

超频三  
PCCOOLER®

股票代码：300647



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# IOT SOLAR STREET LIGHTS

## 物联网太阳能路灯

创新科技 · 绿色变革

# CORE ADVANTAGES

## 企业介绍

深圳市超频三科技股份有限公司（股票代码：300647）创立于2005年，是一家集LED照明产品的研发、生产、销售以及系统解决方案于一体的国家级高新技术企业，致力为全球客户提供最佳的LED照明整体解决方案。

超频三始终坚持技术创新，设立工业设计中心、热传实验室、光电实验室、品控中心四大研发体系。目前已获得授权专利317项（截止2017年底），荣获国家知识产权局颁发的“中国专利优秀奖”、广东省人民政府颁发“广东专利奖”、“广东省科学技术奖励三等奖”、深圳市人民政府颁发的“深圳市专利奖”、“深圳市科技进步一等奖”等。

超频三参与申报“十三五”国家重点研发计划战略性先进电子材料重点专项“用于设施家禽与水产养殖的LED关键技术研发与应用示范”；获批承担深圳市技术攻关项目“超大功率LED高密度照明光组件关键技术研发”；参编“LED体育照明应用技术要求”、“LED夜景照明应用技术要求”与“绿色照明检测与评价标准”三项国家标准；“体育场馆照明设计及检测标准（JGJ153—2016）”行业标准及中国照明学会团体标准“汽车车库照明标准”。

2017年，建筑面积12万平方米的惠州生产基地投产运营。同年5月，超频三首次公开发行股票，并在创业板成功上市。未来，超频三将以更持续、稳健的步伐成为“世界一流的工业设计及制造企业”愿景前进。

Shenzhen Fluence Technology PLC (Stock Code: 300647), established in 2005, is a state-level high-tech enterprise engaged in heat sink's developing, manufacturing and marketing, devoting to provide global clients the best total solution in LED illumination.

Pccooler insist on technological innovation. There are four major research and development system of the company: the Industrial Design Center, the Heat Transfer Laboratory, the Optoelectronics Laboratory and the Quality Control Center. Till now (by the end of 2017), Pccooler has obtained 317 authorized patents, awarded "China's Patent Excellence Award" by State Intellectual Property Office, "Guangdong patent award" and "the Third Prize of Science and Technology of Guangdong Province award" by people's Government of Guangdong Province, "Shenzhen Patent award" and "the First Prize of Scientific and Technological Advance Reward of Shenzhen" by Shenzhen Municipal Peoples Government.

Pccooler participated in declaration of the "13th Five-year" national key development plan of "LED key Technology development and application used in poultry and aquaculture", which is major project of strategy electronic material. Pccooler was authorized to undertake Shenzhen key technology project of "super power high-density LED illumination optical component key technology research and development", and involved in editing 3 national standards--"Technological requirements for LED sport lighting application", "Technological requirements for LED nightscape lighting application" and "testing and assessing standard of green lighting", and Group Standard of China's Commission on Illumination--"lighting standard of car garage".

In 2017, manufacturing base in Huizhou began to product. The building area is 120,000m<sup>2</sup>. IPO started in the May of same year and went public on the GEM board. Pccooler will take a more sustainable and steady step with the vision that become the top-ranking industrial design and manufacturing enterprise in the world.



总部坐落在深圳市龙岗天安数码城  
Located in TianAn Cyber Innovation Park, Longgang, Shenzhen

建筑面积120000m<sup>2</sup>惠州生产基地  
Huizhou Manufacturing base, building area 120,000m<sup>2</sup>

# 2005年

超频三成立  
Pccooler established

# 300647

2017创业板上市  
Went public on the GEM board

# 120000m<sup>2</sup>

生产基地  
Manufacturing base

# 317 项专利

patents

并获得国家专利优秀奖  
awarded "China's  
Patent Excellence Award"

