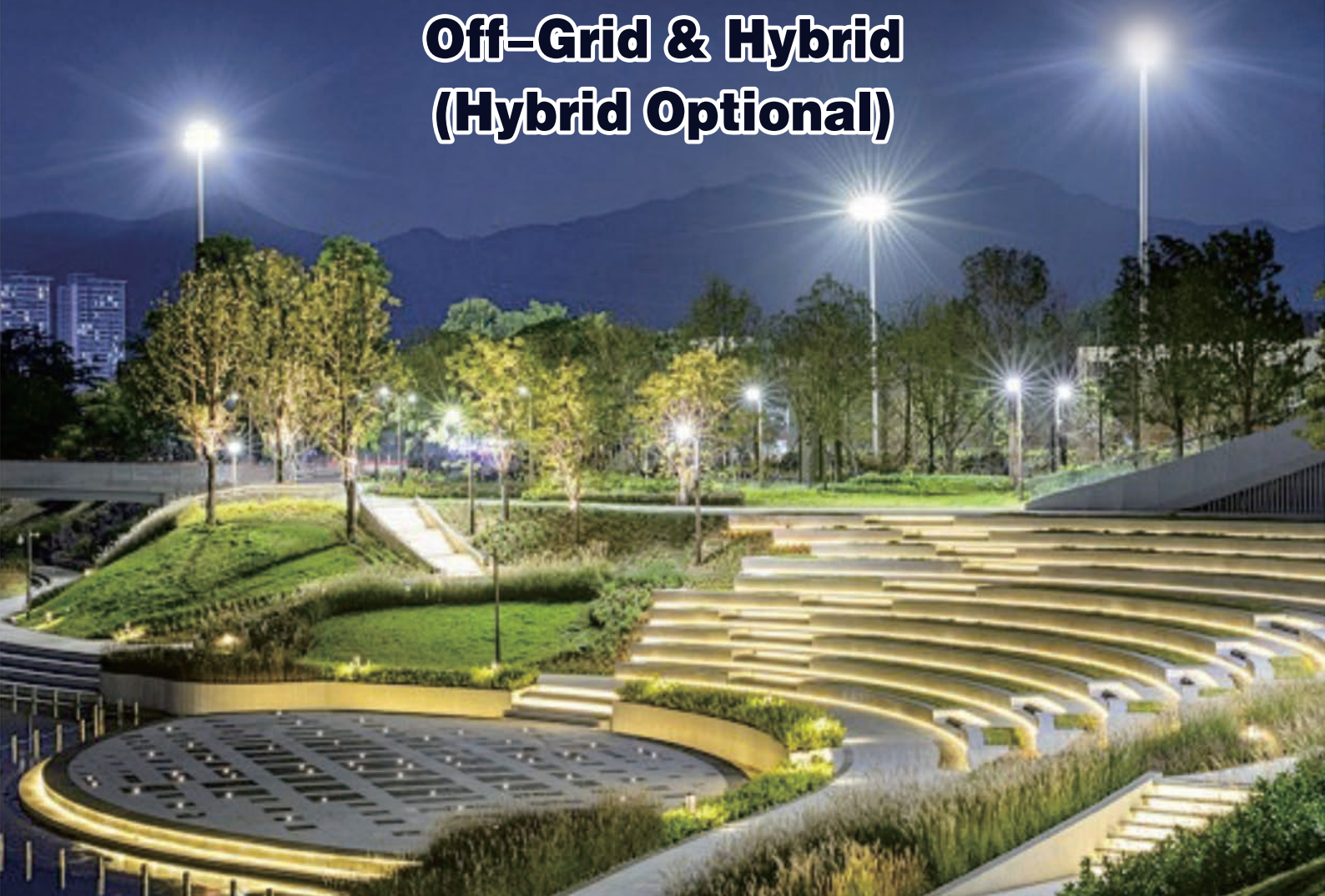


**KAISTAR<sup>®</sup>**

# **Soltech I Integrated Street Light**

**Off-Grid & Hybrid  
(Hybrid Optional)**





# THE COMBINATION OF SIMPLICITY ELEGANCE AND DURABILITY

Harnessing the power of the sun, the all-in-one Soltech I solar luminaire delivers zero carbon illumination to brighten your streets, pathways, and public spaces. It stands apart with its originality and solid construction, seamlessly integrating solar panels and large battery to provide real and continuous high brightness output for long operation hours.

Embrace the future of sustainable lighting with Soltech I , where style meets substance in a beautiful, efficient package.

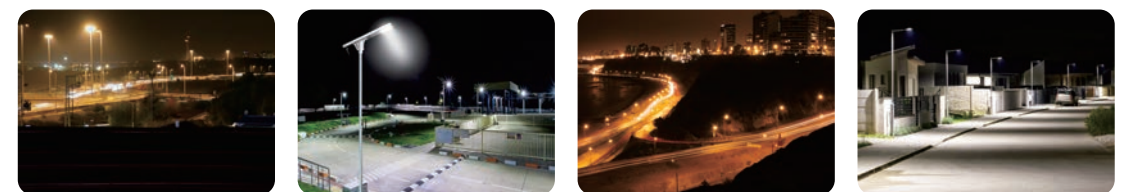






## APPLICATIONS

- Street Lighting
- Roadway Lighting
- Pathway Lighting
- Ramp Lighting
- Sidewalk Lighting
- Private Road Lighting
- Farm Lighting
- Wildlife Area Lighting
- Perimeter Security Lighting
- Park Lighting
- Railway Yard Lighting
- Fence Lighting
- Campus Lighting
- Ship Dock Lighting
- Remote Area Lighting
- Military Base Lighting
- Gate Lighting
- Jogging Path Lighting





## RELIABILITY

## UNEXPECTED VALUE



Only top quality mono - crystalline silicon solar panels with high efficiency and long lifetime are used.



Quality lithium batteries are used to store the energy, provide energy for immediate requirements, and enable a back-up for days when there is little or no sun.



High Lumen LED for maximum efficacy. Dedicated designed low-voltage solar controller technology with dimming capabilities for power-save management.  
Lifetime > 100,000 hrs and CRI nominal 70.



Microprocessor managed algorithms autonomously determine sunrise and sunset.



Easy to install without buying cables and rectifiers, directly on pole with an adjustable spigot 0°~90°.



**KAISTAR®**





## HOW GRID POWER WORKS IN THE HYBRID SYSTEM

### Grid Connection and Backup

The grid connection serves as a backup power source. When the solar energy and battery storage are insufficient to meet the load demand, the grid connection provides the necessary power to ensure uninterrupted supply.

### Power Flow and Stability

The system uses power electronic devices and control algorithms to manage the flow of power between the solar panels, the grid, and the load. This ensures that the system remains stable and efficient, even during periods of high demand or fluctuating solar generation.

