ENSA™

Solar LED Street Lighting

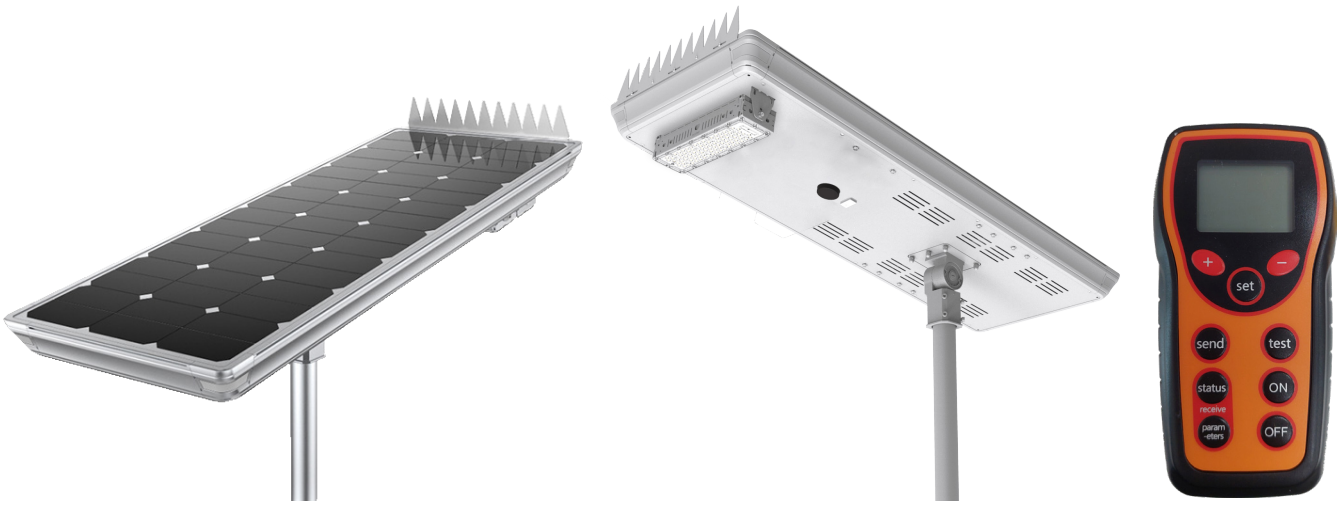
SSL-B Series Quick Install Guide

Version: ENSASSLB-Q123

1. Pre-Installation

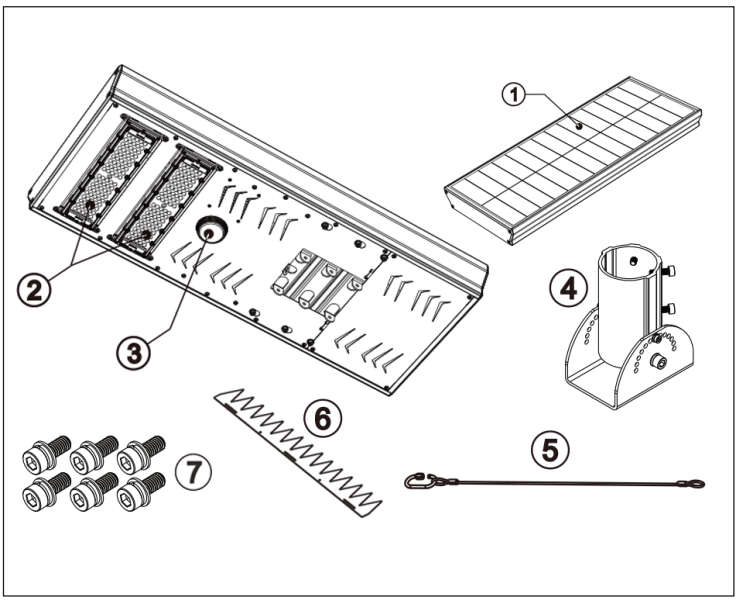
Thank you for purchasing a SSL-B Series Solar Street Light.
This install guide covers basic setup, installation and use of your light.
For more information & warranty details, please visit:
www.ensalife.com

1.1 System Overview



The ENSA™ SSL-B Series is comprised of motion-powered, solar-charged LED street lights, designed to deliver lighting to any outdoor location. These pole-mounted lights provide superb coverage with a wide beam in a cool white colour. The light can be set to always be active from dusk to dawn, or only when motion is detected with the adjustable motion sensor.

These lights are fully self-sufficient, not requiring any external cabling. This makes them excellent for use in remote locations such as rural roads, power stations & construction sites, as well as general use in streets, parks, schools, farms and more.



#	Component
1	Solar panel
2	LED light
3	Microwave sensor & RF Receiver
4	Lamp arm
5	Safety rope
6	Bird spikes
7	Screws

1.2 Function Overview

SSL-B Series Solar Lights feature three main components that govern the function of the system. They are the solar panel assembly (includes battery & solar controllers), the sensor assembly (including infrared remote receiver & microwave motion detector), and the LED light assembly with adjustable bracket. These components are tightly integrated in the operation of the entire system. See below for further explanation.

1.2.1 Solar Light Components

Solar Panel Assembly: This includes all solar panel components including the panel itself, battery, controllers, chassis & mounting arm.

The solar panel acts an ambient light sensor, controlling dusk/dawn switch functions when it no longer generates an adequate voltage from the sun. This setting can be configured in Section 4.

The battery is Lithium Iron Phosphate (LiFePO4), which has superior expected lifetime and temperature tolerance compared to standard Lithium Polymer batteries. It is also immune from thermal runaway conditions to prevent fires like standard LiPo batteries.

The mount arm of the solar panel offers 120° of tilt on a Ø50~60mm pole, with an angle compass for precise adjustment. It also has a spiked bird guard for the panel & a safety wire rope.

Sensor Assembly: The dark circle on the underside of the panel, the sensor assembly houses the infrared receiver for the remote control for light configuration.

It also houses the microwave motion detector. This detects motion in a circular area under the Solar Light in a total diameter of Ø15m when mounted at 10m above the ground.

Light Assembly: This comprises of a high efficiency LED array mounted on a 60° tilt-adjustable bracket to control light distribution. The array's mount position can be moved to better orient the light.

Fig. 1.2a
Underside of panel with detail on solar panel mounting arm, sensor assembly and LED light assembly.

1.2.2 Operation Process

The SSL-B Series Solar Light is a highly customisable solar system, but how it operates is simple. The following details the operation process of the SSL-B Solar Light after mounting.