# 参与“十三五” “13th Five-year”

国家重点研发计划  
Participated in declaration of the  
national key development plan

# GB

国家标准制定者  
Constitutor of national  
standard in lighting Industry

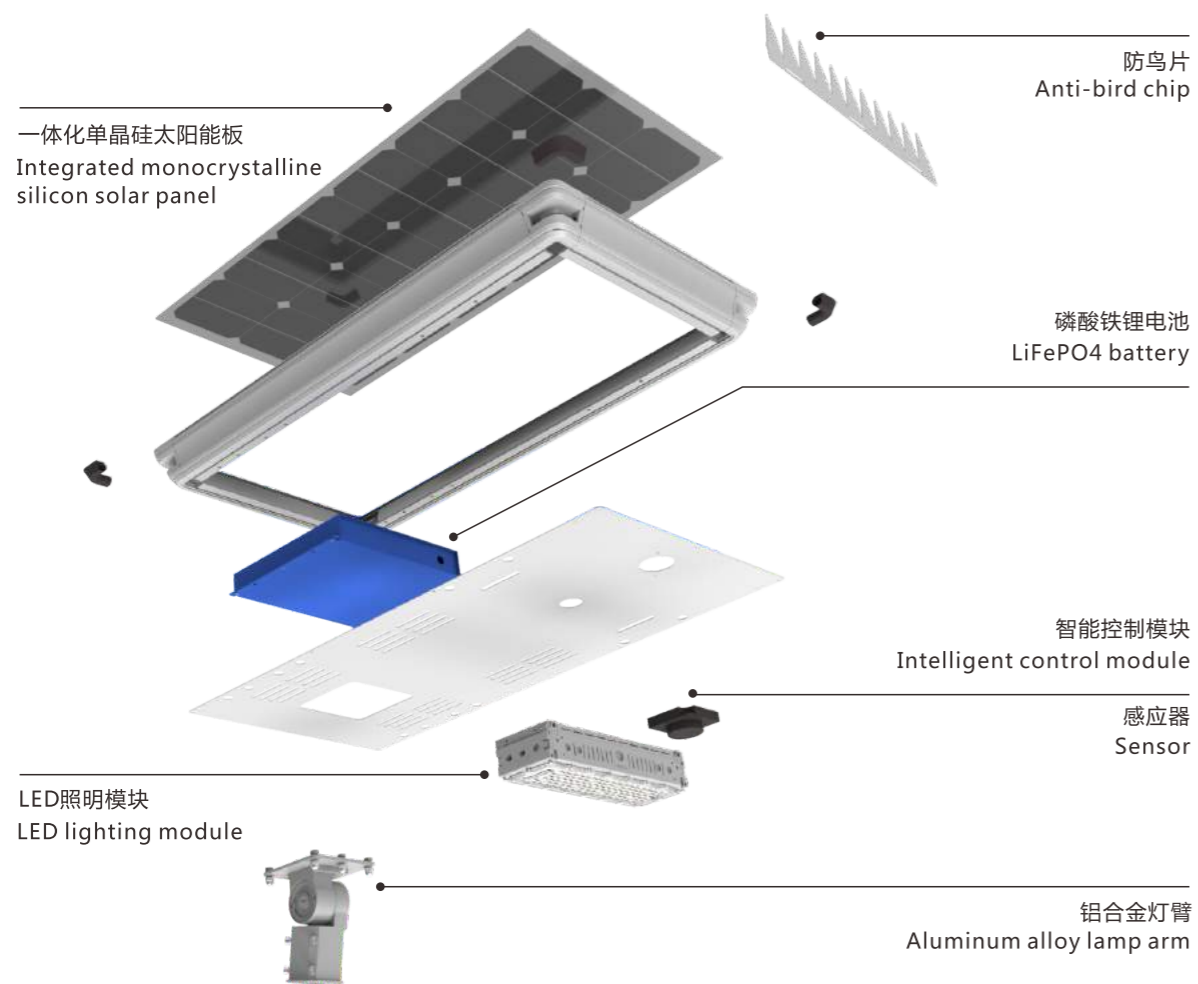


# CORE ADVANTAGES

## 核心优势

超频三拥有丰富的太阳能路灯生产及研发经验，在LED模块的高光效、配光、单晶硅太阳能板MPPT技术提升充电效能、磷酸铁锂电池的低温充放电和电池循环次数寿命以及智能管理控制等方面都有着深入的研究。我们不断应用和推广最新技术，坚持科技与自然的平衡，贴近用户需求的各个方面，提升用户的愉悦体验，竭诚为用户提供优质的太阳能路灯和产品服务。

Pccooler has rich experience in production and R&D of solar LED street light. Also has in-depth research in the LED Module's high luminous efficiency, light distribution, in monocrystalline silicon solar panel MPPT technology enhance charging efficiency, in low temperature charge and discharge of lithium iron phosphate battery and battery cycle lifespan and intelligent management control. We continue to apply and promote the latest technology, adhere to the balance between science and technology and nature, close to all aspects of user's needs, enhance the user's enjoyable experience and dedication to provide users with high-quality solar street lights and product services.