### Power Switching and Management

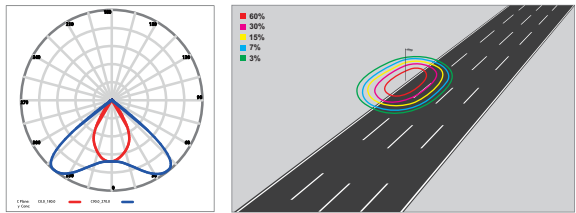
It initially uses the stored DC power from the batteries to illuminate the street light at night. If the battery charge depletes or additional power is required, the controller seamlessly switches to AC supply.

By integrating solar power and grid power in this way, an AC/DC hybrid solar system can provide a reliable and sustainable energy solution, reducing dependence on the grid and maximizing the use of renewable energy.

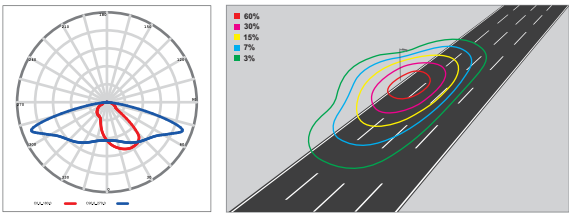


# PHOTOMETRICS

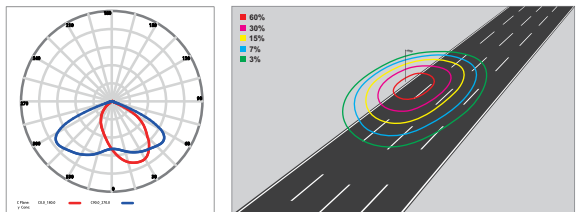
60×100° (TYPE I -VS)



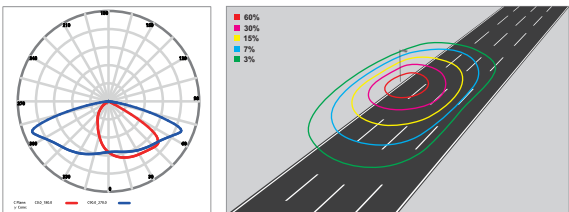
65×155° (Type -M)



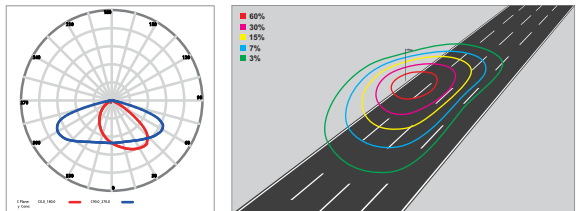
70×135° (TYPE II -S)



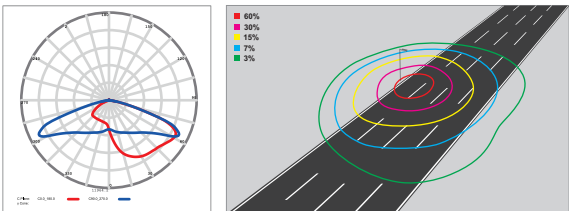
75×150° (TYPE III -M)



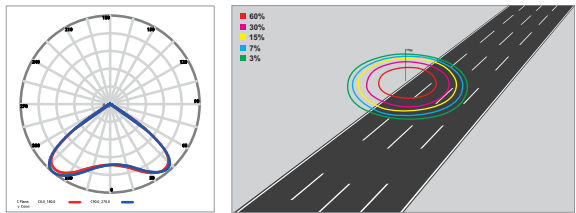
80×150° (TYPE III -S)



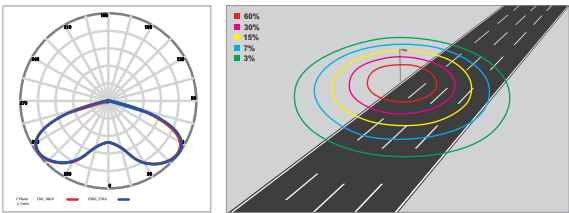
65×145° (Type IV -S)



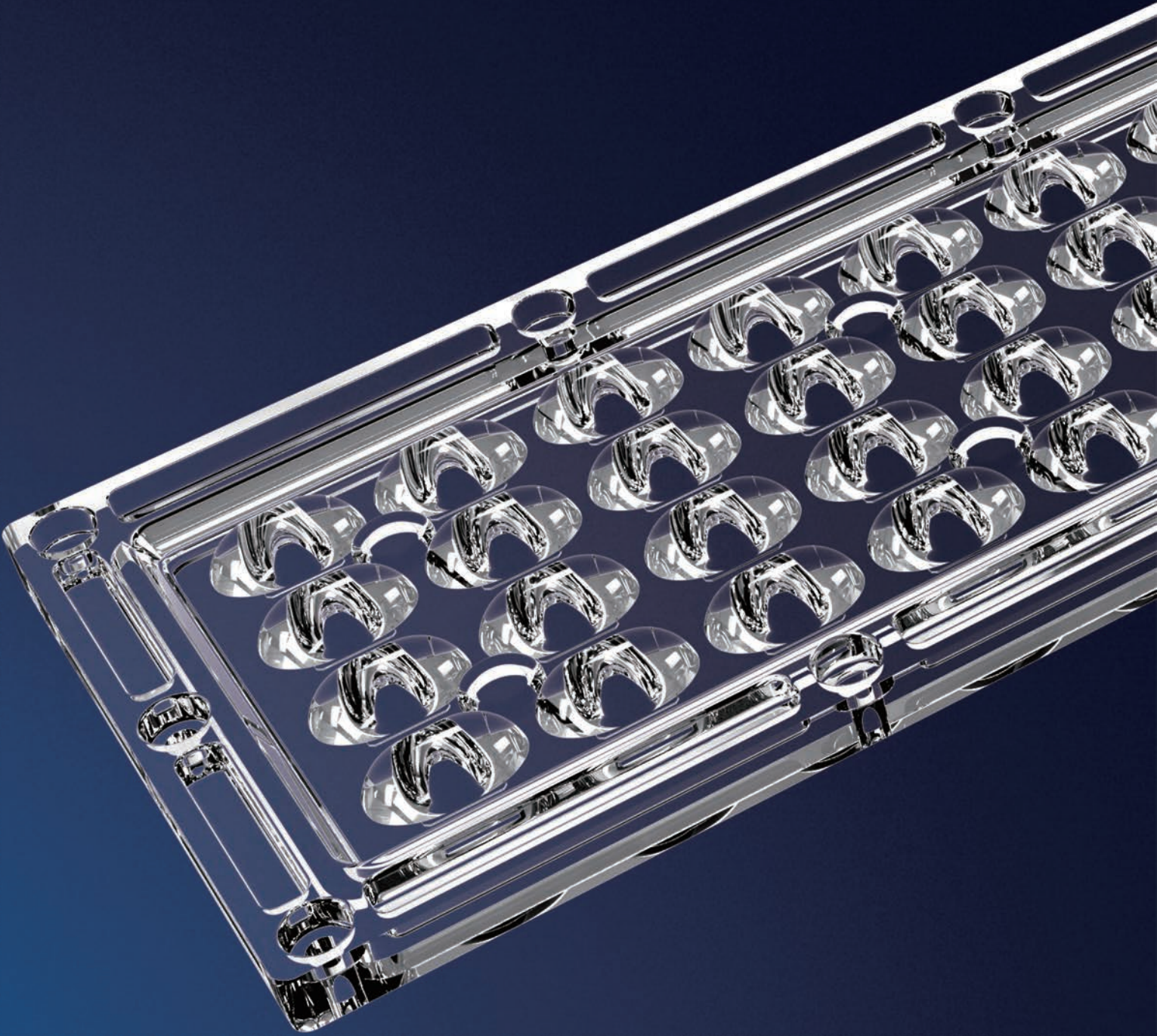
110° (TYPE V -VS)



150° (TYPE V -VS)



Default setting: 6m high Installation, 100% brightness.





