

4.4 Short Circuit Protection (SCP)

The power supply shall shut down and latch off when +12V output is short circuit (impedance less than 0.1ohm), and 5VSB shall be auto restart. The power should be under protection to keep component safe, whatever the outputs is shorten before turn on or shorten after turn on. The +12V can be recovery after removing short by AC on/off or PSON/OFF, but +5VSB can be auto restart after short is removed.

4.5 Over Current Protection (OCP)

Table16. OCP Limited Table

Output	Min	Max
+12V	28A	34A
+5VSB	3.5A	6A

Note:

1. After OCP, the +12V output is turned off and latch off, and by AC ON/OFF or PSON/OFF unlock; the +5VSB output can restart automatically. When the OCP fault is removed, +5VSB should return to normal.

5.0 HOT SWAP AND CURRENT SHARE

5.1 Load Current

Two PSU working in parallel, when the load is under 20% to 100%, the current of redundancy PSU are not exceed the scope of below table accuracy, sharing degree is calculated as follows sharing degree = $(I1-I2)/(I1+I2)$. I1, I2 is PSU1, PSU2 output current.

Table17.

<20%	$20\% \leq I < 50\%$	$50\% \leq I \leq 100\%$
NC	$\leq 15\%$	$\leq 10\%$

5.2 I-Share Voltage

If the power supply allows single and double operate, when a single power supply running, current bus voltage represent the load of this power supply itself, and meet linear condition under certain loading. When double modules work, the current bus voltage will be half base on the voltage of a single power supply. The current bus logic output signal is used to help balance +12V load for multiple power supply. The system can use this signal to monitor the PSU load with a general way.

Table18. I-Share Voltage Level VS Output Current

I-Share Voltage (1 Power Supply)	
Percent of Power Supply Max Current Capacity	Voltage Level ($\pm 10\%$)
100%	4000mv

6.0 OPERATE ENVIRONMENT

6.1 Operate Temperature

Operate temperature: 0°C to +50°C.

6.2 Storage Temperature

Storage temperature: -40°C to +70°C.

6.3 Operate Humidity

Operate Humidity (non-condensing): 5% to 90%.

6.4 Storage Humidity

Storage Humidity (non-condensing): 5% to 95%.

6.5 Operate Altitude

Operate Altitude: 0 to 5000m.

6.6 Storage Altitude

Storage Altitude: 0 to 10000m.

6.7 Cold Start

The power supply shall be able to turn on at 0degC.

7.0 SAFETY

7.1 Safety Certification

Meet FCC Part15 subpartB 15.107,15.109 (USA).

Meet EN60950-1(Europe).

Meet GB4943.1-2011(CCC-CNCA Certification) (CHINA).

7.2 Hi-pot

Primary to secondary Hi-pot withstand voltage: 3000Vac, 10s, leakage current <10mA.

Primary to grounding Hi-pot withstand voltage: 1800Vac, 10s, leakage current <10mA.



7.3 Grounding Impedance Test

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

7.4 Leakage Current

Leakage current 264Vac/50Hz 3.5mA max.

7.5 Insulation Resistance

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

7.6 Smokeless

If one part failure in the power supply, do not have smoke and flames. So it is necessary to put a fuse in the front of DC-DC conversion circuit or equivalent circuit to prevent failure brought smoke and failure parts diffusion. If part failure will trigger the fuse open. All power components are not limited in safety components, should be required to verify smoke-less test.



