

We Care Solar Suitcase®

User Manual

Rev 2.7



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About the Solar Suitcase



The Solar Suitcase Includes:

- 1 Lithium Ferrous Phosphate (LFP) 12 volt battery
- 2 bright, rugged LED lights
- 1 homerun cable for solar panels
- Solar panel(s) – ***EITHER:***
 - 2 plastic-backed solar panels (20 watts each)
- OR***
 - 1 aluminum glass solar panel (50-200 watts)

Appliances:

- 2 rechargeable headlamps with micro USB cable
- 1 multi-tip phone charger
- 1 2-slot USB adapter
- 1 roof mounting hardware kit
- 1 wall mounting hardware kit

Optional Appliances:

- Fetal Doppler
- AA/AAA rechargeable battery charger
- Expansion switch box (provides 2 additional LED lights)

Understanding the Solar Suitcase

Batteries, Panels, and Lights

Main Battery



The Solar Suitcase includes a Lithium Ferrous Phosphate battery (LFP; 12 volt, 12 amp-hour) that stores electricity for night time use.

The LFP battery lasts for 5 years, and can be fully charged and discharged hundreds of times before it needs replacement. It can also be stored for months without harm to the battery.

The Solar Suitcase is also compatible with Sealed Lead Acid (SLA) batteries.

Battery Replacement. After years of usage, if you notice the battery is full at the beginning of the evening, but runs out of charge quickly (for example, the battery cannot provide enough power for one LED light through the night), it is time to replace your battery.

Solar Panel

The solar panel turns sunlight into electricity. The electricity is used to charge the main battery in the Solar Suitcase. The solar panel for the Solar Suitcase is sized so that the battery can fully charge every day.

Plastic-backed
(G-10) Everbright
Panels



Aluminum Glass
(Conventional) Panel



Lights



The Solar Suitcase can power two LED lights throughout the night and an additional two LED lights in systems using a 65-200 watt solar panel. The LED lights plug into the light sockets and be secured with the locking nut. The LED lights can be cleaned with a damp cloth.

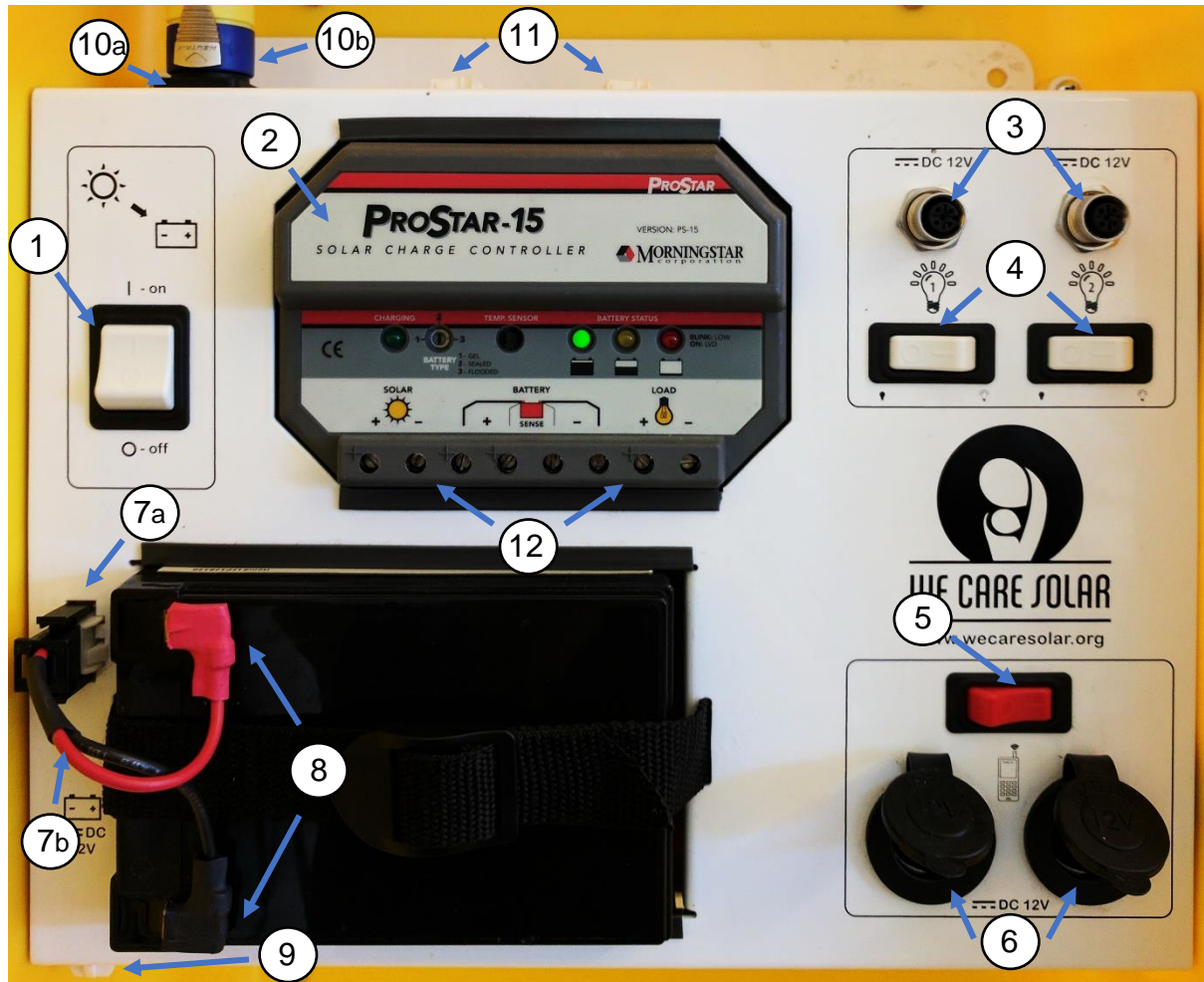


THIS SOLAR SUITCASE IS 12 VOLT DC

The LED lights can only be used with the Solar Suitcase.