SPECIFICATIONS\* (OFF-GRID)

| Part#        | Power | Modules | Efficacy<br>S Series | System<br>Lumen | Solar<br>Panel | Battery    | Product<br>Dimensions |
|--------------|-------|---------|----------------------|-----------------|----------------|------------|-----------------------|
| KS-STLS-I-20 | 20W   | 1       | 210 lm/W             | 4,200lm         | 55W/18V        | 12.8V/12AH | 958×370×287mm         |
|              |       |         |                      |                 |                | 12.8V/18AH |                       |
|              |       |         |                      |                 |                | 12.8V/24AH |                       |
| KS-STLS-I-30 | 30W   | 1       | 210lm/W              | 6,300lm         | 55W/18V        | 12.8V/18AH |                       |
|              |       |         |                      |                 |                | 12.8V/24AH |                       |
|              |       |         |                      |                 |                | 12.8V/30AH |                       |
| KS-STLS-I-40 | 40W   | 1       | 210lm/W              | 8,400lm         | 55W/18V        | 12.8V/18AH |                       |
|              |       |         |                      |                 |                | 12.8V/24AH |                       |
|              |       |         |                      |                 |                | 12.8V/30AH |                       |
| KS-STLS-I-50 | 50W   | 1       | 210lm/W              | 10,500lm        | 75W/18V        | 12.8V/24AH | 1270x370x287mm        |
|              |       |         |                      |                 |                | 12.8V/30AH |                       |
|              |       |         |                      |                 |                | 12.8V/36AH |                       |
| KS-STLS-I-60 | 60W   | 2       | 210lm/W              | 12,600lm        | 75W/18V        | 12.8V/24AH | 1270x370x287mm        |
|              |       |         |                      |                 |                | 12.8V/30AH |                       |
|              |       |         |                      |                 |                | 12.8V/36AH |                       |
| KS-STLS-I-80 | 80W   | 2       | 210lm/W              | 16,800lm        | 105W/36V       | 25.6V/18AH | 1170x550x287mm        |
|              |       |         |                      |                 |                | 25.6V/24AH |                       |
|              |       |         |                      |                 |                | 25.6V/36AH |                       |
|              |       |         |                      |                 |                | 25.6V/42AH |                       |
| KS-STLS-I-90 | 90W   | 2       | 210lm/W              | 18,900lm        | 105W/36V       | 25.6V/18AH |                       |
|              |       |         |                      |                 |                | 25.6V/24AH |                       |
|              |       |         |                      |                 |                |            |                       |

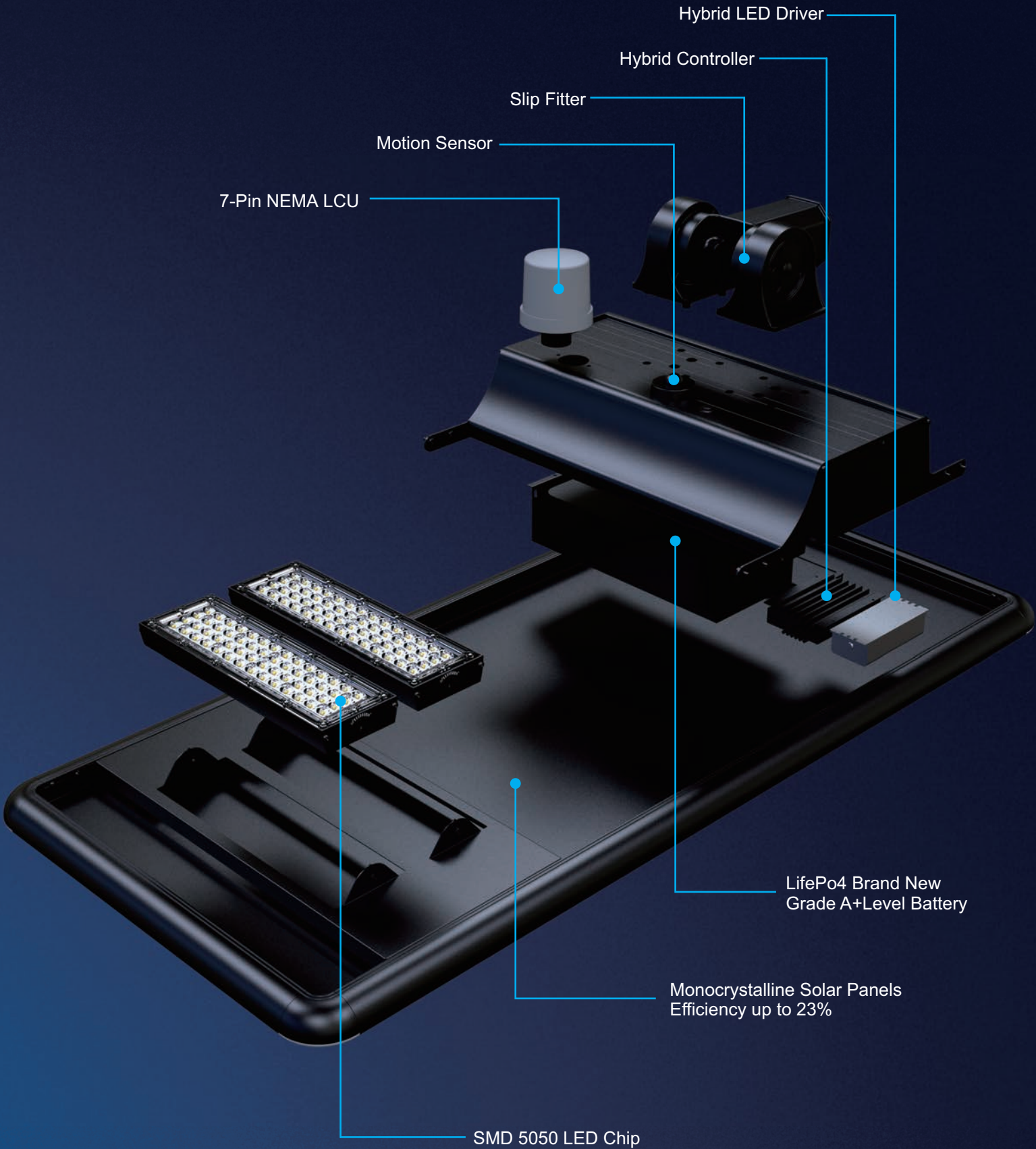
\*All specifications & parameters @25C° & subject to change without notice. All data tolerance +/- 7%