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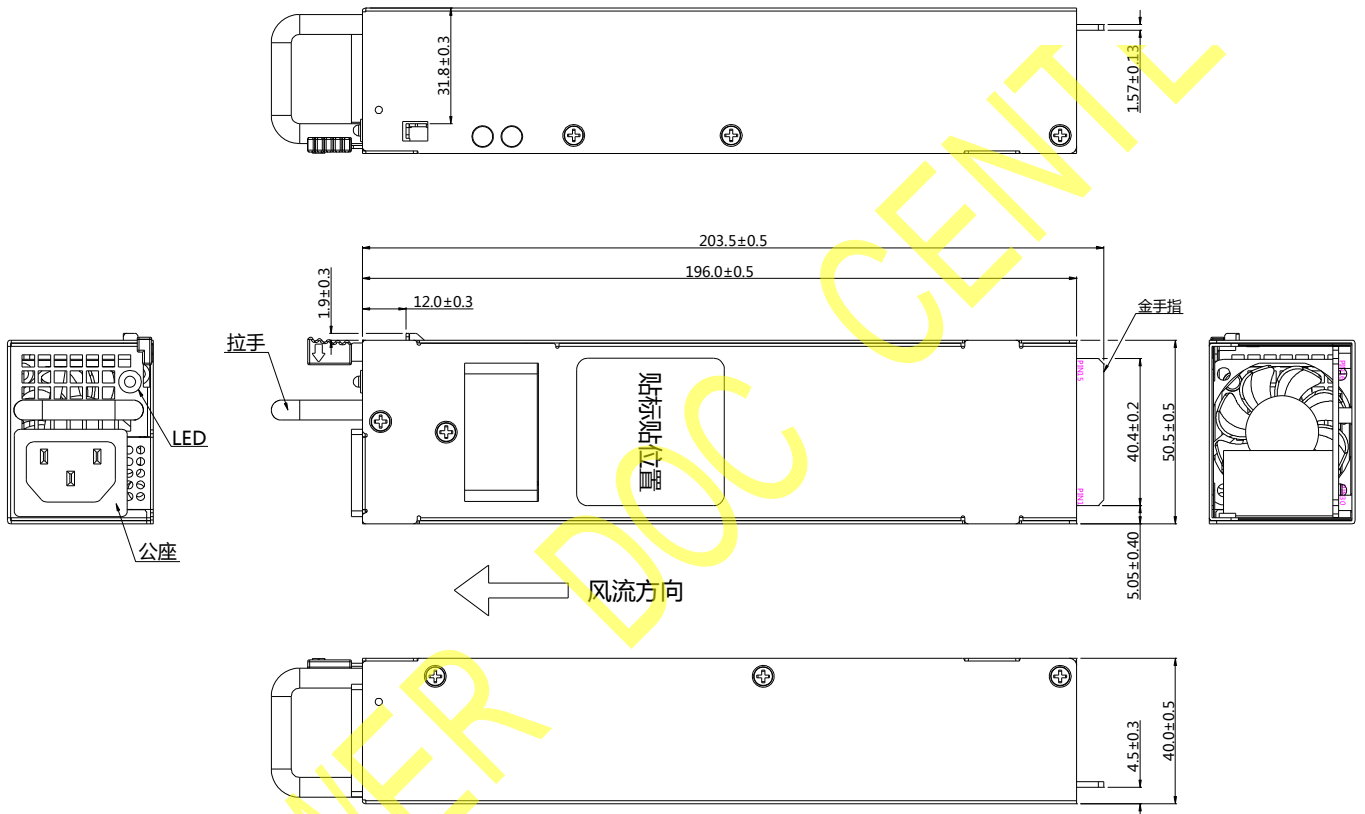
8.0 OUTLINE STRUCTURE

Outline dimension:

Length: 203.5mm include gold finger length

Width: 50.5mm

Thickness: 40mm



9.0 GOLD FINGER DEFINE

Gold finger using C21001-13001-Y 90°(ALLTOP) (2*15PIN) connector, the specific definition of PSU gold finger is as follows:

Table19.

