



We Care Solar Suitcase[®] User Manual

REF-010, REV E



We Care Solar® promotes safe motherhood and reduces maternal mortality in energy poor regions by providing healthcare workers with reliable lighting, mobile communication, and medical devices using solar electricity.

The We Care Solar Suitcase® provides highly efficient solar energy systems to health facilities in areas without reliable electricity. Our durable, easy-to-use Solar Suitcases power medical lighting, mobile communication, and essential medical devices.

Inside This Manual

04	About the Solar Suitcase
05	Solar Suitcase Contents
06	Solar Suitcase Overview
07	Main Battery and Solar Panel
08	Lights
10	Display Screen
11	Start-Up Steps
14	Appliances
16	Rechargeable Headlamps
17	Infrared Thermometer
19	Fetal Doppler
21	AA/AAA Rechargeable Battery Charger
22	Charging Your Phone
23	Maximizing Performance
25	Troubleshooting
26	Appliance is Not Functioning
30	System Performance is Poor
32	Light is Not Functioning
33	System is Not Functioning
34	Replacing the Main Battery
35	Error Codes
45	Maintenance Log



About the Solar Suitcase

05 Solar Suitcase Contents

06 Solar Suitcase Overview

07 Main Battery and Solar Panel

08 Lights

10 Display Screen

Solar Suitcase Contents

Solar Suitcase Installation

- A** 1 Main Battery
(Lithium Ferrous Phosphate 12 volt internal battery)
- B** 1 Homerun Cable
(for connection from solar panel to Solar Suitcase)
- C** 1 Solar Panel Mounting Kit
- D** 1 Solar Suitcase and Light Mounting Kit
- E** 1 Tool Kit
- F** 1 Solar Panel (50-200 watts)



Lights

- G** 4 Lights
- H** 1 Light Expansion Box

Note: As an optional configuration, the Solar Suitcase can come with just two lights and solar panels that fit inside the Solar Suitcase



Appliances

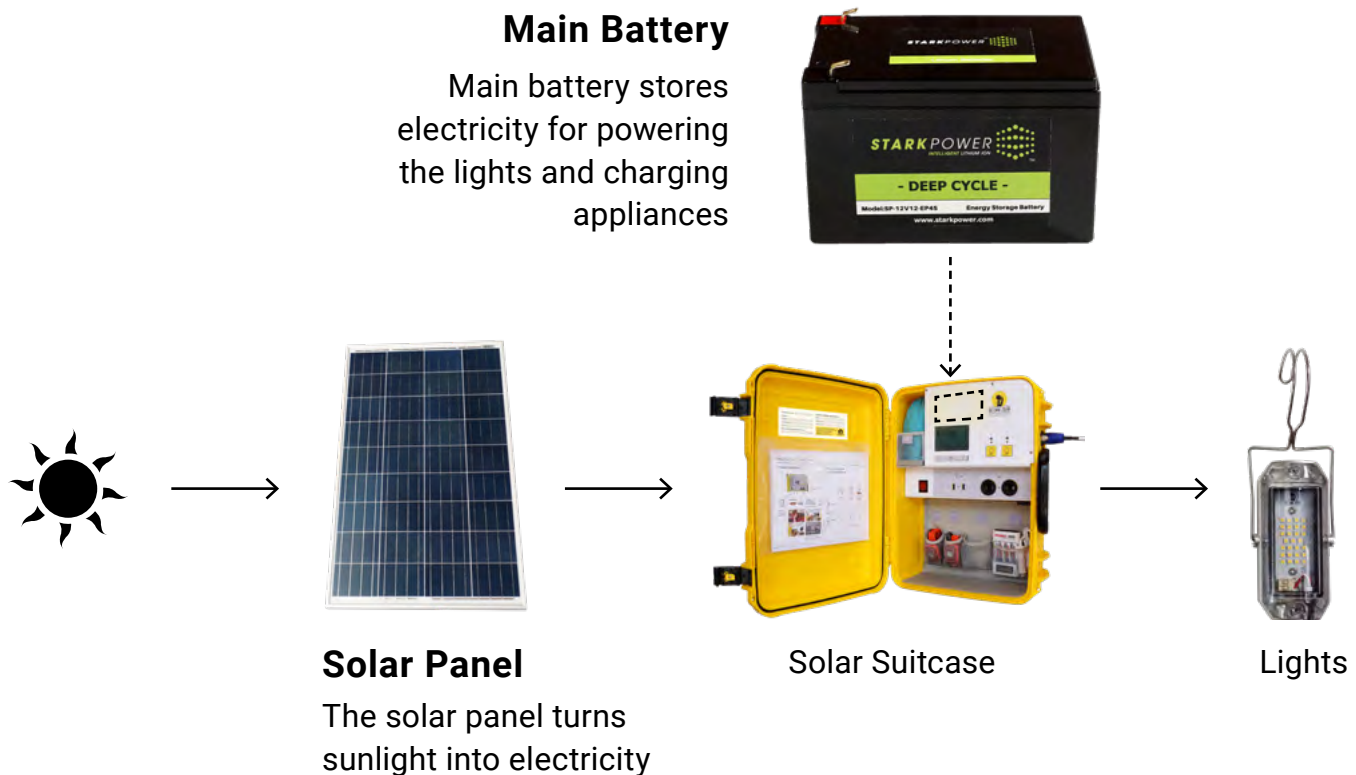
- I** 2 Rechargeable Headlamps with Micro USB Cables
- J** 1 Fetal Doppler
- K** 1 Infrared Thermometer
- L** 1 AA/AAA Rechargeable Battery Charger
- M** 4 AA and 4 AAA Rechargeable Batteries



Solar Suitcase Overview




Main Battery and Solar Panel



Main Battery

The main battery - Lithium Ferrous Phosphate (LFP) 12 volt internal battery - is located behind the display screen. It lasts for about 5 years and can be stored for months without harm to the battery.

Main Battery Replacement

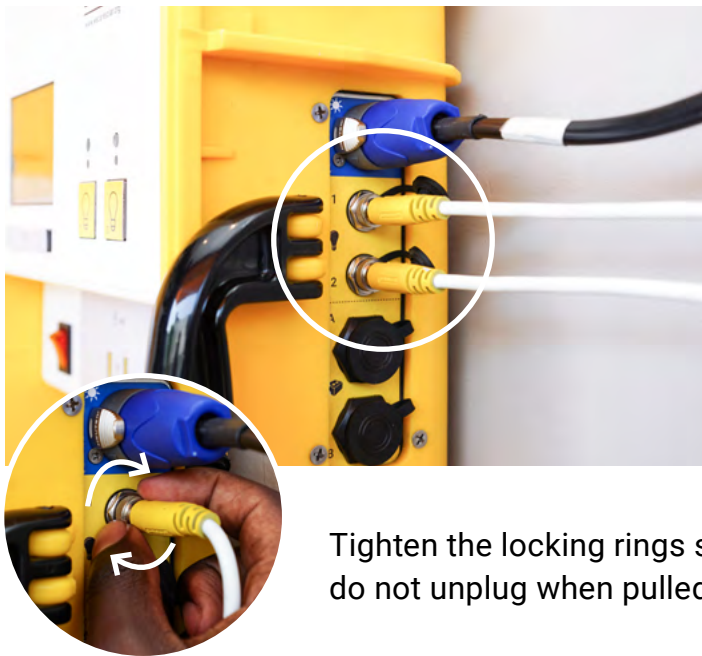
After years of usage, if you notice the main battery is full at the beginning of the evening (you see  on the display screen), but runs out of charge quickly (for example, the main battery cannot provide enough power for one light through the night), it is time to replace your battery.

The Solar Suitcase can be used with both LFP and Sealed Lead Acid batteries. However, Sealed Lead Acid batteries are less durable and will not perform as well as LFP batteries, and will need to be replaced every two years.

