



产品承认书

SPECIFICATION FOR APPROVAL

客户名称 Customer : _____

客户品名 Customer No.: _____

产品名称 Description: LED Driver (Emergency Lighting)

产品型号 Model No: LF- GSP020YD0500U

产品料号 Product Material NO.: 1.1.0900200011

规格 Specifications: AC100-277V DC30-40V 500mA

版本号 Version: V1.1

产品生产商 Vender: 深圳市莱福德科技股份有限公司

客户确认 Customer Approval

检查 TESTED BY	审核 CHECKED BY	批准 APPROVED BY

莱福德确认 Ledfriend Approval

拟定 WORKED BY	审核 CHECKED BY	批准 APPROVED BY
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变更履历表 E.C.LIST

版本Rev	变更内容描述Description of Change	工程Engineer	日期Date
1.0	初次发行Original Release	莫永福	2015.07.08
1.1	增加了面板插图	李海廷	2019.2.25

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一.描述 Description

- 1.1 本产品适用于应急照明 LED 灯具：日光灯、平面灯、三防灯等矩形状 LED 灯具。Application: LED drivers for emergency LED lighting such as LED tubes、panel lights and tri-proof lights and any other rectangular LED lights.
- 1.2 本产品是应急照明 LED 驱动，内置高性能的恒流源驱动，采用高性能 LED 恒流驱动芯片与高速 MCU 相结合，实现不间断应急照明需求。This is a emergency LED driver with high performance and adopt the high quality CC LED driver chips and high speed MCU to fulfill the unceasing emergency lighting demand.
- 1.3 本产品专为 LED 应急照明设计，集电池智能充放电管理与 LED 智能恒流驱动于一体，相比传统的充放电控制器加 LED 驱动电源的方式，成本更低，可靠性更高。This product specially designed for LED emergency lighting.It with the integration of the management of the battery intelligent charge and discharge and intelligent constant current LED driver. It with more lower cost and higher reliability by compare with the traditional charge and discharge electric controller with intelligent CC LED drivers.
- 1.4 整个系统控制采用自己的软件算法，结合高效的恒流芯片，可以实现：三线应急照明（采用三线方式时，串接在线路中的开关正常控制灯的亮与灭）；
应急状态下输出电流为额定电流 $350\text{mA} \pm 15\%$ （也可以根据客户要求定制）。The whole system use ourselves software and combined with the high efficiency constant current chips to reach 3 line emergency lighting.(When use the 3 line solution, the switch in series in the line to switch off and switch on the light..
During the emergency situation, the output current will be $350\text{mA} \pm 15\%$ (can also be customized according to customer request).
- 1.5 产品具有电池过充保护，电池过放保护，输出短路保护，输出开路保护，电池反接保护。
The products possess the battery over charge protection, battery over discharge protection, output short circuit protection, battery reverse connection protection.
- 1.6 防水等级为 IP20, 可依据客户要求灌胶以达到更高防水要求。Waterproof Degree: IP20. It could reach higher waterproof degree by pouring the sealant as per customers demand
- 1.7 应急照明电流可以依据用户要求定制。Emergency LED driver's current could be customized.
- 1.8 本产品输入 AC220V, 输出 DC30-40V ,500mA ，环温 40°C 以下条件下，及外壳 TC 点温度在 85°C 以下条件下，质保 3 年。Three years warranty are offered for the driver(AC:220V,DC:30-40V,500mA) when $T_a < 40^{\circ}\text{C}$ (The working environment/ambient temperature is under 50°C , the working humidity is lower than 90%) and $T_c < 85^{\circ}\text{C}$.

二.产品图片 Product picture



图片仅供参考，请以实物为准

The picture is for reference only, please referring to the actual product.