Understanding the Solar Suitcase

Main Control Board

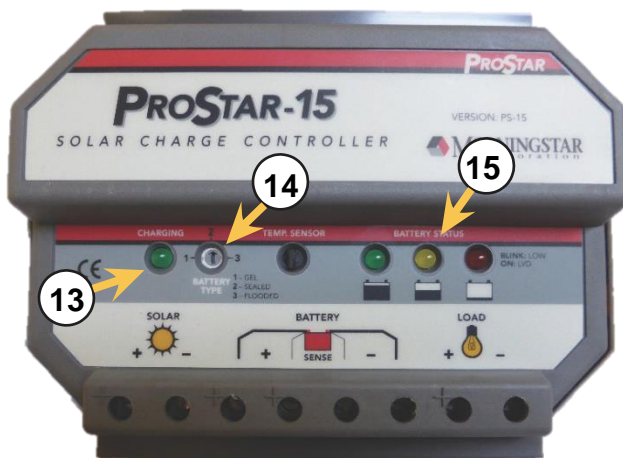


- | | |
|-------------------------------------|--|
| ① Main power switch/circuit breaker | ⑦b Internal battery cable |
| ② Charge controller | ⑧ Battery terminals/slip-on connectors |
| ③ Light sockets | ⑨ External battery socket |
| ④ Light switches/circuit breaker | ⑩a Solar socket |
| ⑤ Appliance switch/circuit breaker | ⑩b Solar plug on homerun cable |
| ⑥ Appliance sockets (12V DC) | ⑪ 2 expansion sockets |
| ⑦a Internal battery socket | ⑫ Terminal screws (on charge controller) |

Understanding the Solar Suitcase

The Charge Controller

The Solar Suitcase connects solar panels to a charge controller, which optimizes the solar charge into the battery. The charge controller also regulates the use of the energy stored in the battery to power lights and other appliances.



13 Solar Charging Light

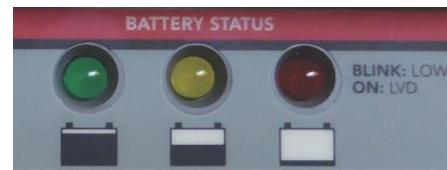


CHARGING – During the daytime, when the solar charging light is solid green, it means that the solar panels are properly wired and that the Solar Suitcase is receiving charge from the solar panels. If you do not see this light in the daytime, the system is not properly connected.

14 Battery Type Selector

The selector must be on “**2-SEALED**” for all sealed lead acid, AGM batteries and LFP batteries like the kind that comes with the Solar Suitcase.

15 Battery Status Lights



The three colored lights allow the user to assess the level of charge in the battery.

Lithium Ferrous Phosphate Battery



BLINKING GREEN – Battery is full. This is a good time to charge mobile phones and other appliances.



SOLID GREEN – Battery is between 10% and 90% charged. You may charge appliances on sunny days.



YELLOW – Battery is getting very low – 10% or less. Conserve energy. Turn off all lights and discontinue charging appliances.

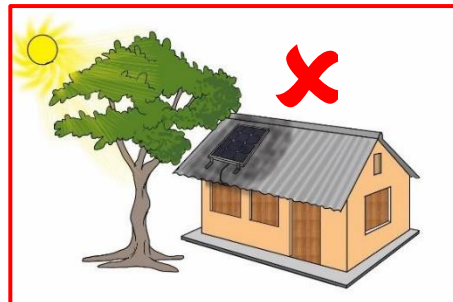
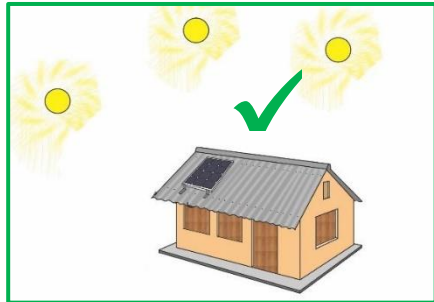


RED BLINKING – Battery is very low and power will soon turn off. Turn off all light switches and appliances. Wait until next sunny day for battery to recharge.

Start-Up Sequence

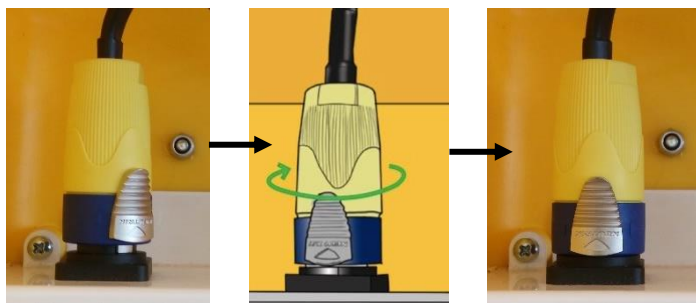
1. Place the solar panel(s) in the sun and connect the solar panels to the homerun cable

Place the solar panels in a sunny location. The panels should be permanently mounted on a rooftop with no shade between the hours of 9 AM and 4 PM. The panels should have a minimum of 10 degree slope so that the rain will clean the panels off.



2. Connect the homerun cable to the Solar Suitcase

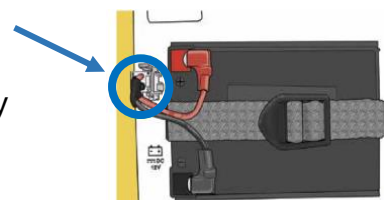
Make sure that the solar plug (yellow and blue) is fully inserted and rotated so that it is locked in. The silver tab will face forward and click into position.