Refer to P.34 for instructions on how to replace the main battery

Lights

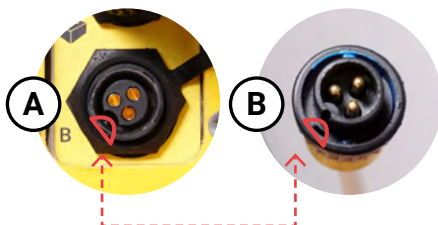
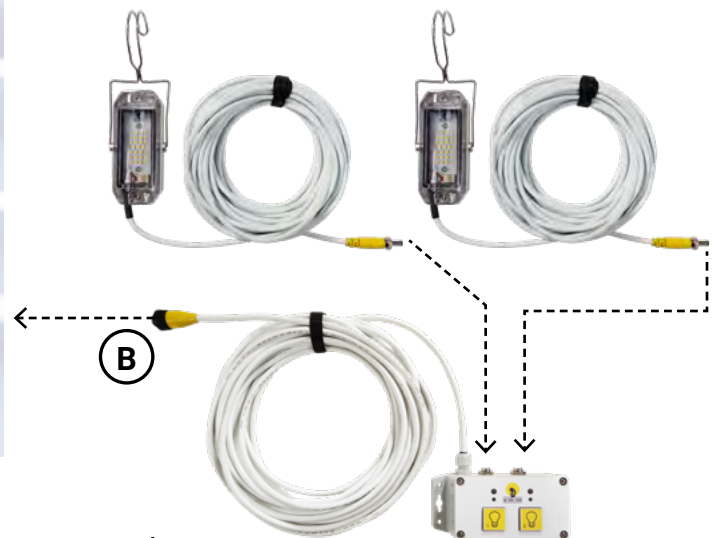
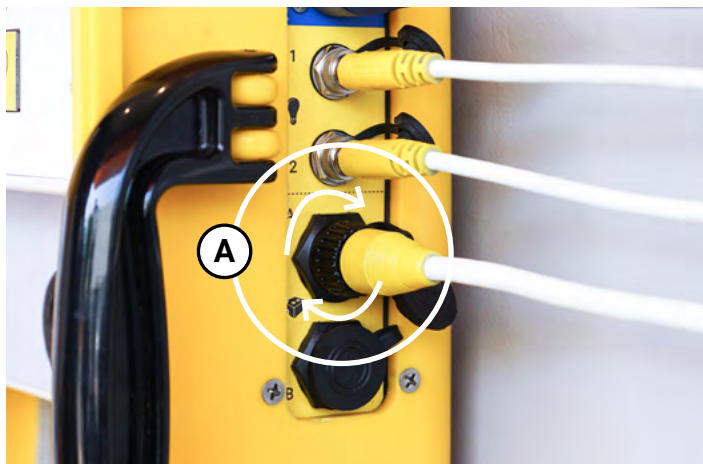
Connecting the Lights



Tighten the locking rings so that the cables do not unplug when pulled on



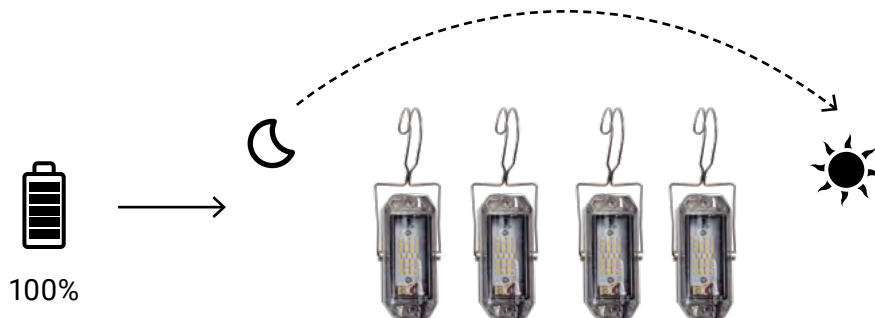
Connecting the Light Expansion Box



Light expansion box connector requires precise alignment

Lights

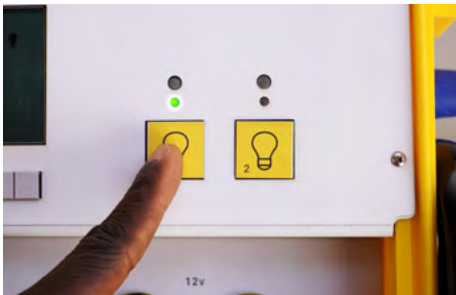
Understanding the Lights



When the main battery is fully charged, it can power 4 lights throughout the night on the brighter setting and up to 60 hours on the normal setting

- ❗ **The lights can only be used with the Solar Suitcase**
- ❗ The lights can be cleaned with a damp cloth

Understanding the Light Buttons and Light Expansion Box



Light buttons on the Solar Suitcase



Light buttons on the light expansion box

Press to turn on lights. There are two settings for the lights.

1 press:



Normal

2 press:

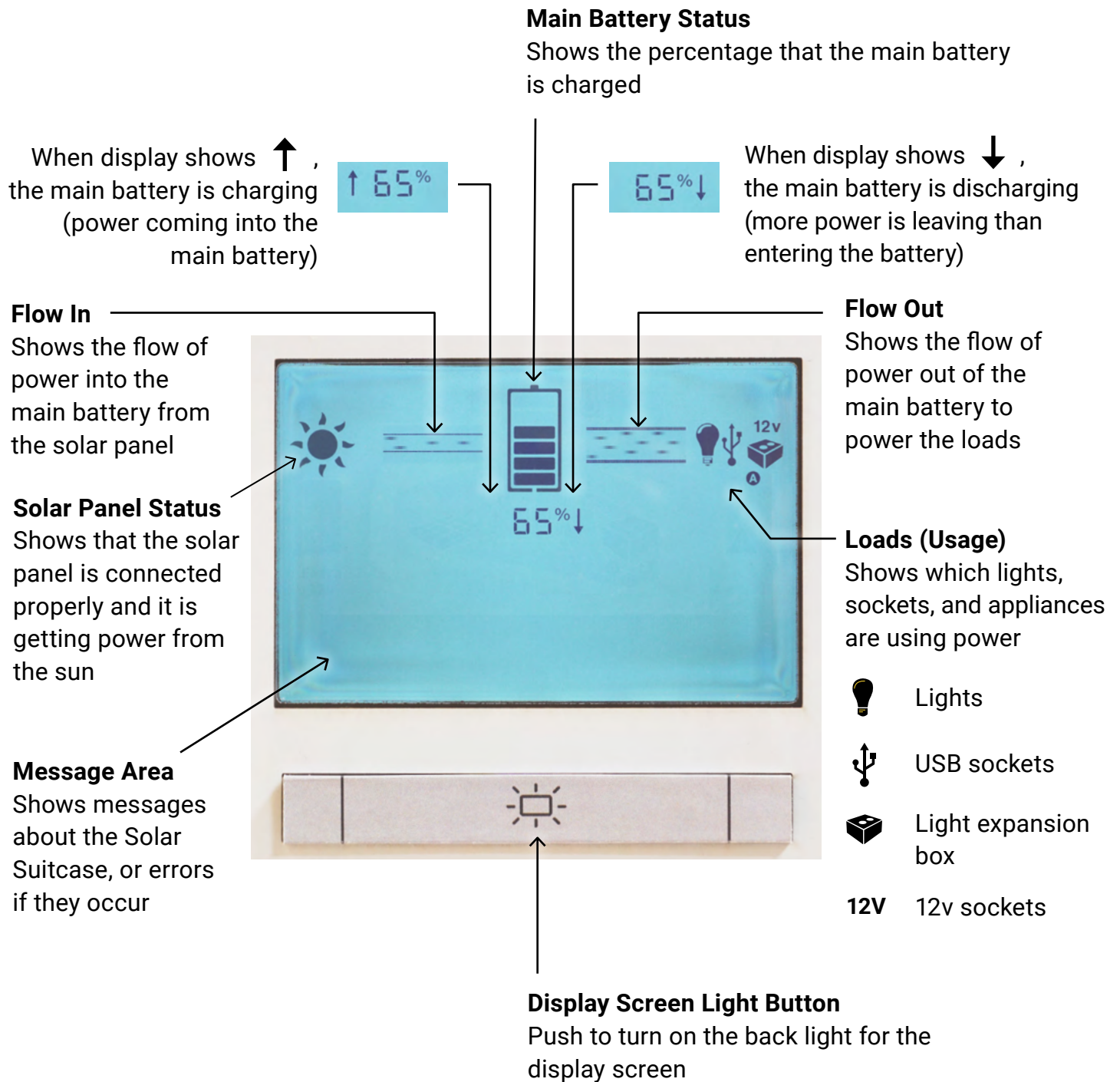


Brighter



If you see a red light, the light is poorly attached or damaged. For troubleshooting see P.29

