Product Specification

Content

Ⅰ. Character

1.Input range 90-286Vac,

2.The parameter can be controlled by the supervisory monitoring unit through RS485.

3.It features input over/under voltage protection, output over current protection, output overvoltage protection, output short circuit protection

4. Module support hot plug,2+1 redundancy and current sharing

5. Wide working temperature range (- 20 ℃ ～55 ℃)

6. High efficiency, long life and high reliability

Ⅱ. Main Specifications

Model	**Output Voltage Range (V)**	**Output Current Range (A)**	**Ripple(p-p) (Rated Load, Width Limited20MHz)**
EPS4860-1U	53.5±0.25V	0—60	200mV

Ⅲ. Quoted Standards

GB/T 2423.1-2001 Environmental testing for electric and electronic products—Part 2：Test methods—Tests A：Cold

GB/T 2423.2-2001 Environmental testing for electric and electronic products—Part 2：Test methods—Tests B：Dry heat

GB/T 2423.3-1993 Basic environmental testing procedures for electric and electronic products Test Ca：Damp heat, steady state

GB/T 2423.4.1993 Basic environmental testing procedures for electric and electronic products Test Db：Damp heat, cyclic

GB/T 2423.5-1995 Environmental testing for electric and electronic products—Part 2：Test methods —Tests Ea and guidance：Shock

GB/T 2423.6-1995 Environmental testing for electric and electronic products—Part 2：Test methods —Tests Ea and guidance：Bump

GB/T 2423.8-1995 Environmental testing for electric and electronic products—Part 2：Test methods —Tests Ed and guidance：Free drop
GB/T 2423.10-1995 Environmental testing for electric and electronic products—Part 2：Test methods —Tests Fc and guidance：Vibration（Sinusoidal）
GB/T 2423.11-1997 Environmental testing for electric and electronic products—Part 2：Test methods —Tests Fd and guidance：Random vibration wide band—General requirements
GB/T 2423.22-2002 Environmental testing for electric and electronic products—Part 2：Test methods —Tests N：Change of temperature
GB/T 14508-93 Mechanical environmental conditions existing in the cargo transportation by classed highway
EN55022：1998 Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement
EN55024：1998 Information technology equipment—Immunity characteristics—Limits and methods of measurement
CEI IEC 61000-4-2 2001 Electromagnetic compatibility—Testing and measurement techniques—Electrostatic discharge immunity test
CEI IEC 61000-4-3 2002 Electromagnetic compatibility—Testing and measurement techniques—Radiated, radio frequency, electromagnetic field immunity test
CEI IEC 61000-4-4 1998 Electromagnetic compatibility—Testing and measurement techniques—Electrical fast transient/burst immunity test
CEI IEC 61000-4-5 1999 Electromagnetic compatibility—Testing and measurement techniques—Surge immunity test
CEI IEC 61000-4-6 2001 Electromagnetic compatibility—Testing and measurement techniques—Immunity to conducted disturbances, induced by radio-frequency fields
CEI IEC 61000-4-8 1993 Electromagnetic compatibility—Testing and measurement techniques—Power frequency magnetic field immunity test
CEI IEC 61000-4-11 1994 Electromagnetic compatibility—Testing and measurement techniques—Voltage dips short interruptions and voltage variations immunity test
CEI IEC 61000-4-29 2000 Electromagnetic compatibility—Testing and measurement techniques—Voltage dips short interruptions and voltage variations on DC input port immunity test
IEC 61000-3-2 2001 Electromagnetic compatibility—Limits for harmonic current emissions （equipment input current≤16A per phase）
IEC 61000-3-3 1995 Electromagnetic compatibility—Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current≤16A
GB4943-2001 Safety of information technology equipment
YD/T 282-2000 General reliability test methods for communication equipment
GB/T 13722-92 Performance requirements and testing methods for power supplies used in the mobile communication
YD/T 732-95 Methods of measurement for DC-DC converter used in communications
YD/T 731-2002 High Frequency Switch-mode Rectifier for Telecommunication