3. Insert the battery plug into the battery socket

Plug the battery plug into the internal battery socket.

The Solar Suitcase arrives with a battery cable already connected the battery with slip-on connectors.



If the slip-on connectors have come loose from the battery terminals, then:


Attach the (+) **RED** terminal on the battery to the (+) **RED** cable.

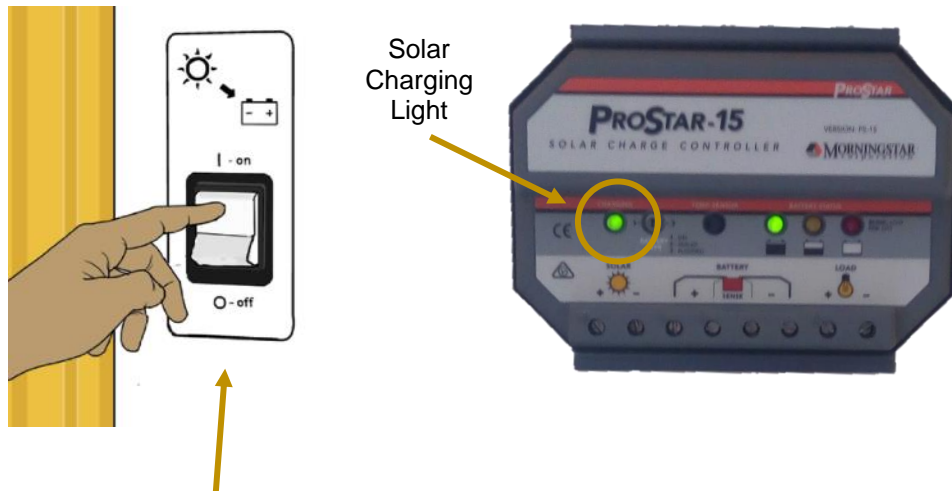
Attach the (–) **BLACK** terminal on the battery to the (–) **BLACK** cable.

Make sure the slip-on connectors are fully inserted.



4. Turn on the system

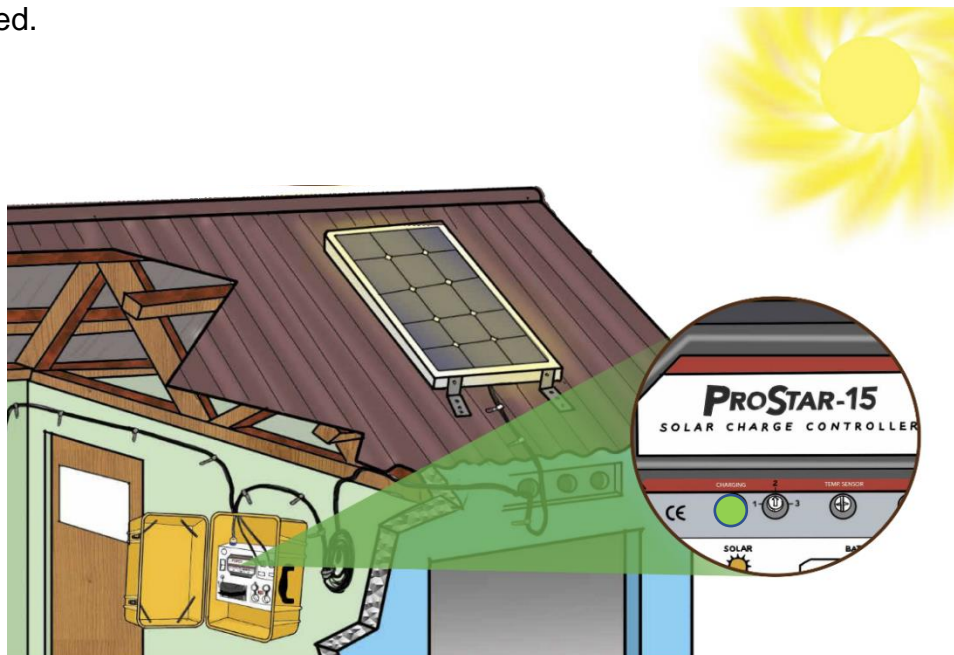
Once the solar panel and battery connections are secure, you can turn on the system. Use the main power switch to turn ON the system. The battery status lights will flash in sequence and the charge controller will turn on. After 3 seconds, the solar charging light will glow solid green . The Solar Suitcase is now ready to use.



The main power switch should remain ON at all times

The only time to turn the main power switch OFF is when you are replacing the main battery.

The battery is charged every sunny day. The solar charging light indicates that the battery is charging. When it is daytime and the homerun cable is properly connected, this light will be green. If you do not see this light in the daytime, the system is not properly connected.



Appliances

The Solar Suitcase comes with the following appliances:



2 headlamps



Micro USB cable for headlamp



2-slot USB adapter



Multi-tip phone charger

Depending on the product specifications ordered, your Solar Suitcase may also include the following **optional** appliances:



fetal Doppler



AA/AAA rechargeable battery charger

Charging Appliances

Appliances should only be **charged during the day** and when the battery status light is **green**. The battery status light on the charge controller will tell you whether or not it is ok to charge appliances.

If the battery status light is:



BLINKING GREEN – Battery is full. This is the best time to charge mobile phones and other appliances.



SOLID GREEN – Battery is between 10% and 90% charged. You may charge appliances on sunny days.

If the yellow or red lights are on, your battery is low. Do not charge any appliances at this time.

