



## SolarBarn lighting for sea containers and unpowered sheds

Basic Components of SolarBarn solar lighting systems



**Solar Panel**  
Crystalline solar modules use photovoltaic cells to generate DC electricity from the sun



**Battery**  
12 volt battery stores electricity produced by the solar panel to power the lights when required



**Solar Regulator**  
Solar voltage output controller regulates the battery charging procedure



**Led Lights**  
Light emitting diodes produce light without creating wasteful heat

### Features & Specifications

#### Solar panel

Solar panels are mono-crystalline with toughened glass and sturdy aluminium frames, they are sized to recharge daily battery usage plus 20% to make up for depleted reserves used during cloudy days. Portable solar panels or light weight solar panels (2 mm thin) can also be supplied.

#### Battery

Batteries are sealed and are safe to use indoors. They are sized to provide the required daily power plus reserve for 2 days autonomy per week to provide power during cloudy days.

#### Solar panel mountings

Flush mount brackets are usually supplied to mount the solar panel on a metal roof, but a tilt mounting kit for level roofs or pole mounting bracket can be supplied instead.

#### Lights

Led lights are recommended as they are durable and efficient. Our standard kits use rigid strip LEDs, but you may choose any type such as standard 12V light bulbs, worklights or floodlights. Any combination can be used.

#### Light control

Our standard kits are controlled by a motion sensor with a manual override (bypass switch) but you may choose a manual on/off switch or a timer switch.

#### Wiring & assembly

Cables are fitted with plug-in connectors and are labelled to ensure there is no confusion during assembly. Detailed instructions are included

**Table 1 Shows the minimum\* solar panel watts and battery amp-hour capacity to power one or more 12 volt LED lights, each drawing 0.6 amps (0.6Ah per hour) in a geo-location with 4 hours of equivalent peak sunlight per day.**

*\* It does not provide additional solar power or battery capacity for backup power during overcast days.*

**The actual solar power required for a solar lighting system depends on the location of the installation.**

- Solar power production levels will change during the year from summer to winter.
- Solar systems need sufficient power during the winter months when nights are long and days are short.
- Northern Australia has more consistent daily sun hours while in the southern states it varies greatly.

**Example:** Compare the winter solar power (insolation) levels in Hobart TAS to Darwin NT:

Hobart has less than 2 daily hours of peak sun in winter - solar panel sizes should be doubled for winter lighting.

Darwin has more than 5 hours of peak sun throughout the year - solar panel size can be decreased by 25%.

Table 1

One light	Two lights	Four lights
On time: 1 hr per day Solar power: 3 Watts Battery capacity: 1.2 Amp-hours	On time: 1 hr per day Solar power: 6 Watts Battery capacity: 2.4 Amp-hours	On time: 1 hr per day Solar power: 12 Watts Battery capacity: 4.8 Amp-hours
On time: 2 hrs per day Solar power: 6 Watts Battery capacity: 2.4 Amp-hours	On time: 2 hrs per day Solar power: 12 Watts Battery capacity: 4.8 Amp-hours	On time: 2 hrs per day Solar power: 24 Watts Battery capacity: 9.6 Amp-hours
On time: 3 hrs per day Solar power: 9 Watts Battery capacity: 3.6 Amp-hours	On time: 3 hrs per day Solar power: 18 Watts Battery capacity: 7.2 Amp-hours	On time: 3 hrs per day Solar power: 36 Watts Battery capacity: 14.4 Amp-hours
On time: 4 hrs per day Solar power: 12 Watts Battery capacity: 4.8 Amp-hours	On time: 4 hrs per day Solar power: 24 Watts Battery capacity: 9.6 Amp-hours	On time: 4 hrs per day Solar power: 48 Watts Battery capacity: 19.2 Amp-hours
On time: 5 hrs per day Solar power: 15 Watts Battery capacity: 6 Amp-hours	On time: 5 hrs per day Solar power: 30 Watts Battery capacity: 12 Amp-hours	On time: 5 hrs per day Solar power: 60 Watts Battery capacity: 24 Amp-hours
On time: 6 hrs per day Solar power: 18 Watts Battery capacity: 7.2 Amp-hours	On time: 6 hrs per day Solar power: 36 Watts Battery capacity: 14.4 Amp-hours	On time: 6 hrs per day Solar power: 72 Watts Battery capacity: 28.8 Amp-hours
On time: 7 hrs per day Solar power: 21 Watts Battery capacity: 8.4 Amp-hours	On time: 7 hrs per day Solar power: 42 Watts Battery capacity: 16.8 Amp-hours	On time: 7 hrs per day Solar power: 84 Watts Battery capacity: 33.6 Amp-hours
On time: 8 hrs per day Solar power: 24 Watts Battery capacity: 9.6 Amp-hours	On time: 8 hrs per day Solar power: 48 Watts Battery capacity: 19.2 Amp-hours	On time: 8 hrs per day Solar power: 96 Watts Battery capacity: 38.4 Amp-hours
On time: 9 hrs per day Solar power: 27 Watts Battery capacity: 10.8 Amp-hours	On time: 9 hrs per day Solar power: 54 Watts Battery capacity: 21.6 Amp-hours	On time: 9 hrs per day Solar power: 108 Watts Battery capacity: 43.2 Amp-hours
On time: 10 hrs per day Solar power: 30 Watts Battery capacity: 12 Amp-hours	On time: 10 hrs per day Solar power: 60 Watts Battery capacity: 24 Amp-hours	On time: 10 hrs per day Solar power: 120 Watts Battery capacity: 48 Amp-hours
On time: 11 hrs per day Solar power: 33 Watts Battery capacity: 13.2 Amp-hours	On time: 11 hrs per day Solar power: 66 Watts Battery capacity: 26.4 Amp-hours	On time: 11 hrs per day Solar power: 132 Watts Battery capacity: 52.8 Amp-hours
On time: 12hrs per day Solar power: 36 Watts Battery capacity: 14.4 Amp-hours	On time: 12 hrs per day Solar power: 72 Watts Battery capacity: 28.8 Amp-hours	On time: 12 hrs per day Solar power: 144 Watts Battery capacity: 57.6 Amp-hours



