MFR Data table
A7h	MFR_POUT_MAX	Read Word	2	See MFR Data table
A8h	MFR_TAMBIENT_MAX	Read Word	2	See MFR Data table
A9h	MFR_TAMBIENT_MIN	Read Word	2	See MFR Data table
FCh	SMART_ON_CONFIG	Write Byte	1	00h Standard

		Read Byte		Redundancy 55h Smart On Active 0Eh Smart Standby (Exit to standard redundancy when load is greater than 65% of rated load)

Table38. MFR Data Table

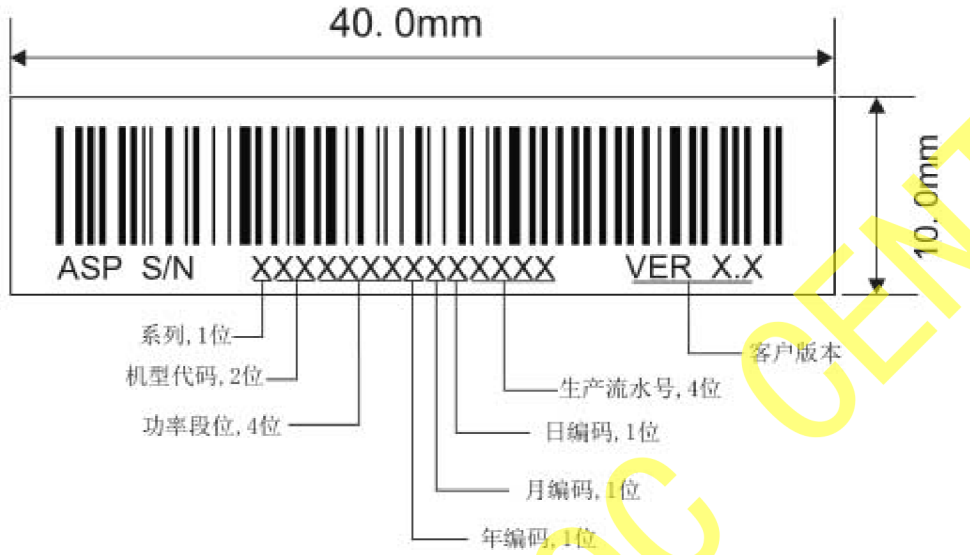
CMD Code	Name	Conditions
99h	MFR_ID	ASPOWER
9Ah	MFR_MODEL	U1D-D10800-DRB
A0h	MFR_VIN_MIN	-36V
A1h	MFR_VIN_MAX	-72V
A4h	MFR_VOUT_MIN	11.4V
A5h	MFR_VOUT_MAX	12.6V
A6h	MFR_IOUT_MAX	66A
A7h	MFR_POUT_MAX	800W
A8h	MFR_TAMBIENT_MAX	50℃
A9h	MFR_TAMBIENT_MIN	0℃

14.0 LABEL AND BAR CODE

14.1 Label

14.2 Bar Code

Outline dimension：40mm（L）*10（W）



1. 系列类型

机种系列服从欧陆通产品分类原则.

2. 机型代码

从01-ZZ表示同系列同一功率段,不同分支不同客户的代码.

3. 功率段位

0800=800W,1200=1200W,3000=3000W等,依次类推.