SPECIFICATIONS\* (HYBRID)

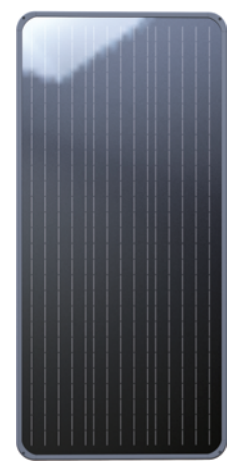
| Part#         | Power | Modules | Efficacy<br>S Series | System<br>Lumen | Solar<br>Panel | Battery    | Product<br>Dimensions |
|---------------|-------|---------|----------------------|-----------------|----------------|------------|-----------------------|
| KS-STLS-I-20H | 20W   | 1       | 190lm/W              | 3,800lm         | 55W/18V        | 12.8V/12AH | 958×370×287mm         |
|               |       |         |                      |                 |                | 12.8V/18AH |                       |
|               |       |         |                      |                 |                | 12.8V/24AH |                       |
| KS-STLS-I-30H | 30W   |         | 190m/W               | 5,700lm         | 55W/18V        | 12.8V/18AH |                       |
|               |       |         |                      |                 |                | 12.8V/24AH |                       |
|               |       |         |                      |                 |                | 12.8V/30AH |                       |
| KS-STLS-I-40H | 40W   |         | 190lm/W              | 7,600lm         | 55W/18V        | 12.8V/18AH | 1270x370x287mm        |
|               |       |         |                      |                 |                | 12.8V/24AH |                       |
|               |       |         |                      |                 |                | 12.8V/30AH |                       |
| KS-STLS-I-50H | 50W   | 2       | 190lm/W              | 9,500lm         | 75W/18V        | 12.8V/24AH |                       |
|               |       |         |                      |                 |                | 12.8V/30AH |                       |
|               |       |         |                      |                 |                | 12.8V/36AH |                       |
| KS-STLS-I-60H | 60W   |         | 190lm/W              | 11,400lm        | 75W/18V        | 12.8V/24AH | 1270x370x287mm        |
|               |       |         |                      |                 |                | 12.8V/30AH |                       |
|               |       |         |                      |                 |                | 12.8V/36AH |                       |
| KS-STLS-I-80H | 80W   |         | 190lm/W              | 15,200lm        | 105W/36V       | 25.6V/18AH | 1170x550x287mm        |
|               |       |         |                      |                 |                | 25.6V/24AH |                       |
|               |       |         |                      |                 |                | 25.6V/36AH |                       |
|               |       |         |                      |                 |                | 25.6V/42AH |                       |
| KS-STLS-I-90H | 90W   |         | 190lm/W              | 17,100lm        | 105W/36V       | 25.6V/18AH |                       |
|               |       |         |                      |                 |                | 25.6V/24AH |                       |
|               |       |         |                      |                 |                |            |                       |

\*All specifications & parameters @25C° & subject to change without notice. All data tolerance +/- 7%





# KEY COMPONENTS OF THE HYBRID SYSTEM



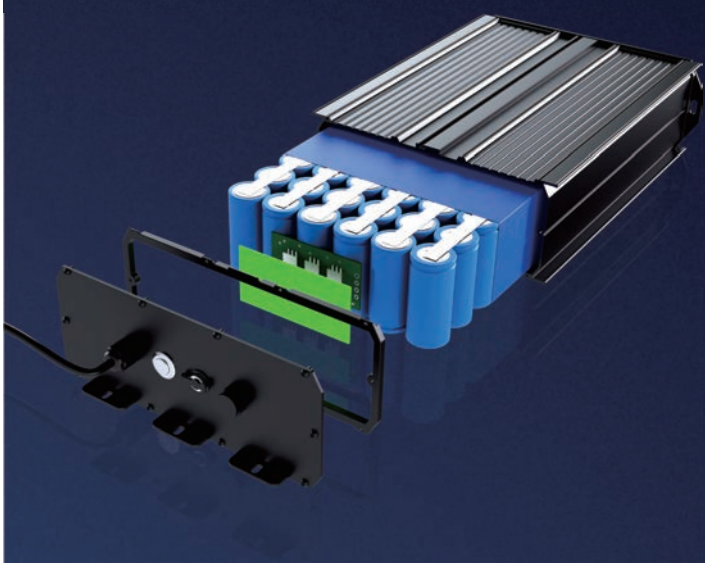
## Monocrystalline Solar Panel

- High power density reach to 23% conversion efficiency.
- Multi-busbar design makes the solar panel with higher durability.
- PV modules have demonstrated resistance against PID (Potential induced degradation).
- Bigger cells with better performance.



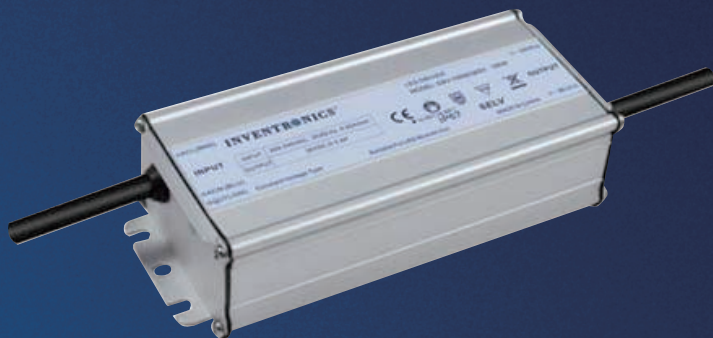
## Hybrid Control Unit

- High tracking efficiency >99.9%.
- If battery voltage is low, it can be set to dimming or directly use the grid power to light up.
- Dimming start voltage and percentage can be set.
- Day/Night threshold can adjust automatically.



## High Performance Battery Pack

- Grade A+ battery cells used.
- High efficiency with light weight.
- Safety and a long lifespan.
- No active maintenance.
- High discharge rates.
- Suitable for extreme temperatures.



