



深圳市荣电创新技术有限公司  
Shenzhen Rong Electric Technology Co.,Ltd

## 产品承认书

# SPECIFICATION FOR APPROVAL

Customer: \_\_\_\_\_

Issued Date: \_\_\_\_\_

Model No.: MD400PC4.2+3.2H

Description: 超薄共阴双路电源

荣电创新			客户	
PREPARED BY 编写	CHECKED BY 审核	APPROVED BY 批准	CHECKED BY 审核	APPROVED BY 批准
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# MD400PC4.2+3.2H

--LED display screen power supply products

**MD400PC4.2+3.2H is a power supply (4.2V—55A/3.2V—35A) with high efficiency and dual output. It is a special power supply designed for LED display screen and has the following characteristics:**

MD400PC4.2+3.2H 是一款具有高效双路输出的电源(4.2V—55A/3.2V—35A)，该电源是为LED显示屏设计的专用电源，具有以下特点：

- **Small size: L208mm\*W58mm\*H26mm**  
尺寸小：长 208mm\*宽 58mm\*高 26mm
- **Light weight: ≤556g**  
重量轻：≤ 556g
- **High efficiency: ≥87% (see figure 4.3)**  
高效率：≥87% (参见图 4.3)
- **Small Leakage current: ≤1.0mA (Vin=242Vac)**  
漏电流小：≤1.0mA (Vin=242Vac)
- **Output voltage range: Vo1:4.12—4.28Vdc Vo2:3.13—3.26Vdc**  
输出电压范围：Vo1:4.12—4.28Vdc Vo2:3.13—3.26Vdc
- **Wide operating temp. range: -30—70°C (+50°C—+70°C linear de-rated, See Figure 4.2.)**  
宽工作温度范围：-30—70 °C(+ 50 °C—+ 70°C线性降额，见图 4.2。)
- **Wide Input voltage range: 180Vac—264Vac**  
宽输入电压范围：180Vac—264Vac
- **Power factor: ≥0.95**  
功率因数：≥0.95
- **Cooling mode: Ventilation cooling**  
冷却模式：自然冷却
- **Protection Features: Output over-voltage protection、over-current protection、short-circuit protection.**  
保护功能：输出过压保护、过流保护、短路保护

警告：在居住环境中，运行此设备可能会造成无线电干扰。

## Product Picture 产品图片





## 一、Environmental conditions 环境条件:

NO. 序号	ITEM 项目	Specifications 技术要求	Units 单位	Remarks 备注
1.1	Permanent operating temperature 工作温度	-30—70 (详情见 4.2 Operate temperature derating guideline. 温度降额曲线)	°C 度	Need to add aluminum substrate for heat dissipation; See 6.5 for details. 需要加铝基板散热; 详情见 6.5
1.2	Storage temperature 存储温度	-40—80	°C 度	
1.3	Work Relative Humidity 工作相对湿度	10—90 (无凝露)	%	Note 1
1.4	Storage Relative Humidity 存储相对湿度	10—90	%	
1.5	Cooling mode 散热方式	Ventilation cooling 自冷		
1.6	Atmospheric pressure 大气压力	80—106	Kpa 帕斯卡	
1.7	Altitude 海拔高度	-60—5000	M 米	(Above 3000 meters, the ambient temperature drops by 1°C for every 200 meters increase. 3000 米以上, 每升高 200 米, 环境温度降额 1°C)
1.8	Vibration 振动耐受	10-55Hz 19.6m/S <sup>2</sup> (2G),20 minutes each along X,Y and Z axis.		
1.9	Shock 冲击耐受	49m/S <sup>2</sup> (5G),20 once each X,Y and Z axis.		