4. 年编码格式

年份	2015	2016	2017	2018	2019	2020	2021	2022	……
编号	A	B	C	D	E	F	G	H	……

5. 月编码规则

月份	1月	2月	3月	4月	5月	6月	……	11月	12月
编号	1	2	3	4	5	6	……	B	C

6. 日编码规则

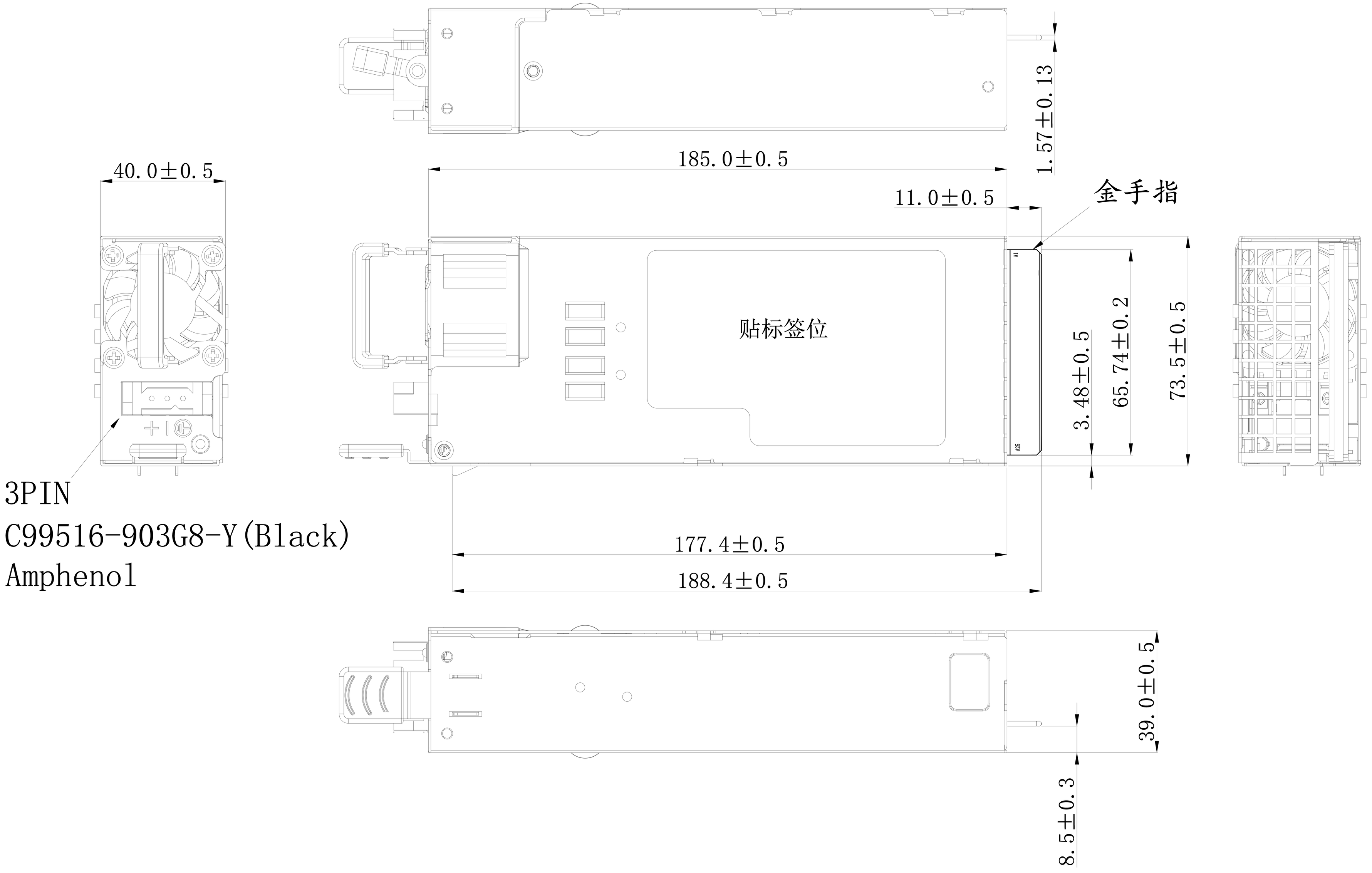
日份	1号	2号	3号	4号	5号	6号	7号	8号	9号
编号	1	2	3	4	5	6	7	8	9
日份	10号	11号	12号	13号	14号	15号	16号	17号	18号
编号	A	B	C	D	E	F	G	H	J
日份	19号	20号	21号	22号	23号	24号	25号	26号	27号
编号	K	L	M	N	P	Q	R	S	T
日份	28号	29号	30号	31号					
编号	U	V	W	X					

7. 生产流水号格式

流水号用4位来表示，计数如0001~9999

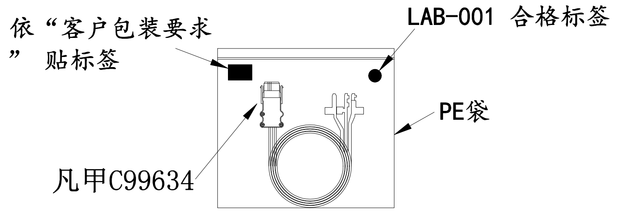
8. 客户版本号

版本号参阅BOM中虚拟料号customer revision.


40.0±0.5
185.0±0.5
1.57±0.13
11.0±0.5
金手指
贴标签位
A1
A25
3.48±0.5
65.74±0.2
73.5±0.5
3PIN
C99516-903G8-Y(Black)
Amphenol
177.4±0.5
188.4±0.5
39.0±0.5
8.5±0.3