## Hybrid AC Driver

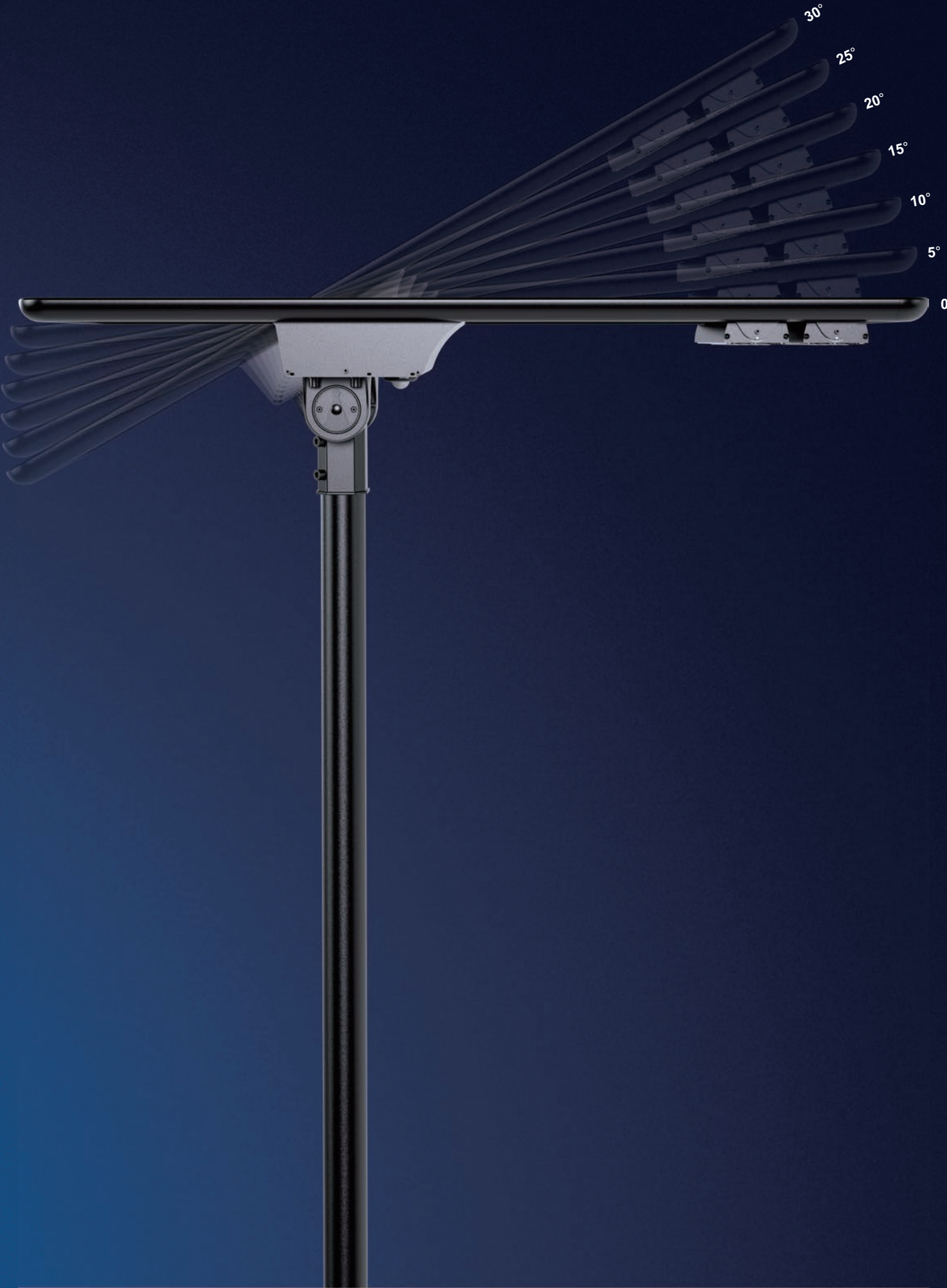
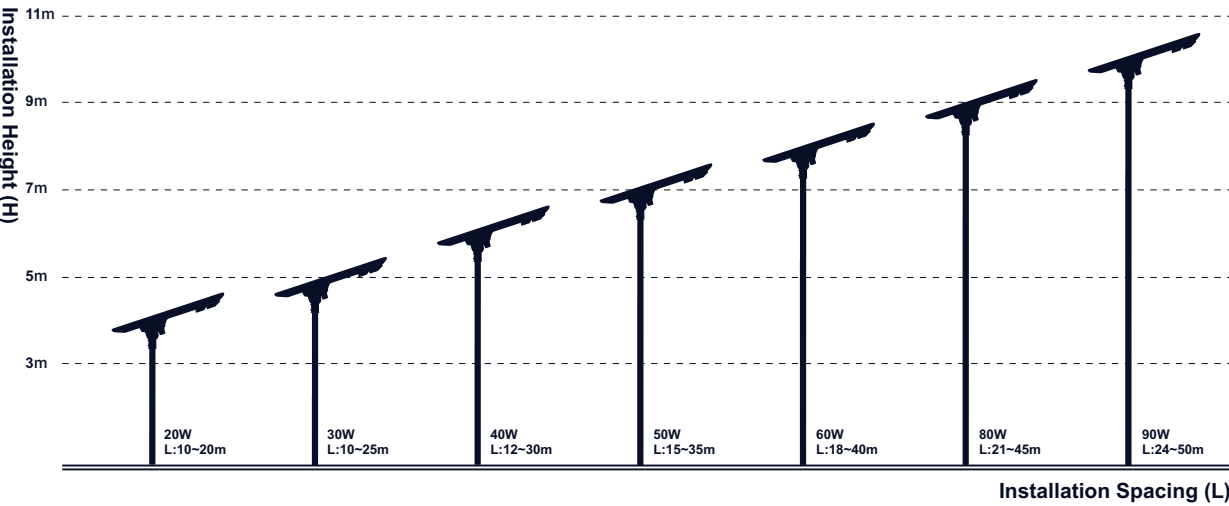
- High efficiency (up to 92%).
- Constant voltage output.
- No-Load power < 0.5 W.
- Input surge protection: DM 4KV, CM 6KV.
- All-around protection: OCP, OVP, SCP, OTP.
- IP67
- SELV output.



EPA VALUE

| Part#                                        | Power             | Horizontal Angle Solar Panel (°) | EPA (ft²) |
|----------------------------------------------|-------------------|----------------------------------|-----------|
| KS-STLS-I-20<br>KS-STLS-I-30<br>KS-STLS-I-40 | 20W<br>30W<br>40W | 0                                | 0.31      |
|                                              |                   | 5                                | 0.33      |
|                                              |                   | 10                               | 0.67      |
|                                              |                   | 15                               | 0.99      |
|                                              |                   | 20                               | 1.31      |
|                                              |                   | 25                               | 1.62      |
|                                              |                   | 30                               | 1.92      |
| KS-STLS-I-50<br>KS-STLS-I-60                 | 50W<br>60W        | 0                                | 0.36      |
|                                              |                   | 5                                | 0.44      |
|                                              |                   | 10                               | 0.88      |
|                                              |                   | 15                               | 1.31      |
|                                              |                   | 20                               | 1.74      |
|                                              |                   | 25                               | 2.14      |
|                                              |                   | 30                               | 2.54      |
| KS-STLS-I-80<br>KS-STLS-I-90                 | 80W<br>90W        | 0                                | 0.53      |
|                                              |                   | 5                                | 0.61      |
|                                              |                   | 10                               | 1.21      |
|                                              |                   | 15                               | 1.80      |
|                                              |                   | 20                               | 2.38      |
|                                              |                   | 25                               | 2.94      |
|                                              |                   | 30                               | 3.47      |