### 模组化结构 灯体可拆卸

Modular structure with removable lamp body

主要部件采用模块化密封设计，防护等级IP66，具有高可靠性和维修便捷性；灯具外壳采用高强度和耐候性能优越的铝合金材质，不惧室外环境变化；

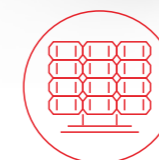
The main components adopt modular and sealed design, IP66 protection, with high reliability and easy to maintenance. The housing is made of aluminum alloy material with high strength and weatherability performance, easy cope with outdoor environmental changes;

# HIGH-EFFICIENCY SOLAR PANEL

## 高效太阳能板

一体成型单晶硅太阳能电池板（常见于空间站、卫星等航天领域），转化率高达**20%**，较多晶硅太阳能电池板转化率高**30%**以上，在光电转化效率和速度上具有独到优势。

Integrated Monocrystalline silicon solar panel(widely used space station and satellite etc), 20% conversion rate which is more them 30% higher compare with polysilicon solar panel.it has unique advantages in photoelectric conversionefficiency and speed.



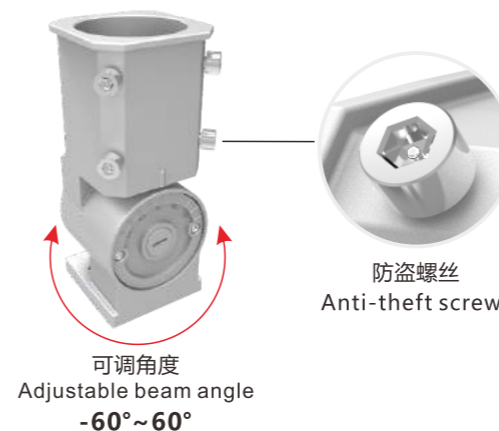
一体成型单晶硅太阳能板  
Integral monocrystalline silicon solar panel:



转化效率高达20%  
Conversion rate up to 20%;



25年长寿命  
25 years lifespan



### 高强度铝合金灯臂

High-strength aluminum alloy lamp arm

可多角度调节的旋转灯臂，光伏板可获最佳太阳光照，灵活适用不同纬度地域及不同形式灯杆安装需求。可调范围为-60°~60°。

Multi-angle adjustable lamp arm, solar panel can obtain the best sun illumination,flexibly suitable for different geographical area and different pole form installation requirements. Adjustable range is -60°~60°;

# INTELLIGENT CONTROL SYSTEM

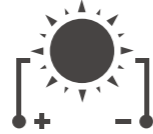
## 智能控制系统



### BMS

智能化管理及维护各个电池单元，防止电池出现过充电和过放电，延长电池的使用寿命，监控电池的状态，有效延长电池使用寿命，保证产品安全持久运行。

BMS: Intelligent management and maintain each battery unit, help to prevent over-charging and over-discharge of the battery, monitor the battery's state, effectively extend the battery's lifespan, and ensure the product's durable operation safely.



### MPPT

MPPT (最大功率跟踪) 控制器能够追踪太阳能板最大发电效率，充电效率比PWM控制器提升**15%~20%**

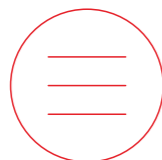
MPPT: MPPT (Maximum Power Point Tracking) controller can track the maximum power generation efficiency of solar panels. Charging efficiency increases 15%~20% compared to PWM controller.