1. During the day, the solar panel charges the battery. The LED light is off.
2. The solar panel detects that the sun has set. The LED light turns on.
3. The light is configured:
   - To be at set brightness at different time periods during the night **AND/OR**
   - Use the motion sensor to control brightness before & after movement is detected
4. The solar panel detects that the sun has risen. The LED light turns off.
5. The cycle repeats.

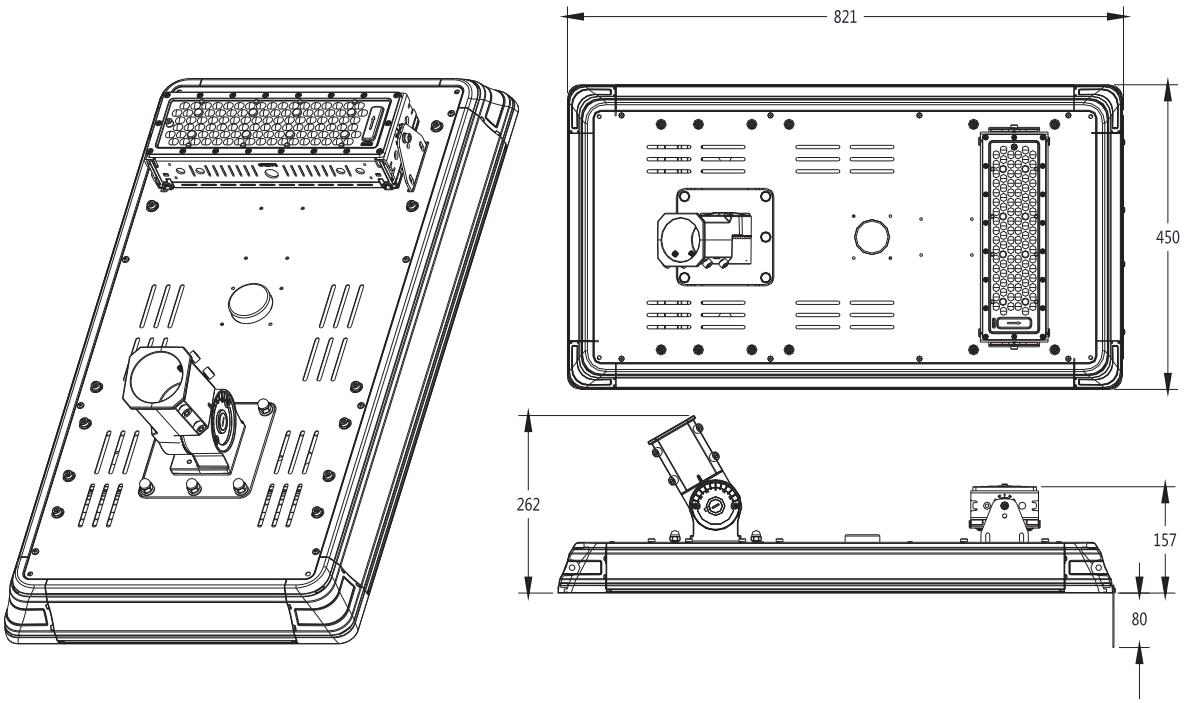
1.3 Model Specifications

Model		SSL-B20M	SSL-B30M	SSL-B50M	SSL-B60M
Product Image					
Series Name		SSL-B Series Motion Activated Solar LED Street Lights			
Light					
Light Output (max)		3900lm	5500lm	9400lm	11100lm
Luminous Efficacy		>180lm/W			
Colour Temperature		4000K natural white / 5700K cool white			
Beam Angle		145° x 75°		145° x 100°	
Rated LED Lifespan		50,000hrs			
LED Testing		LM80 / TM21 (available on request)			
LED Power Consumption (max)		20W	30W	50W	60W
Internal Battery		218Wh LiFePO4	320Wh LiFePO4	500Wh LiFePO4	1200Wh LiFePO4
Operating Voltage		12.8VDC	12.8VDC	12.8VDC	25.6VDC
Operating Time (max)		72~120 hours (intelligent mode, rainy weather)			120~168 hours (intelligent mode, rainy weather)
Light Bracket		Adjustable bracket angle -30° ~ 30°			
Solar Panel					
Panel Type		Monocrystalline silicon			
Panel Wattage		56W	90W	120W	180W
PanelConversionRate		≥21%			
Panel Bracket		Adjustable bracket angle -60° ~ 60°			
Rec. Install Height		5 ~ 7m	5 ~ 7m	8 ~ 10m	8 ~ 10m
Detection					
Motion Detection		Microwave motion sensor			
Detection Range		Ø8~15m (height: 5~10m)			
Light Mode Settings	Normal	Time period / Brightness			
	Morning	Time period / Brightness			
	Sensor	Time period / Brightness on motion / On-time delay / Brightness no motion			
General					
Ingress Protection		IP65			
Pole Diameter		Ø50~60mm			
Product Dimensions		821 x 450 x 161mm	1015 x 525 x 161mm	1321 x 525 x 161mm	1496 x 685 x 161mm