INSTALLATION REFERENCE







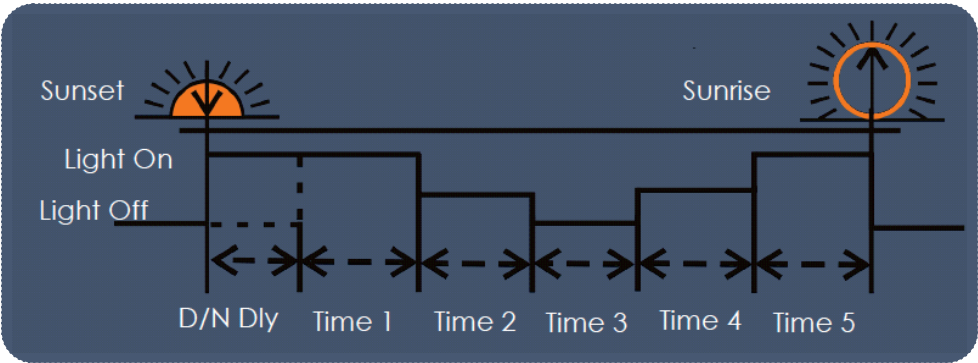
# SOLTECH CONTROLLER - B

## Regular MPPT Controller



### Five-Stage Mode

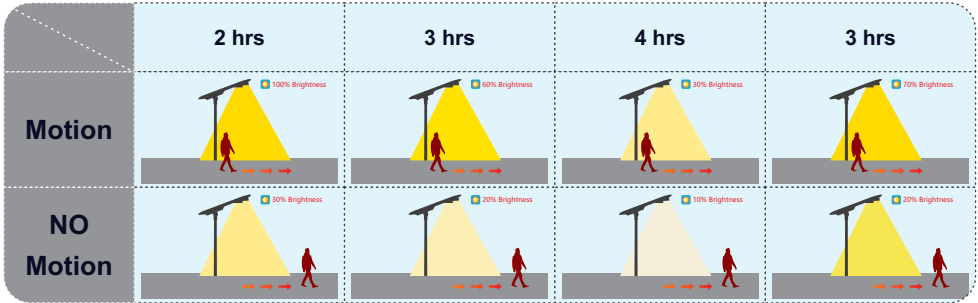
The lamps lighting divide into 5 stage, each stage time and dim can be setting according to demands. With diming setting, it is an efficient way to save energy, and keep the lamp working in best power and time.



### Motion Sensor Mode

Motion: 2 hrs-100%; 3 hrs-60%; 4 hrs-30%; 3 hrs-70%;

Without Motion: 2 hrs-30%; 3 hrs-20%; 4 hrs-10%; 3 hrs-20%;





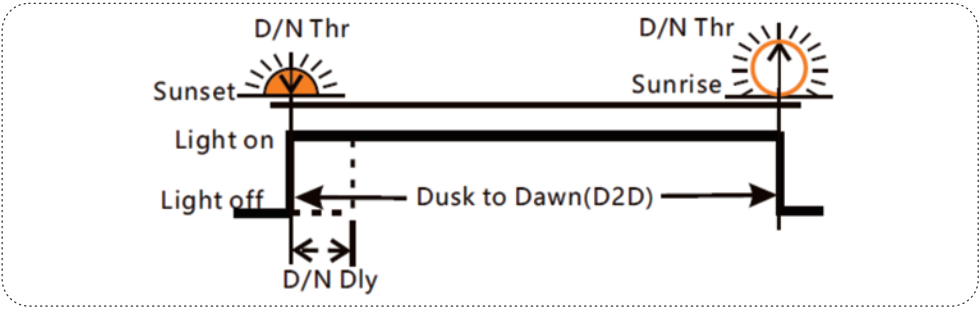
# SOLTECH CONTROLLER - C

## Hybrid MPPT Controller



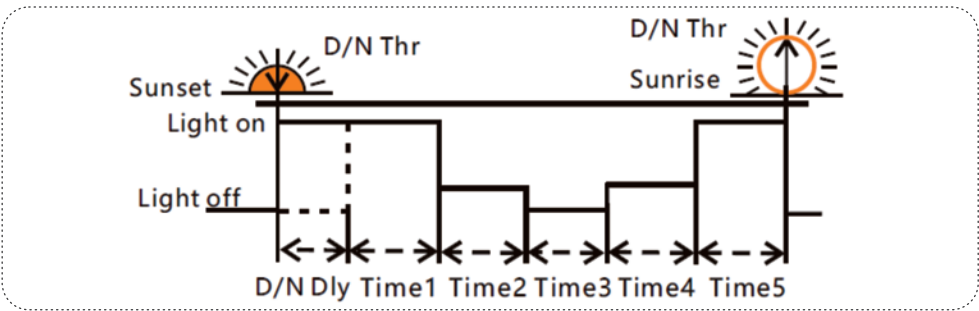
### Dusk to Dawn (D2D)

When fixture is set to D2D, it works in dusk to dawn mode. The fixture will turn on while the sun is down, as determined by the solar panel voltage.



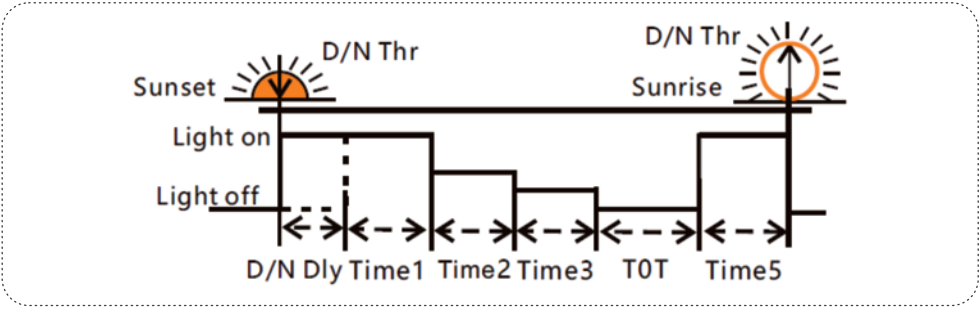
### Five-stage Night Mode

The lamps lighting divide into 5 stage, each stage time and dim can be setting according to demands. With dimming setting, it is an efficient way to save energy, and keep the lamp working in best power and time.



### TOT Mode (Can set the load on time before morning coming.)

When fixture is set to TOT then it will determine Time4 based on Time5 and previous data on the time of sunrise.







## MONO SOLAR PANEL



### Higher Durability

The multi-busbar design can decrease the risk of the cell micro- cracks and fingers broken.



### High Power Density

High conversion efficiency 23% and more power output persquare meter, by lower series resistance and improved light harvesting.