To charge appliances, BOTH the solar charging light AND the battery status light should be green.



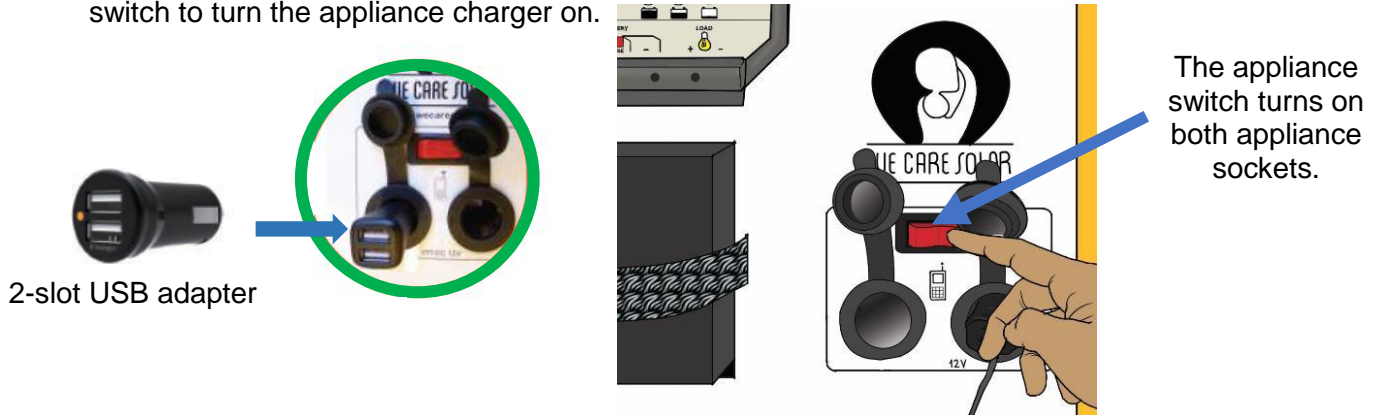
Appliances

Multi-Tip Phone Charger

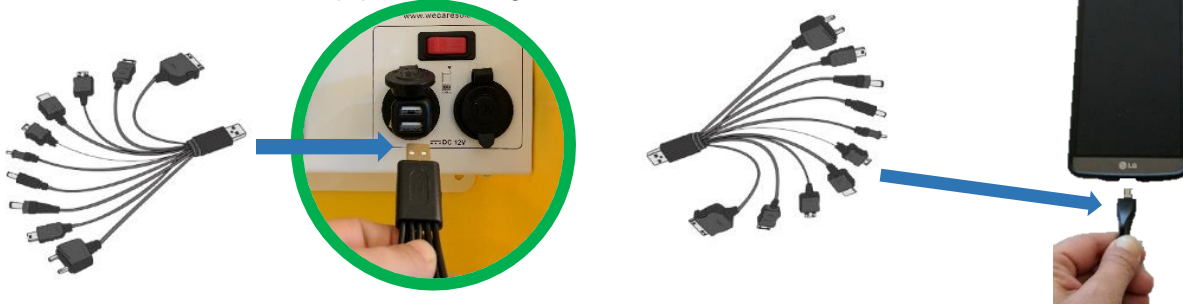
The Solar Suitcase comes with a multi-tip phone charger that is able to charge most types of cell phones.

Using the phone charger:

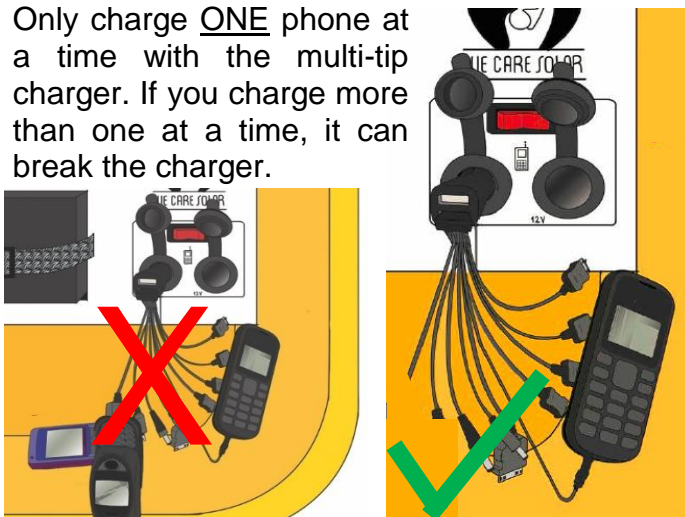
- 1) Plug the 2-slot USB adapter into one of the appliance sockets and flip the appliance (red) switch to turn the appliance charger on.



- 2) Plug the multi-tip phone charger into the 2-slot USB adapter and the appropriate plug on the other end of the multi-tip phone charger into the cell phone.



Only charge ONE phone at a time with the multi-tip charger. If you charge more than one at a time, it can break the charger.



You can also use your own cell phone charger with the Solar Suitcase, either by using the 2-slot USB adapter or by plugging a car charger directly into the socket.



Appliances

Headlamps

The Solar Suitcase comes with two headlamps.



Using the headlamp:

- 1) Use the strap to put the headlamp on your head and push the on/off (top) button to turn it on.
- 2) If fully charged and with the light on the brightest mode, the headlamp will last for about 3 hours. If you want to conserve power, you can dim the light. To do this, hold the on/off button down and the light will get dimmer. To return the light to the brightest setting, simply push the on/off button to turn the headlamp off, and then turn it back on again.
- 3) You can also adjust the angle of the light beam by rotating the light away from the strap once it is on your head.
- 4) When you are done using the headlamp, push the on/off button on the top to turn it off.