2.1安全提示说明: Safety tips instructions:

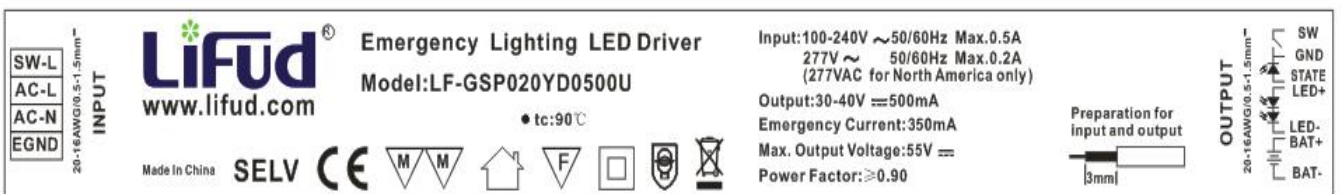
①建议客户在灯具供电回路中安装过欠压保护与浪涌保护装置，以确保用电安全。

In the lighting power supply circuit, it is recommended that the customer install over-under-voltage protection and surge protection device, to ensure the safety of electricity.

②灯具内装配电源使用的PC罩、外壳、堵头等套件必须满足UL94-V0及以上防火等级。

The PC cover, enclosure, plug suite which the driver(installed inside the Lamps and lanterns) uses must meet UL94V-0 fire rating.

2.2 产品丝印图纸Screen printing products drawings:



三.输入特性 Input Characteristics

名称 Name	最小值 Min	额定值 Rated	最大值 Max	单位 Units	备注 Remark
输入电压 Input Voltage	90	110/220/277	305	Vac	
输入频率 Input Frequency	47	50/60	63	HZ	
输入电流 Input Current	--	--	0.5	A	90Vac满载

Input Current					90Vac Full load
浪涌电流(冷启动) Inrush Current(cold start)	--	--	60	A	230Vac满载 230Vac Full load

四.负载特性 Load Characteristics

名称 Name	最小值 Min	最大值 Max	单位 Units	备注 Remark
开机延迟时间 Start-up Delay Time	--	≤2.0	S	110Vac 满载 110Vac Full Load
	--	≤2.0	S	220Vac 满载 220Vac Full Load
输入线性调整率 Input Line Regulation	--	≤5	%	40Vdc 满载 40Vdc Full Load
	--	≤5	%	30Vdc轻载 30Vdc Light Load
输出线性调整率 Output Line Regulation	--	≤5	%	110Vac输入 110Vac Input
	--	≤5	%	220Vac输入 220Vac Input
空载功耗No-load power consumption	--	3	W	110Vac输入 110Vac Input
	--	4	W	220Vac输入 220Vac Input
温度漂移 Temperature Drift	--	≤10	%	110Vac满载 110Vac Full Load
	--	≤10	%	220Vac满载 220Vac Full Load

五. 产品电性能综合描述 Electrical Performance

5.1 参数表 Parameter Table

输出电压范围	输出电流范围	输出功率	输入电压	功率因数	效率	谐波电流	输出纹波电压	电流精度
Output Voltage Range	Output Current Range	Output Power	Input Voltage	Power Factor	Efficiency	Harmonic Current	Output Ripple Voltage	Current Tolerance
(单位: Vdc)	(单位: mA)	(单位: W)	(单位: Vac)	(单位: 100%)	(单位: %)	(单位: %)	(单位: Vdc)	
30-40	500	20W	110	≥0.97	≥77	≤15	≤4	±6%
			220	≥0.93	≥77	≤20	≤4	±6%

			277	≥0.90	≥77	≤20	≤4	±6%
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备注Remark:

- 1.以上参数均是在输出满载、接蓄电池条件下测试的结果。The parameters above are obtained under the testing condition of full load with Battery.
- 2.以上参数均是代表本产品为标准品上演变的参数，如果客户对电性能有特别的要求可以申请重新调试、研发。The parameters table above includes all variants based on standard model, if special parameters are required, R&D will do evaluation first before deciding modification.
- 3.以上数据均在环境温度25℃，湿度50%条件下进行。The data above are obtained under ambient temperature of 25℃ and 50% RH.

5.2 电池规格 Battery specification

适用于可充电锂离子电池/镍氢电池 Adapted for Lithium Ion Battery and Ni-MH Battery

标称电压：18.50V Rating Voltage:18.50V

充电方式：恒流恒压；充电电流：180mA

Charging Mode : C.C/C.V. ; Charging current:180mA

放电终止电压：15V Exhausted Voltage: 15V

充电限制电压：22V Overcharge Voltage : 22V

充电时间=1.1*C/ 0.18; Charging Time=1.1*C/ 0.18;

放电时间=C/[(Vo * Io)/(15*0.9)] *α; Discharging Time=C/ [(Vo * Io)/(15*0.9)] *α;

(C:电池容量 mAh;Vo:应急 LED 电压;Io:应急 LED 电流; α: 修正系数,电池电压<18V ,α为 0.9; 电池电压>18V,α为 1;)

(C:Capacity mAh;Vo:Emergency Lighting Voltage;Io:Emergency Lighting Current; α : Correction Factor,when its voltage below 18V,α:0.9; and its voltage above 18V,α:1;)

建议电池容量 2000mAh: The recommended value of battery Capacity is 2000mAh.