文件名称	包装规范
适用范围	凡甲C99634线材包装

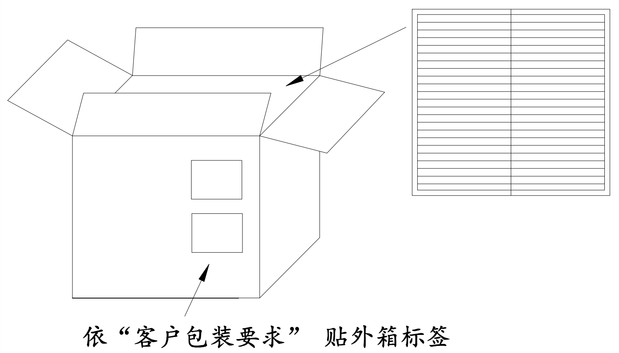
一、产品卷绕方向及放置方式



每袋装1PCS

二、包装明细：

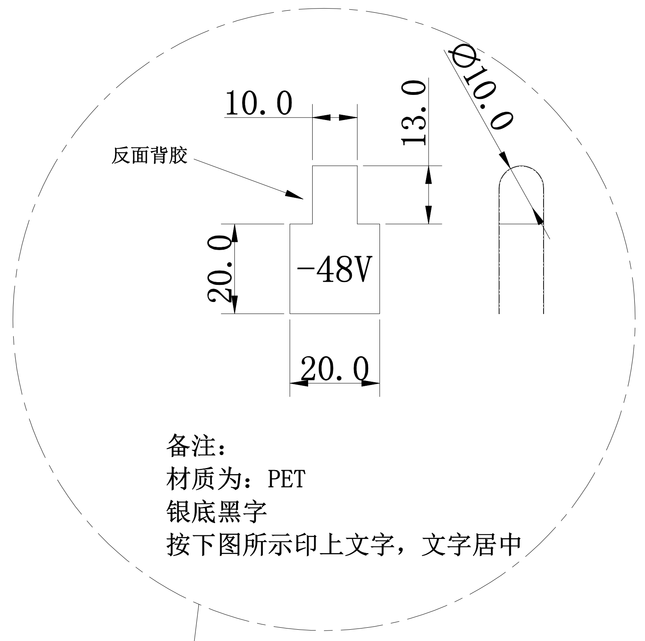
供应商包装料号	P500014(PE袋) P420003(外箱)	包装数量	1PCS/袋 2袋/层 20PCS/箱



每层装箱要求：
1.箱底铺气泡垫
2.把产品摆放在气泡垫上，每层放2袋（1袋1PCS）不能重复堆积
3.最上层铺气泡垫直至填满纸箱

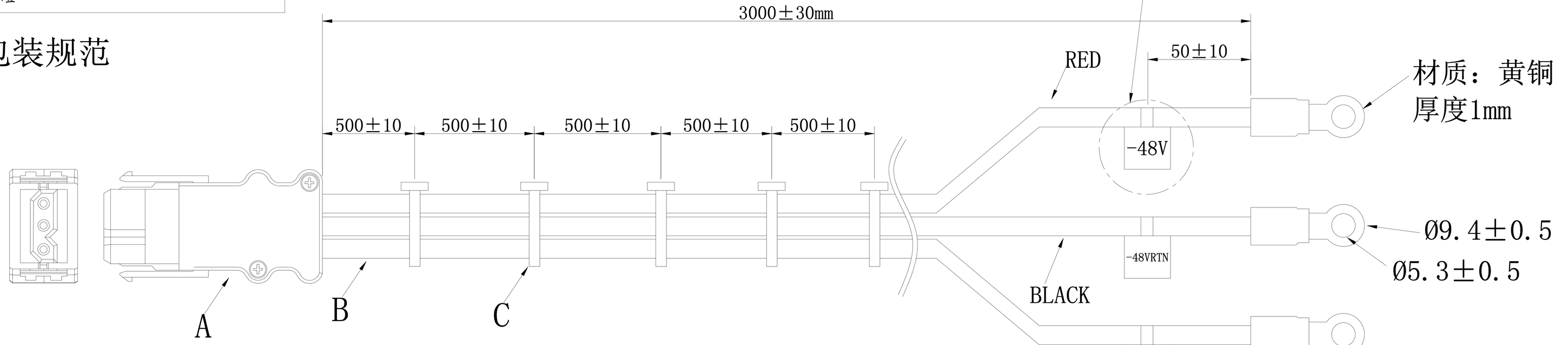
依“客户包装要求” 贴外箱标签

版本	变更前描述	变更后描述	修改人	日期
1.0	首次发行		林东辉	2017.07.13
1.1	料号:130300665	线上面增加标贴	林东辉	2018.03.03
1.2	版本升级	客户要求，增长至3000mm	林东辉	2019.04.03
1.3	版本升级	按供应商实物，更新胶壳外形	林东辉	2019.10.31



备注：
材质为：PET
银底黑字
按下图所示印上文字，文字居中

线材来料包装规范



备注：
A:塑胶型号：凡甲C99634(黑色)
B：UL1015 12AWG
C:尼龙扎带
材料均需符合环保安规要求

ASPOWER线材端子与胶壳拉力测试标准			
AWG	SA(mm²)	标准（Kg）	标准（N）
16	1.74	9.0Min	89.0Min
18	1.09	9.0Min	89.0Min
20	0.69	5.9Min	57.9Min
22	0.45	3.6Min	35.6Min
24	0.29	2.2Min	22.3Min
26	0.18	1.3Min	13.4Min
28	0.11	0.9Min	8.9Min

机种名:U1D-D10800-DRB-HKWS

ASPOWER 深圳欧陆通电子股份有限公司.

品名	料号	图号	设计	确认	审核	日期	比例：/	单位：mm
DC输入线	130300732	12AWG UL1015 3000mm 3PIN 1.3REV	林东辉				页码：	1/1