Note 1: Please add the new requirement when the power supply will be used for high humidity condition. 当电源将被用于高湿度的环境下, 在下订单时请增加这新的要求。



## 二、Electrical Characteristics 电气特性:

### 2.1. Input Electrical characteristics 输入特性:

NO. 序号	ITEM 项目	Specifications 技术要求	Units 单位	Remarks 备注
2.1.1	Rated input voltage 额定输入电压	200-240	Vac	详情见 4.1 Input voltage derating guideline. 输入电压降 额曲线 Note 2
2.1.2	Input voltage range 输入电压范围	180-264	Vac	
2.1.3	Input frequency range 输入频率	47—63	Hz	
2.1.4	Cooling efficiency 冷机效率	$\geq 87$ (Vin=220Vac)	%	Full load(room temperature) Note 3
2.1.5	PF 功率因数	$\geq 0.95$	/	Full load
2.1.6	Maximum input current 最大输入电流	$\leq 5.5$	A	
2.1.7	Inrush current 输入浪涌电流	$\leq 120$	A	220Vac

Note 2: Meanings of rated input voltage and the input voltage range: the rated input voltage is the international general appellation, the highest voltage of rated input voltage float upwards 10%, is the input voltage upper limit, the maximum value, the minimum voltage of rated input voltage float downward 10%, is the input voltage lower limit, the minimum value. Rated input voltage range of 100-240 is corresponding to 90-264. The two terms are not contradictor, essence is consistent, uniform, only two different terms. 额定输入电压与输入电压范围的含义: 额定输入电压是国际通用的称谓, 额定输入电压的最高电压向上浮动 10%, 就是输入电压的上限, 即最大值, 额定输入电压的最低电压向下浮动 10% 就是输入电压的下限, 即最小值。额定输入电压 100-240 对应的输入电压范围为 90-264. 这两者不是相互矛盾的, 实质是一致的, 统一的。

Note 3: Efficiency: Terminal output voltage multiplied by the output current, and then divided by the AC input voltage, divided by the AC input current, divided by the power factor: efficiency = terminal output voltage X output current / (the AC input voltage X AC input current X power factor). 电源效率: 端子口输出电压乘以输出电流, 然后除以交流输入电压, 除以交流输入电流, 除以电源功率因数; 效率 = 端子口输出电压 X 输出电流 / (交流输入电压 X 交流输入电流 X 功率因数)。

**2.2. Output Electrical Characteristics 输出特性:**

NO. 序号	ITEM 项目	Specifications 技术要求	Units 单位	Remarks 备注
2.2.1	Output rating voltage 输出额定电压	V01:4.2 V02:3.2	Vdc	
2.2.2	Output current range 输出电流	V01: 0—55 V02: 0—35	A	
2.2.3	Peak output pulse current 峰值输出脉冲电流	V01: 60.5Amax V02: 38.5Amax	A	Average current VO1≤55A,VO2≤35A 平均电流 VO1≤55A,VO2≤35A
2.2.4	Derating output current 降额输出电流	V01: 44 V02: 28	A	Unaided heat dissipation 无辅助散热
2.2.5	Output voltage range 输出电压范围	V01:4.12—4.28 V02:3.13—3.26	Vdc	
2.2.6	Voltage regulation accuracy 电压调整率	±2%	Vo	
2.2.7	Load regulation accuracy 负载调整率	±2%	Vo	
2.2.8	Regulation accuracy 稳压精度	±2%	Vo	
2.2.9	Ripple and noise 纹波及噪声	V01: ≤250 V02: ≤200	mVp-p	Full load;20MHz, 104+10uF NOTE 4
2.2.10	Power output delay 开机延迟时间	≤3000	ms	NOTE 5
2.2.11	Hold up time 输出保持时间	≥10	ms	Vin=220Vac NOTE6
2.2.12	Output voltage rise time 输出电压上升时间	≤100	ms	NOTE 7
2.2.13	Off overshoot 输出过冲	±10%	Vo	
2.2.14	Output dynamic 输出动态响应	Voltage changes less than ± 5% Vo; dynamic response time ≤ 250uS 输出电压变化小于±5% ; 动 态响应时间≤ 250uS		LOAD 25%–50%, 50%–75% Slew Rate:1A/uS
2.2.15	Start-up with Capacitive load 容性负载	V01≤10000, V02≤10000	uF	Full load