智能判断近期天气情况，合理规划放电功率  
Intelligently judge recent weather conditions, reasonably plan discharge power



过流保护  
Overcurrent



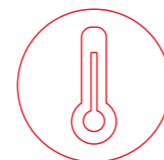
过压保护  
Overvoltage



过充保护  
Overcharge



过放保护  
Overdischarge



过温保护  
Overtemperature



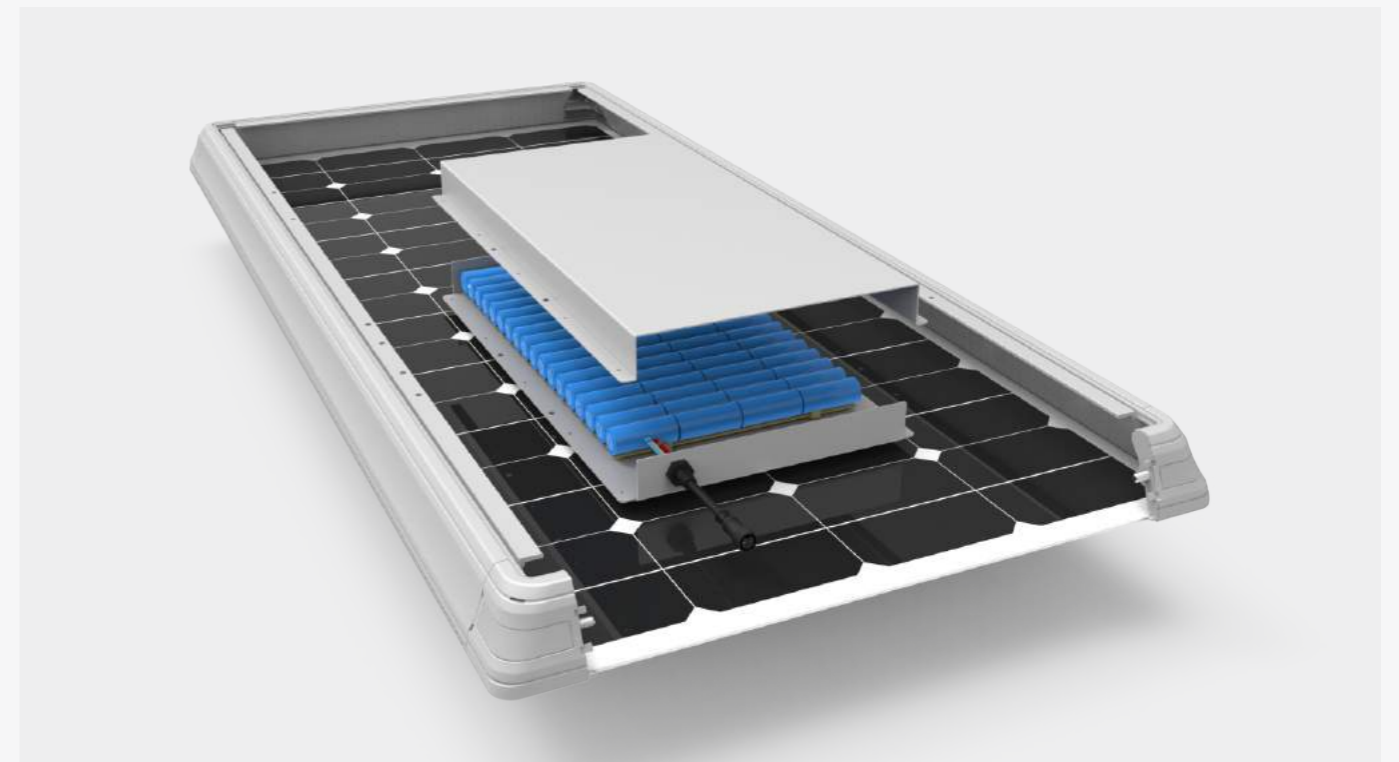
过载保护  
Overload

# LiFePO4 BATTERY

## 磷酸铁锂电池

绿色环保、不含重金属的**A1级磷酸铁锂电池**，结合充放电软硬件双重保护技术，高温性能好，可大电流放电，寿命循环**2000**次以上；

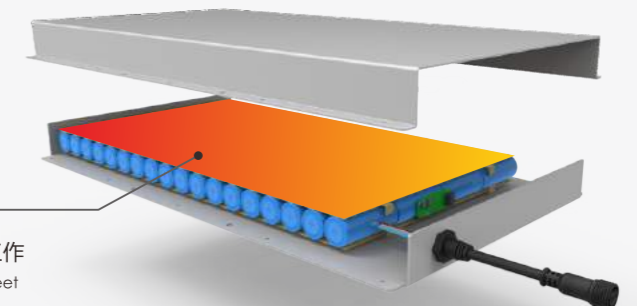
Adopt green environmental protection, non-heavy metal A1 grade lithium iron phosphate battery, combined with dual protection technology of charge and discharge, high temperature performance, large current discharge, lifespan cycle more than 2000 times;