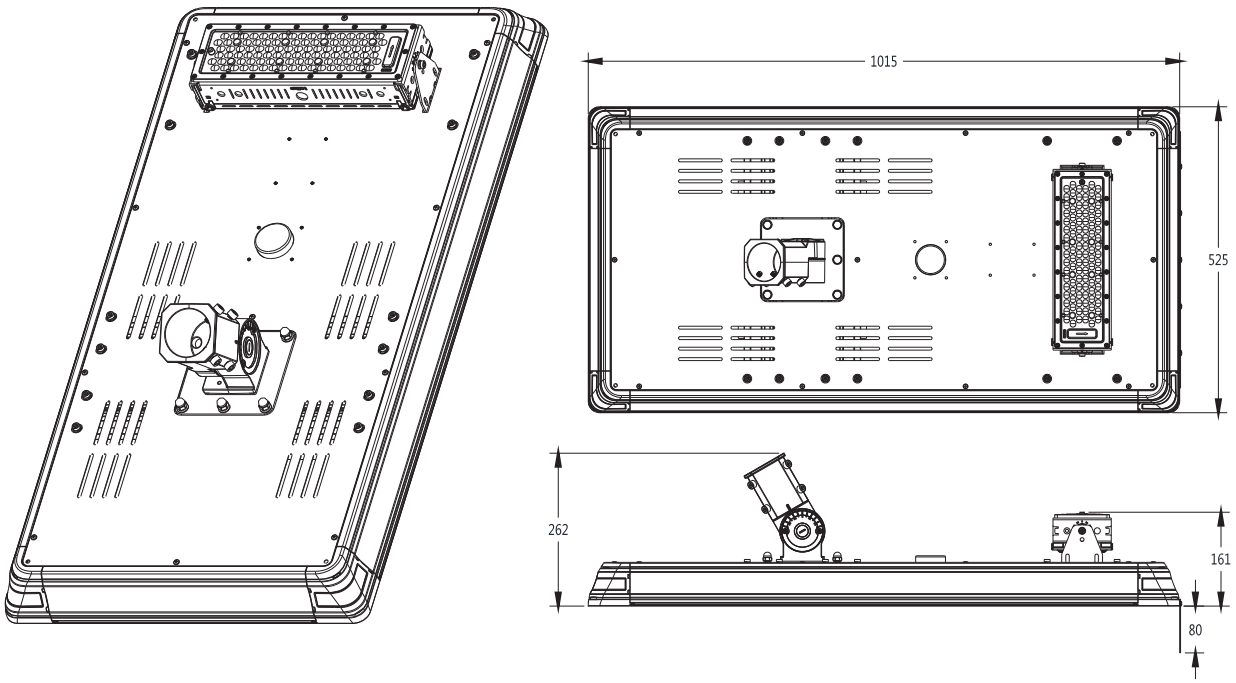
1.4 Solar Light Diagrams

Solar Panel Dimensions

SSL-B20MC

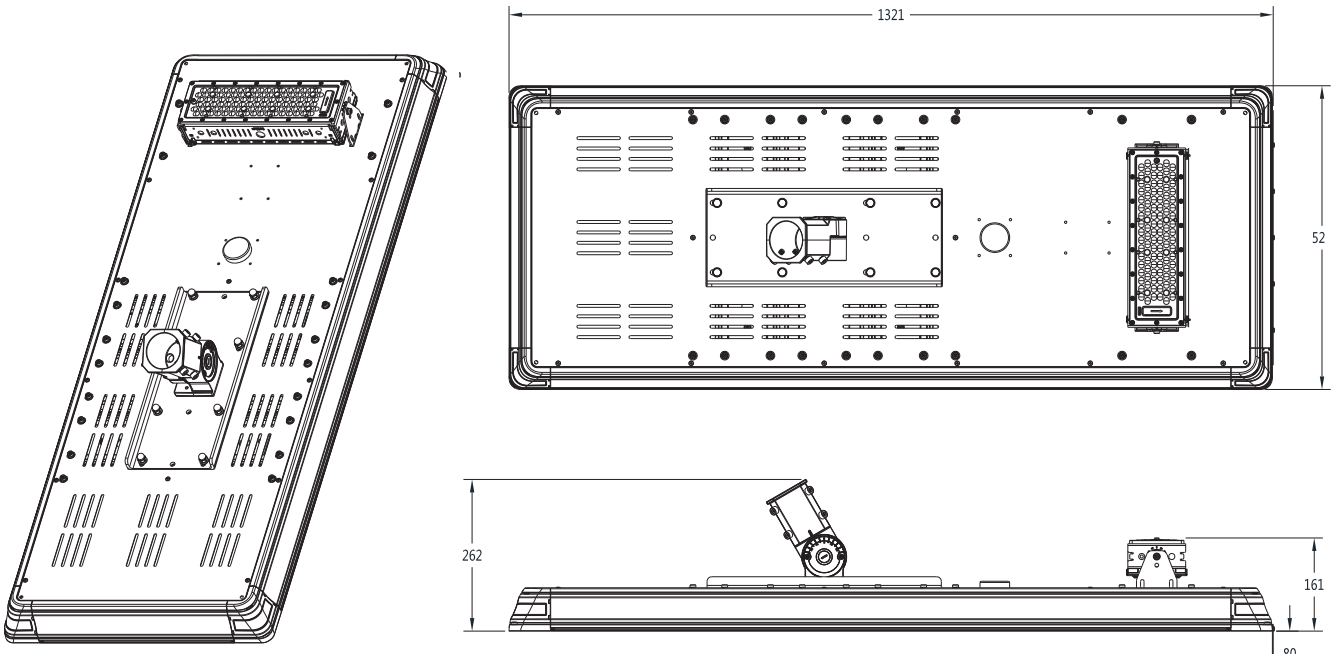


SSL-B30MC

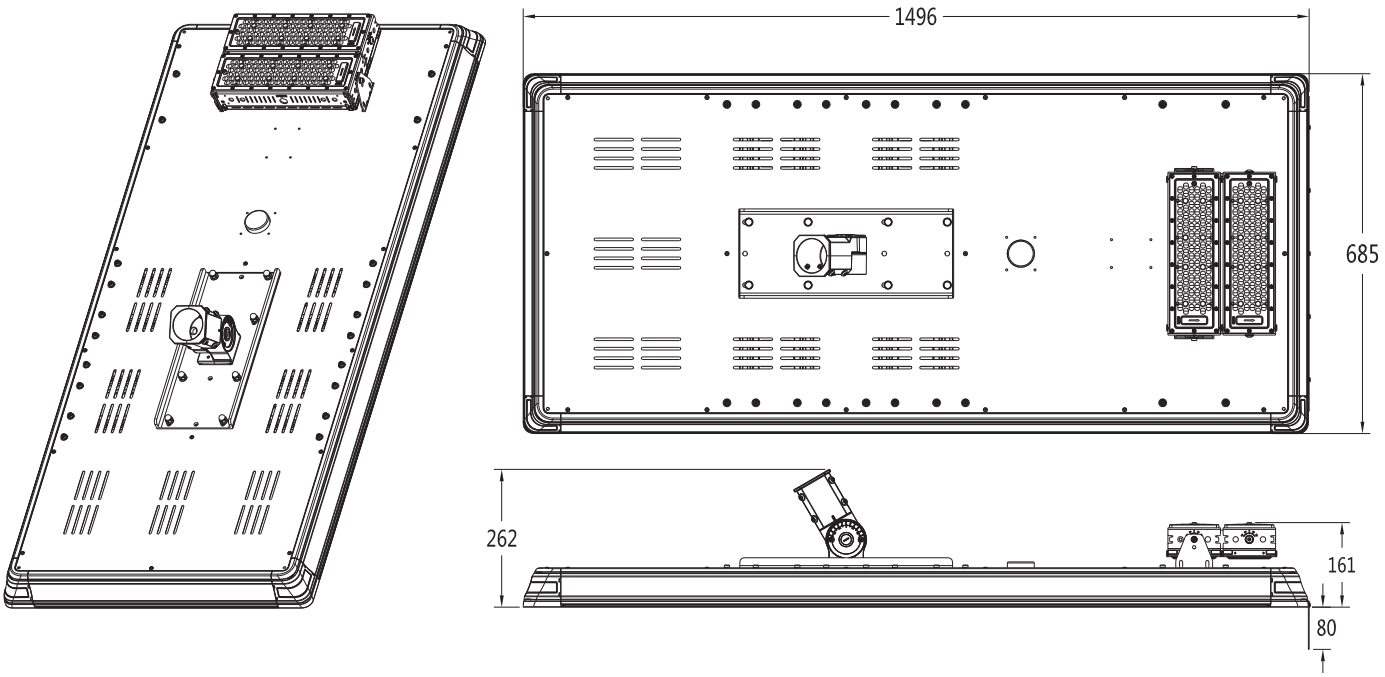


1.4 Solar Light Diagrams (continued)

SSL-B50MC



SSL-B60MC



2. Solar Light Mounting & Installation

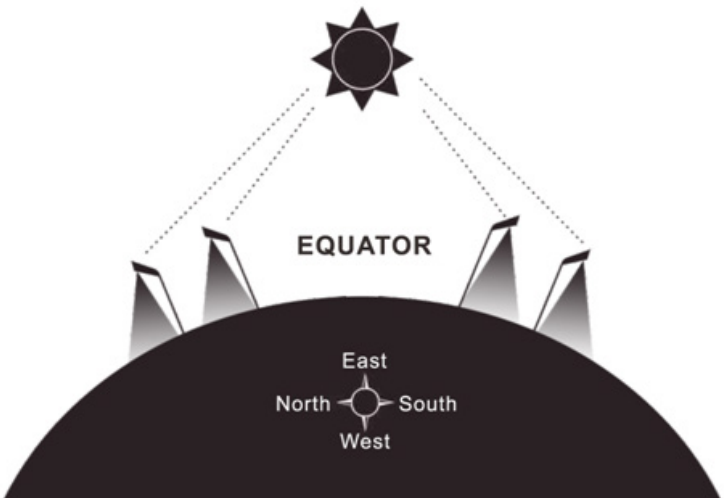
This section covers choosing an installation site, selecting a pole for the Solar Light, mounting the Solar Light to the pole and adjusting the Solar Light for optimal use.

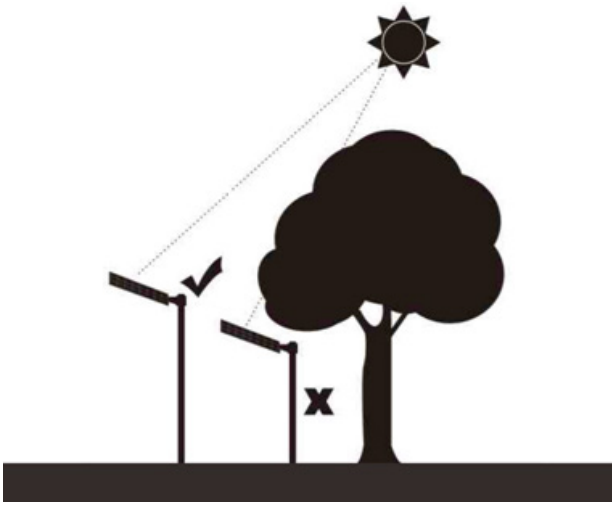
- The Ingress Protection rating of this product is IP65, which is suitable for outdoor lighting, but cannot be soaked in water.
- The solar panel is fragile, do not scratch or strike the solar cells.
- Do not clean the solar panel with an abrasive sponge or soap. Use solar panel cleaning kits.
- The longest storage period of solar street lamps is 6 months after they are fully charged. If they are transported or stored for a long time, they need to be checked and recharged, otherwise the battery may be damaged.
- Charging temperature: 0~60°C. Discharge temperature: -20~60°C
- Do not store the product in a temperature exceeding 45°C.

2.1 Choosing an Installation Site

Follow these guidelines to ensure you get the best use out of your Solar Light.