Charging Light:

When you turn the headlamp on, the charging light on the side of the headlamp will briefly flash green, orange, or red, before changing to white. If it flashes orange or red, it is time to charge the headlamp.



If the charging light is blinking blue when you try to turn it on and it will not turn on, it means the headlamp is locked. To unlock it, hold down the on/off button until the blue light turns off and the main light turns on (about four seconds).



You will also know if the battery is running low if the light does not seem very bright or the headlamp won't turn on at all. The headlamps can be charged just like a cell phone. If the headlamp is completely discharged, it will take about three hours to fully charge it back up.

Charging the headlamp:

- 1) Plug the 2-slot USB adapter into one of the appliance sockets and flip the appliance (red) switch to turn the appliance charger on.

2-slot USB adapter



- 2) Plug the micro-USB cable into the 2-slot USB adapter and plug the other end into the charging port on the side of the headlamp.



When charging, the charging light should be flashing **green**. When the headlamp is fully charged, it will turn to solid green.



Appliances

Fetal Doppler

One of the optional appliances in the Solar Suitcase is the fetal Doppler. Midwives use the fetal Doppler to hear a baby's heartbeat and to get a digital reading of the heartbeat. The fetal Doppler can be used instead of a fetoscope.



Using the fetal Doppler:

- 1) First, palpate the mother to find the position of the fetus
- 2) Place lubricant on the probe
 - For lubricant, you can use ultrasound gel or any vegetable oil
 - DO NOT use water because it does not conduct sound well
- 3) Turn the fetal Doppler ON using the side switch
 - The switch also controls the volume
- 4) Place the probe on the mother's belly
- 5) Listen for the heart rate for five seconds, and increase the volume if needed
- 6) Shift the angle of the probe slightly if you don't hear a heartbeat, and wait again for five seconds
- 7) DO NOT move the probe quickly
- 8) PLACE, PAUSE, and LISTEN

- 9) You have found the heartbeat when you hear a steady heartbeat and the heart on the display is **solid black**
- 10) Turn the fetal Doppler OFF after you are done using it



Understanding the fetal Doppler display

- The normal fetal heart rate is between 120 and 160. If the heartbeat is less than 120 or more than 160, the baby may be in danger.
- If the heartbeat remains abnormal, turn the mother on her side, begin intravenous fluids, start oxygen and call for assistance
- Call a doctor or refer the mother to a hospital if the fetal heartbeat remains too fast or too slow
- If the heartbeat is less than 100, it may be the mother's heartbeat. To confirm whether you are hearing the mother, check her wrist pulse with your hand while listening to the fetal heart rate.
- **Remember: You must see a solid black heart in the display to be receiving an accurate heart rate reading**



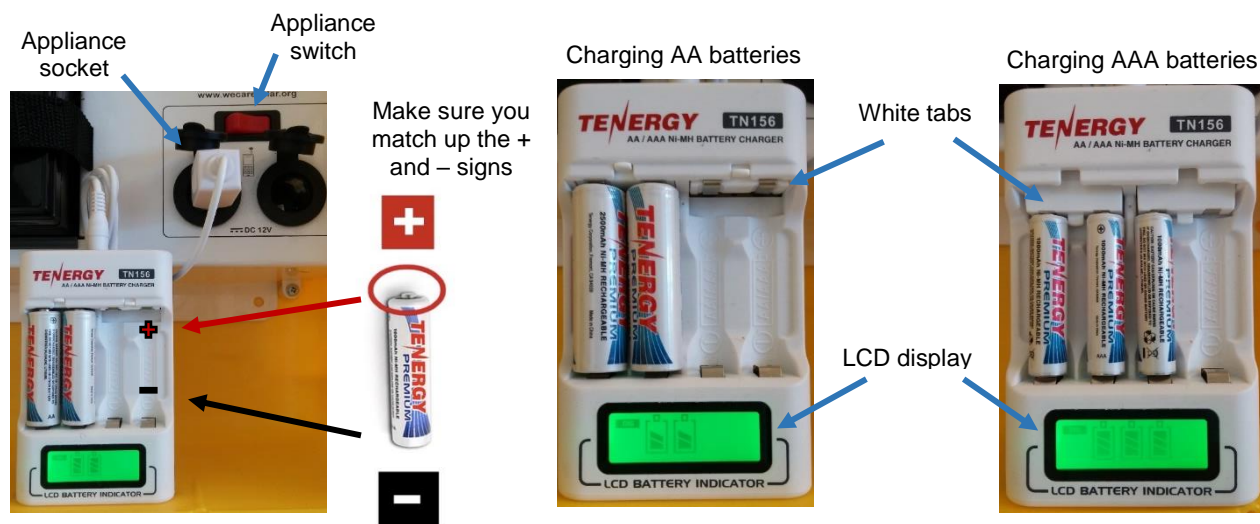
Charging the fetal Doppler using the AA/AAA rechargeable battery charger:

- 1) To take the rechargeable AA batteries out of the fetal Doppler to charge them, open the back of the appliance. You can now remove the batteries.



- 2) To charge, place the positive side of the batteries in the positive side of the charger. To charge AA rechargeable batteries, the small white tab on the battery charger needs to be in the upright position. To charge AAA batteries, the small white tab needs to be moved downwards.
- 3) Plug the rechargeable battery charger into one of the appliance sockets and flip the appliance (red) switch to turn the appliance charger on.

The LCD display will tell you that the batteries are charging and show you when the batteries are fully charged. If the LCD screen is not lit, check that the charger is properly inserted into the appliance socket and that the appliance switch is turned on.