Display Screen





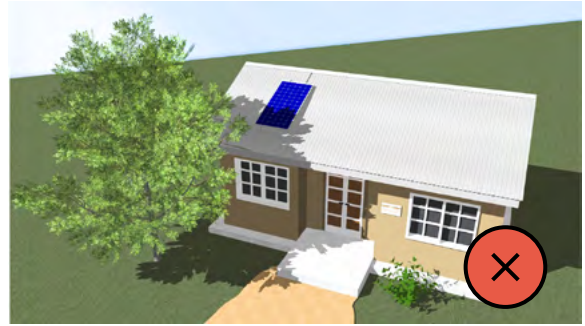
Start-Up Steps

Start-Up Steps

For more details, refer to installation manual

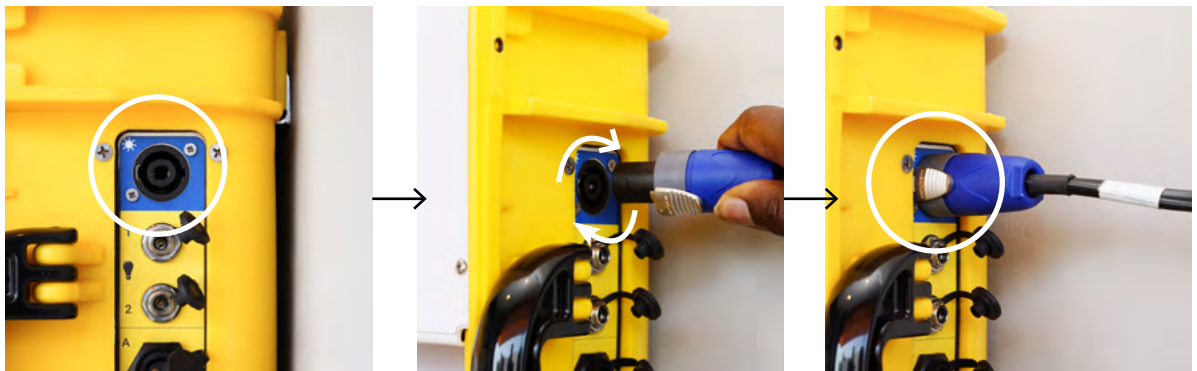
Step
1

Install the solar panel in a sunny location and connect the solar panel to the homerun cable. Avoid shading.



Step
2

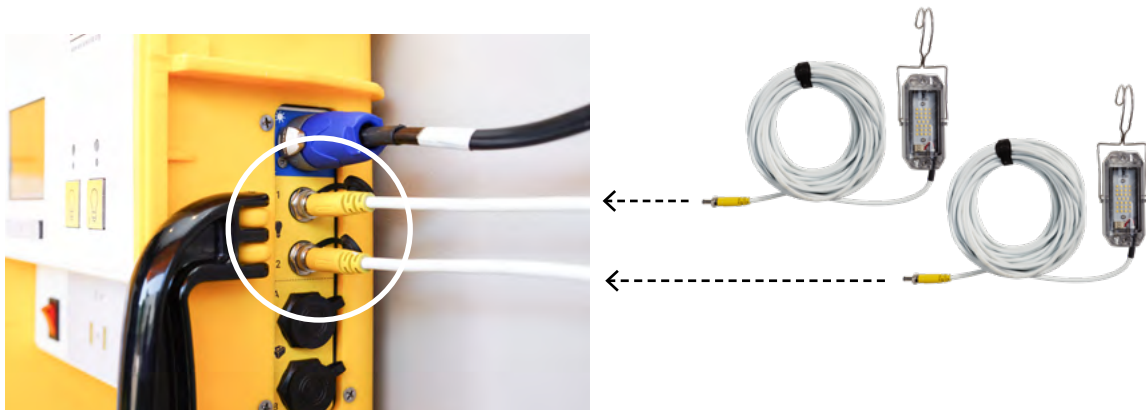
Connect the homerun cable to the Solar Suitcase



ⓘ The cable is properly connected when the silver tab clicks into place

Step
3

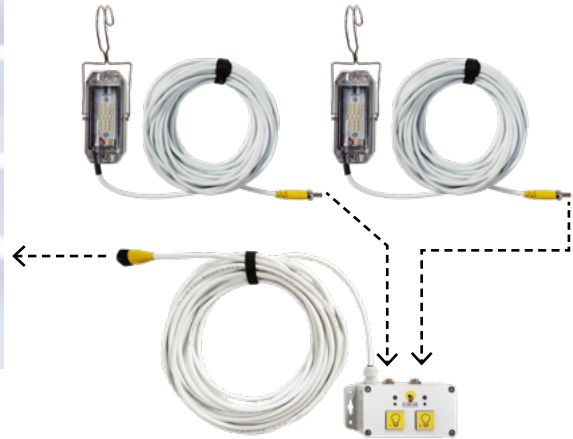
Connect two lights to the Solar Suitcase



Start-Up Steps

Step
4

Connect the light expansion box to the Solar Suitcase and additional two lights to the light expansion box



Step
5

Turn on the system



- ⚠ The main power switch should remain ON at all times, everyday.**
The only time to turn the main power switch OFF is when the Solar Suitcase is being serviced or when troubleshooting to fix a problem.



Appliances

16 Rechargeable Headlamps

17 Infrared Thermometer

19 Fetal Doppler

21 AA/AAA Rechargeable Battery Charger

22 How to Charge Your Phone

Appliances



You can charge
your phone here

The Solar Suitcase comes with the following appliances:



Micro USB cables for
rechargeable headlamps



AA/AAA rechargeable
battery charger



Rechargeable
headlamps



Fetal Doppler



Infrared
thermometer

Rechargeable Headlamps

Understanding the Rechargeable Headlamps

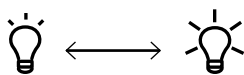


A

On/off Button



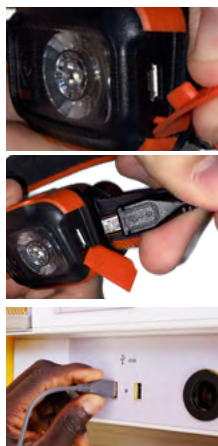
One click to turn on the headlamp



Long press to adjust the brightness

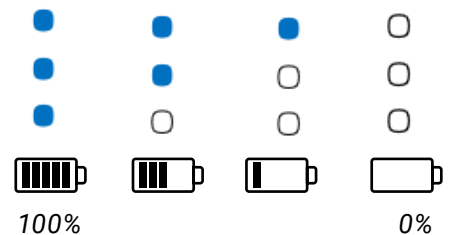
B

Charging Port



C

Battery Status Indicator



The indicator lights come on when the headlamp's power is on.



Charging

If the light flashes when you try to turn it on, it is locked.



Locked

To unlock lights, press and hold until light stops blinking and then release.