5.3 电池智能充放电 Battery Intelligent charging and discharging controller

充电方法：charging method:

1) 电池电压<15V +/-0.5V ; 电池充电电流为脉冲电流修复电池充电;

Battery voltage<15V +/-0.5V ; charging with pulse current to repair the Battery ;

2) 15V +/-0.5V < 电池电压 < 21.3V +/-0.5V;

电池充电电流为恒流充电，充电电流 180mA +/-20 mA;

15V +/-0.5V < Battery voltage < 21.3V +/-0.5V; Charging Current : C.C180mA +/-20 mA;

3) 21.3V +/-0.5V < 电池电压 < 22V +/-0.5V;

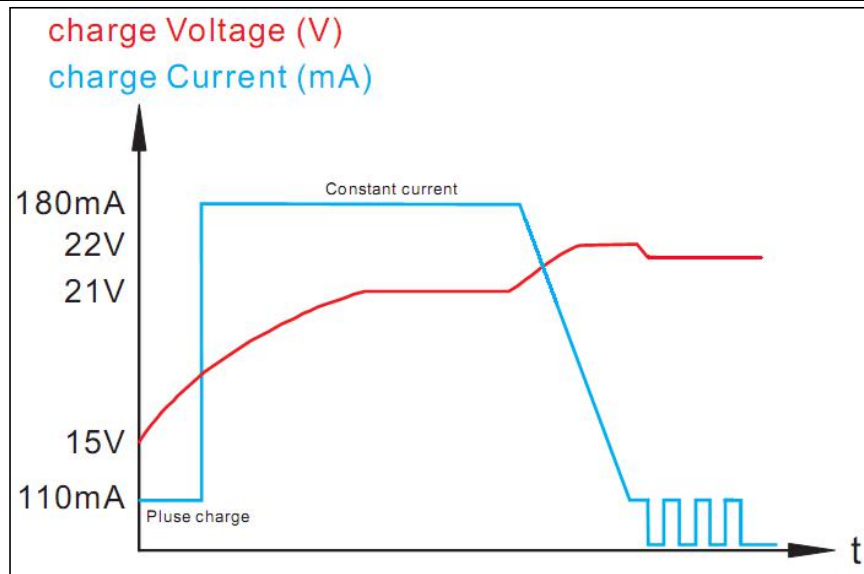
电池充电为恒压充电，且充电电流 110mA +/-20 mA;

21.3V +/-0.5V < Battery voltage < 22V +/-0.5V; Charging Current : C.V110mA +/-20 mA;

4) 22V +/-0.5V < 电池电压, 关断电池充电;

22V +/-0.5V < Battery voltage; Shutdown battery charging;

充电曲线：Charging Curve



放电管理：discharging management:

电池电压 $<15V \pm 0.5V$;关断电池放电;

When Battery voltage below $15V \pm 0.5V$ then Shutdown battery discharging;

5.4 LED 指示灯状态说明 The LED indicator states description

AC供电状态：LED指示灯常亮

AC power supply: The LED indicator light

电池放电状态：LED指示灯 3S 亮；3S不亮（电池电压 $19V \pm 0.5V \sim 22V \pm 0.5V$ ）

The Battery discharge: The LED indicator 3S ON and 3S OFF ($19V \pm 0.5V < \text{Battery voltage} < 22V \pm 0.5V$)

电池放电状态：LED指示灯 2S 亮；2S不亮（电池电压 $17V \pm 0.5V \sim 19V \pm 0.5V$ ）

The Battery discharge: The LED indicator 2S ON and 2S OFF ($17V \pm 0.5V < \text{Battery voltage} < 19V \pm 0.5V$)