IMPORTANT: The battery charger can charge *rechargeable (NiMH)* AA batteries (like those that come in the fetal Doppler) and rechargeable AAA batteries. The charger **CANNOT** be used with single-use (Alkaline) batteries. If you place single-use batteries into the battery charger, the charger will break. Charge the batteries in “families”, meaning all the batteries that go with an appliance should be charged together at the same time.

Optimizing Performance

To optimize performance of your Solar Suitcase, it is important to follow these simple steps:

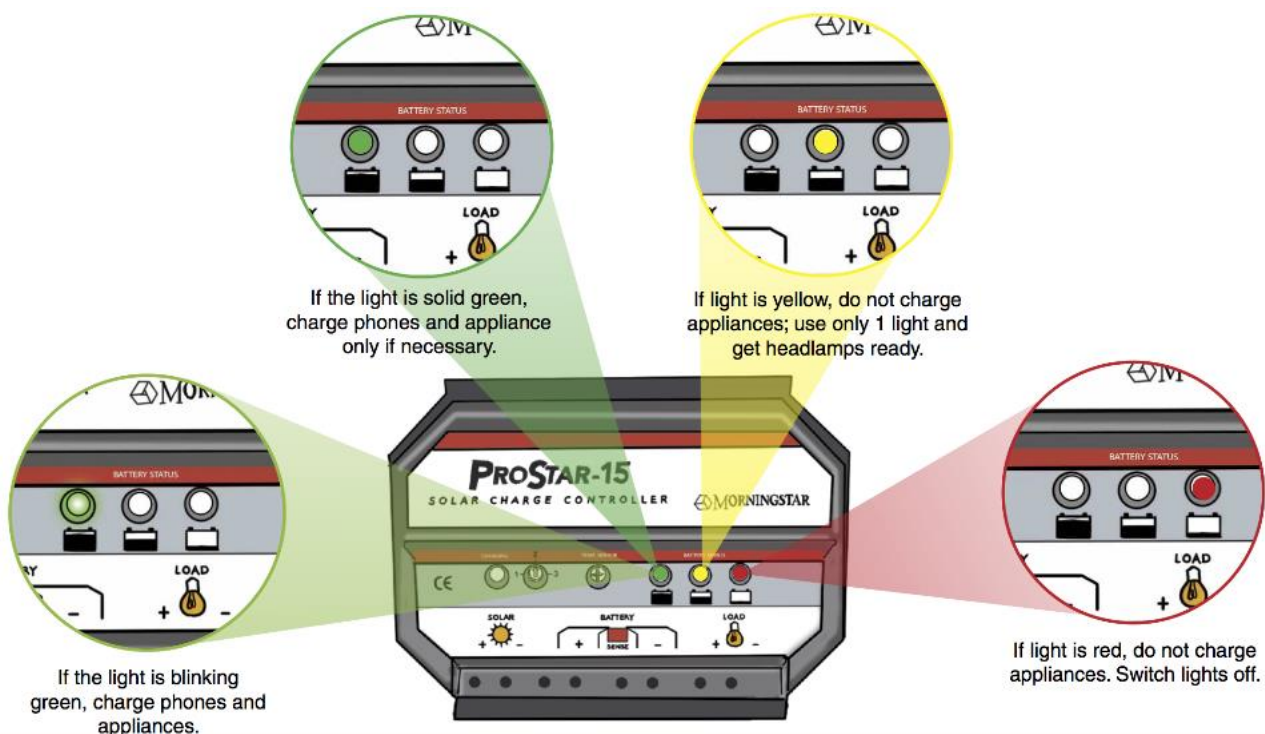
1. Clean your solar panels if you can do so safely

Keep the solar panels clean for best results. Dirt and dust will reduce the amount of electricity the solar panels will produce. If dust accumulates, only clean the panels if it is safe to go up on the roof. To clean the panels, just rinse with water. Do NOT scrub as you might scratch the panel. Do NOT use soap. If the main battery is getting fully charged each sunny day, then dirt on the panels is not a problem. Also, rainfall will help clean the panels for you.



2. Know your battery status

When you know your battery status, you know when it is a good time to charge appliances and when you should conserve electricity. Knowing your battery status is important to ensure the lights are always available during an emergency.

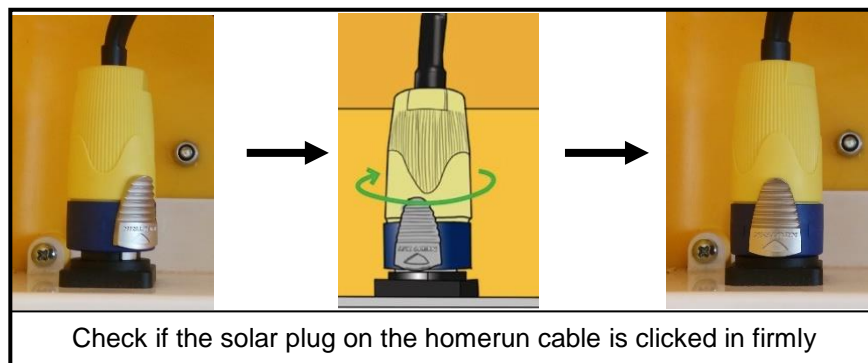
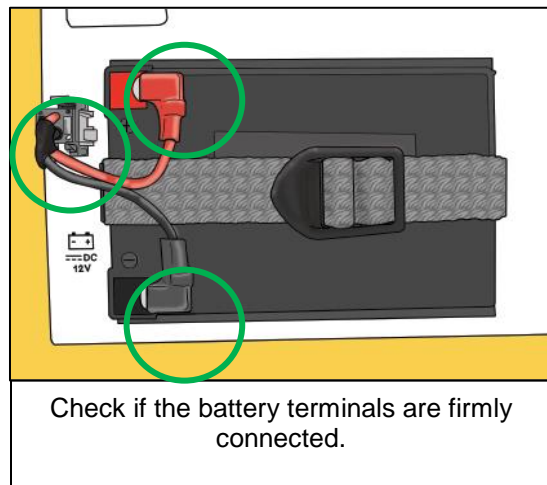
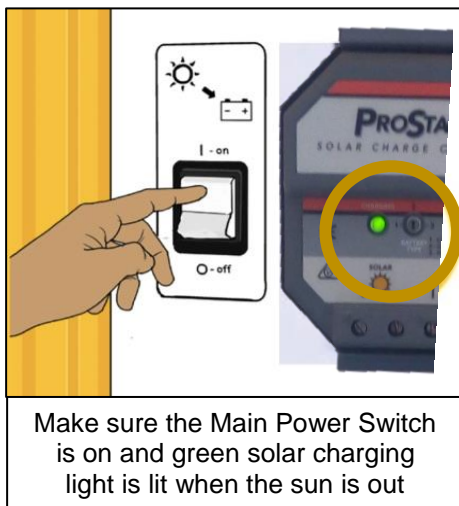