- To maximise exposure to the sun, solar panels must be installed to tilt north in the southern hemisphere and south in the northern hemisphere.
- The Solar Light should not be installed in a location that blocks sun exposure by buildings or trees.
- See Section 2.4 for more detail.





2.2 Choosing a Pole & Foundation

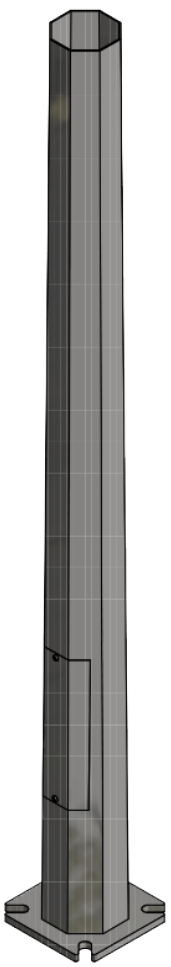
When selecting a pole and foundation to install the solar panel on, there are several requirements to keep in mind:

- Using a **tapered pole** is recommended.
- The pole's height should be equal to or higher than the solar panel's **recommended install height -** this is **5 ~ 7m for 20W/30W** models & **8 ~ 10m for 50/60W** models.
- The pole must have a spigot size of **60mm** (adapters available)**.**
- The pole must be **strong enough to hold the weight of the solar panel** - this can range up to **39kg** (60W model).
- The foundation and fasteners should be strong enough resist high wind speeds. A shallow concrete foundation is recommended.

ENSA™ can supply two pole models that fit these install requirements. These galvanised poles include 4 x M20 foundation bolts (600 x 25mm), a bolt template ring and 60mm spigot adapter.

- **SLR-POL4** (4.5m / 14.7ft)
- **SLR-POL6** (6.0m / 19.7ft)

Consider frangible poles depending on requirements. Tilt poles may help with installation.