电池放电状态：LED指示灯 1S 亮；1S不亮（电池电压 $15V \pm 0.5V \sim 17V \pm 0.5V$ ）

The Battery discharge: The LED indicator 1S ON and 1S OFF ($15V \pm 0.5V < \text{Battery voltage} < 17V \pm 0.5V$)

电池异常状态：LED 指示灯 0.5S 亮；0.5S 不亮

The Battery failure : The LED indicator 0.5S ON and 0.5S OFF

备注：电池在充满电时(电池开路)：LED 指示灯 0.5S 亮；0.5S 不亮

Note: when the battery charge is full, The LED indicator 0.5S ON and 0.5S OFF

5.5 接线示意图及功能说明 The wiring diagram and function description

1. 接线示意图 The wiring connect schematic diagram



a) AC 交流开关 ON/AC switches ON

- 1). SWL 开关为 OFF 状态时：电池充电；LED 指示灯常亮；LED 应急灯不亮；
The SWL switches OFF: Battery charging; The LED indicator light;
The LED lighting does not light;
- 2). SWL 开关为 ON 状态时：电池充电；LED 指示灯常亮；LED 应急灯亮(500mA)；
The SWL switches ON: Battery charging; The LED indicator light(LED Current:500mA) ;
The LED lighting light;
- 3). SWL 开关为 ON 状态且 SW 开关对 GND 短接时：
电池充电；LED 指示灯常亮；LED 应急灯进入模拟应急模式；LED 应急灯亮 (350mA±15%)；
The SWL switches ON and the SW switch to GND when in short circuit; Battery charging;
The LED indicator light; and the LED emergency Enter the simulation emergency mode ;
The LED lighting light (LED Current:350mA±15%) ;

b) AC 交流开关 OFF/AC switches OFF

- 500ms 内转换为应急照明;由电池供电；LED 指示灯 3S 亮；3S 不亮； LED 应急灯亮 (350mA±15%)；
Within 500ms Conversion for emergency lighting; Battery powered;
The LED indicator 3S ON and 3S OFF; The LED lighting light (LED Current:350mA±15%) ;

六. 保护要求 Protection Requirements

功能保护项 Protections	功能指标 Specs	备注 Remark
开路保护 Output open circuit protection	输出电压 ≤55Vdc Output voltage ≤55Vdc	锁死保护模式或恒压模式 latch or constant voltage mode
短路保护 Output short circuit protection	短路输出时的输入功率 ≤5W Short circuit output when the input power ≤5W	不接电池状态下测试 without Battery

七. 环境要求 Environment Requirements

名称 Name	最小值 Min	额定值 Rated	最大值 Max	单位 Units	备注 Remark
工作温度 Operating Temperature	-20	25	40	°C	
工作湿度 Operating Humidity	10	--	90	%RH	
储存温度 Storage Temperature	-30	25	65	°C	
大气压力 Pressure	86	--	106	KPa	