Troubleshooting

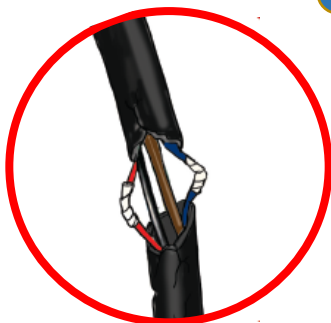
<i>Description of Issue</i>	<i>Issue</i>	<i>Page</i>
No appliances or lights work No lights on the charge controller display	→ A. System is not functioning	16-17
Lights turn out in the middle of the night Lights turn out earlier than they used to	→ B. System performance is poor	17-18
One or both lights do not work at all	→ C. LED light is not functioning	19
One appliance socket is not working One specific appliance is not working	→ D. Appliance is not functioning	19-21

A. System is not functioning

Step 1: Examine the Solar Suitcase



Step 2: Check the homerun cable for cuts



If the wire inside is severely damaged or you can see the metal wire in the cable, wrap electrical tape around each separate negative and positive wire within the larger wire, then wrap tape around the whole bundle.

Or call a technician.



NOTE: If the wire is only damaged on the black casing, wrap with electrical tape to prevent it from causing a problem.



B. System performance is poor

Step 1: Check how old the battery is. An LFP battery lasts for 5 years and an SLA battery lasts for 2 years. If the battery is old, it will need to be replaced.

There is a sticker on the battery that tells you how old it is and when it will likely need to be replaced

Installation date: 19/06/2017
Contact name: Joseph Kru
Contact number: 088 769 473
Expected replacement date: 19/6/2022

Step 2: Make sure the system is not being overused during the day. Use the battery status lights to guide proper usage.



Battery is full

– This is a good time to charge appliances.



Battery is between 10% and 90% charged – You may charge appliances on sunny days.



Battery is getting very low – 10% or less. Conserve energy. Turn off all lights and discontinue



Battery is very low and power will soon turn off. Turn off all light switches and appliances. Wait until next sunny day for battery to recharge.



Step 3: Now check what is causing the lack of energy!



If bad weather



**Use light at night only;
don't charge appliances**



If there is shade



**Cut branch, or move the solar panels
to an area of the roof that is not
shaded.**



If solar panel is dirty



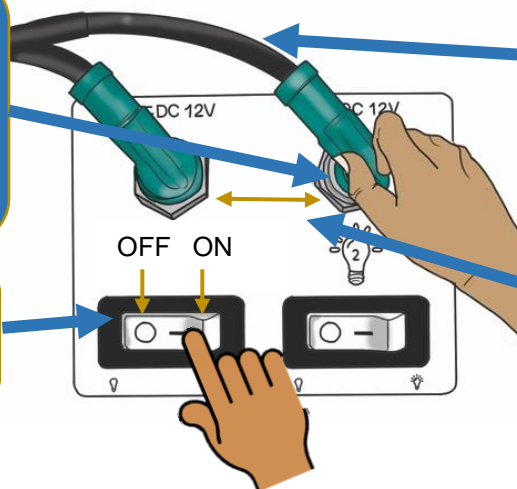
Wash panel with soft cloth

If there is sunshine but no green light above the sun icon (the solar charging light), it means that there is a problem with the solar panel or homerun cable. Either the solar plug on the homerun cable is not fully “clicked” into proper position, OR there is a loose or broken wire between the solar panel and the Solar Suitcase, OR the wires in the homerun cable or panel have reverse polarity (meaning they are not wired properly).

C. LED light is not functioning

Step 1: Check light connectors are inserted correctly and the locking nut is firm

Step 2: Check the light switch is on



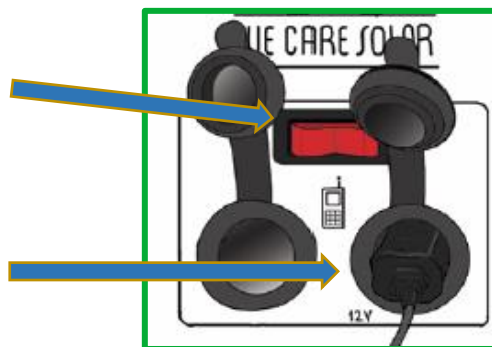
Step 3: Check the light cable for damage

Step 4: Try switching light connections to see if it is the light, or the socket that is faulty