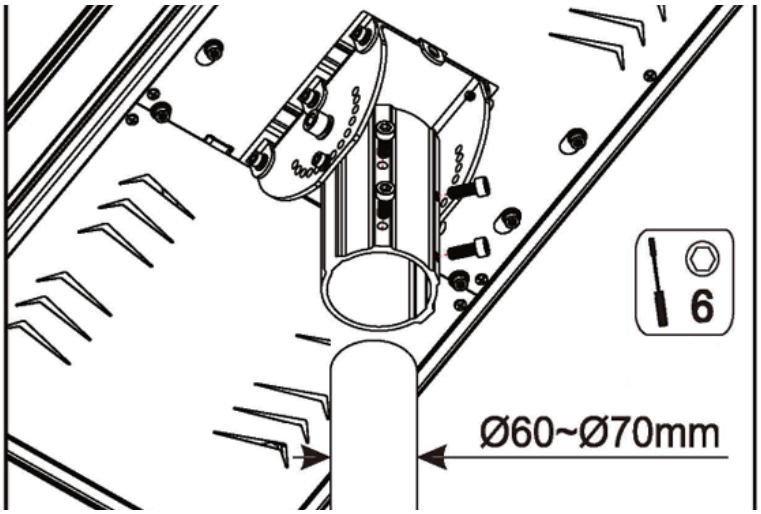


2.3 Mounting the Solar Panel

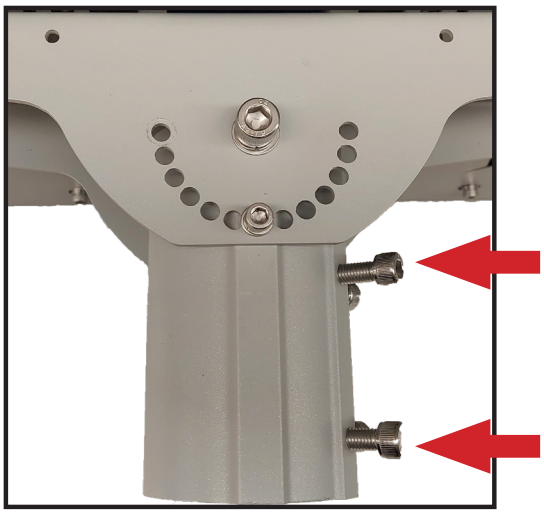
Caution: Solar panel **must** be installed so it is in **direct sunlight all day**.

Any shading will greatly reduce the solar panel's performance.

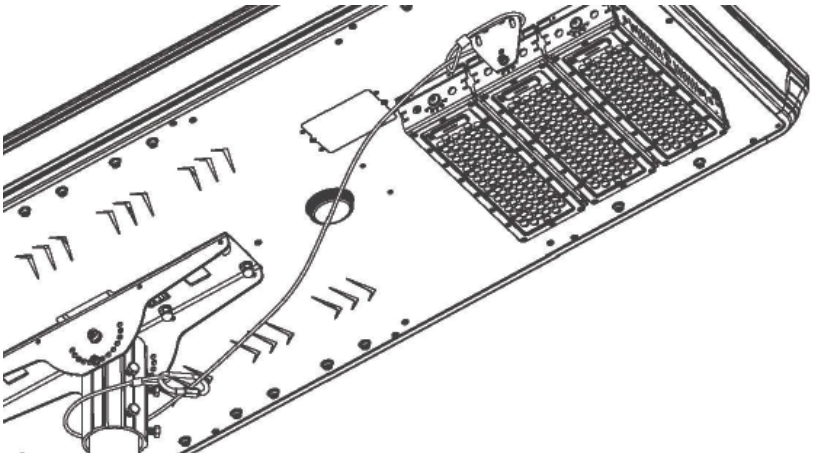
Mounting the Panel



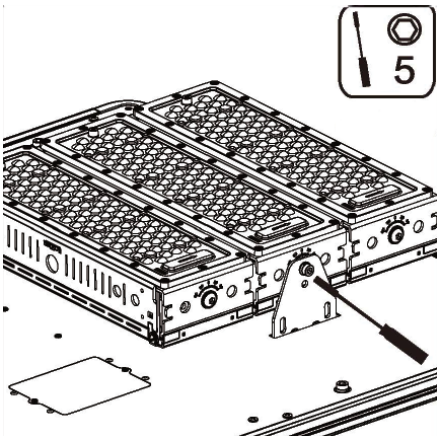
Safety Rope

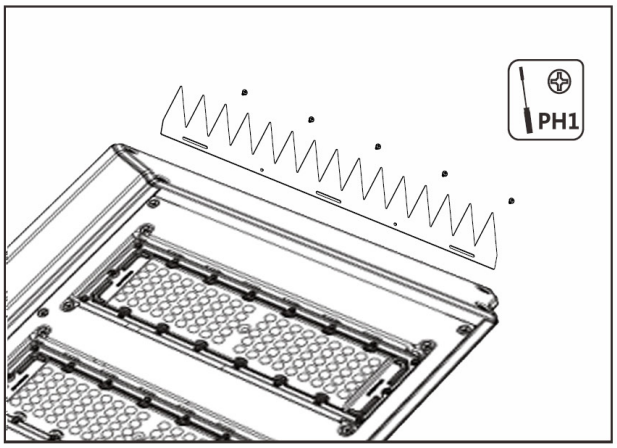


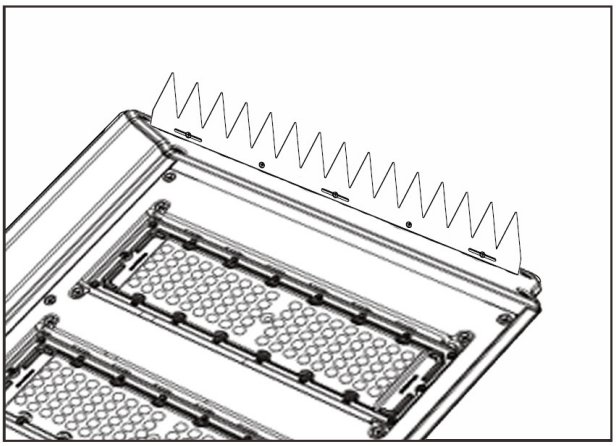
Adjust Light Angle



Optional Bird Spikes







2.4 Adjusting the Solar Panel Tilt Angle

To ensure your solar panel absorbs as much light as possible, it's important to adjust the solar panel angle.

For Australia and all locations in the southern hemisphere, the lower edge of the solar panel must point **north**. Locations in the northern hemisphere must have the lower edge of the panel pointing **south**.