八. 可靠性要求 Reliability Requirements

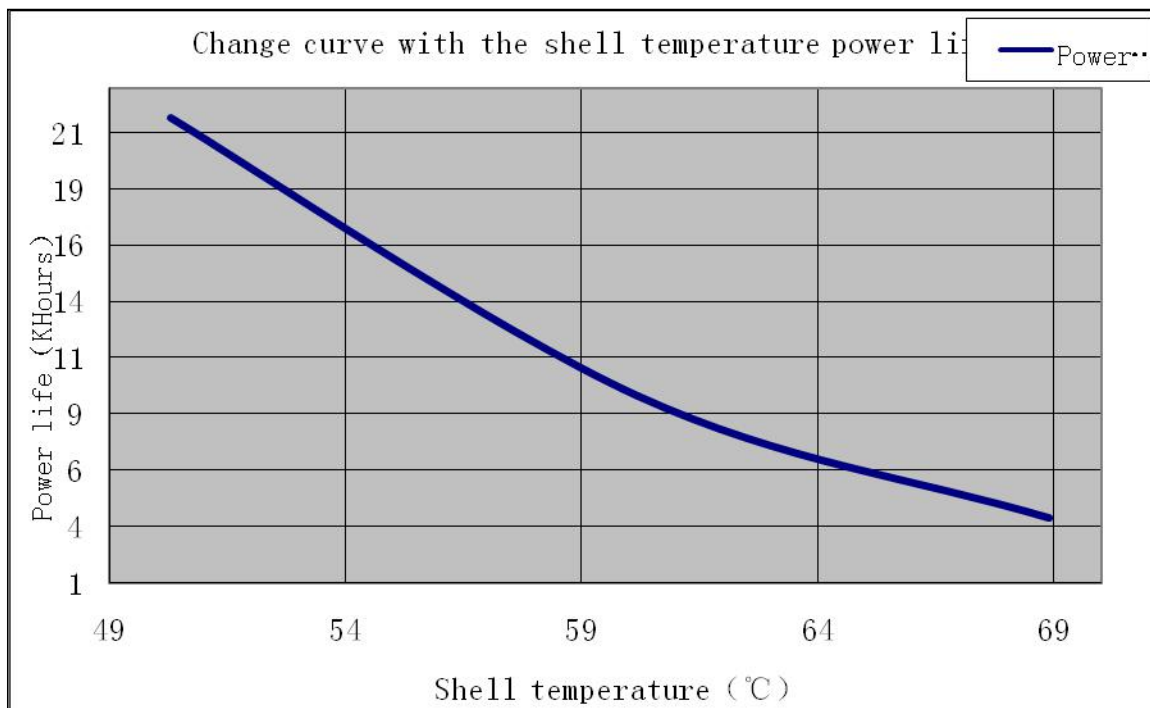
平均间隔故障时间估算 MTBF Life Time Calculation

平均间隔故障时间:在25°C环境及额定输入与满载条件下, 至少25,000小时.

The MTBF life time is at least 25,000 hours in the condition of rated input and full load in the ambient temperature of 25°C.

九. 产品寿命参考示意图 Reference schematic product life

(在一个密闭的空间内, 当外壳 TC 点温度达到 40°C、50°C、60°C、70°C、80°C、90°C时, 计算产品的寿命)



十. 认证标准 Certification Standards

10.1 安全标准 Safety Standards

介电耐压强度(高压) Dielectric Strength (Hi-pot)	初级对次级: 3750Vac/10mA Max./60 秒 Primary to Secondary: 3750Vac 10mA Max./60 Seconds
	初级对地: 1500Vac/10mA Max./60 秒 Primary to Earth: 1500Vac 10mA Max./60 Seconds
	次级对地: 1500Vac/10mA Max./60 秒 Secondary to Earth: 1500Vac 10mA Max./60 Seconds
接地电阻 Grounded Resistance	<0.1Ω, 25A, 1 Minute
泄露电流 Leakage Current	0.75mA Max. at Input 277ac/50Hz.
绝缘电阻 Insulation Resistance	在初级与次级间加 500Vdc 进行绝缘测试, 最小绝缘阻抗 100MΩ. The insulation test is conducted by adding a 500Vdc voltage between primary and secondary side of the driver, and the minimum insulation impedance is 100MΩ.

安规/Type	国家/Country	标准/Standard	状况/Compliance
UL	North America	UL8750; UL1310/UL1012; CAN/CSA-C22.2 No.223-M91	
CE	Europe	EN61347-1:2008 +A1:2011+A2:2013; EN61347-2-13:2006	
IEC	All IEC Countries	IEC61347-1:2007 +A1:2010+A2:2012; IEC61347-2-13:2006	
GB	China	GB19510.1-2009; GB19510.14-2009	

10.2 EMI/EMS 标准/EMI/EMS Standards

10.2.1 EMI 标准/EMI Standards

CI SPR15/A2:2008

IEC61547:2009 ; 一般照明用设备, 电磁兼容抗扰度要求; Equipment for general lighting purposes--EMC immunity requirements;

EN55015:2013: 电气照明及类似设备的无线电骚扰特性的限值和测量方法; Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment;

GB17743:2007: 电气照明及类似设备的无线电骚扰特性的限值和测量方法; Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment;

EN61547:2009: 对于一般照明设备 EMC 强制要求; Equipment for general lighting purposes--EMC immunity requirements;