Unlock

Infrared Thermometer

Understanding the Infrared Thermometer

Infrared Probe

On/Off Button & Measurement Button

- Press once to turn on thermometer
- Press again to take a temperature reading

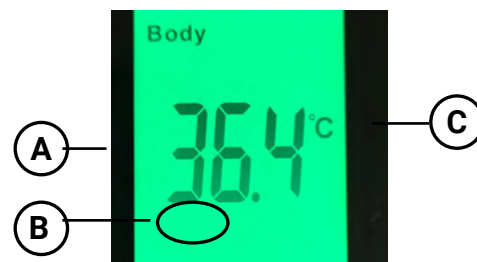
Left and Right Keys

- Press → and hold 6 seconds to switch display units (°C/°F)
- Press the ← or → key once to view test records



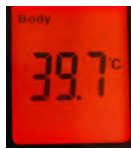
Battery Compartment for AAA Batteries



LCD Temperature Display and Battery Indicator



(A) Temperature Reading

Normal	Fever	High Fever
		
32 – 37.4 C 89.6 – 99.4 F	37.5 – 39.0 C 99.5 – 102.2 F	>39.1 C >102.3 F

(B) Low battery alert

- Battery indicator will appear if the battery is low



(C) Temperature setting

- C = Celsius
- F = Fahrenheit

Loading AAA Batteries into the Infrared Thermometer

Step 1 Open the battery storage cover

On the back of the thermometer, use your fingers and slide the battery cover down until you hear a click. You can then remove the cover from the thermometer.



Step 2 Place batteries

Make sure to match up + & - symbols



Infrared Thermometer

Using the Infrared Thermometer

This no-touch infrared thermometer allows you to measure a temperature by holding the thermometer close to the forehead of a person.

Step
1

Turn on the thermometer.
Push the mode button.



Step
2

Take the patient's temperature.
Hold the thermometer 2 - 4 cm away from the forehead. Push the mode button.



Step
3

Read the LCD display.
The temperature will be shown in one second. For additional information on reading the LCD display, see p.17 of this document.

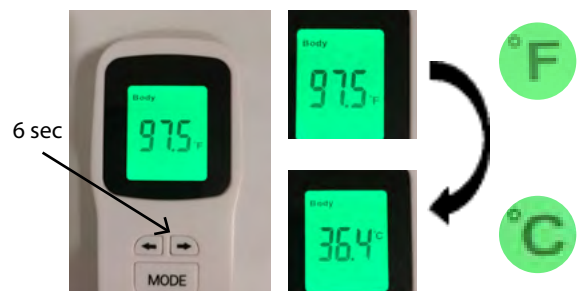


Step
4

The thermometer will turn off automatically when you are done using it.
Store with your Solar Suitcase.

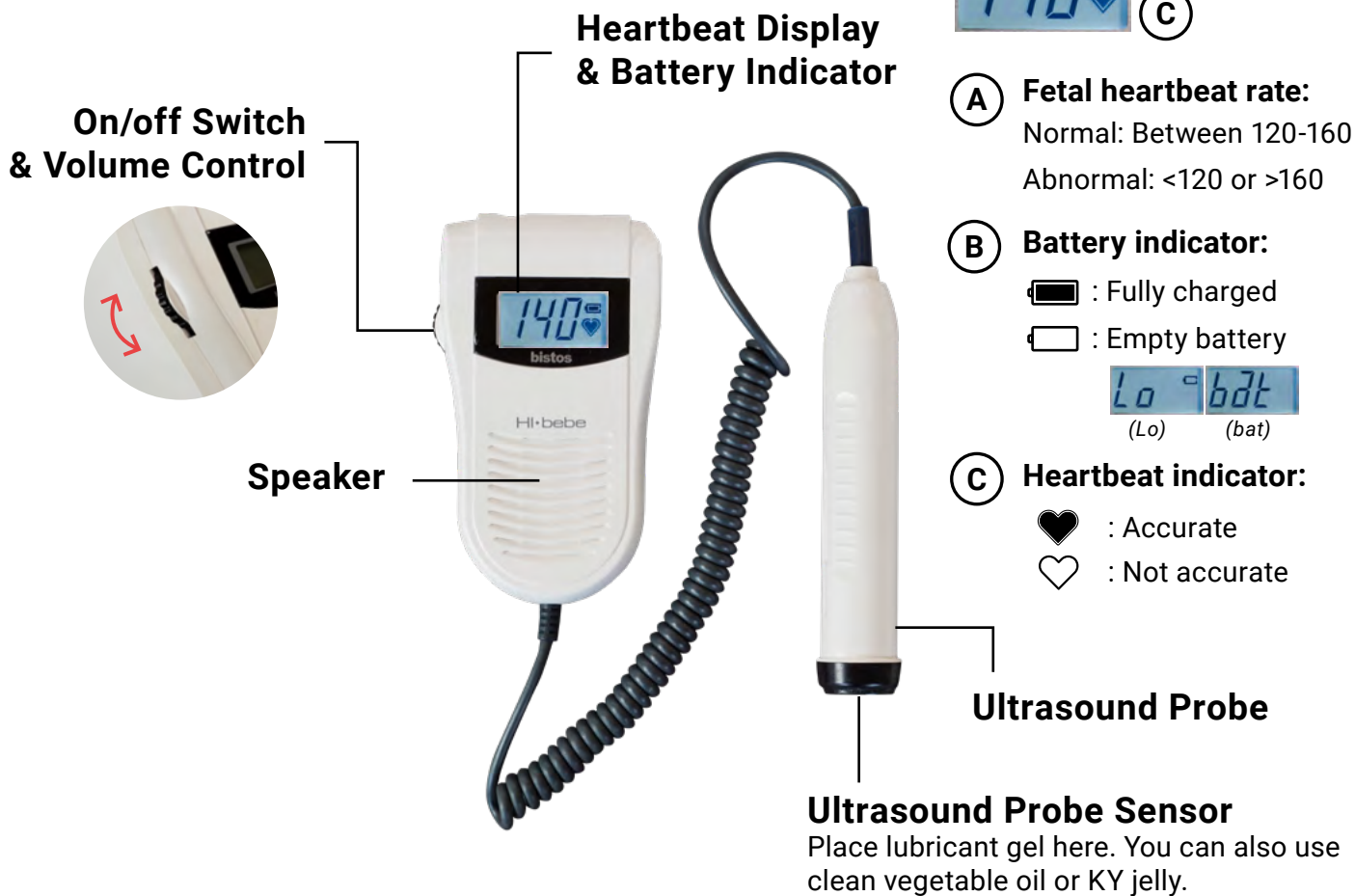


! If your temperature readings are way too high, you might be in °F Fahrenheit mode. To change the temperature mode back to °C Celsius, hold down the → button for 6 seconds.



Fetal Doppler

Understanding the Fetal Doppler



Loading AA Rechargeable Batteries into the Fetal Doppler

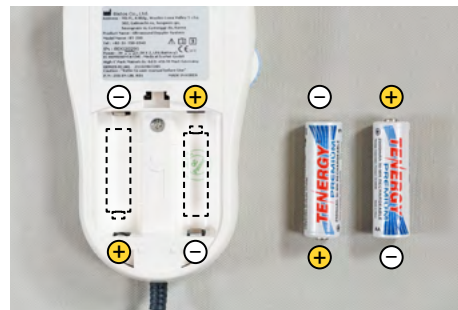
Step 1



Open the back cover

Press down and pull backward to open

Step 2



Place batteries

Make sure to match up the + & - symbols

Fetal Doppler

Using the Fetal Doppler

- ① Find the position of the baby and locate fetal chest



- ② Place gel, clean vegetable oil, or KY jelly where you will best hear the heartbeat



- ③ Turn on the fetal Doppler



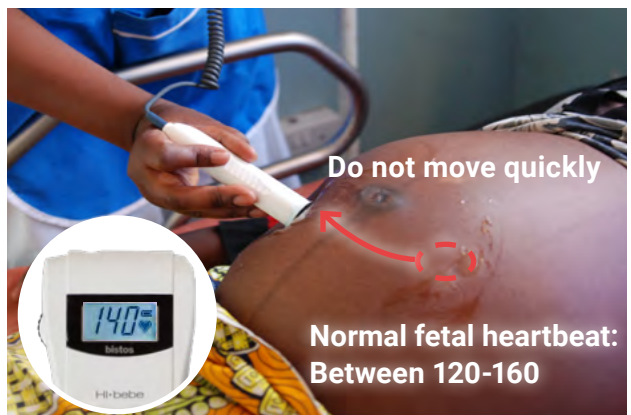
- ④ Hold the probe for 5 seconds and adjust the volume up if needed