### PID Resistant

Tested in accordance to the standard IEC 62804, our PV modules have demonstrated resistancea gainst PID (Potential Induced Degradation), which translates to security for your investment.



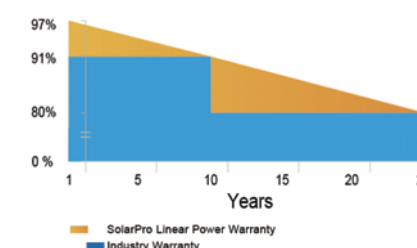
### Bigger Cells with better performance

A slight increase of the size of our cells, Boosts the performance of the newest modules by six percent on average.



### First-class Quality Assurance

- 10-year warranty for material and technology.
- 25-year linear power output warranty.



### Specifications\*

|                              |               |      |      |
|------------------------------|---------------|------|------|
| Maximum Power (Pmax/W)       | 55            | 75   | 105  |
| Open Circuit Voltage(Voc/V)  | 22.8          |      | 43.2 |
| Short Circuit Current(Isc/A) | 3.25          | 4.31 | 3.15 |
| Maximun Power Voltage(Vmp/V) | 18V           |      | 36V  |
| Maximum Power Current(Imp/A) | 3.1           | 4.2  | 2.9  |
| Module Efficiency(%)         | 24            |      |      |
| Output Tolerance(%)          | ±3            |      |      |
| Operating Temperature        | 40°C~+85°C    |      |      |
| Wind Load/Snow Load          | 2400pa/5400pa |      |      |
| NOCT                         | 45±2°C        |      |      |
| Temp Coefficient of Isc      | +0.046%/°C    |      |      |
| Temp Coefficient of Voc      | -0.275%/°C    |      |      |
| Temp Coefficient of Pmax     | -0.350%/°C    |      |      |

\*All specifications & parameters @25C° & subject to change without notice. All data tolerance +/- 5%



# HIGH PERFORMANCE BATTERY PACK GRADE A+ CELL

Po4 batteries have a higher energy density they can store more energy in a smaller and lighter package.  
This makes them ideal for applications where weight and space are a concern.

### Advantage of LiFePO4

- ◆ A Long Lifespan
- ◆ No Active Maintenance
- ◆ Lightweight Champion
- ◆ High Efficiency
- ◆ Safety
- ◆ High Discharge Rates
- ◆ Extreme Temperatures
- ◆ Rechargeable Multiple Times

### Specifications\*

| Capacity                    | 12Ah                                                                                                                                                                                               | 18Ah | 24Ah | 30Ah | 18Ah                                                                                | 24Ah |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------------------------------------------------------------------------------|------|
| Nominal Voltage             | 12.8V                                                                                                                                                                                              |      |      |      | 25.6V                                                                               |      |
| Charging Voltage            | 14.6V                                                                                                                                                                                              |      |      |      | 29.2V                                                                               |      |
| Load Voltage                | ≥12V                                                                                                                                                                                               |      |      |      | ≥24V                                                                                |      |
| Standard charging method    | 5A(CC)charging to 14.6V; After CV(DC 14.6V)<br>Charge until charging currents≤0.02C                                                                                                                |      |      |      | 5A(CC)charging to 29.2V; After CV(DC 29.2V)<br>Charge until charging currents≤0.02C |      |
| Max charging current        | ≤10A                                                                                                                                                                                               |      |      |      | ≤20A                                                                                |      |
| Max discharge current       | ≤10A                                                                                                                                                                                               |      |      |      | ≤20A                                                                                |      |
| Over current                | ≤10A                                                                                                                                                                                               |      |      |      | ≤20A                                                                                |      |
| Cut off discharge Voltage   | 10V                                                                                                                                                                                                |      |      |      | 20V                                                                                 |      |
| Operating temperature range | Standard LiFePO4 Charge:0°C to 60°C / 32°F to 140°F & Discharge:-20°C to 60°C / -4°F to 140°F)<br>Advanced LiFePO4 Charge:-20°C to 60°C / -4°F to 140°F & Discharge:-20°C to 60°C / -4°F to 140°F) |      |      |      |                                                                                     |      |
| Storage                     | -20 ~60                                                                                                                                                                                            |      |      |      |                                                                                     |      |
| Battery category            | LiFePO4                                                                                                                                                                                            |      |      |      |                                                                                     |      |
| Cycle life                  | ≥4000                                                                                                                                                                                              |      |      |      |                                                                                     |      |

\*All specifications & parameters @25C° & subject to change without notice. All data tolerance +/- 5%



### LiFePO4 Battery

2000–5000 Cycles

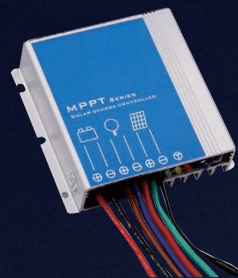
5-10 Years life

2.5~12.8kg

Environmentally friendly

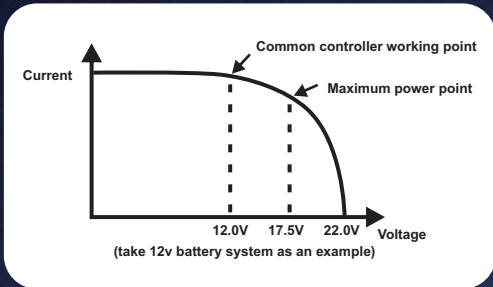


MPPT CHARGE CONTROLLER



Features

- Innovative Max Power Point Tracking(MPPT) technology,tracking efficiency >99.9%
- Full digital technology, high charge conversion efficiency up to 97.5%,discharge conversion efficiency up to 96.5%
- Can output constant current (output current can be set)
- 5 stages time and dimming can be adjusted
- Can read parameters and running status
- If battery voltage is low, it can be set to dimming
- Dimming start voltage and percentage can be set
- Day/Night threshold can adjust automatically
- AGM, Liquid, GEL and Lithium battery for selection
- 0 Charging Protection(Lithium)
- When BMS power off because of LVD, it can activate the system automatically
- Four stages charge way: MPPT, boost, equalization, float
- IP67, Strong and durable aluminum caseFull automatic electronic protect function



Indicator Functions

| LED        | Status                | Function                                           |
|------------|-----------------------|----------------------------------------------------|
| Green LED  | On                    | Solar panel is correctly connected,but not charged |
|            | Fast flash(0.1s/0.1s) | Charging                                           |
|            | Flash(0.5s/0.5s)      | Equal or Boost Charging                            |
|            | Slow flash(0.5s/2s)   | Float Charging, Lithium constant voltage charge    |
| Yellow LED | Off                   | Over voltage protection                            |
|            | On                    | Battery is normal                                  |
|            | Slow flash(0.5s/2s)   | Battery voltage is low                             |
|            | Fast flash(0.1s/0.1s) | Low voltage protection                             |
| Red LED    | Off                   | Work normal (Standard version)                     |
|            | On                    | The output power is 0                              |
|            | Super slow(0.2s/5s)   | Open circuit protection                            |
|            | Flash(0.5s/0.5s)      | Over temperature                                   |
|            | Fast flash(0.1s/0.1s) | Short circuit or Over current protection           |