10.2.2 EMS 标准/EMS Standards

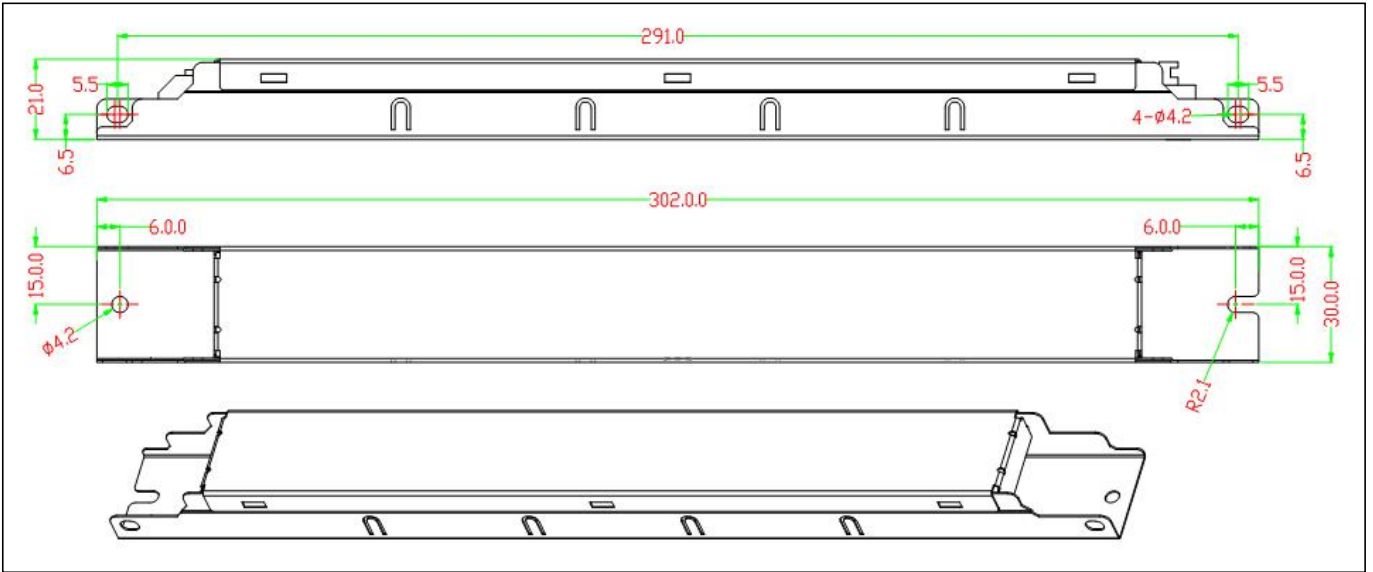
GB17743 GB17625.1-2012	电磁兼容 —— 限值 —— 谐波电流发射限值 Electromagnetic Compatibility-Limits- Limits for Harmonic Current Emissions.
IEC61000-3-2:2009 EN61000-3-2:2009	谐波电流发射限值, Class C Harmonic Current Emissions, Class C.
IEC61000-3-3:2008 EN61000-3-3:2008	电压震动和闪烁范围 Voltage Fluctuations &Flicker.
IEC 61000-4-2 EN 61000-4-2	静电放电: 空气放电 8KV, 接触放电 4KV Electrostatic Discharge (ESD):8KV Air Discharge,4KV Contact Discharge
IEC 61000-4-3 EN 61000-4-3	辐射、射频电磁场抗干扰试验 Radio-Frequency Electromagnetic Field Susceptibility Test –RS
IEC 61000-4-5 EN 61000-4-5	辐射、射频电磁场抗干扰试验 Surge Immunity Test :AC Power Line: Line to Line 1KV, Line to Earth 2KV
EN 61000-4-8	工频场抗干扰测试 Power Frequency Magnetic Field Test
IEC 61000-4-11 EN 61000-4-11	电压暂降 Voltage Dips

十一.外观尺寸 Outline Drawing

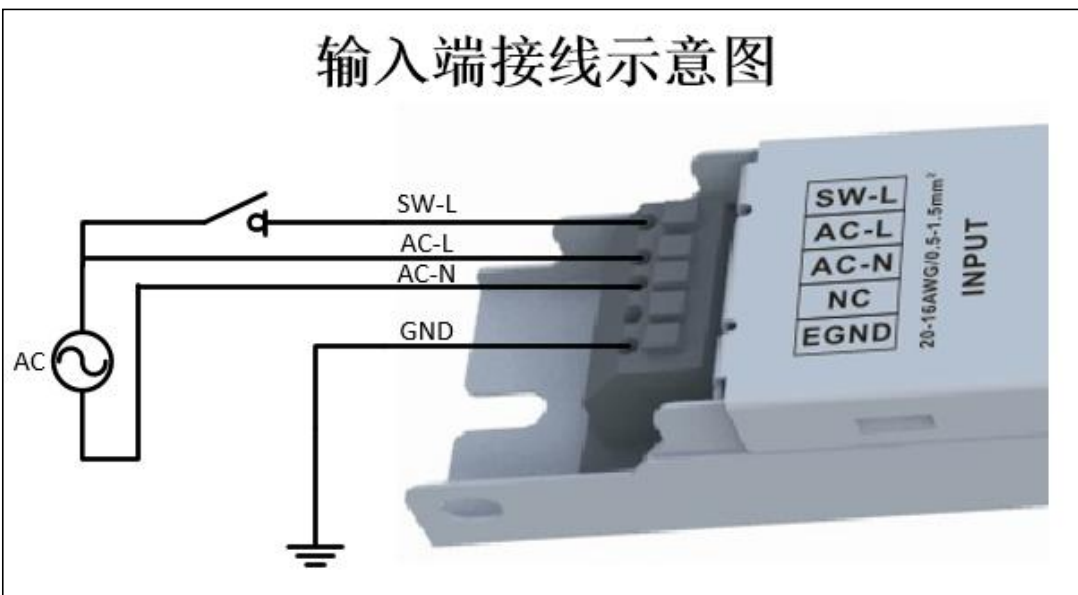
11.1. 重量 Net Weight

Net Weight:209±5g/pcs

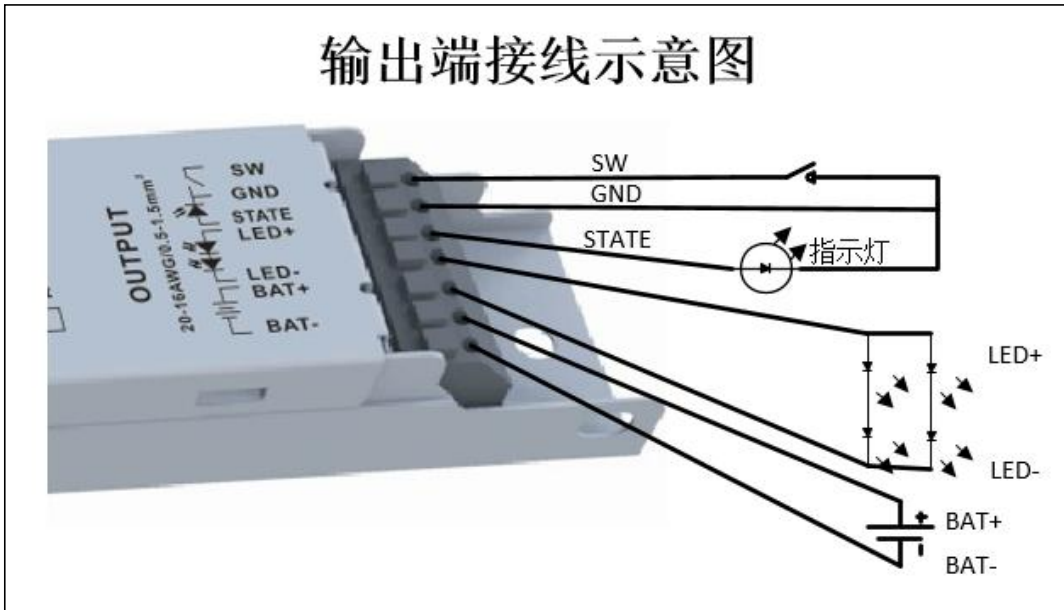
11.2. 尺寸示意图 Mechanical Size



11.3. 接线示意图 Wiring diagram

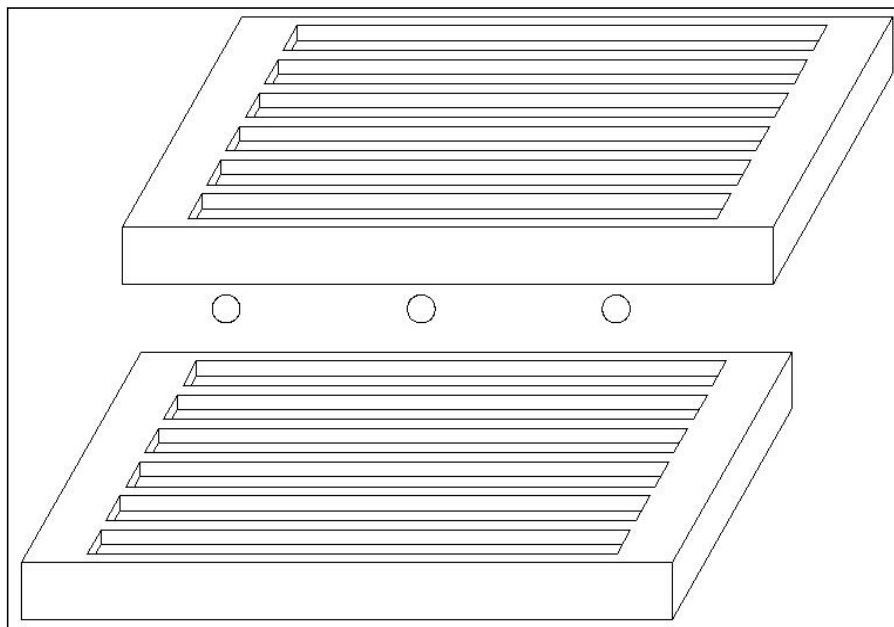


输出端接线示意图



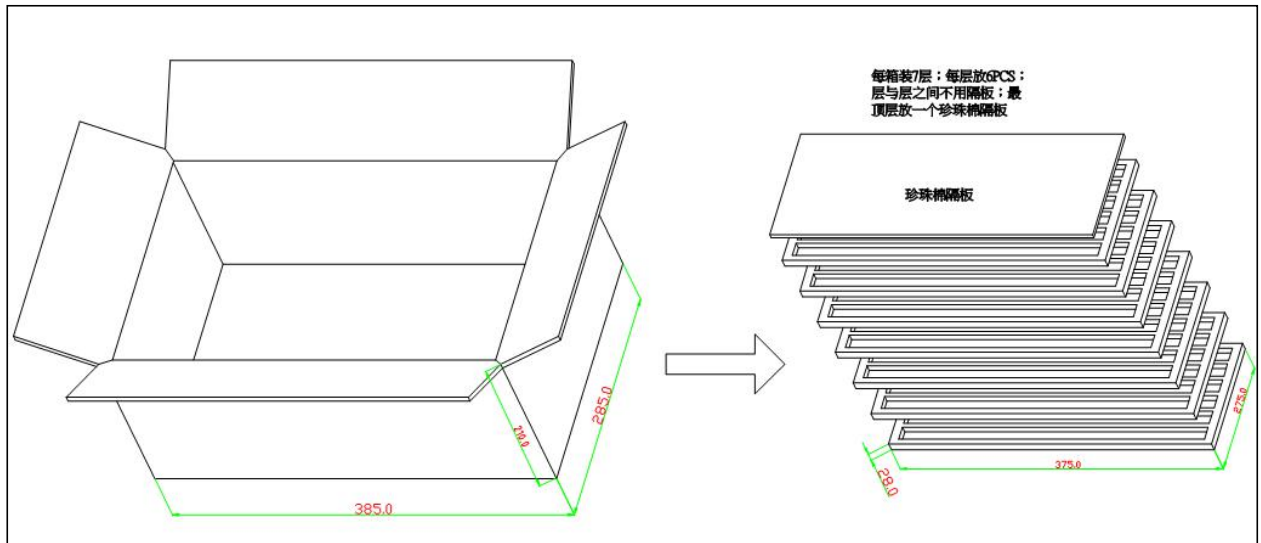
十二. 包装图 Package Drawing

12.1. 内包装 Inner Packaging



每个吸塑盘放置6个LF-GSP020YD
There are 6 pieces of LF-GSP020YD on each blister packing plate.

12.2. 外包装箱 Shipping Package



每个包装箱内放置7层吸塑盘，总计42个产品。

Each packaging box has 7 tiers, and there are 42 pcs LF-GSP020YD (6 pcs x 7 tiers) in total.