Container with two LED dome lights, Optional flexible conduit and junction box was included to run cable along roof

## Solar lighting kits can be customized to suit your lighting needs

- More lights or different types of lights, eg: strip lighting or exterior work lights
- Additional motion sensors for long containers with divided interiors
- Motion sensor bypass switch to keep lights on regardless of the motion sensor
- On/off light switch or programmable light timer switch
- Longer cables for locating the solar panel or battery further away
- Tilting solar panel roof or pole mounting to improve solar efficiency
- Battery and solar regulator housed in a weatherproof ABS enclosure

**Table 2 Shows standard solar light kit sizes for shipping containers and sheds in areas where the minimum sun exposure is 4 hours of peak sunlight per day, with reserve power for two days autonomy per week.**

Table 2

3M (10ft) containers 3m x 3m sheds One 450 lumen strip light	6M (20ft) containers 6m x 3m sheds Two 450 lumen strip lights	12M (40ft) containers 6m x 6m sheds Four 450 lumen strip lights
2 Hours lighting per day <b>10 watt</b> solar panel <b>7 Ah</b> battery <b>6 Amp</b> solar regulator	2 Hours lighting per day <b>20 watt</b> solar panel <b>12 Ah</b> battery <b>6 Amp</b> solar regulator	2 Hours lighting per day <b>40 watt</b> solar panel <b>24 Ah</b> battery <b>6 Amp</b> solar regulator
4 Hours lighting per day <b>20 watt</b> solar panel <b>12 Ah</b> battery <b>6 Amp</b> solar regulator	4 Hours lighting per day <b>40 watt</b> solar panel <b>24 Ah</b> battery <b>6 Amp</b> solar regulator	4 Hours lighting per day <b>80 watt</b> solar panel <b>48 Ah</b> battery <b>10 Amp</b> solar regulator
6 Hours lighting per day <b>30 watt</b> solar panel <b>20 Ah</b> battery <b>6 Amp</b> solar regulator	6 Hours lighting per day <b>60 watt</b> solar panel <b>40 Ah</b> battery <b>6 Amp</b> solar regulator	6 Hours lighting per day <b>120 watt</b> solar panel <b>80 Ah</b> battery <b>10 Amp</b> solar regulator
12 Hours lighting per day <b>60 watt</b> solar panel <b>40 Ah</b> battery <b>6 Amp</b> solar regulator	12 Hours lighting per day <b>120 watt</b> solar panel <b>80 Ah</b> battery <b>10 Amp</b> solar regulator	12 Hours lighting per day <b>240 watt</b> solar panels <b>160 Ah</b> battery <b>20 Amp</b> solar regulator

## Installing a SolarBarn lighting kit requires minimal technical knowledge

Only basic hand tool skills are required to install the solar panel, light fittings and switches, The following are typical instructions included with Solarbarn solar lighting kits.