IV. Environmental Conditions

No.	Items	Technical Specifications	Unit	Remarks

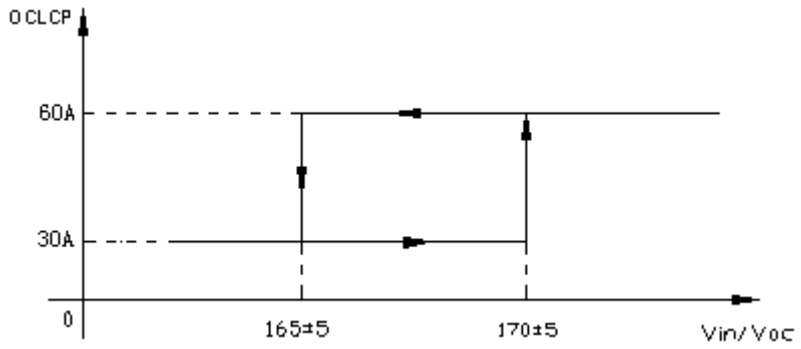
1	Operating Temperature	-20 — +55	℃	Full load
2	Storage Temperature	-40 — +70	℃	
3	Relative Humidity	5—95	%	No condensation
4	Altitude	0-5000	m	derate 1℃ with every 200 meters' rising at 2000-5000m
5	Cooling	Forced cooling, Draw air from the front and exhausts heat from the behind and this module has temperature-sensing timing function.		

V. Electrical Characteristics

No.	Item	Technical Requirement	Unit	Remark
1、Input Characteristics				
1.1	Rated input voltage	200—240	Vac	Max AC input voltage 310VAC(static state),no damage to the unit for long time
	AC Input voltage range	90—286		
1.2	Frequency	45—65(typical 50/60)	Hz	
1.3	Power factor	≥0.99		Rated input, rated load
1.4	Power transformation point	160-175	Vac	The details refer to power transform characteristic curve diagram
1.5	Max input current	≤30	A	Low voltage full load
1.6	Inrush current	≤30	A	220Vac
2、Output Characteristics				
2.1	Rated output voltage	53.5±0.25	Vdc	Input 220Vac
2.2	Output power	3210	W	175—286Vac input
		1605	W	90—174Vac input
2.3	Efficiency	≥90	%	220Vac/rated load current
2.4	Temperature coefficient	≤±0.02	%/℃	

2.5	Ripple and noise		≤200	mVp-p	Oscillograph band width is 20MHz.Parallel 10u+104 Capacitor with probe
2.6	Starting up output delay		≤8	S	0 VDC from rated input voltage to 42 VDC
2.7	Turn on/off overshoot amplitude		≤±5	%	
2.8	Dynamic response	Overshoot range	△V：≤±5	%	Load change at 25%—50%—25% or 50%—75%—50%, jumping rate is 0.1A/us; and the jumping period is 4ms; the two half periods are the same
		Recovery time	△t：≤200	μS	
2.9	Combined regulation		≤±1%		
2.10	Current sharing imbalance		≤±5	%	At the range of 50～100% load
2.11	The output rise time		500	ms	Rated input, rated load
3、Protection Characteristics					
3.1	Input under voltage protection point		≤85	Vac	Can auto recover,
3.2	Input under voltage recovery point		≤88	Vac	The return difference ≥ 5V
3.3	Input over voltage protection		≥312	Vac	Can auto recover Output Current 0A（Test by AC SOURCE+ booster）
3.4	Input over voltage recovery point		≥302	Vac	The return difference ≥ 5V
3.5	Input over current protection		—	—	The AC input L and N wire have fuse
3.6	Output over voltage protection point		58.5—60.5	Vdc	Constant voltage
3.7	Output current limit protection point		63≤I≤75	A	Can auto recover
3.8	Short circuit protection		Endure long time short circuit without damage and auto recover. The module will hiccup 5 minutes before it locked itself.		
3.9	Over temperature protection		Auto-recoverable when temperature is less than 65℃		

1. Power convert characteristics curve



VI. Other Requirement

No.	Item	Requirement	Remark
1	Acoustics noise	≤55dB	A-weighted，test distance is 1 meter
2	Smell requirement	Can't generate peculiar smell and unhealthy smell	
3	Component requirement	All components meet derating requirement The rated temperature of electrolytic capacitance ⩾ 105℃, and the electrolytic capacitance has 10 years life span in 40℃ sealed environment.	
4	Hot swap	The rectifier meet the hot swap requirement	
5	Failure Isolation	After the rectifier failure, it can detach from the system reliably.	
6	Environment protection requirement	Meet 2002/95/EC; No cadmium, hydrid and fluorid; can't send out organic Compound; no asbestos; the package material is recoverable.	