### 智能温度控制

Intelligent temperature control

实时监测电池仓温度，实现智能温度补偿；  
Monitor battery compartment temperature in real time to achieve intelligent temperature compensation;



选配超低温的电池保护系统，使得路灯在极寒的天气也可以正常工作  
equipped with ultra-low temperature battery protection system, enables street lights can work in extremely cold weather.

# HIGH LUMEN EFFICIENCY LED MODULE

## 高光效LED模块

光效 > 160lm/W, 实现更高照度

Lumen efficiency > 160lm/W, achieve higher illumination



高光效

High luminous efficiency



长寿命

Long lifespan



发热小

Less heat



低光衰

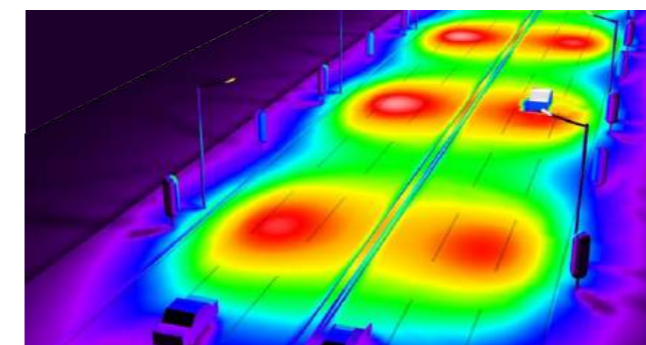
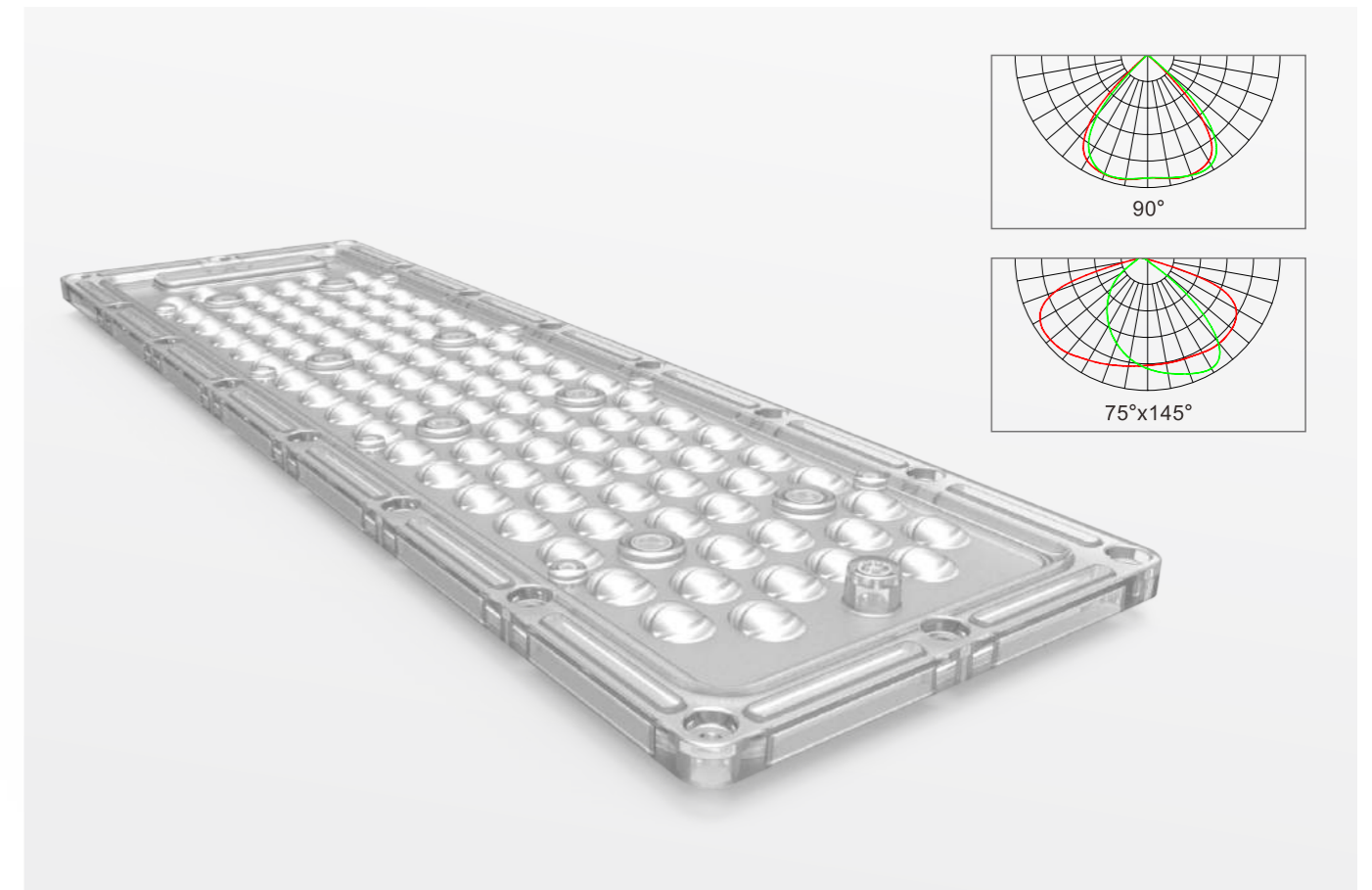
low light decay