Note 4: Ripple & noise test: Ripple & noise bandwidth is set to 20MHz, use a 0.10uF ceramic capacitor in parallel with a 10.0uF electrolytic capacitor at output connector for ripple & noise measurements. 纹波和噪声的测试: 纹波和噪声的测试带宽为 20 兆赫兹, 在输出端口并联一个 0.10 微法的瓷片电容和一个 10.0 微法的电解电容。

Note 5: The power delay time measured is when AC power on to 90% of specified output voltage observed on the channel. 开机延迟时间为 AC 输入上电到输出电压上升到 90% 间的时间。

Note 6: The hold-up time measured is when AC power off to 90% of specified output voltage observed on the channel. 输出保持时间为从输入 AC 掉电到输出电压下掉到输出电压的 90% 间的时间。



Note 7: The rise time measured is when the output voltage rise from 10% to 90% of specified output Vout observed on the channel wave form. 输出上升时间为输出电压从 10%上升到 90%间的时间。

2.3. Protection Features 保护特点:

NO. 序号	ITEM 项目	Specifications 技术要求	Units 单位	Remarks 备注
2.3.1	Output current limit protection point 输出过流保护	V01: >65A 两路输出关闭, 自恢复 (V02 输出为满载)	A	Turn off 可恢复, (两路输出关闭)
		V02: >39A (V01 输出为满载)		Latch off 锁机, (+V01 输出保持)
2.3.2	Output short circuit protection 输出短路保护	V01 Turn off 可恢复。	/	Hiccup Model, Auto-recovery 打嗝, 自恢复
		V02 Latch off 锁机, 断电恢复。		

2.4. Other features 其它特性:

NO. 序号	ITEM 项目	Specifications 技术要求	Units 单位	Remarks 备注
2.4.1	MTBF	≥100,000	H	25°C, MIL-217 Method 2 Components Stress Method

三、 Safety features/EMC 安全特性及电磁兼容性:

Safety Standards 安全标准:GB4943/EN60950  认证

NO. 序号	ITEM 项目	Test conditions 测试条件	Standard/SPEC 标准、技术要求
3.1	Isolation voltage 绝缘耐压 Note 8	Input-Output 输入对输出	3000Vac/10mA/1min
		Input-PE 输入对大地	1500Vac/10mA/1min
		Output-PE 输出对大地	500Vac/10mA/1min
3.2	Insulation Resistance 绝缘阻抗	Input-Output 输入对输出	DC500V
		Input-PE 输入对大地	DC500V
		Output-PE 输出对大地	DC500V
3.3	Leakage current 输入泄漏电流	<1.0mA (Vin=242Vac)	GB8898-2001 9.1.1
3.4	EMI 电磁干扰性	CE 传导干扰	CLASS A
		RE 辐射干扰	CLASS A
3.5	Harmonic current 谐波	CLASS D	EN61000-3-2



3.6	EMS 电磁抗干扰性 Note9	CS 传导骚扰	Level3 Criteria B	EN61000-4-6
		RS 辐射骚扰	Level3 Criteria B	EN61000-4-3
		PFMF 工频骚扰	Level3 Criteria B	EN61000-4-8
		ESD 静电骚扰	Level3 Criteria B Air Discharge:8KV Contact Discharge:6KV	EN61000-4-2
		EFT 快速脉冲群	Level3 Criteria B	EN61000-4-4
		SURGE 雷击/浪涌	Differential Mode:±1KV/2Ω、 Common Mode:±2KV/12Ω Criteria B	EN61000-4-5
		DIP 中断, 跌落	30% dip;10mS Criteria B 100% dip;5000mS Criteria C	EN61000-4-11

Note8: Input line (all L&N) should be shorted; and all output should be shorted.  
所有输入线（包括 L 线和 N 线）要短路和所有输出包括正负端要短路。

Note9: The power supply will be loaded as a component on final device, The user shall confirm EMC with the final device, Criterion as follows: 电源将会作为一个部件装在最终设备上, 用户需结合最终的设备进行 EMC 相关确认, 判据如下:

A: The performance of the power supply does not allow any degradation relative to normal conditions 电源性能相对于正常情况不容许有任何降低。

B: The performance of the power supply is allowed to degrade, but no mode of reset or functional interruption is allowed. 电源性能容许下降, 但不容许出现任何方式的复位或功能中断。

C: Function interruption and does not allow long-time function interruption or manual reset. 容许出现短时功能中断的自动复位, 不容许出现长时间的功能中断或需进行人工复位。

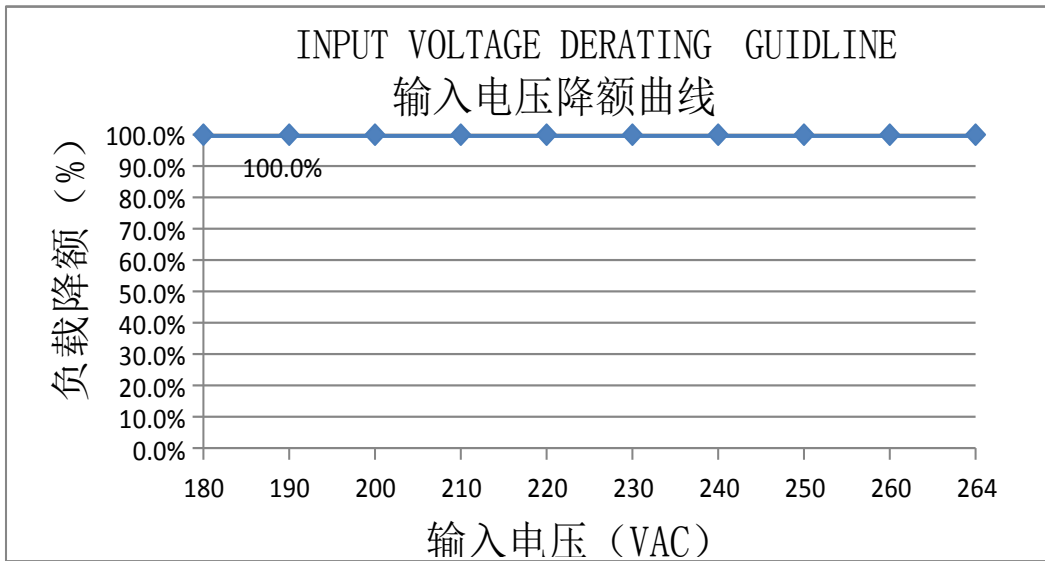
R: No damage to any component other than the protective device is allowed, and the specimen can recover its performance after replacing the damaged protective device. 不容许出现除保护器件之外的任何器件损坏, 且更换损坏的保护器件后试件能恢复性能。

EMC test methods of guidance, please refer to Rong Electric Technology co., LTD. “EMI test statement” on the website <http://www.rong-electric.com>. EMC 测试方法的指引, 请参照荣电创新技术有限公司网站 <http://www.rong-electric.com> 上的“EMI 测试声明书”