VII. Safety & EMC

No.	Item		Criterions	Remark
1	Dialectical strength	Input-output	4242Vdc/10mA/ 1min	No flyover, no breakdown.
		Input-ground	2121Vdc/10mA/ 1min	
		Output-ground	700Vdc/10mA/ 1min	

2	Isolation resistance	Input-output	≥10MΩ@500Vdc	Under normal air pressure，humidity 90%，
		Input-ground	≥10MΩ@500Vdc	
		Output-ground	≥10MΩ@500Vdc	
3	Touch current (Input-ground)		≤3.5mA	264Vac/60Hz
4	EMC	CE	CLASS A	EN55022
		RE	CLASS A	EN55022
		EFT	LEVEL 3 B	IEC61000-4-4
		SURGE	LEVEL 4 B (difference mode2KV, common mode 4KV)	IEC61000-4-5
		DIP	Drop to 70%UT，duration 100ms，at angle of 0°,45°,90°,135°,180°,225°,270°,315°, meeting class B. Drop to 40%UT，duration 20ms，at angle of 0°,45°,90°,135°,180°,225°,270°,315°, meeting class B. Drop to 0%UT，duration 10ms，at angle of 0°,45°,90°,135°,180°,225°,270°,315°, meeting class B. Under other testing conditions all meeting class B.	IEC61000-4-11
		ESD	For the shell which would be touched by human in the normal operation ： IEC61000-4-2, contact discharge +/-6KV；air discharge+/-8KV standard B；（Power on when in test）	IEC61000-4-2
			For the shell which would be touched by human in the normal operation, contact discharge+/-8KV ； air contact +/-10KV standard R.（power off when in test）	
			Signal terminal：contact discharge+/-2KV standard R；（power on in test，no test conducted to the Ground wire and current sharing wire）	
		CS	LEVEL 3 A	IEC61000-4-6
		RS	LEVEL 3 A	IEC61000-4-3
		Voltage fluctuation and flicker	PST≤1.0;P1t≤0.65;relative voltage DC wave≤3%；The max DC wave ≤4%.The time of d (t) ≥ 3% is no more than 200mS.	IEC61000-3-3
		Current harmonic	CLASS A	IEC 61000-3-2 [6]

Performance criterion：

Criterion A: Performance is normal when meet the technical requirements;

Criterion B（DIP test criterion）: The performance that can recover automatically when function degrade or lost temporarily ；

Criterion B (other test criterion except DIP) :The performance that can recover automatically when function degrade or lost temporarily ； But in the test, the output voltage must be kept in normal range.

Criterion C：auto-recover for short time function interruption allowable, long time of function interruption and recovery by hand script unallowable；

Criterion R：Any components damage except protection components unallowable, the testing pieces' performance can recover when replaces the damaged protection components.

VIII. Logical function and signal

No.	Item	Technique requirement
1	Input mode indication	Indication light on the front board(green)：The light is off when commercial electricity is unavailable (no AC input, AC over voltage, under voltage), output unavailable, otherwise the light is on.
2	Protection indication	Indication light on the front board (yellow)：The light is on over temperature protection, AC over voltage,AC under voltage,over circuit;The light is wink when communication break off for one minutes，otherwise the light is off
3	Rectifier failure indication	Indication light on the front board (red)：The light is on when overvoltage output、no output、fan failure、short circuit，otherwise the light is off.