City	Angle
Adelaide	55°
Brisbane	48°
Darwin	10°
Perth	52°
Tasmania	61°
Sydney	54°
Victoria	56°

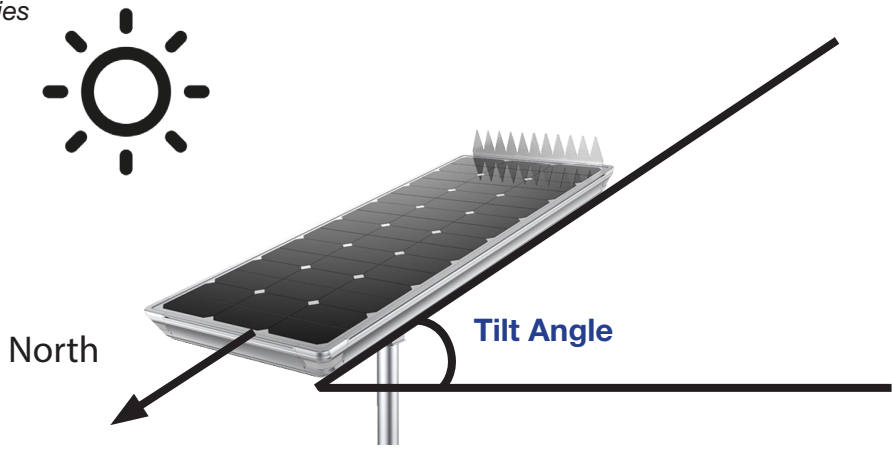
Fig. 2.4a
Optimal Winter Tilts for Australian Captial Cities

We recommend adjusting the solar panel to a tilt angle that is optimised for winter. This is to achieve better light absorbtion in winter and a consistent amount of light absorbtion year-round.

The formula for calculating the optimal winter tilt is **(Installation Latitude x 0.89)+24**, when the latitude is above 25°, or **Installation Latitude x 0.87** if the latitude is less than 25°. Refer to Fig 2.5a for the optimal Winter Tilts for Australian Capital Cities.

For example Sydney has a latitude of 33.8688° S, therefore the panel should be tilted directly north with an angle of 54° (33.8 x 0.89 = 30, then 30 + 24 = 54°)

If you are unable to use the optimal winter tilt or it is impractical to tilt the panel north, while still illuminating the desired area, set a tilt angle of 5° and rotate the unit to the best lighting position. Note that this will reduce charging performance, which may reduce operating time.



How to adjust tilt angle:

1. Use a 5mm Allen Key to remove the two panel adjustment bolts. *(Fig. 2.5b)*. **Warning: The panel will freely move after the bolts are removed.**
2. Once the the bolts are removed, tilt the panel to the desired angle. Replace the bolts after adjusting the angle to secure the solar panel in place.
3. Use a 8mm Allen Key to tighten the large bolts above the angle adjuctment bolts.

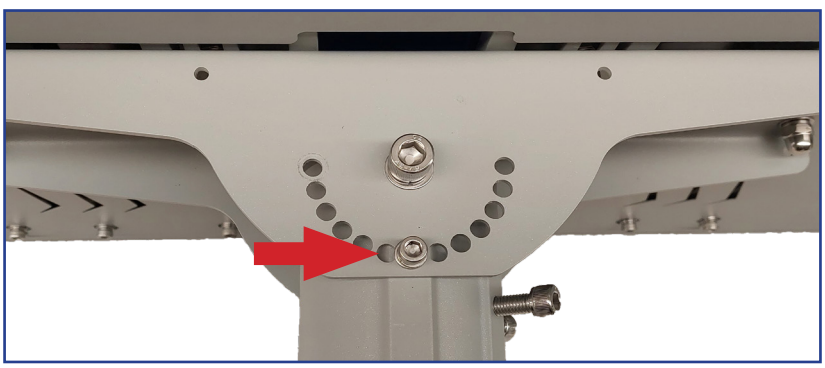


Fig. 2.4b
Solar panel angle bolt

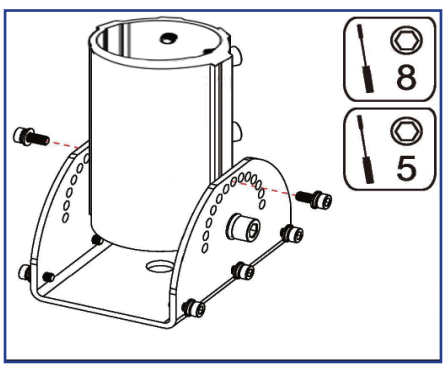


Fig. 2.4c
Solar panel angle adjustment

3. Connect the Battery

The Solar Light is shipped with the battery disconnected from the system.

To activate the Solar Light, this battery must first be reconnected. To reconnect:

1. Remove the “Battery Disconnected” sticker. *(Fig 2.8a)*
2. Find the two cables labeled “Battery”. *(Fig 2.8b)*
3. Taking note of the cable key, connect the two cables. *(Fig 2.8c)*
4. Twist the waterproof locking connector until tight. *(Fig 2.8d)*
5. Install the solar panel connection cover, included in the solar panel accessory bag. *(Fig 2.8e)*

Once the battery is connected, a red LED will flash slowly inside the black sensor on the solar panel. If the battery is connected correctly and this does not occur, this likely indicates low battery voltage - place the system in direct sunlight for at least 1 hour to charge before continuing.

Fig. 3.1a

Fig. 3.1b

Fig. 3.1c

Fig. 3.1d

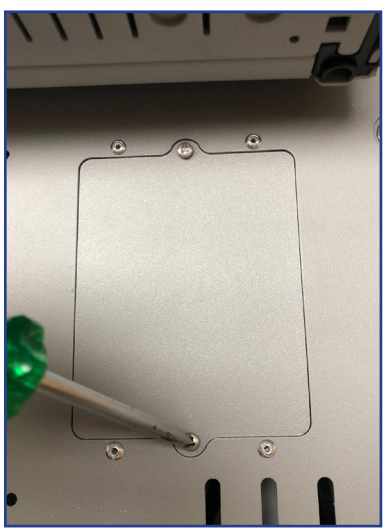


Fig. 3.1e

4. Advanced Solar Light Configuration

4.1 Remote Overview

This section covers how to fully configure the motion-activated 20W/30W/50W/60W LED light on the Solar Light. This is recommended only for advanced users.

Warning: Modification to the LED light and sensor default values may increase power consumption, affect light uptime and more.

Incorrectly editing settings can permanently damage the solar panel, battery and/or LED light. Performing changes to contrary to those in this guide may cause damage to the panel not covered under warranty.

All configuration of the solar panel & LED street light is performed with the included RF remote. The remote interacts with the panel's RF receiver to control settings (the dark circle on the underside of the panel).