Pin	Name	Description	Pin	Name	Description
Pin 6	GND	Ground	Pin 20	GND	Ground
Pin 7	GND		Pin 21	GND	
Pin 8	GND		Pin 22	GND	
Pin 9	GND		Pin 23	GND	
Pin 10	GND		Pin 24	GND	
			Pin 25	GND	
Pin 1	+12V	12V	Pin 26	+12V	12V
Pin 2	+12V		Pin 27	+12V	
Pin 3	+12V		Pin 28	+12V	
Pin 4	+12V		Pin 29	+12V	
Pin 5	+12V		Pin 30	+12V	
Pin 11	PS/ON	Remote ON/OFF control signal	Pin 12	+5VSB	+5V Standby Output
Pin 19	+5VSB	+5V Standby Output	Pin 18	+12VBUS	+12V Current Share Line
Pin 13	A0	I2C Adress line	Pin 17	SCL	PMBUS Clock Line
Pin 14	PG	Power Good Output	Pin 16	SDA	PMBUS Data Line
Pin 15	OCP	+3.3V and+5VOCP signal			



10.0 EMC

Table20. EMI (Electromagnetic Interference) Requirements Table

Item	Frequency Segment	Level	Reference Standard	Note
Conduction interference	150KHz~30MHz satisfy 3dB margin	A	EN 55022	115V/60Hz 230Vac/50Hz
Radiation interference	30MHz~1GHz	A	EN 55022	115V/60Hz 230Vac/50Hz
Voltage Fluctuation	Relative voltage variation characteristics Dt	500ms	IEC61000-3-3	230Vac/50Hz
	Maximum relative voltage change Dmax	4%		
	Relative steady state voltage change	$\cong 3.3\%$		
Voltage Flicker	Short term flicker Pst	1.0	IEC61000-3-3	230Vac/50Hz
	Long term flicker Plt	0.65		

Table21. EMS (Electromagnetic Susceptibility) Requirements Table

Item	Description and Requirement	Level	Criterion	
EFT	$\pm 2KV$	A	IEC61000-4-4	
surge	Common: $\pm 2KV$ 12ohm Different: $\pm 1KV$ 2ohm	A	61000-4-5	
ESD	Touch: $\pm 6KV$ Air: $\pm 8KV$	A	IEC61000-4-2 ESD	
Conducted Susceptibility	150KHz~80MHz 3V/M	A	IEC 61000-4-6	
Radiated Susceptibility	80M Hz~1000MHz 10V/M	A	IEC 61000-4-3	
Voltage Dips	0%Ut	10ms	B	IEC 61000-4-11



	70%Ut	500ms	B	
	0%Ut	5000ms	C	
Power frequency magnetic field	experimental grade: 1		A	IEC61000-4-8

Performance criterion:

A. Equipment can work in the specified conditions.

B. Test equipment temporary performance decline, loss of function or reset phenomenon, but it can be recovery itself.

C. Equipment has temporary performance decline or loss of function and it is restored by operator intervention or system.

D. Equipment has non recoverable performance degradation or loss of function due to component damage, software affected or data loss.

11.0 PART CONTROL REQUIREMENTS

1. All current limiting devices shall have UL, TUV or VDE certification and shall be identified as applications in which the device complies with IEC60950.

2. All printed circuit board ratings shall meet UL94V - 0 and those from UL certified PCB manufacturers.

3. All joints shall pass UL certification and UL flame retardant rating UL94V-0.

4. All wiring harness shall be from UL certified wiring harness manufacturer. SELV cable is rated at minimum 80V, 130degC.

5. Product safety labels must be printed with UL certified labels and ribbons. In addition labels can be purchased from UL label manufacturers for approval.

6. The product must have the correct regulatory marks to support the certification specified in this document.



12.0 MECHANICAL PERFORMANCE

Mechanical vibration experiment is mainly to simulate the product vibration experiment in the work and transport process, the purpose is to test whether the product can meet certain specifications of vibration intensity, the main test items include:

1. Work random vibration.
2. Work shock.
3. Packaging random vibration.

Table22.