Ⅸ. Environmental Testing Condition

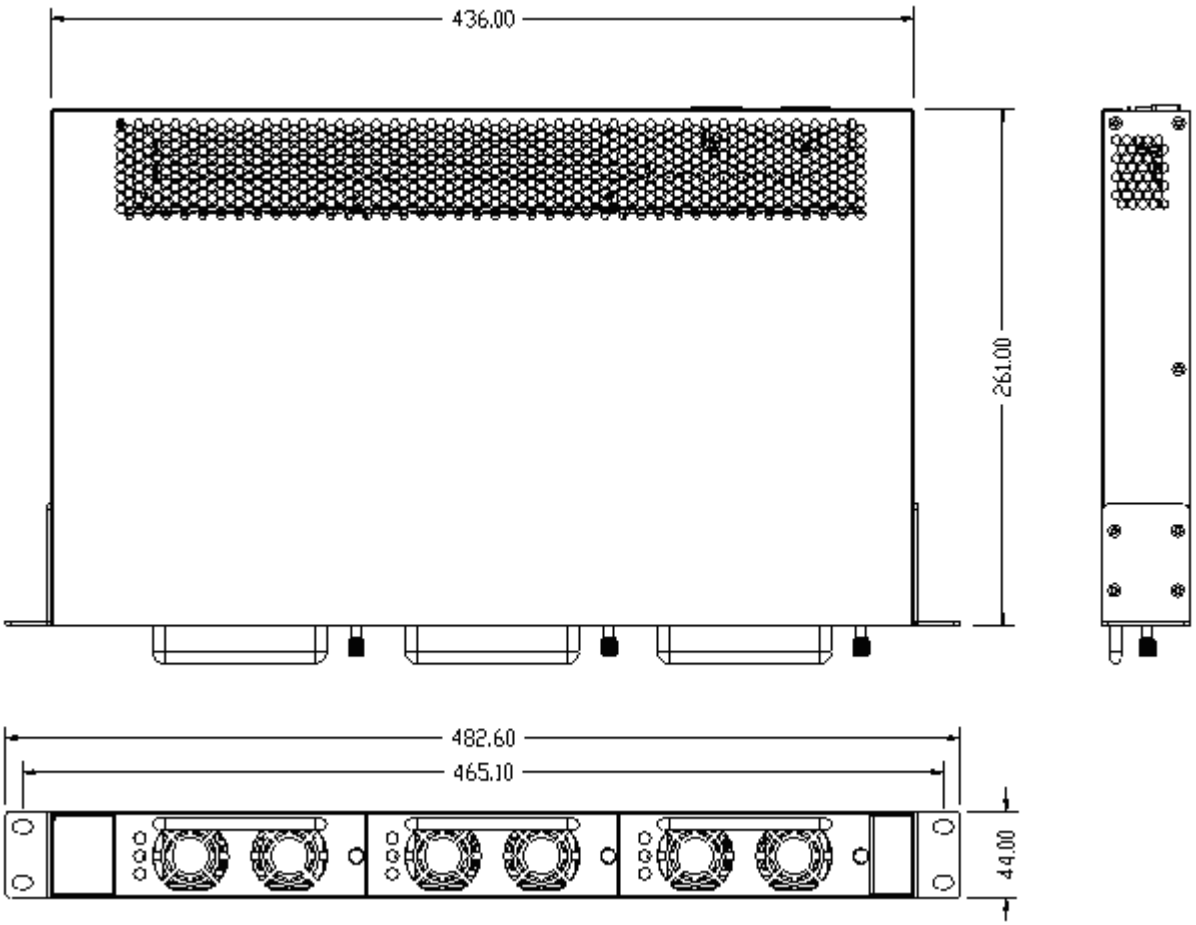
No.	Item	Criterions	Remark
1	High temp operation	55℃	Performance is normal for 24 hours
2	Low temp operation	-20℃	Performance is normal for 24 hours
3	High temp storage	70℃	Normal mode available after two hours' recovery
4	Low temp storage	-40℃	Normal mode availabe after two hours' recovery
5	Vibration	Sine wave： 5~9Hz：	Environment condition Reference standard：

		Vibration altitude 3.5mm； 9~200Hz： Acceleration 10m/s2； 3 axis，sweep frequency vibrate for 5 times for each direction，1OCT/min (1 time sound interval/min)	ETS300019-2
		Random vibration： 2~10Hz： 10m2/s3； 10~200Hz： 3m2/s3； 200~500Hz： 1m2/s3； 3 axis，30min for each direction	Transportation environment condition Reference standard： ETS300019-2
6	Shock	Acceleration 250m/s2；pulse width 6ms； 3 axis 6 sides, each 500times	Using environment condition Reference standard ： ETS300019-2
		Acceleration 250m/s2；Pulse width 6ms； 3 axis 6 sides, each 500times	Transportation environment condition Reference standard ： ETS300019-2
7	Drop	Height 1m；bottom side once	

Ⅹ．Mechanical Characteristics and Connector Definition

10.1 outline dimension (unit：mm)

L*W*H=482.6mm*261mm*44mm



Power system backplane use terminal connector, as shown below (from left to right for 1 to 9 feet)

PIN definition：

The signal pin definition		
A	485-	RS485 communication line，isolation inside
B	485+	
C	5V-	From the outside for 5 v power supply, to power a RS485 communication with the module output isolation chip
D	5V+	

Ⅺ. Reliability Requirements

11.1 **MTBF**：(standard, environment temperature, load requirement)：according to high-class products requirement of communication rectifier equipment stipulated by ministry of posts and Tele communication YD/T682-94，MTBF（mean time between failures）≥150，000 h. The product

can endure environment change, such as over load, overheating, abrupt change of voltage 。

11.2 **Component**：Famous brands were selected and derating was done to the electric stress and temperature stress, anti-instant change design was done to the critical component so as to ensure the reliability of the component.

11.3 Thermal design：Forced air-cooling system design and reasonable layout of component ensure the least temperature rise.

11.4 **High endurance of Environment Design:** Product meets requirements of different environments. It meets different of temperature and humility environments .Storage temperature should be -40℃—+70℃, operational temperature -20 ～55℃.

11.5 **Electromagnetism immunity**：The complexity of the power source network has been evaluated in the design of the power unit. Many methods have been designed to improve its immunity.

Ⅻ. Remarks

Dangerous power output , keep safe space when in operation！

High Temperature Alarm Label

XIII. Label