- ⑤ If you don't hear the heartbeat, shift the angle of the probe and wait for 5 seconds



- ⑥ If you still don't hear the heartbeat, move the probe slightly to find the heartbeat and wait for 5 seconds



- ❗ Turn off the fetal Doppler when done

AA/AAA Rechargeable Battery Charger

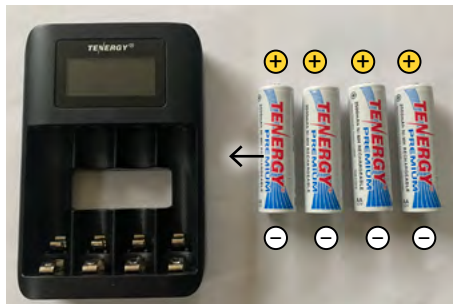
For Fetal Doppler and Infrared Thermometer

Charging Batteries

Step
1

Place rechargeable batteries
in battery charger

Use only size AA/AAA
rechargeable batteries
and make sure to match
up the + and - symbols



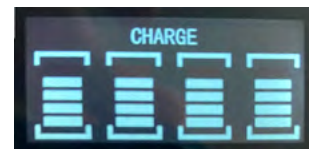
Step
2

Plug the AA/AAA
rechargeable battery charger
into the USB port.



Step
3

Read rechargeable
battery indicator



Charging



Fully charged

Charging Your Phone

Step
1

Connect phone charger to your phone



Step
2

Plug phone charger into USB or 12v socket



You can also use a car charger to charge your phone

Step
3

Place phone in pocket





Maximizing Performance

Maximizing Performance

The Main Power Switch Should Remain ON at All Times

The only time to turn the main power switch OFF is when the Solar Suitcase is being serviced or when troubleshooting to fix a problem

When to Use Lights and Charge Appliances

It's always best to charge appliances when the main battery is full and it is a sunny day



75%-100%



Lights



Phone
Charging



Appliance
Charging



50%-74%



0%-49%



 or only in an emergency

Clean Your Solar Panel If You Can Do So Safely



Safety first



Water, yes



Scrub, no



Soap, no



Troubleshooting

26 Appliance is Not Functioning

- One appliance socket is not working
- One specific appliance is not working

30 System Performance is Poor

- Lights turn off in the middle of the night
- Lights turn off earlier than they used to

32 Light is Not Functioning

- One or more lights do not work at all

33 System is Not Functioning

- No appliances or lights work
- No symbols on the display screen
- Solar Suitcase is not operational

34 Replacing the Main Battery

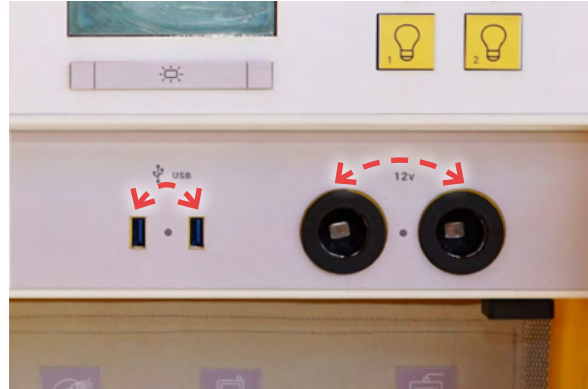
35 Error Codes

Appliance is Not Functioning

- One appliance socket is not functioning
- One specific appliance is not working

Make Sure All Appliance Sockets Are Functioning

If one socket fails to charge, try to connect your appliance to another socket. If the appliance still isn't working, follow the instructions below for that appliance (phone charging, rechargeable headlamp, or fetal Doppler).



Phone is Not Charging

Step
1

Change to another charger or purchase a new charger



Step
2

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



The Rechargeable Headlamp is Not Working

Step
1

Check if the rechargeable headlamp is charging properly



When charging properly, the charging lights should have a flashing blue light.

If the headlamp is plugged into the solar suitcase and no blue lights are flashing, then it is not charging.

Step
2

Check that the rechargeable headlamp is being used correctly

Review P.16 of this manual on how to use the rechargeable headlamp.
A few reminders:



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



If the light flashes when you try to turn it on, it is locked. To unlock, press and hold the on/off button until the light stops blinking and then release.



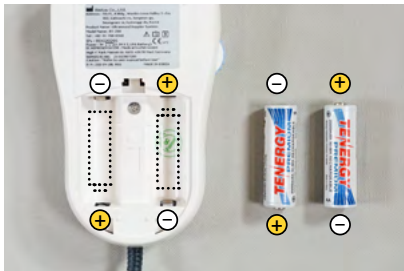
If it still doesn't work, it may need to be replaced. Contact the organization that delivered the Solar Suitcase to get information on where to get a replacement.

Appliance is Not Functioning

Fetal Doppler is Not Working

Step
1

Check the AA rechargeable batteries



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



Make sure the AA rechargeable batteries are fully charged



Replace the AA rechargeable batteries if they are old or damaged

Step
2

Check the usage

Review P.18 "Fetal Doppler" in the User Manual



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



Make sure it is being used correctly



Make sure you use lubricant gel, clean vegetable oil, or KY jelly

Appliance is Not Functioning

Thermometer is Not Working

Step
1

Check the AAA rechargeable batteries



Make sure the AAA rechargeable batteries are inserted correctly (+ to + and - to -)



Make sure the AAA rechargeable batteries are fully charged



Replace the AAA rechargeable batteries if they are old or damaged

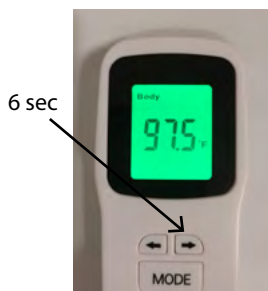
Step
2

Check the usage

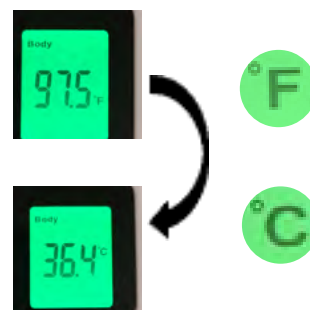
Review P.17 "Infrared Thermometer" in the User Manual



If your temperature reading says "Lo", move the probe closer to the forehead. Make sure the infrared probe is 2-4 cm from the person's forehead.



If your temperature readings are way too high, you might be in °F Fahrenheit mode. To change the temperature mode back to C Celsius, hold down the → button for 6 seconds.




System Performance is Poor

- Lights turn out in the middle of the night
- Lights turn off earlier than they used to

Step
1

Check how old the battery is

Installation Date		IN CASE OF PROBLEMS CONTACT	
Installer		Name	
Name		Organization	
Organization		Phone	
Phone		 <p>If you are unable to reach anybody locally, please contact We Care Solar. Email: info@wecaresolar.org Phone: +1 510 756 0205</p>	
Main Battery Replacement Date			

LFP batteries last about 5 years. There is a sticker on the Solar Suitcase that tells you when the battery will likely need to be replaced.

Step
2

Make sure the system is not being overused during the day



75%-100%

Lights



Phone Charging



Appliance Charging



50%-74%



0%-49%



 or only in an emergency

System Performance is Poor

Step
3

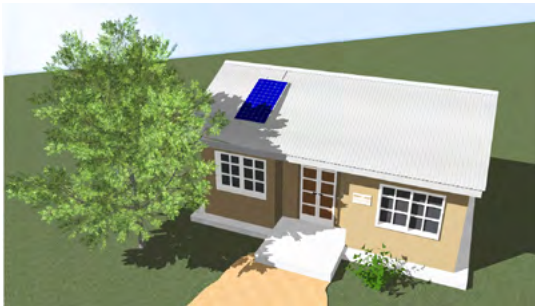
Now check what is causing the lack of energy



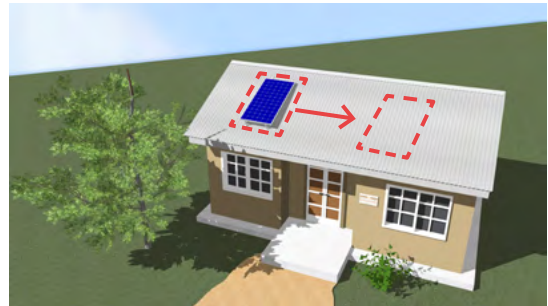
If there is bad weather...