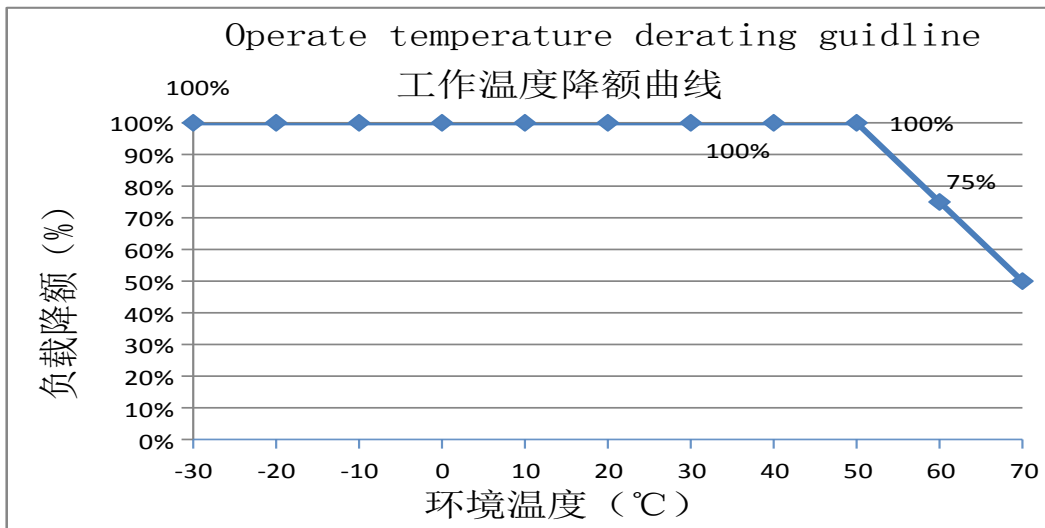


#### 四、Derating guideline:降额曲线:

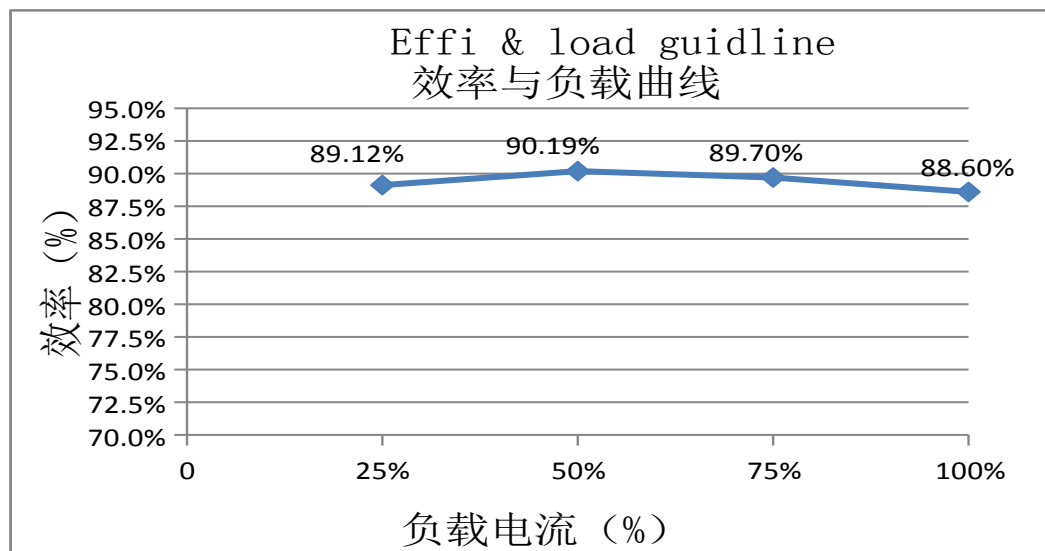
##### 4.1 Input voltage derating guideline.输入电压降额曲线:



##### 4.2 Operate temperature derating guideline.温度降额曲线:



##### 4.3 Effi & load guideline: 效率与负载曲线:





### 五、The definition of mechanical properties and connectors (Units: mm) 机械特性

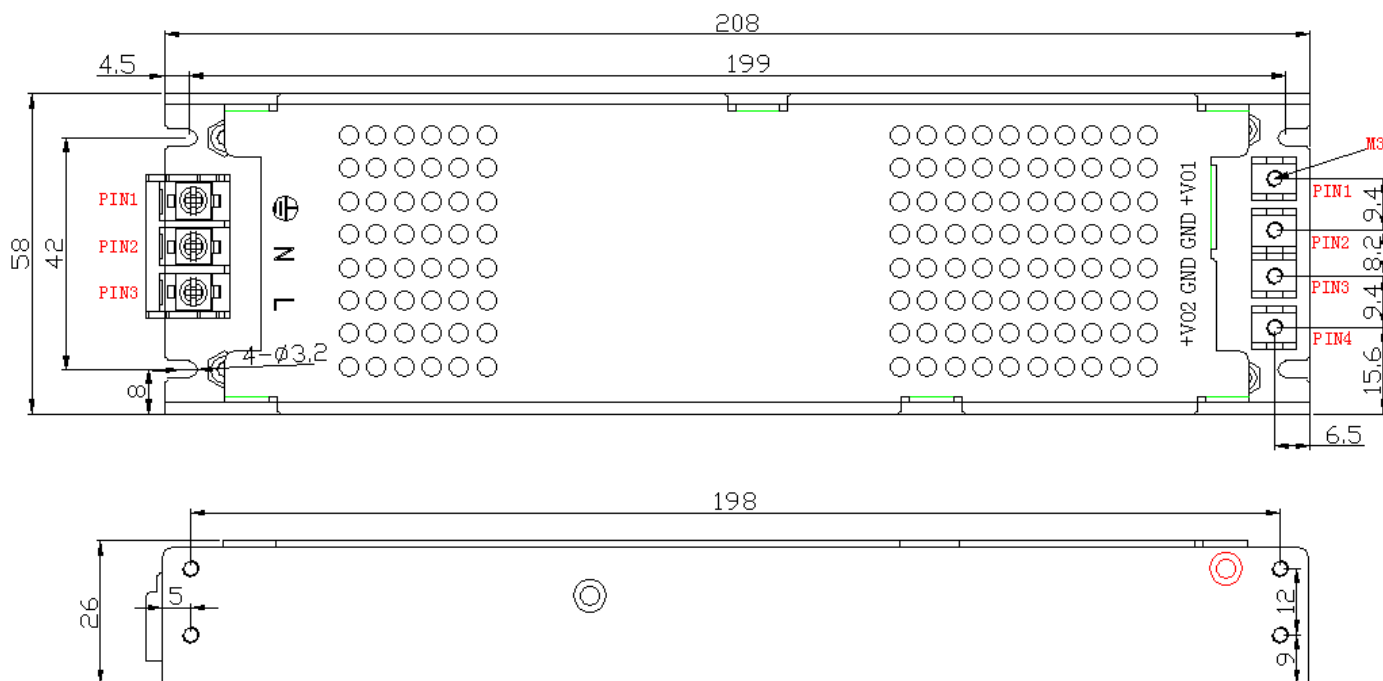
#### 及接插件定义 (单位: 毫米)

##### 5.1. Dimensions 尺寸:

L208 x W58x H26 电源尺寸为: 长 208 宽 58 高 26, 单位: 毫米。

电源尺寸误差约±1mm

##### 5.2. Installation hole size: 安装孔位尺寸:



##### 5.3. Pin connection. 连接器脚位定义:

###### 5.3.1 Input connection CON1 : 3PIN 8.25mm 间距输入连接器。

NO. 序号	NO. 序号	Define. 定义
1	PIN1	EARTH
2	PIN2	NEUTRAL
3	PIN3	LINE

###### 5.3.2 output connection CON3 CON4 CON5 CON6: M4 铜端子\*4PIN

NO. 序号	NO. 序号	Define. 定义
1	PIN1	+VO1
2	PIN2	GND
3	PIN3	GND
4	PIN4	+VO2



## 六、Weight, packaging, transport and storage. 重量，包装，运输和储存：

### 6.1. Weight. 重量：

6.1.1. Everyone weight is about 556G. 单个电源的重量约为 556 克。

6.1.2. One box have 24 units, total weight is about 13.8KG. the dimensions of the box :LXWXH (units :mm) : 一个箱子装 24 台，总重量约为 13.8 千克;箱子尺寸为：L455x W375 x H90mm

### 6.2 Packing 包装：

Box has the product name, model number, manufacturer ID, the manufacturers certificate of quality inspection department, manufacturing date; the box with an attachment list. 包装箱上有产品名称、型号、厂家标识、厂家质量部门的检验合格证、制造日期等；包装箱内有附件清单。

### 6.3 Transportation 运输：

Suitable for cars, boats, aircraft transport, transport should be awnings, sun protection, loading and unloading of civilization. 适应于车、船、飞机运输，运输中应遮蓬、防晒、文明装卸。