# WIDE BAT-WINGS TYPE + POLARIZED LENS

## 宽蝙蝠翼+偏光透镜

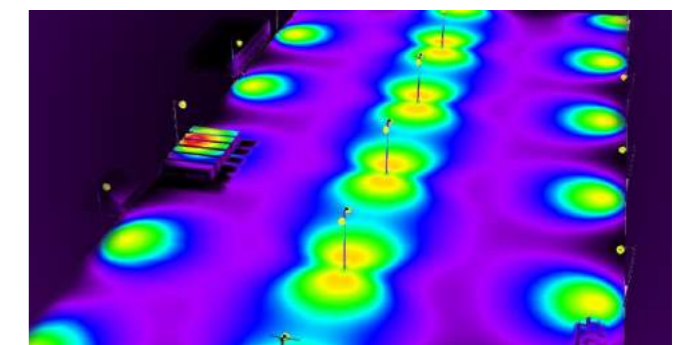
更大照明面积：全新设计的配光透镜，大幅度改善照明效果，照明均匀度更好。专门设计的透镜配光类型，适合多种应用场合。

Larger lighting area: newly designed light distribution lens greatly improves the lighting effect, with better lighting uniformity. Specially designed translucent optics for a variety of applications.



TYPE II 适合普通道路照明需求，  
例如：农村乡道、城市支干道路、住宅区等

Light distribution simulation:  
TYPE II suitable for general road lighting needs, such as rural road, Urban branch road, residential areas, etc.



TYPE III 适合较宽道路照明需求，  
例如：广场停车场、建筑工地、矿区等

Light distribution simulation:  
TYPE III suitable for wider road lighting needs, such as: parking lot, construction site, mining area, etc.

# IOT MANAGEMENT, INTELLIGENT LIGHTING

## 物联管理 智享照明

超频三将传统的太阳能路灯架构+物联网+无线通讯技术的完美融合，实现远程化的后台数据监测与管理，实时了解太阳能每个组件（路灯、光伏板、电池、控制器）的正常工作状态，让您足不出户了解千里以外终端客户的产品使用情况，亦可不出家门即可管理路灯的开合以及亮点功率及时长的调整。

PCCOOLER perfectly combine traditional solar street lighting architecture + Internet of things + wireless communication technology perfectly, achieve monitoring and management of remote background data, real-time understand the normal working status of each component of solar energy (street lights, photovoltaic panels, batteries, controllers), allow you to know the end customer's product usage that is thousands of miles away without leaving home, or to manage the opening and closing of street lights and the adjustment of bright spot power in a timely manner.