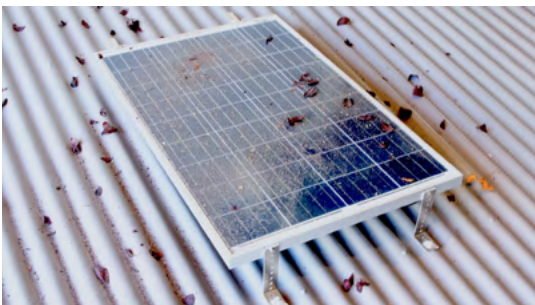
Use the lights on the normal setting, not the brighter setting, and don't charge appliances



If there is shade...



Trim the tree or move the solar panel to an area of the roof that is not shaded



If solar panel is dirty...



Wash panel with water and a soft cloth

Light is Not Functioning

- One or more lights do not work at all

Step
1

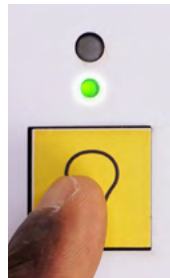
Check that the light connectors are inserted correctly and the locking nut is firmly tightened



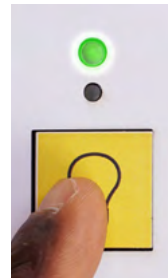
Step
2

Check that the light button is on normal or brighter

Normal:



Brighter:



Off:



Step
3

Check the light cable for damage

Step
4

Try swapping light connections to see if it is the light or the socket that is faulty

Step
5

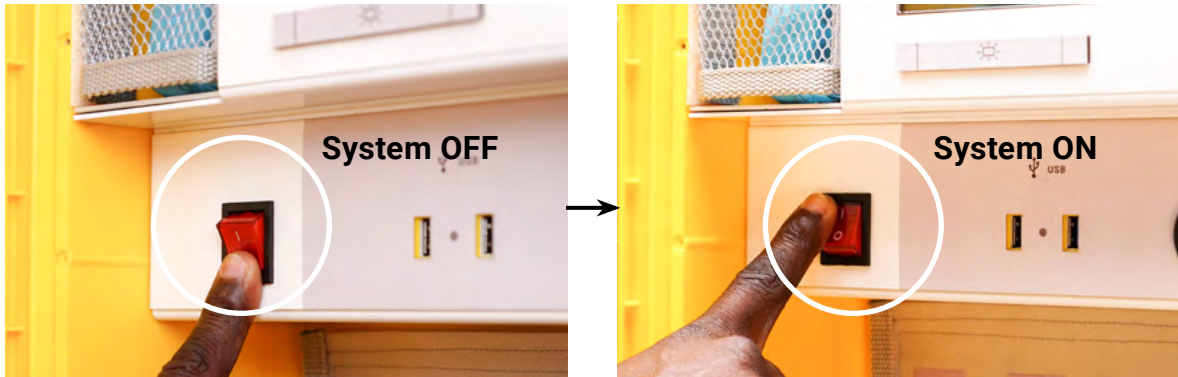
If the faulty light is one that is connected to the light expansion box, check that the light expansion box cable is firmly inserted into the Solar Suitcase at light expansion box socket A or B

System is Not Functioning

- No appliances or lights work
- No symbols on the display screen
- Solar Suitcase is not operational

Step
1

If the Solar Suitcase is not operational, press main power switch to OFF. Wait 10 seconds. Press main power switch to ON.



Step
2

Check if the solar plug on the homerun cable is clicked in firmly

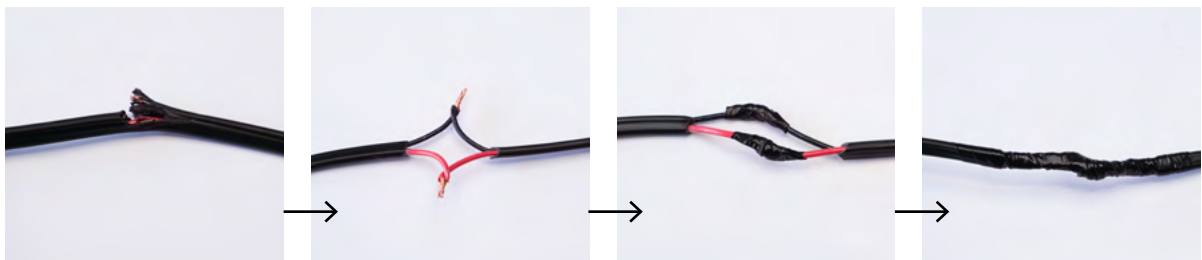


⚠ The cable is properly connected when the silver tab clicks into place

Step
3

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.**



Replacing the Main Battery

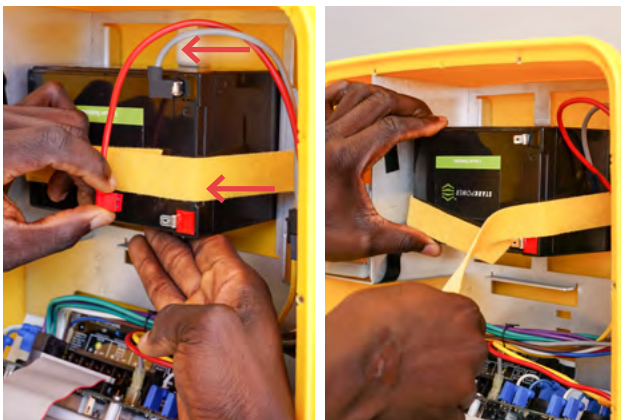
- ① Turn main power switch to off



- ② Remove two screws from front panel



- ③ Disconnect the wires from the battery and hold the battery while removing the Velcro strap



- ④ Remove the main battery and replace with a new one. Be careful not to damage the fragile circuit boards.



- ⑤ Reconnect the main battery and attach the Velcro strap tightly



- ⑥ Align small pin below fetal Doppler compartment and secure front panel with screws. Turn ON the main power switch.