### 6m sea container solar light kit, provides two hours of lighting per day plus backup power 20 watt solar panel, 12 amp-hour battery, 2x 450 lumen strip lights, motion sensor with bypass switch

#### This is a 12V DC solar lighting system.

It will provide 2 hours of lighting per day plus reserve capacity for 2 days autonomy per week.  
It uses a solar panel to recharge a 12V battery.  
The battery is used to provide power for lighting.  
The lighting is activated by a PIR motion sensor and a manual sensor bypass light switch.

#### Components

- 20 watt solar panel with 5M lead
- Four solar panel mounting brackets.
- 12 amp-hour 12 volt battery to store the solar power.
- Solar regulator with solar panel and battery leads.
- Two 450 lumen led strip lights with 1.4M leads
- Motion sensor with bypass switch to activate the light.
- Electrical cables fitted with quick connectors.

#### Technical data

- 20W 12V solar panel has an average output current of 1A.
- Solar power is provided by 4 hours of equivalent peak sunlight per day.
- 1 amp output for four hours = 4Ah.
- 12 Ah 12V battery can provide a maximum of 6Ah (with 50% of battery charge remaining to ensure a full battery service life).
- Daily lighting requirement is 2 hours.
- The two strip lights consume 2.4Ah in 2 hours.
- The battery can provide 2.4Ah for daily usage and still have 3.6Ah reserve capacity for cloudy days.

#### How it works (refer to the diagrams)

The solar panel is connected to the solar regulator.  
The solar regulator is connected to the battery to control the battery charging procedure.  
The lights are powered by the battery.  
Light switching is controlled by the motion sensor and a bypass switch. When the bypass switch is switched off the motion sensor will turn the lights on only when motion is detected. The bypass can be switched on to keep the lights on at all times. It can also be used as the sole means of switching by disconnecting the motion sensor from the power cable.

**Installation** - Identify the best locations for the solar panel, motion sensor and battery.  
Note of the lengths of the cables, allow for corners and obstructions when planning the paths for cables. Wrap outdoor connections with mastic tape to prevent corrosion.

#### All cables are labelled for easy assembly.

#### Standard electrical cables lengths (Different lengths can be requested):

5 metres from the solar panel to the solar regulator  
3 metres from the battery to the motion sensor  
1.5 metres from the motion sensor to the 1<sup>st</sup> light  
2.5 metres between lights

#### Battery and solar regulator

- Place the battery and solar regulator together and connect the regulator to the battery.
- Connect the red leads to the positive terminals and the black leads to the negative terminals  
**CAUTION** Do not allow live battery leads to come into contact with the solar connections. Incorrect wiring will destroy the solar regulator's electronics.

#### Solar panel

- Locate the solar panel on a roof or suitable surface where it will be in full sun throughout the day.  
If possible, position it so that it is tilted and facing north to gather more sunlight.
- Attach the mounting brackets to the solar panel with the included bolts, then fix the brackets to the roof with suitable screws, rivets or construction adhesive.
- Connect the solar panel cable to the solar regulator.  
**CAUTION** Incorrect wiring will destroy the solar panel.

#### Motion sensor

- Install the motion sensor in a high position where any motion inside the container will trigger it.
- Drill a 15mm hole in a suitable bracket (not included) to mount the sensor by the threaded ferrule.
  - Connect red, blue and brown wires to their respective sockets on the power cable.
- The bypass switch can be left hanging for easy access.  
**CAUTION** Check all connections because incorrect wiring will destroy the motion sensor's electronics.

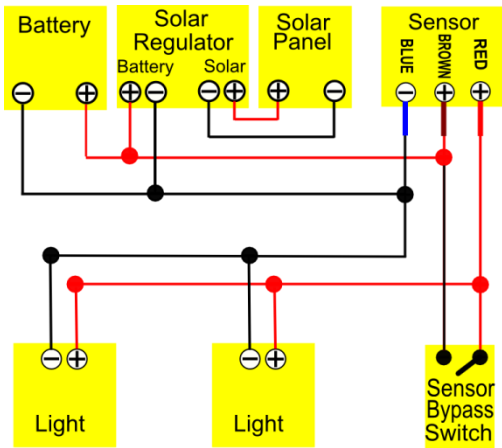
#### Lights

- Install the strip light centrally to the roof of the container, fix the light to the roof with the two holding brackets, one at each end, using suitable screws or rivets.
- Connect the light lead to the power cable.



# SolarBarn Solar lighting kit assembly diagrams

Electrical diagram



Motion sensor

SENS adjustment: Movement detection distance - 5 to 10 Meters  
 TIME adjustment: Length of time light will stay on - 8 Sec to 6 Min  
 LUX adjustment: Sensitivity to Ambient Light - 3 to 2000 LUX