### 远程监测 实时监控

具有无线通讯功能，通过太阳能路灯智能管理系统和无线模块，对路灯进行远程监测、实时监控。

### Remote monitoring real time monitoring

SL series with wireless communication function, Through the intelligent management system of solar street lamp and wireless module, have remote monitoring and real-time monitoring.



### 故障自动报警

实时监控太阳能板电压、电流、功率、蓄电池充放电电流、电压、负载工作状态、控制器工作状态等数据以及故障自动报警。

### Automatic fault alarm

Real time monitoring of solar panel voltage, current, power, battery charging and discharging current, voltage, load working state, controller working state data and fault automatic alarm.



### 远程调控

支持远程开关灯/调光及蓄电池、负载参数修改。

### Remote control

Support remote switch on and of/dimmer and battery, load parameter modification.



### 故障追踪 精准定位

多波峰MPPT技术，适用于光伏电池部分阴影遮挡或者部分损坏的情况，追踪效率大于99%。

### Fault tracking and precise positioning

Multi peak MPPT technology, suitable for partial shading or partial damage of photovoltaic cells, and the tracking efficiency is more than 99%.

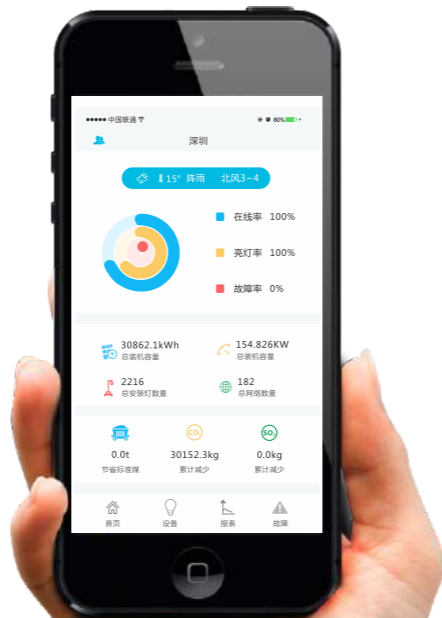


### 地图定位

利用GIS地图，具备地理位置显示的功能。

### Map location

Using GIS maps, with geographic display capabilities.



物联网太阳能路灯管理系统主要由路灯组件+集中控制器+单灯控制器+智慧云平台共同组成，集中控制器与单灯控制器通过GPRS/NB-IOT无线通讯组网的方式将单灯采集的数据汇总与集中控制器，通过GPRS数据流量的方式上传至系统云平台，为手机及电脑端访问提供数据依存。

The Internet of Things solar street light management system is mainly composed of a street light component + a centralized controller + a single light controller + a smart cloud platform. The centralized controller and the single light controller aggregate the data collected by the single light via the GPRS/NB-IOT wireless communication network. The centralized controller uploads data to the system cloud platform through GPRS data flow, providing data dependence for mobile phone and computer terminal access.



### 智能物联网太阳能路灯与传统路灯功能对比

Performance comparison between smart IOT solar led street light and traditional street light

太阳能路灯控制器类型 Solar led street light controller type	PWM控制器 PWM controller	MPPT控制器 MPPT controller	MPPT+物联网控制器 MTTP+IOT controller	说明 instruction
光衰检测 Light decay detecting	×	×	√	自动光衰检测并调节 Automatic light decay detection and adjustment
阴雨天充电 Charging in rainy days	×	×	√	MPPT充电3阴雨天等同一个晴天 MPPT charge 3 rainy days is equivalent to a sunny day
电池管理 Battery management	×	√	√	电池寿命管理 Battery lifespan management
远程监控 Remote monitoring	×	×	√	远程实时监控每一盏路灯的状态 Remotely monitor the status of each street light in real time
配置优化 Optimize configuration	×	×	√	通过数据分析，完成不同地域太阳能电池板与电池的最佳配置 Through data analysis, complete the optimal configuration of solar panels and batteries in different regions
故障告警 Fault alarm	×	×	√	自动检测系统故障并告警到手机或电脑 Automatically detect system failures and alert to mobile phones or computers
智能分析 Intelligent analysis	×	×	√	自动收集每盏灯每晚的详实数据，并统计报表分析 Automatically collect the detailed data for per light at per night, and statistical report analysis
人工智能 Artificial intelligence	×	×	√	通过系统平台大数据采集与分析，完成路灯的智能化运行，达到全年稳定亮灯 Big data collection and analysis through the system platform, complete the intelligent operation of street light and achieve stable lighting throughout the year