The remote control allows you to adjust solar panel, battery & sensor settings and then transmit them to apply the configuration to the solar system. See initial menu options and button functions below:

Fig. 4.1a
Solar panel remote control

Remote Control Button Functions

set	**Set**	Press to edit values, then press again to confirm changes.
+	**+**	Press to scroll down or decrease value.
−	**-**	Press to scroll down or increase value.
send	**Send**	Press to transmit parameters to the control board.
test	**Test**	Press to test the light module. Toggle between 100%, 70%, 50%, 30% and 0% brightness.
status	**Status**	Press to check the current status of the control board.
param -eters	**Parameters**	Press to read the current values set on the control board.
ON	**ON**	Press to allow the control board & Light to function at night time.
OFF	**OFF**	Press to set the control board & light to enter sleep mode at night time. **Warning: If this is pressed, the remote will not communicate with the control board at night time. Press ON during daylight hours to fix this.**

When using the remote to communicate with the panel, the remote will display an icon in the top right corner (Fig 5.1b) to indicate the current send state (Sending, Send Succeeded, Send Failed). Three beeps indicate that the remote was unable to communicate with the panel. A long single beep indicates that the communication was successful.

Fig. 4.1b
Remote Send States

4.2 Settings Detail

Each SSL-B Series Solar Light has default factory settings for light configuration and battery configuration. Below are the functions of each setting in the **SysConfig** menu and the solar system default settings . Before adjusting solar panel and light settings, familiarise yourself with the setting definitions below.

Warning: Changing settings without proper understanding of their function can permanently damage the solar panel, battery and/or LED light. Use Section 4.2 as a reference only. Follow instructions in Section 4.3 before modifying any settings on your SSL-B Series model. Contact ENSA for more information.

Name	Remote Title	Description	Settings	Default Settings
Battery Type	BatType	Type of battery installed in the solar panel	Li 24 / Li12 / Li6 / Li3 / Lead	**SSL-B60MC:** Li24 **SSL-B50MC:** Li12 **SSL-B20MC:** Li6 **DO NOT change this parameter**
Sensing Delay	S-D-Time	Countdown timer after last detected motion where light output stays at **Light Ratio** setting before switching to **Idle Ratio** setting. *See the next page for more details.*	No / 1S ~ 60S / 2M ~ 60M	**All Models:** 60S
PV Wake Up	PV-Wake	TBA	Yes / No	**All Models:** Yes
Light Control Voltage	L-Con-V	The solar panel acts as an ambient light sensor. Once the solar panel voltage drops below the **Light Control Voltage**, the first **Time Period/Light Ratio** will begin after **Light Control Delay** has elapsed.	1 ~ 11V	**SSL-B60MC & SSL-B50MC:** 5V **SSL-B20MC:** 4V
Light Control Delay	L-Con-DT	The amount of time that must elapse after the solar panel voltage drops below the **Light Control Voltage** before the first **Time Period/Light Ratio** will begin.	5S ~60S / 2M ~ 60M	**All Models:** 60S
Over Discharge Voltage	Over-DV	Battery cut-off voltage. When the battery voltage falls below this value, output will be disabled.	2.0V ~ 17.0V	**SSL-B60MC & SSL-B50MC:** 11.5V **SSL-B20MC:** 5.75V **DO NOT change this parameter**
Over Discharge Recovery	Over-DRV	Minimum voltage for the battery to start. Battery output is enabled or resumed from cut-off when battery voltage is above this value.	2.0V ~ 17.0V	**SSL-B60MC & SSL-B50MC:** 12.5V **SSL-B20MC:** 6.25V **DO NOT change this parameter**
Charge Voltage	Chg-Volt	Battery overcharge voltage. To protect the battery from overcharging, the battery stops charging when it is above this voltage.	2.0V ~ 17.0V	**SSL-B60MC & SSL-B50MC:** 14.4V **SSL-B20MC:** 7.2V **DO NOT change this parameter**
Charge Recovery	Chg-CR-V	When the battery level falls below this value, the battery will resume charging.	9.00V ~ 25.00V	**SSL-B60MC & SSL-B50MC:** 13.8V **SSL-B20MC:** 6.9V **DO NOT change this parameter**
Low Temp Change	Cold Chg	Low temperature cutoff	0°C ~ -40°V	**All Models:** -35°
Low Temp Work	Heatwork	High temperature cutoff	40°C ~ 90°V	**All Models:** 65°
Load Current	LED-Cur	Set the constant current output level.	0.14A ~ 10.0A	**SSL-B60MC:** 1.75A **SSL-B50MC:** 2.7A **SSL-B20MC:** 2.18A
Power Saving	SmartPow	When turned on, the battery will adjust power output automatically to save energy.	High / Mid / Small / No / USE	**All Models:** USE
Derating Start Value	S-M-StaV	Voltage where the control board will begin to reduce the power output from **Load Current** to **Minimum Current** to save energy.	7.5V ~ 17.0V	**SSL-B60MC & SSL-B50MC:** 12.6V **SSL-B20MC:** 6.3V
Derating End Value	S-M-EndV	Voltage where the contorl board will have reduced the power output to **Minimum Current** to save energy.	7.5V ~ 17.0V	**SSL-B60MC & SSL-B50MC:** 11.6V **SSL-B20MC:** 5.8V
Minimum Current	Min-Cur	The minimum constant current output level		**All Models:** 0.1A
Load Parameters	LoadPowSet	Enter the Load Parameters section. *See the next page for more details.*	-	-
Factory Reset	Re-deflt	Reset remote back to factory parameters.	Yes / No	**All Models:** No

Load Parameters

The Load Parameters section will change depending on on how **Sensing Delay** is configured. The first **Time Period** begins once sunset has been detected via **Light Control Voltage**. The second Time Period begins once the first Time Period has elapsed.

If **Sensing delay** is set to **No** the light will be **Time Control** mode. In Time Control Mode the light you can set the **Time Period** (1st-9thTime) and **Light Ratio** (1st-9thPower) to determine the light brightness for designated time periods.

If **Sensing Delay** is set to a second or minute value (e.g 20S), the light will be in **Sense Mode**. In Sense Mode you can set the **Time Period** (STime1-9), **Light Ratio** (S-C-Pow1-9) and **Idle Ratio** (S-L-Pow1-9) to determine the light brightness when movement is detected (**Light Ratio**) and the light brightness when motion has stopped being detected and Sensing Delay has elapsed (**Idle Ratio**).