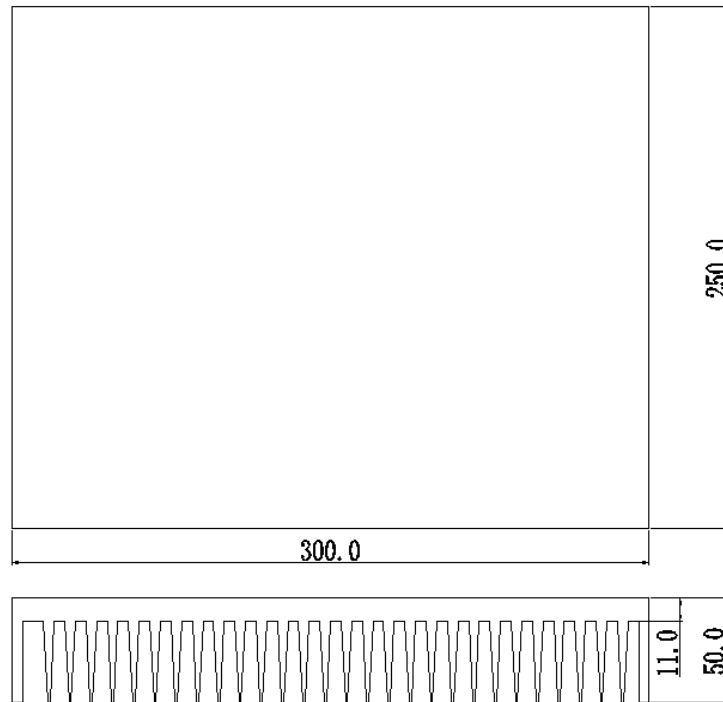
### 6.4 storage 储存：

Product is not used which should be stored in the box, warehouse temperature  $-20^{\circ}\text{C}$  —  $+80^{\circ}\text{C}$ , relative humidity of 10%—90%, the warehouse does not allow any harmful gases, flammable, explosive and corrosive products of chemicals, and strong mechanical vibration, shock and strong magnetic field, package box should be at least 20cm high from the ground, away from the wall, heat, window or air intake at least 40cm, under specified conditions in the storage period is generally one year, more than one year should be re-tested. 产品未使用时应存放在包装箱内，仓库环境温度为 $-20^{\circ}\text{C}$  —  $+80^{\circ}\text{C}$ ，相对湿度为 10% — 90%，仓库内不允许有有害气体，易燃，易爆的产品及有腐蚀性的化学物品，并且无强烈的机械振动，冲击和强磁场作用，包装箱应垫离地至少 20cm 高，距离墙壁、热源、窗口或空气入口至少 40cm，在本规定条件下的贮存期一般为 1 年，超过 1 年后应重新进行检验。



### 6.5 Requirements for Burning in Test. 老化测试要求

We recommend that the Power Supply should be mounted tightly with the heatsink described as the following heatsink drawing while the products burn in at 45°C and 220Vac input. 在环境温度45°C下，不加湿，电源输入220V，带满负载，机壳底面紧贴散热板，加电老化。建议散热板尺寸单位：mm（如下图所示）



#### 引用标准:

- 1、GB4943/EN60950: 由电网供电的或由电池供电的信息技术设备（含商业电子设备）的安全标准
- 2、GB2324: 电工电子产品 基本环境试验规程
- 3、EN55032: 信息技术设备 无线电干扰特性 限制和测量方法
- 4、IEC61000-4 系列: 电磁兼容性（EMC）试验和测量技术
- 5、IEC61000-6-1: 居住、商业、轻工业环境使用产品 电磁抗扰度 标准与测量
- 6、IEC61000-6-2: 工业环境使用产品 电磁抗扰度标准与测量
- 7、GB17625.1-1998: 低压电气及电子设备发出的谐波电流限值（设备每相输入电流≤16A）
- 8、GB/T 17626: 电磁兼容 试验和测量技术
- 9、GB/T14714: 微小型计算机系统设备用开关电源通用技术条件