NO	Experiment Item	Sample	Standard	Parameter	Criterion
1	work random vibration	≥3	IPC9592A-2010 IEC60068-2-64	ASD: 20~1000Hz: 0.04g ² /Hz; 1000~2000Hz: 6db/oct; 2000Hz: 0.01g ² /Hz. About 8Grms. 3 axial, each axial at least 10min. Test process sample power on, normal input voltage, no load. During the test, each power output and signal output should be monitored continuously. The monitoring period should be less than 1ms.	Power supply voltage is Within the specification limits during the test.
2	work shock	≥3	IPC9592A-2010 IEC60068-2-27	Half sine wave, 16ms, at least 30g. 3 axial, each axial 3 times. During the test, each power output and signal output should be monitored continuously. The monitoring	Power supply voltage is Within the specification limits during the test.



				period should be less than 1ms.	
3	packaging random vibration	≥3	IPC9592A- 2010 IEC60068-2- 64	ASD: 5~1000Hz: 0.05g ² /Hz; 1000~2000Hz: 6db/oct; 2000Hz: 0.0125g ² /Hz. About 9Grms. About 9Grms, 3 axial, each axial at least 10min. Each PSU should have independent packaging follow normal delivery.	After the test, product should be inspected. Allows minor damage without affecting appearance, installation, or function. Connector pins are not allowed to bend, switch damage, handle damage. Label readability is poor, metal deformation or bending. All equipment through functional testing. Test shipment packaging damage degree does not make judgment requirements.

13.0 MTBF

Quantitative reliability (Quantitative) performance requirements: MTBF (MTBF Mean Time Between Critical Failure), according to the Bell core standard SR-332 Issue3, the PSU operates continuously under 35degC condition, 115VAC/60Hz 230V/50HZ, and 240VDC input voltage under max load, and MTBF is more than 100000 hours, the testing process should not be interrupted.



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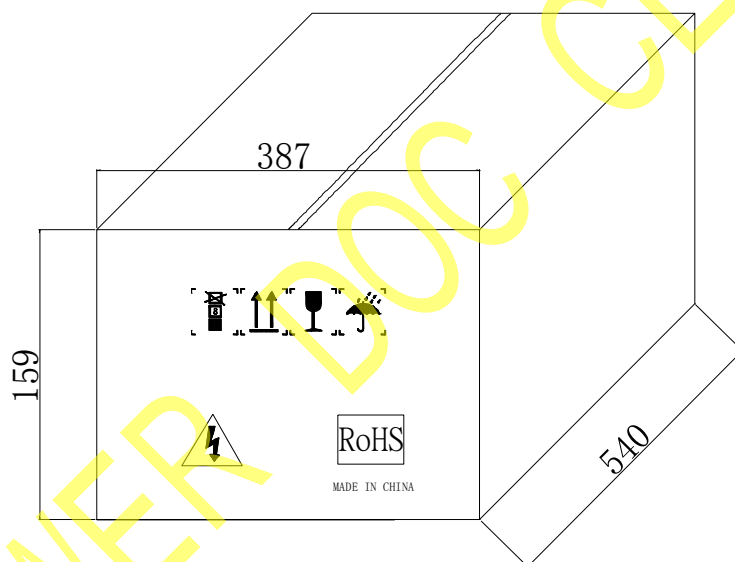
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Table23.

Input Voltage	Load	MTBF
115VAC/60Hz	12V/25A	100000hours
230VAC/50Hz	12V/25A	100000hours
240VDC	12V/25A	100000hours

14.0 PACKAGE

14.1 Outline Diagram of Carton



Note:

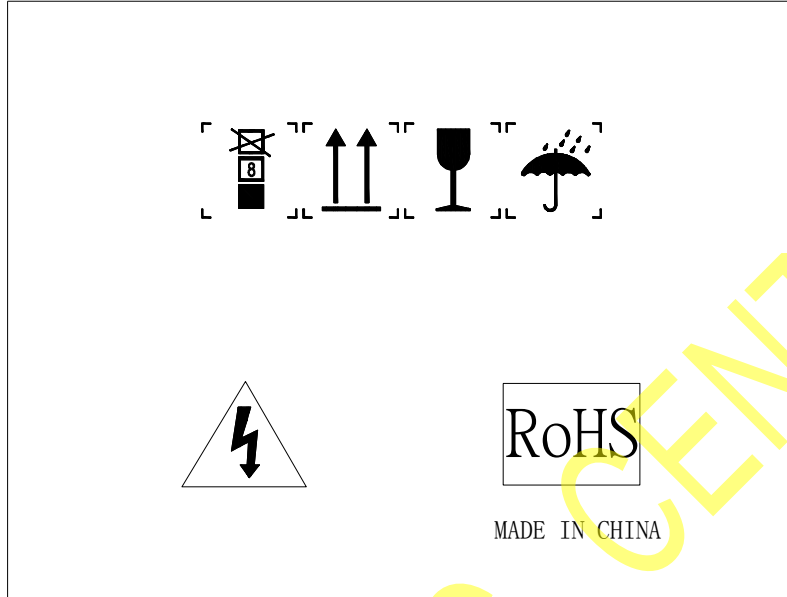
1. Material: outside the box: K=K, five layers of corrugated paper, the thickness: 5.0mm min, Bursting strength: 11KG min.
2. Outline: bright and clean, no stain, yellow white and no color difference, no gap junction.
3. Dimension: above dimensions for carton size, tolerance +/-3mm.



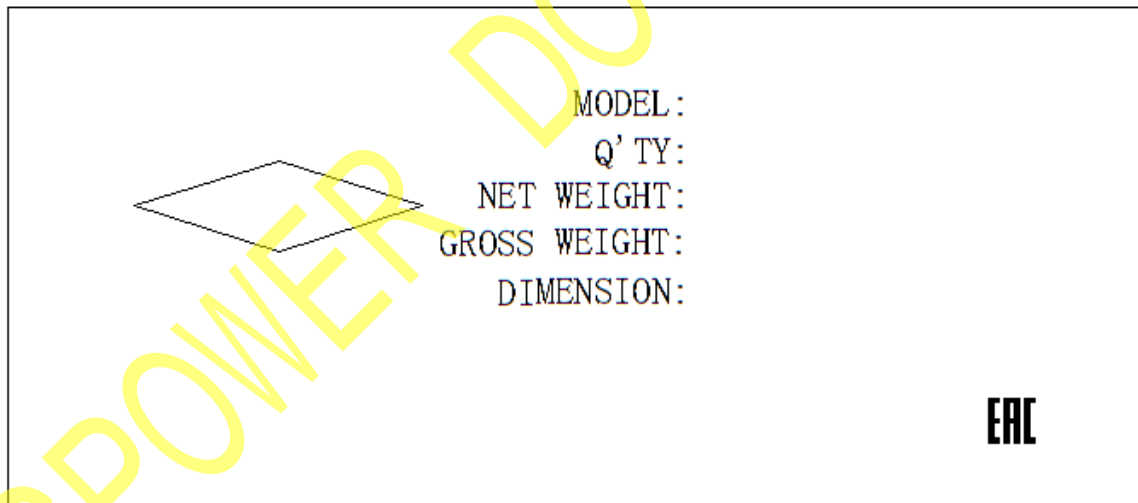
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14.2 Side Label



14.3 Front Label





15.0 SOFTWARE

15.1 Address

PSU address line corresponding address bit A0, address PSU high four bits for 0xB0, defined as follows:

1	0	1	1	0	0	A0	R/W bit	1:read, 0:write
---	---	---	---	---	---	----	---------	-----------------

15.2 Software Read Accuracy

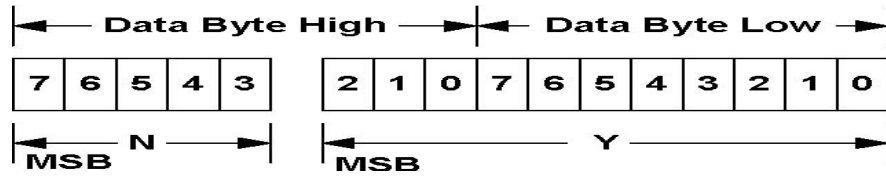
Table24.