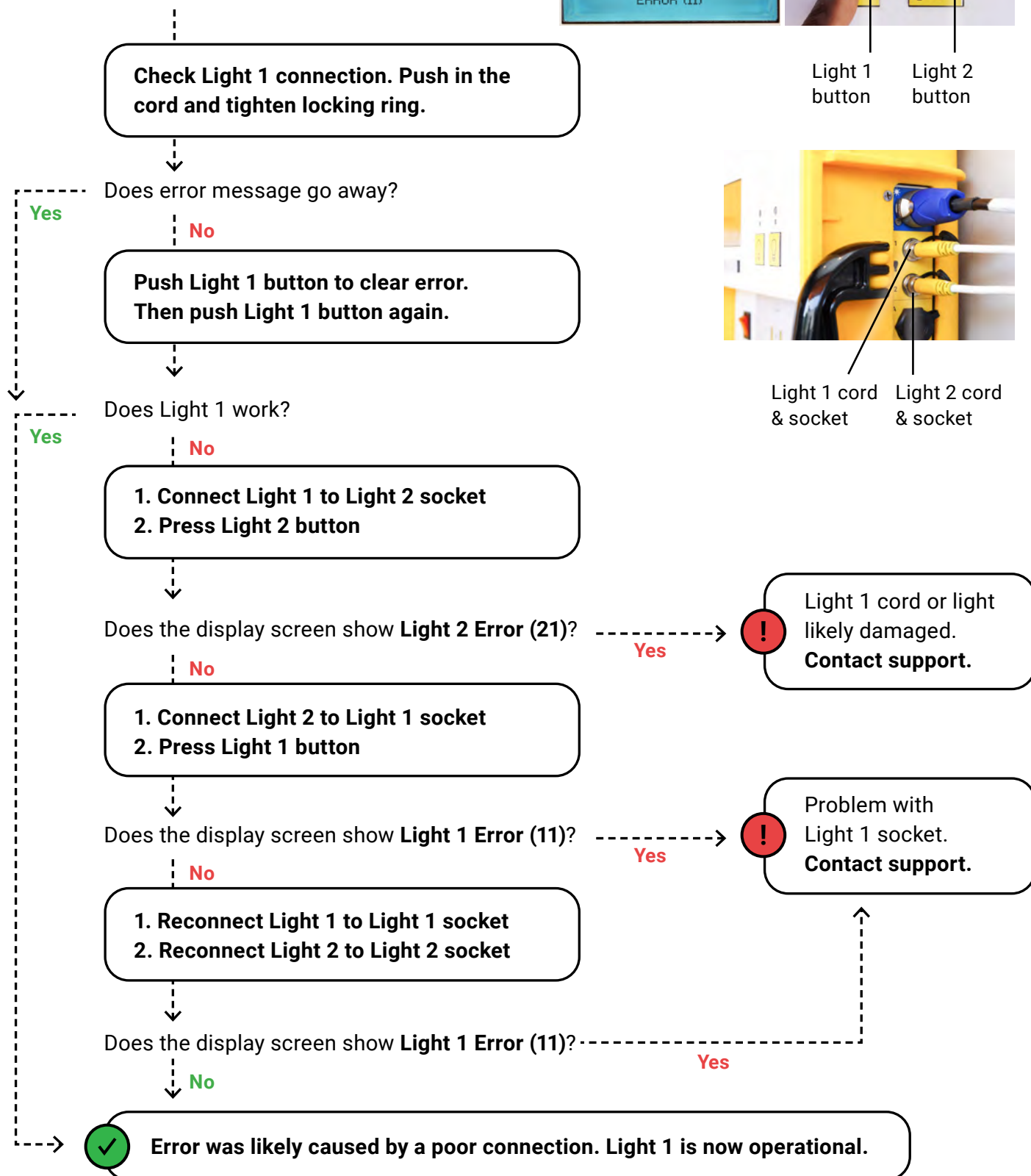
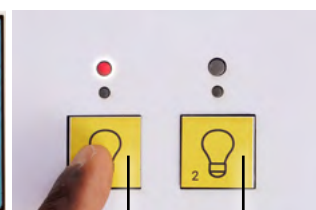
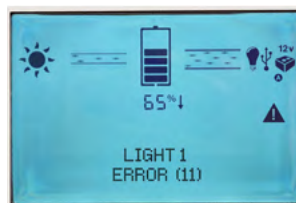
- ⓘ Ensure red terminal attaches to red terminal (+) on battery, and black terminal attaches to black terminal (-) on battery

- ⓘ Align small pin

Error Codes

Light 1 Error (11)

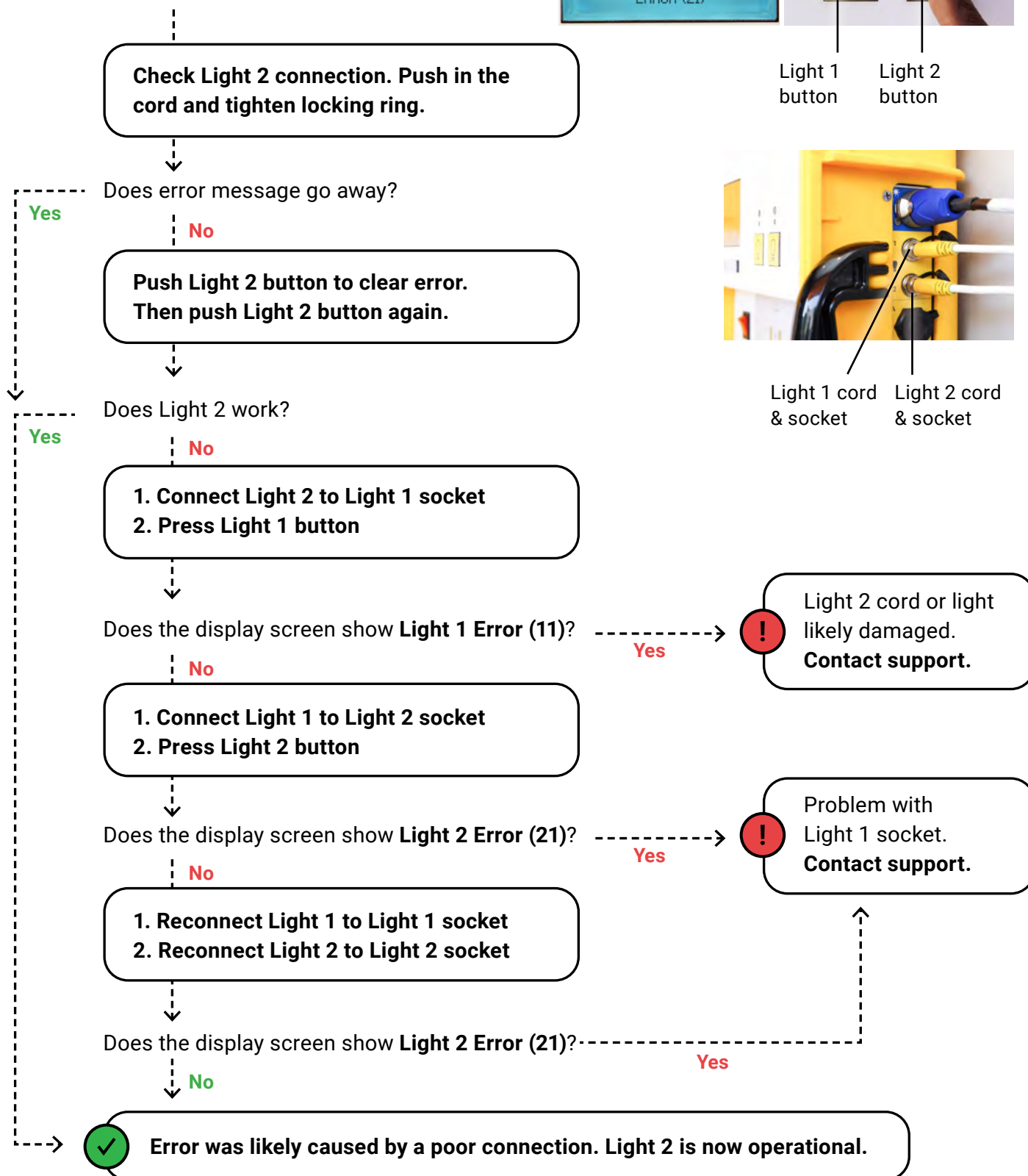
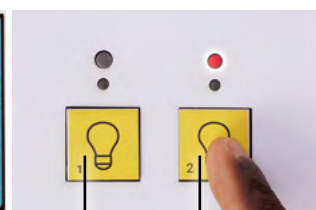
There is an error with Light 1 attached to the Solar Suitcase



Error Codes

Light 2 Error (21)

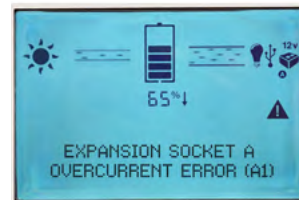
There is an error with Light 2 attached to the Solar Suitcase



Error Codes

Expansion Socket A Overcurrent Error (A1)

Too much power is flowing through Expansion Socket A



Disconnect lights, appliances and phones from Expansion Box A

Does error message go away?

Yes

Reconnect lights, appliances and phones to Expansion Box A

Does the display show Expansion Socket A Overcurrent Error (A1)?

Yes

No

Connect Expansion Box A cable to Expansion Socket B

Does the display show Expansion Socket B Overcurrent Error (B1)?

Yes

No

Reconnect Expansion Box A cable to Expansion Socket A

Does the display show Expansion Socket A Overcurrent Error (A1)?

Yes

No

System is now operational

There is a problem with Expansion Box A or the cable connected to Expansion Socket A. Look for a damaged cable or contact support.