Specifications\*

|                    |                           |                                             |                                          |                        |           |
|--------------------|---------------------------|---------------------------------------------|------------------------------------------|------------------------|-----------|
| Battery Parameters | System Voltage            | 12V                                         | 12V/24V                                  | 12V/24V                | 12V/24V   |
|                    | Max Charging Current      | 8A                                          | 10A                                      | 15A                    | 20A       |
|                    | Battery Type              | Lithium                                     |                                          |                        |           |
|                    | Charging Volt. Target     | 10.0~17.0V<br>(Programmable, default:12.6V) | 10.0~32.0V(Programmable, default: 12.6V) |                        |           |
|                    | Charging Volt. Recovery   | 9.2~16.8V<br>(Programmable, default:12.4V)  | 9.2~31.8V(Programmable, default: 12.4V)  |                        |           |
|                    | Low voltage disconnect    | 9.0~15.0V<br>(Programmable, default:9.0V)   | 9.0~30.0V(Programmable, default: 9.0V)   |                        |           |
|                    | Low voltage reconnect     | 9.6~16.0V<br>(Programmable, default:9.8V)   | 9.6~31.0V (Programmable, default: 9.8V)  |                        |           |
|                    | 0 Charging protection     | Yes, Slow, No(Programmable)                 |                                          |                        |           |
| Panel Parameters   | Max volt on PV terminal   | 60V                                         |                                          | 55V                    | 55V       |
|                    | Max input power           | 100W~120W                                   | 130W/260W                                | 200W/400W              | 260W/520W |
|                    | Dusk/Dawn detect volt.    | 3.0~8.0V<br>Programmable                    | 3.0~20.0V Programmable                   |                        |           |
|                    | Day/Night delay time      | 0~30min<br>Programmable                     | 0~30min Programmable                     |                        |           |
|                    | MPPT tracking range       | Battery Voltage +1.0V ~Voc×0.9              |                                          |                        |           |
| Load Parameters    | Output Power              | 1~60W                                       | 10~60W/20~120W                           | 10~90W/20~180W         |           |
|                    | Output Voltage            | 20 ~ 55V                                    | 15~60V/35~60V                            | 20~55V/30~55V          |           |
|                    | Current setting range     | 0.15~3.0A<br>Programmable                   | 0.15~4.0A<br>Programmable                | 0.15~6.0A Programmable |           |
|                    | Min current               | 100mA Dimming                               |                                          |                        |           |
|                    | Current precision         | ±2%                                         |                                          |                        |           |
|                    | Dimming                   | 0~100% Programmable                         |                                          |                        |           |
|                    | Voltage of start dimming  | 10.0~17.0V(Lithium)                         | 10.0~32.0V(Lithium)                      |                        |           |
|                    | Dimming percentage        | 1~20% Programmable                          |                                          |                        |           |
| System Parameters  | Max tracking efficiency   | >99.9%                                      |                                          |                        |           |
|                    | Max charge conversion     | 97.50%                                      |                                          |                        |           |
|                    | Max LED driver efficiency | 96%                                         |                                          |                        |           |
|                    | Communication mode        | Infrared/2.4G/RS485                         |                                          |                        |           |
|                    | Induction mode            | Infrared Human Sensing/Microwave Sensing    |                                          |                        |           |
|                    | Self consumption          | 6~25mA                                      |                                          |                        |           |
|                    | Ambient temperature       | -35~+60℃                                    |                                          |                        |           |
|                    | Ambient humidity          | 0~100%RH                                    |                                          |                        |           |
|                    | Protection degree         | IP67                                        |                                          |                        |           |
|                    | Max Altitude              | 4000m                                       |                                          |                        |           |

\*All specifications & parameters @25C° & subject to change without notice. All data tolerance +/- 5%



# INSTALLATION NOTES

1. Due to variations in longitude and latitude at the installation site, the angle at which the sun's rays illuminate differs. During installation, it is crucial for the Soltech panel to be oriented towards the sun precisely at 12:00 noon. However, often due to factors like road direction and light poles, achieving this alignment becomes challenging. The solar panel must still maintain a horizontal position even if it can't be ideally oriented towards the sun at noon due to road lighting requirements.

Several conditions can lead to suboptimal functioning of standard lamps. Prior to making a purchase, it's important to communicate these factors to the salesperson and consider increasing the solar panel's power capacity:

- a. Any deviation below the horizontal plane of the solar panel, relative to the solar irradiation angle, will result in a significant decline in the solar panel's power generation efficiency.
- b. When installing solar lamps and lanterns, it's essential to avoid any obstacles that might block sunlight, such as trees or buildings.
- c. Natural elements like rain, ice, snow, dust, clouds, and bird droppings can reduce the solar panel's power generation efficiency.

Ensuring that the solar panel remains unobstructed by barriers like trees and buildings, and accounting for factors such as the solar panel's angle and external elements, are vital for optimal performance.

2. Install lamps at a considerable distance from areas prone to strong electromagnetic interference, such as high-voltage cables and high-power wireless transmission towers. These sources could potentially disrupt the lamp control system, leading to malfunctions and improper operation.

3. When the temperature drops below 0°C, the efficiency of lithium iron phosphate batteries for charge and discharge decreases. To prevent damage and the battery protection triggered by over-discharge, it's advisable to explain this to the sales

staff and consider increasing battery capacity before making a purchase.

4. Any environmental impact can result in a decline in the efficiency of solar panel power generation. Repeated discharge of the lithium iron phosphate battery might easily activate the protection mechanism, causing the lamps to stop functioning normally. Most lithium batteries can be restored to operation by disconnecting and reconnecting the battery-light source connection and the solar panel connection.

5. Once the battery protection has been deactivated and reactivated, our focus should be on identifying and resolving any natural environmental factors that compromise the efficiency of solar panel power generation, as well as minimizing the power consumption of the light source.

6. Install the lamps on days abundant with sunshine. The lamps are initially set to 30% power upon leaving the factory. Prior to installation and usage, ensure that the lamps can receive effective sunlight charging for at least 4 hours after activation. Failure to do so may trigger battery startup stress protection due to excessive discharge, leading to abnormal lamp operation.

7. The self-discharge and stress protection features of the lithium iron phosphate battery necessitate that if the lamp remains unused and uninstalled for a period of 60 to 90 days from the factory departure, it must undergo a 4-hour effective sun charging upon activation.

Instances where lamp functionality is compromised due to the aforementioned circumstances are not included in the warranty coverage. However, we are committed to assisting customers in identifying and analyzing the underlying causes, and devising plans for enhancements. It's important to note that lamps unable to activate after battery protection will not be covered by the warranty.

**KAISTAR®**