Read Content	Instruction	Input Voltage Range	Load Condition		
			<10%	10%~20%	20%~100%
Input voltage	Read_VIN(88h)	100Vac~127Vac or 200Vac~240Vac	5%	5%	5%
Input power	Read_PIN(97h)		NA	15%	10%
Output voltage	Read_Vout(8Bh)		5%	5%	5%
Output current	Read_Iout(8Ch)		NA	10%	5%
Output power	Read_Pout(96h)		NA	10%	5%
Amb temperature	READ_TEMPERATURE_1		+/-5°C	+/-5°C	+/-5°C
Input voltage	Read_VIN(88h)	135Vdc~380Vdc	5%	5%	5%
Input power	Read_PIN(97h)		NA	15%	10%
Output voltage	Read_Vout(8Bh)		5%	5%	5%
Output current	Read_Iout(8Ch)		NA	10%	5%
Output power	Read_Pout(96h)		NA	10%	5%
Amb temperature	READ_TEMPERATURE_1		+/-5°C	+/-5°C	+/-5°C

15.3 Software Data Format

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 below:

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.

15.4 Status Command

Table25. STATUS_WORD Command

Byte	Bit	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	TEMPER- ATURE	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

Table26. 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

Table27. 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	Yes
0	POUT Overpower Warning	No

**Table28. STATUS_INPUT Command**

Bit	Meaning	Support
7	VIN Over voltage Fault	No
6	VIN Over voltage Warning	No
5	VIN Under voltage Warning	No
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

Table29. 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

Table30. 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

**Table31. STATUS_OTHER Command**

Bit	Meaning	Support
7	Transformer primary and secondary communication failures(Mfr. Defined)	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

15.5 Supported Command**Table32.**

CMD Code	Name	Type	Bytes	Comment
03h	CLEAR_FAULTS	Send Byte	0	
19h	CAPABILITY	Read Byte	1	Support PEC check out, maximum communication speed: 100KHz
1Ah	QUERY	Block Read	1	
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	
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	Ambient temperature
8Eh	READ_TEMPERATURE_2	Read Word	2	Secondary hotspot temperature
8Fh	READ_TEMPERATURE_3	Read Word	2	Primary hotspot temperature
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	0x22(V1.2)
99h	MFR_ID	Read Block	14	ASPOWER
9Ah	MFR_MODEL	Read Block	14	U1A-K10300-DRB
9Bh	MFR_REVISION	Read Block	6	1.1SA1
A0h	MFR_VIN_MIN	Read Word	2	90(V)
A1h	MFR_VIN_MAX	Read Word	2	264(V)
A4h	MFR_VOUT_MIN	Read Word	2	11.4(V)
A5h	MFR_VOUT_MAX	Read Word	2	12.6(V)
A6h	MFR_IOUT_MAX	Read Word	2	25(A)
A8h	MFR_TAMBIENT_MAX	Read Word	2	50(°C)
A9h	MFR_TAMBIENT_MIN	Read Word	2	0(°C)



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16.0 Label

SWITCHING POWER SUPPLY

Qdion 交换式电源供应器

MODEL (型号) : U1A-K10300-DRB
Produced by ASPOWER

AC INPUT (交流输入) ~	电压 (VOLTAGE)	电流 (CURRENT)	频率 (FREQUENCY)
	100V-240V	5A Max.	50/60Hz
DC INPUT (直流输入) ===	145V-350V	5A Max.	/
DC OUTPUT (直流输出) ===	+12V	+5Vsb	最大功率300W
	25A	3A	

Attention:
Maximum continuous output is 300W
最大连续输出300W

EAC 89+

Attention :
Indoor use only and chassis-assembly!
注意: 仅供室内和搭配机箱使用!

⚠ Don't remove this cover. Hazardous voltage in power supply!
请勿拆开外壳, 电源内有危险电压!

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