Expansion Cable A & Expansion Socket A

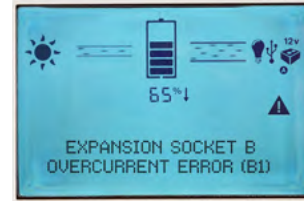


Expansion Socket B

Error Codes

Expansion Socket B Overcurrent Error (B1)

Too much power is flowing through Expansion Socket B



Disconnect lights, appliances and phones from Expansion Box B

Does error message go away?

Yes

Reconnect lights, appliances and phones to Expansion Box B

Does the display show Expansion Socket B Overcurrent Error (B1)?

Yes

No

Connect Expansion Box B cable to Expansion Socket A

Does the display show Expansion Socket A Overcurrent Error (A1)?

No

Reconnect Expansion Box B cable to Expansion Socket B

Does the display show Expansion Socket B Overcurrent Error (B1)?

No

System is now operational

There is a problem with Expansion Box B or the cable connected to Expansion Socket B. Look for a damaged cable or contact support.

Expansion Cable A & Expansion Socket A

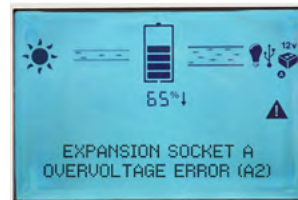


Expansion Socket B

Error Codes

Expansion Socket A Overvoltage Error (A2)

Expansion Socket A voltage is too high



Disconnect lights, appliances and phones from Expansion Box A

Does error message go away?

Yes

Reconnect lights, appliances and phones to Expansion Box A

Does the display show Expansion Socket A Overvoltage Error (A2)?

Yes

No

Connect Expansion Box A cable to Expansion Socket B

Does the display show Expansion Socket B Overvoltage Error (B2)?

Yes

Reconnect Expansion Box A cable to Expansion Socket A

Does the display show Expansion Socket A Overvoltage Error (A2)?

Yes

No

System is now operational

There is a problem with Expansion Box A or the cable connected to Expansion Socket A. Look for a damaged cable or contact support.

Expansion Cable A & Expansion Socket A

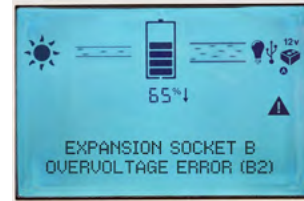


Expansion Socket B

Error Codes

Expansion Socket B Overvoltage Error (B2)

Expansion Socket B voltage is too high



Disconnect lights, appliances and phones from Expansion Box B

Does error message go away?

Yes

Reconnect lights, appliances and phones to Expansion Box B

Does the display show Expansion Socket B Overvoltage Error (B2)?

Yes

No

Connect Expansion Box B cable to Expansion Socket A

Does the display show Expansion Socket A Overvoltage Error (A2)?

No

Reconnect Expansion Box B cable to Expansion Socket B

Does the display show Expansion Socket B Overvoltage Error (B2)?

No

System is now operational

There is a problem with Expansion Box B or the cable connected to Expansion Socket B. Look for a damaged cable or contact support.

Expansion Cable A & Expansion Socket A



Expansion Socket B

Error Codes

System Voltage Too Low (03)



Description

The voltage is too low to run the lights and charge appliances because the battery is too low

Actions (What to do)

Wait for the sun to shine on the solar panel which will charge the battery

Solution

When the sun charges the battery, the error will go away. If error message does not go away after 24 hours, contact support.

USB Socket Error (31)



Description

There is an error with one of the USB charging sockets

Actions (What to do)

Disconnect appliances and phones from the USB sockets. Error message will go away.

Solution

Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that appliance or phone is not compatible or damaged.



Error Codes

12V Socket Overcurrent Error (41)



Description

Too much power is flowing through one of the 12V sockets

Actions (What to do)

Disconnect appliances and phones from 12V sockets. Error message will go away.

Solution

Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that appliance or phone is not compatible or damaged.

12V Socket Overvoltage Error (42)



Description

Voltage on one of the 12V sockets is too high

Actions (What to do)

Disconnect appliances and phones from 12V sockets. Error message will go away.

Solution

Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that appliance or phone is not compatible or damaged.

12V Socket Voltage Fault Error (43)



Description

There is unexpected voltage on one of the 12V sockets

Actions (What to do)

Disconnect appliances and phones from 12V sockets. Error message will go away.

Solution

Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that single appliance or phone is not compatible or damaged. If the error message comes on when attaching any appliance or phone then there is a problem with the system. Contact support.

Error Codes

Other Error Codes

Error Codes	Description	Actions (What to do)	Solution
System Too Hot (01)	The system is too hot	Turn main power switch to OFF. Wait for the system to cool down. Turn main power switch to ON every few hours to see if the error message goes away.	The error message will go away when the system cools down. If after 24 hours the system still has the error message, contact support.
System Too Cold (02)	The system is too cold. Charging when the system is too cold might damage the battery.	Wait for system to warm up. Check every few hours to see if the error message goes away.	The error message will go away when the system warms up. If after 24 hours the system still has the error message, contact support.
System Voltage Too High (04)	An internal component such as the battery or charging circuit has failed	Turn lights off. Do not charge appliances or phone. Wait one hour to see if the error message goes away.	If error message does not go away after 24 hours, contact support.
System Overcurrent (05)	The system has detected an error. Most likely an appliance or phone is requiring too much power.	Disconnect appliances and phones. Error message will go away.	Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that appliance or phone is not compatible or damaged.
System Fault (06)	The system has detected an error. Most likely an appliance or phone is requiring too much power.	Disconnect appliances and phones. Turn main power switch to OFF. Wait 10 seconds. Turn main power switch to ON. If error message goes away move to the solution step. If error message is still on, contact support.	Connect appliances and phones one at a time to see if the error message occurs again. If yes, then that appliance or phone is not compatible or damaged.

Error Codes

Error Codes	Description	Actions (What to do)	Solution
Expansion Socket A Voltage Fault Error (A3)	Unexpected voltage on Expansion Socket A	Disconnect devices plugged into Expansion Socket A. Error message will go away. Reconnect devices to Expansion Socket A.	If error message comes back on when the device is reconnected, there is likely a problem with the device or the expansion box being connected. If the error message comes back on regardless of what is being connected, there is likely a problem with the system. Contact support.
Expansion Socket B Voltage Fault Error (B3)	Unexpected voltage on Expansion Socket B	Disconnect devices plugged into Expansion Socket B. Error message will go away. Reconnect devices to Expansion Socket B.	If error message comes back on when the device is reconnected, there is likely a problem with the device or the expansion box being connected. If the error message comes back on regardless of what is being connected, there is likely a problem with the system. Contact support.

For any error codes not listed above, please contact the number listed on your Solar Suitcase sticker.

Maintenance Log

Date	Technician	System Observations/Problems	Actions Performed
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		

Maintenance Log

46

Date	Technician	System Observations/Problems	Actions Performed
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		
	<div>Name</div> <div>Organization</div> <div>Phone</div>		



What to do if the Solar Suitcase is not working well

- Review sections on Maximizing Performance (P.23) and Troubleshooting (P.25) in this User Manual.
- If you are unable to fix the problem with this information, call the number written on the sticker on the inside of the Solar Suitcase door.
 - If you are unable to reach anybody locally, fill out an incident report for remote technical assistance. Visit <https://wecaresolar.org/solar-suitcase/maintenance-troubleshooting/> for a link to our Incident Report.

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

Online Sources

For resources on Solar Suitcase installation, use, maintenance, and repair, or to submit an Incident Report for remote technical assistance, please visit <https://wecaresolar.org/solar-suitcase/>

Warranty

We Care Solar provides a warranty for two years on the base system. The base system includes: chassis, charge controller, lights, main battery, 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: micro USB adapter, AA/AAA rechargeable battery charger, rechargeable headlamps, infrared thermometer, and fetal Doppler.

Designed by



Institute for
Creative
Integration

<https://www.creative-integration.com/>