# CPSL01 产品系列

## PRODUCT SERIES



CP-SL01-0015/20

CP-SL01-0030

CP-SL01-0050

CP-SL01-0060

产品型号 Model	高效晶硅太阳能板 High Efficiency Solar Panel	磷酸铁锂电池 LiFePO4 battery	光通量 Luminous flux	工作时间 Working time	建议安装距离 Installation distance	建议安装高度 Mount height	口径尺寸 Caliber size	感应距离 Sensing distance
CP-SL01-0015-N01	50W 多晶硅 /poly	160WH	2767LM	3-5day	20-25m	4-5m	60mm	10-15m
CP-SL01-0020-P01	60W 单晶硅 /mono	218WH	3867LM	5-7day	25-30m	4-5m	60mm	10-15m
CP-SL01-0030-N01	80W 多晶硅 /poly	320WH	5515LM	3-5day	25-30m	5-7m	60mm	10-15m
CP-SL01-0030-P01	90W 单晶硅 /mono	338WH	5515LM	5-7day	25-30m	5-7m	60mm	10-15m
CP-SL01-0050-N01	120W 单晶硅 /mono	500WH	9384LM	3-5day	25-30m	8-10m	60mm	10-15m
CP-SL01-0060-N01	150W 单晶硅 /mono	640WH	9384LM	5-7day	25-30m	8-10m	60mm	/
CP-SL01-0060-P01	180W 单晶硅 /mono	810WH	11087LM	5-7day	25-30m	8-10m	60mm	/

# CPSL 产品系列

## PRODUCT SERIES



CP-1A-E

CP-2A-E

CP-3A-E

CP-4A-E

产品型号 Model	单晶硅太阳能板 Monocrystalline solar panels	磷酸铁锂电池 LiFePO4 battery	光通量 Luminous flux	工作时间 Working time	建议安装距离 Installation distance	建议安装高度 Mount height	口径尺寸 Caliber size	感应距离 Sensing distance
SL-1A-E	20W	77WH	1112LM	5-7day	15-20m	4-5m	60mm	10-15m
SL-2A-E	30W	127WH	1979LM	5-7day	20-25m	4-6m	60mm	10-15m
SL-3A-E	75W	307WH	4339LM	5-7day	25-30m	6-10m	60mm	10-15m
SL-4A-E	75W	338WH	5200LM	5-7day	25-30m	6-10m	60mm	10-15m

# CPSL03 产品系列

## PRODUCT SERIES



产品型号 Model	多晶硅太阳能板 Polysilicon solar panel	磷酸铁锂电池 Li-ion battery capacity	光通量 Luminous flux	工作时间 Working time	建议安装距离 Installation distance	建议安装高度 Mount height	口径尺寸 Caliber size	感应距离 Sensing distance
CP-SL03-0030	50W	160WH	2700LM	5-7day	18-20m	5-6m	60mm	8-12m
CP-SL03-0040	80W	224WH	3500LM	5-7day	22-25m	6-7m	60mm	8-12m
CP-SL03-0060	120W	384WH	5000LM	5-7day	25-30m	7-8m	60mm	8-12m

Widely application

## 适用广泛



### 城市区域 Urban area

道路主干道、支道、街道以及城市广场、公园、停车场。  
Main roads, branches, streets and urban squares, parks, parking lots.



### 乡镇农村 Countryside

乡村、小镇道路照明，新农村建设，农村居民区。  
Rural, town road lighting, new rural construction, rural residential areas.



### 住宅区 Residential areas

小区、别墅区、学校、庭院。  
Community, villas, schools, courtyards.



### 工业厂区 Industrial plant area

厂区道路、草坪区、户外活动场地等。  
Factory roads, lawn areas, outdoor venues and so on.



### 偏远地区 Remote areas

高原、山区、孤岛等电网覆盖不足或居民居住相对分散等区域。  
Plateau, mountain area, isolated island, where with insufficient coverage of power grid or relatively scattered residential areas.



### 风景旅游区 Scenic area

旅游景点、高尔夫球场、海滨浴场、园林庭院等照明。  
Scenic spot, golf courses, bathing beach, garden and other lighting.