Time Control Mode

Name	Remote Title	Description	Settings	Default Settings
(Time) Time Period	1st-9thTime	User-programmable light on/off schedule. Maximum 15 hours for each setting. Time intervals begin once the sun has set.	00.00 ~ 15.00	**All Models:** 1stTime: 6.00 2ndTime: 4.00 3rdTime: 8.00 4th-9thTime: 0.00
(Time) Light Ratio	1st-9thPower	Set light output (%).	0% ~ 100%	**All Models:** 1stPower: 100% 2ndPower: 60% 3rdPower: 100% 4th-9thPower: 0%
(Time) Morning Light Time	MorTime	The time period the light will be on for during daylight hours.	00.00 ~ 15.00	**All Models:** 0.00
(Time) Morning Light Ratio	MorPower	Set light output (%) during the Morning Light Time period	0% ~ 100%	**All Models:** 0%

Sense Control Mode

Name	Remote Title	Description	Settings	Default Settings
(Sense) Time Period	STime1-9	User-programmable light on/off schedule. Maximum 15 hours for each setting. Time intervals begin once the sun has set.	00.00 ~ 15.00	**All Models:** S-Time1: 6.00 S-Time2: 4.00 S-Time3: 8.00 S-Time4-9: 0.00
(Sense) Light Ratio	S-C-Pow1-9	Set light output (%) for when movement is detected.	0% ~ 100%	**All Models:** S-C-Pow1: 100% S-C-Pow2: 60% S-C-Pow3: 100% S-C-Pow4-9: 0%
(Sense) Idle Ratio	S-L-Pow1-9	Set light output (%) after last detected movement and after **Sensing Delay** has elapsed.	0% ~ 100%	**All Models:** S-L-Pow1: 30% S-L-Pow2: 20% S-L-Pow3: 30% S-L-Pow4-9: 0%
(Sense) Morning Light Time	MorTime	The time period the light will be on for during daylight hours.	00.00 ~ 15.00	**All Models:** 0.00
(Sense) Morning Light Ratio	S-C-Pow	Set light output (%) for when movement is detected during the **Morning Light Time** period	0% ~ 100%	**All Models:** 0%

4.4 Change LED Light Settings

1. Point the remote control at the solar panel's black sensor and scroll to the **Load Pow Set** (Load Parameters) and press **Set** to enter the system configuration menu.

- Use and to scroll.
- Press **Set** to begin editing values. The value will be shown in reverse colour.
- Use and to change the value.
- Press **Set** again to confirm.

Note: The remote will power off automatically if no key is pressed for 3 minutes.

Nine periods of time can be set to turn on the solar panel LED light. These periods can be set with a min. of 0 and max. of 15 hours. *(9 hours by default - refer to 5.2 Settings Detail)*

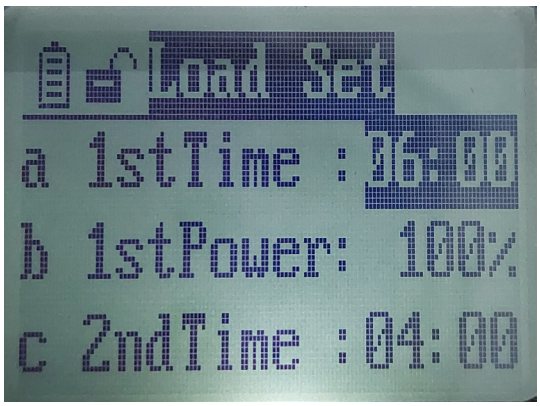


Fig. 5.4a
Time activated light settings

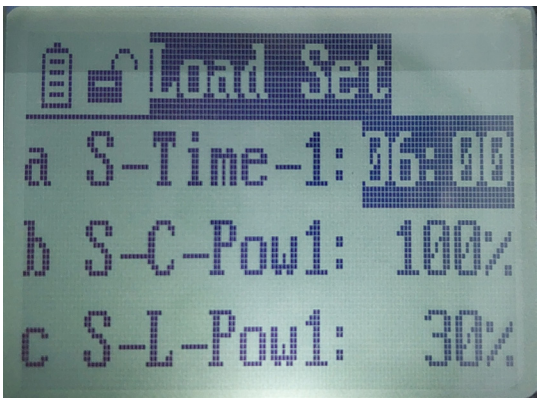


Fig. 5.4b
Sense activated light settings

2. Point the remote control at the solar panel's black sensor and press **Send Key** to update the solar panel with your new configuration. If you hear a long beep, the configuration settings are transmitted successfully.

4.5 Disable LED Light

To disable the LED light, simply change the **Sensing Delay** to **No.** Then set each time period to 0 hours, and each light ratio to 10%.

4.6 Lock/Unlock the Remote Control

After setup has been completed, you can lock the remote control to prevent settings from being accidentally changed, or changed by somebody else.

To Lock/Unlock the remote control, press the **Off** and **+** buttons together for three seconds.

When the remote gives two short beeps, the remote is now locked. Repeat these steps to unlock the remote.

4.7 Remote Control Type Selection

If the remote has been reset via the Factory Reset option, the Remote Control Type will need to be reconfigured before it can communicate with the panel.

Press the and buttons together for three seconds to open the **Remote Control Settings** (RemotSet) page.

Set **CommType** to **RF** and **RF-Dst** to **10**. **Cur-Pasw** should be **0000**. If it has been changed, use the **Chg-Pasw** option

4.8 Check Solar Panel Status

Current Run State

To check the solar panel's **current** state press **status**, (or press and hold **status** for three seconds and select **RunState**) This will show info such as photovoltaic voltage, battery voltage, output voltage, current and power, temperature and total operating time in minutes and more.

Name	Remote Title	Description
System State	SysState	On connecting to the panel, the Solar Panel Status can be in 3 states.
		DCHG: When the Solar Light is on
		FULL: When the Solar Panel is fully charged
		CHG: When the Solar Panel is charging
		OV-D: When the system is below **Over Discharge Voltage**
		L-OPN: when the remote hasn't connected or the system is above **Charge Voltage**
Battery Voltage	BatVolt	Battery voltage as measured by the charge controller output.
Photovoltaic Voltage	PV-Volt	Solar panel voltage as measured by the charge controller input.
Charge Current	Chg-C	Current being supplied to the battery.
Charge Power	Chg-P	Power being supplied to the battery.
Charge Time	Chg-AH	Ah charged during this session.
Load Voltage	LoadVol	Voltage being supplied to the LED light.
Load Current	LoadCurr	Current being supplied to the LED light.
Load Power	Load-P	Power being supplied to the LED light.
Lighting-up Time	Light-T	Total running uptime of the Solar Light, measured in hours & minutes.
Sensing Time	Sensor-T	Total running time the sensor has detected movement, measured in hours & minutes.
Discharge Ah	DisC-AH	Ah discharged during this session.
Ambient Temperature	Temp	Temperature inside the Solar Light.
Running days	RunDays	Total running uptime of the Solar Panel, measured in hours & minutes.

Notes

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Note:

All products, designs and software here are subject to change without prior written notice.