C. Appliance is not functioning

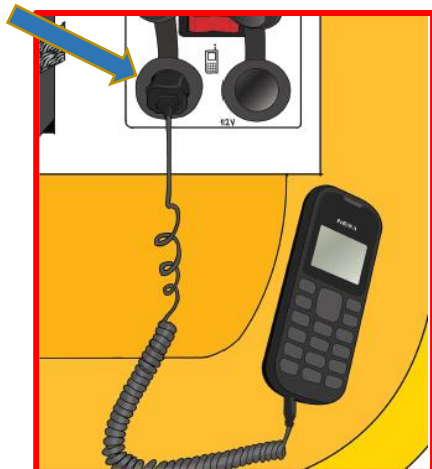
Step 1: Make sure the red appliance switch is in the ON position

Step 2: Make sure the USB adapter is fully inserted into the socket

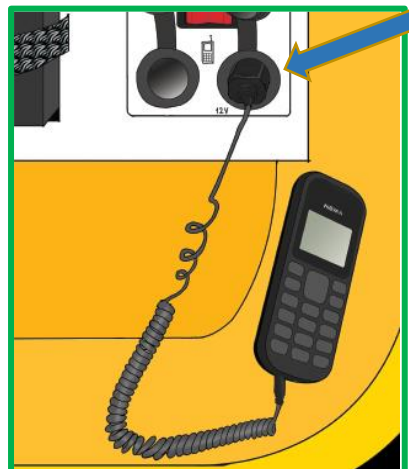


Step 3: Make sure both sockets are functioning

If socket 1 fails to charge

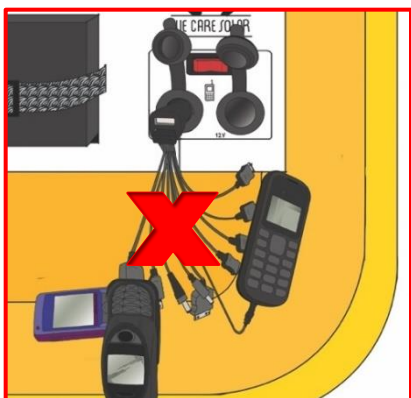


Try to connect to socket 2



If you have done steps 1-3 on the previous page and the appliance still isn't working, follow the instructions below for that appliance (phone charging, headlamp, or fetal Doppler).

C1. Mobile phone is not charging



Do not charge multiple phones with the multi-tip phone charger. If the multi-tip phone charger is used with many phones, it can easily fail.

Change to another charger or purchase a new charger.



If that doesn't work, it could also be that the battery in the phone doesn't work and you need to replace it.



C2. The headlamp is not working

Step 1: Check if the headlamp is charging properly

When charging properly, the charging light should be flashing **green**.



If the light is any other color than green, it is not charging.

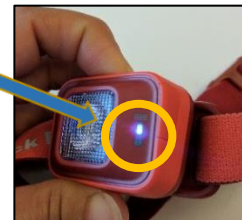
Step 2: Check that the headlamp is being used correctly

Review p.10-11 of this manual on how to use the headlamp. A few reminders:

Make sure the headlamp is switched on properly. Switch off headlamp after use.



If the charging light is blinking blue when you try to turn it on, it means the headlamp is locked. To unlock it, hold down the main (top) button until the blue light turns off and main light turns on (about 4 seconds).

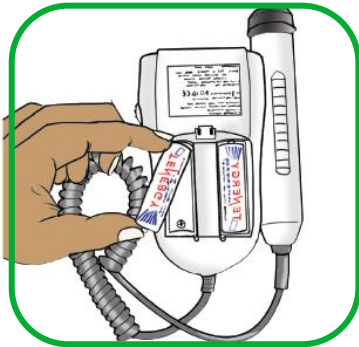


If it still doesn't work, it may need to be replaced. Contact the organization that delivered the Solar Suitcase to obtain information on where to get a replacement.

C3. Fetal Doppler is not working

Review p.12-14 of this manual on how to use the fetal Doppler. If that doesn't solve the problem, follow the steps below:

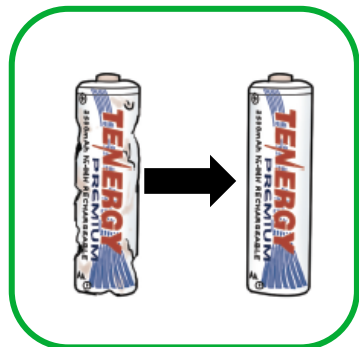
Step 1: Check the batteries



Make sure the batteries are inserted correctly (+ to + and – to –)



Make sure the batteries are fully charged



Replace batteries if they are damaged or old

Step 2: Check the usage



Be sure the on/off switch is turned on to use. Turn off when done



Make sure it is being used correctly



Always use gel or oil on the tip. If you are out of gel, use KY jelly or vegetable oil.

What to do when the Solar Suitcase is not working well:

- Review sections on *Optimizing Performance* (p.13) and *Troubleshooting* (p.16-21) in this User Manual.
- If you are unable to fix the problem with this information, call the organization that installed the Solar Suitcase. (Look at the number written on a sticker on the inside of the Solar Suitcase door.)
- If you are unable to reach anybody locally, you can also call or write directly to We Care Solar:

We Care Solar
www.wecaresolar.org
+1-510-766-0206
info@wecaresolar.org

Warranty

We Care Solar provides a limited warranty for two years on the base system. The base system includes: chassis, charge controller, LED lights, and solar panels (if purchased from We Care Solar). All warranty claims are dependent on proper installation and usage.

No appliances are covered under warranty. Appliances include: phone charging cables, USB adapter, rechargeable battery charger, headlamps, and fetal Doppler.



Please visit <https://wecaresolar.org/resources/product-info/> for training videos on Solar Suitcase installation, use, maintenance, and repair.

Artwork in this manual courtesy of:

