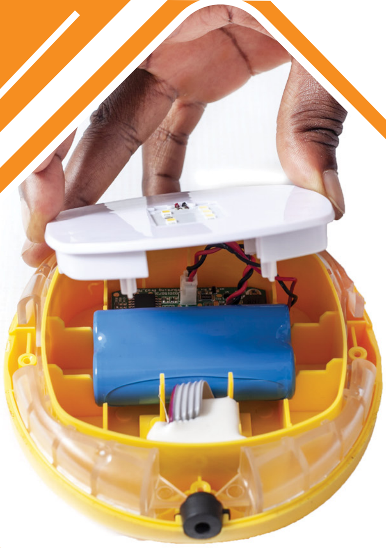


PICOSOLAR DIAGNOSIS & REPAIR MANUAL

Developed by SunnyMoney as part of the Global LEAP Solar E-Waste Awards

Contents

ABBREVIATIONS:

mAh.......................... milli Ampere hour

V................................ Voltage

LEAP........................ Lighting and Energy Access Partnership

E-waste.................... Electronic waste

SHS.......................... Solar Home Systems

Introduction

SunnyMoney is working to reduce e-waste by extending the life of its solar lights through repair.

The guidance in this manual is intended to support better repair by repair technicians and others who have an interest in repair. SunnyMoney recommends that only those with experience and knowledge in technical repair attempt the steps outlined in this manual. SunnyMoney will not be held responsible for damage to products.

A mobile repair App has also been designed with similar information to this manual. It includes video demonstrations which provide visual guidance for some of the more complex procedures. If you own a smartphone you can search for "SunnyMoney Picosolar Repair Guide" and download the app from the Google Play store.

To learn more about SunnyMoney or SolarAid please visit www.solar-aid.org

SunnyMoney's work to reduce e-waste in Zambia is funded through the Global LEAP Awards

E-waste

E-waste is short for 'electronic waste' which means electronic goods and their parts that become waste products from formerly functioning electronics such as televisions, mobile phones and solar lights. Growing e-waste is fueled by higher consumption rates of electric and electronic equipment, short life-cycles, and few options for repair. A record 53.6 million metric tonnes (Mt) of electronic waste was generated worldwide in 2019, up 21 percent in just five years.

When solar products are deposited into regular landfills and allowed to degrade, some components can be damaging to human health as well as the environment. The majority of today's solar lanterns use lithium ion battery technology. Some concerns around lithium ion batteries are that:

- When lithium ion batteries begin to degrade, they can leach out into the soil. This can pose a threat for people in the area who may touch this chemical or may make its way into agricultural soils or into the groundwater.

- Lithium-ion batteries are sensitive to high temperatures and inherently flammable. It is important that lithium ion batteries are stored in a safe way at their end of life. One inexpensive method is by storing them inside buckets filled with sand.

E-waste in Zambia

Like the rest of the world, e-waste is on the rise in Zambia. There is currently one company that is registered by the Zambian Environmental Management Authority (ZEMA) to recycle electronic waste.

They are: TCH E-waste.

Towa Chilongo, +260 960 707919, tchilongo@tche-waste.co.za , www.tche-waste.co.za

Solar energy

How does solar energy work?

Solar energy is energy that emanates from sunlight. It is one of type of renewable energy, meaning that it will never run out. It is not like fossil fuels such as coal, oil and natural gas, which are called non-renewable energy.

Solar heating uses the sun's heat to warm water for washing and heating. The cold water is pumped into the solar collector on the roof where the sun warms it up. It is then pumped back down into the building where it is stored in a tank so the hot water can be used when it is needed.

Solar electricity refers to Solar Photovoltaic (PV) panels collect solar energy and convert it into electricity. The PV cells can be linked to a rechargeable battery which collects energy in the day to be used at any time, even at night when there is no sun.

Differences in small and larger solar systems

Larger solar systems include stand-alone components like large panels of up to 1,000 watts, inverters, charge controllers and deep cycle batteries. These systems deliver much larger voltage rates of up-to 20 volts per solar panel. To increase voltage, panels are connected in series. To increase current, panels are connected in parallel.

SunnyMoney works primarily with smaller solar systems (sometimes referred to as picosolar) including solar lanterns and solar home systems. These products are used predominantly for lighting, mobile phone charging and to play a radio. Picosolar products involve lower voltage, up to approximately 7 volts and are neither in series nor parallel. This means that they are easier to repair than larger systems. The panels are not large enough to power a television, although some solar home systems can be used to play some newer, low energy televisions.

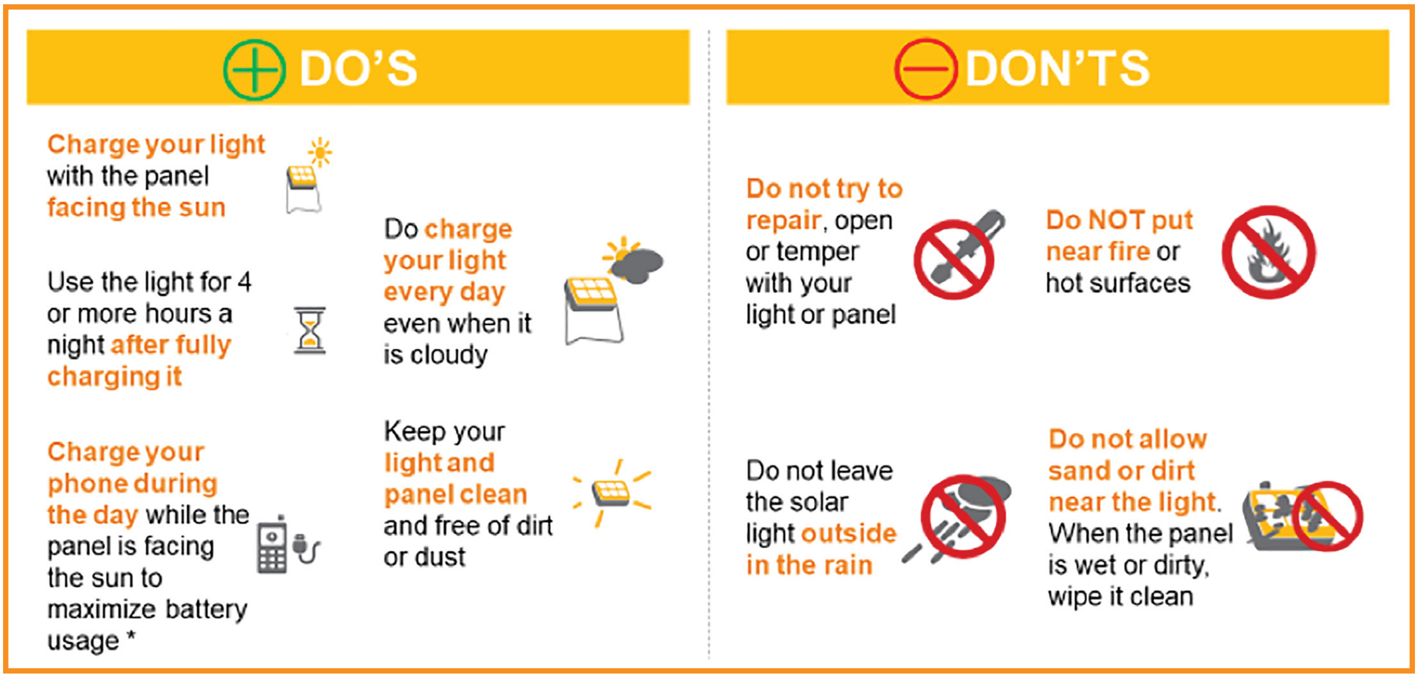
Record Keeping for Repair Technicians

Maintaining clear and full records is important for any business. It helps repair businesses to keep track of how much money is coming in, where money is being spent and how profitable different types of repair are, which enables them to set relevant rates for services.

For SunnyMoney, it is important to understand what types of products customers are bringing in and what their problems are. Ordering batteries and other components can take 3- 6 months to ship by sea. Knowing in advance what lights have what problems allows better preparation to order relevant stock or spare parts when they are needed.

Proper maintenance of solar products

To maintain the integrity of solar products, it is recommended to:
• Charge the light every day;
• Keep the solar product dry and clean;
• Do not leave it exposed outdoors when it is not charging or when it is full;
• Keep it away from hot surfaces.



When to attempt or avoid repair

Repair for solar lights may not be possible or may not make sense in all cases. Some procedures are straightforward and not too time consuming such as broken or desoldered cables. However, some procedures may be very time consuming and have a lower likelihood of being successful, such as trying to remove or alter components on the PCB. Do a cost/benefit analysis of a repair, consider how much your time costs, the cost of the spare part (if relevant) and what the customer is willing to pay.

Ensure that you understand the power specifications of the light and do not use a power source that does not meet the specifications. Linking the light to the wrong battery or a larger panel than what is required could damage the product further.

Spares

The quality of the repair is dependent upon the quality of the spare parts. Some locally sourced rechargeable batteries are of poor quality may not last long. On the battery in the photo, it lists an abnormally high 6800 mAh, where a realistic mAh should be around 3000 for a 3 Volt battery. If you are unsure whether the battery does have the power listed, use a multimeter to test the voltage of the battery.

SunnyMoney is working to obtain good quality components for repair technicians for solar products. Our interest is to ensure that products are being repaired well and lasting longer. We hope to be able to supply batteries and components at a fair price. If the component is not available through SunnyMoney you must inform the customer that the component is NOT BEING SUPPLIED BY SUNNYMONEY. We will not be able to supply all components at all times.

Ethics

Note that when conducting repair on products, there are some guidelines that should be followed: Use the correct tools and following the guidelines.

Using the wrong type of screwdriver, for example, can strip the screws and damage the product. Follow the guidelines for diagnosis and repair wherever possible.

Only reputable spares can be used

SunnyMoney is working to set up a reliable supply of good quality products. In the case where spares are not available, it should be made clear to the customer that SunnyMoney spares have not been used and the spare was sourced through other means.

Refurbished products cannot be sold as new products

The lifespan of a repaired/refurbished product is likely to be lower than a new product since other components have been exposed to wear and tear. Customers must know that they are purchasing a refurbished product and not a new one.

Contacts of Repair entities

Repair technicians who have undergone SunnyMoney's training can be found at:

Nsolo Electronics
Wingston Road
Choma, Zambia
0977687669

Masters Electronics & Auto Services
James Mulenga and Nkandu Lazarus
Munkombwe Complex
Choma, Zambia
0974938076

If you wish to purchase a new light contact Sunny Money 0974 793 464
or email info.zambia@sunnymoney.org

Before you begin

Charging the light

The first step before engaging on any diagnosis or repair is to ensure that the light is fully charged.

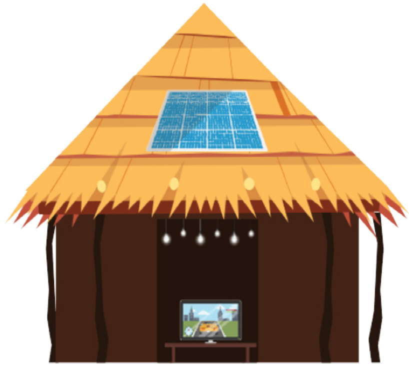
Built in Solar Panel: Make sure your solar light is in a clean, dry place. Wipe the solar panel with a dry cloth to remove any dirt or dust. Place your solar light outside and ensure the panel is facing the sun.

Separate Solar Panel: Wipe the solar panel with a dry cloth to remove any dirt or dust. Plug the solar panel into the solar light, keep the solar panel horizontal, with the dark side facing the sun. Keep the lamp indoors.

Turn the light off during charging. If you are not sure of the switch position, put the panel under the sun and check the light after 20 minutes.

If the light is ON switch it OFF and keep charging it

Charge your light in the sun for a full eight hours.



Warranty

SunnyMoney lights are covered under a limited two-year warranty. This warranty covers manufacturing defects. If the product was purchased within the last two years and it is faulty it can be exchanged for a new product. The original receipt is required to claim the warranty.

Any tampering of the product, which includes any attempted opening of the product or even the loosening of the screws voids the warranty.

Before undertaking any repairs, find out if the product is still under warranty. Contact the SunnyMoney agent or the SunnyMoney head office to arrange for a replacement product, where applicable. 0974 793 464 or email info.zambia@sunnymoney.org

After the warranty period is finished and the product stops working there is no replacement. At this point you are encouraged to open the product and attempt to repair it, if you have the relevant skills.

Warning

The following section is for those with a background in electronics and repair.

If you proceed beyond this point you may damage your solar light. This may include cracking the plastic casing, damaging batteries, connections and/or panels. SunnyMoney suggests using certified technicians and will not be held responsible for any damage sustained during the attempted diagnosis and repair of products.

Any warranty on the product will be void.

If you proceed beyond this point, you are indicating that you understand and accept any risk associated with opening or tampering with the product.

Diagnosis and Repair

The following provides information on diagnosis and repair for two versions of the SM100, S2, Pro2, Mobile and HP30. We hope to expand our diagnosis and repair guidance for more products in the future.

This section covers the technical specifications, diagnoses and repair guidance for each of the six lights. It is recommended that a full diagnosis be conducted before attempting repair to fully understand where the issue lies or there may be more than one fault with the product.

The troubleshooting section is intended to address common faults experienced during the life cycle of each light. It is recommended that you complete a diagnosis before using the troubleshooting section.

Identifying old from new SM100

There are two different versions of the SM100, the old and the new version. Some of the ways you can distinguish one from the other are:

	Old SM100	New SM100
Switch	One light setting	Two light setting
Battery	Grey battery	White battery
LED	No circle in transparent casing	LED sits in transparent circle casing
Solar Panels	Black solar panel	Blueish black solar panel

SM100 (Older version)

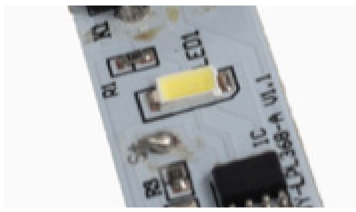
Components of the SM100 (Older version)

Screws: Phillips start T4/T5 star head self-tapping screws

Battery: LiFePO4 3.2V, 300 mA/Form factor 14500

Switch: 12x12x9mm foot square push button. Yellow rubber cover (custom)

Panel: Integrated 50 mA polycrystalline solar panel



LED: 0.5W white, 18 Lumen

Opening the product

Required:
Phillips T4/T5 star head screwdriver
Small flathead screwdriver

- Use the T4/T5 star head screwdriver to remove the four screws which hold the front lens to the back case.
- When screws are out, use a small flathead screwdriver gently pry the front lens from the back casing, ensuring not to damage the soldered wires connecting the PV panel to the PCB.
- Try to keep the rubber O-ring on the lens side in position, as it is challenging to reapply it.
- Ensure that all the screws are kept in a safe place.

Observation of internal components

Observe how the components are laid out and connected. This will facilitate the reassembly process. Look for possible indications of problems:

- Accumulation of dust inside the light, or on the switch mounted on the PCB
- Burnt cables or burnt components on the PCB Disconnected or unsoldered cables on the main panel or on the PCB

You will now be guided through a series of tests to diagnose the problem with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

Battery testing

Required: Multimeter.

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery.

Set the Multimeter on 20V dc value

DC Voltage

The battery cables (red and black) are soldered directly onto the PCB. Place the red multimeter probe lead on to the red soldered part of the end cable (B+), and the black probe lead onto the black soldered part of the end cable (B-) :

If the multimeter reading is in the range of 3.2V-2.7V, the battery is in good condition. If it is below 2.0V, the battery's capacity is too low. You can try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated facility.

Switch testing

Inspect the switch to determine whether it is firmly soldered onto the PCB (remains static and unmoving). Look for evidence of dust accumulation or any other foreign material. If there is some, use a clean, dry brush or mini blower to remove it.

Press the switch and listen for a clip sound. If there is no sound, the switch may be damaged.

Set the multimeter on the continuity range , and place the multimeter probes on each of the two switch terminals while pressing the switch. If the multimeter gives a sound when pressed, then the switch is ok. If there is no sound, then the switch may be damaged.

Panel Test

Ensure that the panel cables are firmly soldered on both the panel and the PCB. If not, then resolder them.

Set the multimeter on 20 V DC setting range

V⎓ DC Voltage

Place the solar panel facing the sun and place the red meter probe lead on to the positive (+) point of the solar panel and the black meter probe lead on to the negative (-) point of the solar panel .

If the multimeter reading is in the range of 4.5V-3.0V, then the panel is working well. If the reading is below this range or there is no reading, the panel may be damaged.

SM100 (older version) Repair Options

Now that you have diagnosed the problem with your product, there is guidance on repair options: Battery replacement and Switch replacement.

Always use quality products recommended by SunnyMoney or the manufacturer.

Battery Replacement

What you will need:

- Replacement battery: LiFePO4 3.2V, 300 mA/Form factor 14500
- Soldering iron
- Solder
- Soldering wick or desoldering iron
- Insulation strippers
- Multimeter

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery.

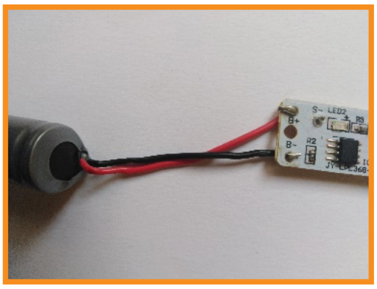
Test the new battery with a digital multimeter to ensure that it is has the required voltage: 3.2V.

Remove the existing battery: Desolder the contact points on the PCB. Carefully remove the battery. Remove excess solder from the PCB, in preparation for soldering the replacement battery. It should be clear to avoid short circuiting. Dispose of the battery in a designated battery disposal bin/facility.

Prepare the new battery for insertion. Ensure that the cable insulation has been removed from the ends of the wires that are connected to the battery. If the wires are not exposed at the end, use the insulation strippers to remove enough insulation so that the ends of the wires can easily thread through the terminal ports on the PCB and fold over (approximately 7mm).

Thread the exposed wire through the PCB terminal holes. Be mindful of positive and negative wires being connected to the ports according to the correct polarity (red goes to positive '+' sign and black to negative '–' sign).

Solder the wires to the PCB board. Be mindful of any excess solder covering other parts of the board. Ensure that the ends of the wires are not sticking up too much, interfering with the functioning of the product. If they are, you can cut the ends so that they are flush with the board.



Once the soldered points ('+' and '-') are cool and dry, measure the battery output voltage. It should be 3.2V.

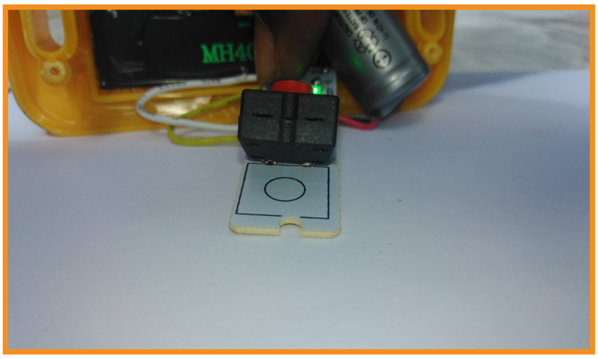
Replacing the switch

What you will need:
- Replacement switch: 12x12x9mm push button
- Soldering iron
- Solder
- Soldering wick or desoldering iron
- Multimeter

Carefully de-solder the contact points of the switch. Ensure that you remove any excess solder that may be blocking the switch terminal holes on the PCB.

Test the new switch for continuity. If it is in good working order, then it can be fitted for reuse.

Take the new switch and align it with the switch box drawn on the PCB while placing the switch leads on the PCB.



Securely solder the switch leads onto the top of the PCB (not the bottom).

When the solder is cool and dry, carry out a continuity test across the switch terminals to make sure they are in working order. If the multimeter gives a sound when the switch is pressed, then it is ready for use.

Replacing the switch rubber cover

What you will need:
- Phillips start T4/T5 star head screwdriver
- Silicon button cover

Press the silicon button cover into the hole marked on the top lens cover.

Ensure that the top part of the silicon button cover sticks out firmly and completely.

Properly align the main switch button mounted on the PCB with the fitted silicon button cover as you screw the top lens cover to the bottom casing.

Reassemble your product

What you will need:
- Phillips start T4/T5 star head screwdriver
  Secure the PCB to the back side of the top lens cover using the two screws provided.

Firmly place the battery onto the battery slot adjacent to the PCB.

Ensure that the yellow rubber cover mounted on the top lens cover of the solar light is well aligned with the inner main switch mounted on the PCB.

Replace the rubber O-ring around the base cover. This is tricky and may benefit from two sets of hands.

This forms a sealing layer around the top lens cover and the bottom casing to prevent the entry of dust and moisture.

Place the top lens cover on the bottom casing and screw them together.

Test it to see if the light works.

Charge the light for eight hours in the sun before using.

Common Faults

If the light does not turn ON
1. Fully charge the light
2. Check the cables and PCB, see: **Observation of Internal Components**
3. Test the battery, see: **Battery Testing**
4. Test the switch, see: **Switch Testing**

If the light does not turn OFF
1. Check the cables and PCB, see: **Observation of Internal Components**
2. Test the switch, see: **Switch Testing**

If the light is not charging
1. Check the cables and PCB, see: **Observation of Internal Components**
2. Test the battery, see: **Battery Testing**
3. Test the panel, see: **Panel Testing**

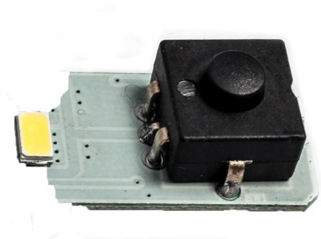
If the duration of the lighting time is reduced
1. Fully charge the light.
2. Test the battery, see: **Battery Testing**

SM100 (Newer version)

Components of the SM100 (Newer version)

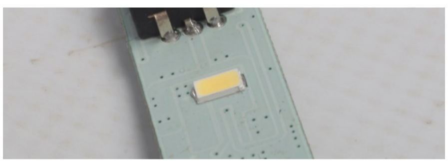
Screws: Philips T5/T6Torx

Battery: LiFePO, 4V,
400 mA Form factor 14500



Switch: 12x12x9mm foot square
push button with silicon cover top
(custom)

Panel: Integrated 4 V, 75 mA
polycrystalline solar panel



LED: 0.5 W white blue LED,
4+ hours at 30 lumens,
10+ hours at 10 lumens

Opening the product

Require:
- Philips T5/T6 screwdriver
- Small flathead screwdriver

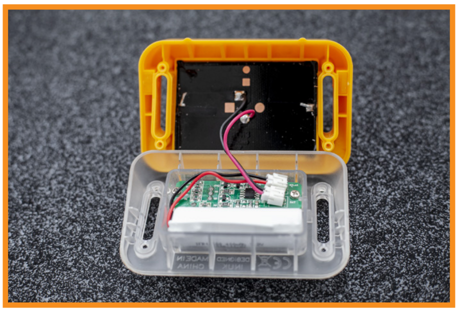
Use a Philips T5/T6 screwdriver to remove the four screws which hold the front lens to the back casing.

When screws are out, use a small flathead screwdriver to gently pry the front lens from the back casing, ensuring you do not damage the soldered wires which connect the PV panel to the PCB.

Try to keep the rubber O-ring on the lens side in position, as it is challenging to reapply.

Ensure that all the screws are kept in a safe place.

Observation of internal components



Observe how the components are laid out and connected. This will facilitate the reassembly process. Identify the PCB, the battery, cables from the panel to the PCB, cable connectors from the battery to the PCB and the status of the switch mounted on the PCB.

Look for possible indications of problems:
- Accumulation of dust inside the light, or on the switch mounted on the PCB
- Burnt cables or burnt components on the PCB
- Disconnected or unsoldered cables on the main panel or on the PCB
- Loose cable connectors.

You will now be guided through a series of tests to diagnose the problem with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

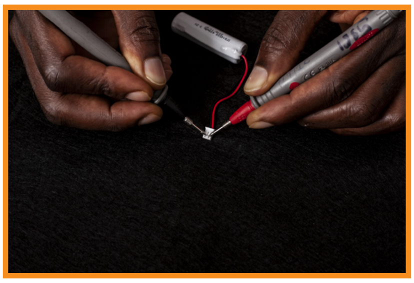
Battery testing

Required: Multimeter.
Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery

Set the Multimeter on 20V dc value

The batteries are connected via connector blocks. Gently unplug the male connector from the female receptacle.

Place the red multimeter probe lead on to the red terminal of the battery and the black probe lead on to the black terminal of the battery.



If the multimeter reading is in the range of 3.2V-2.7V, the battery is in good condition. If it is below 2.0V, the battery's capacity is too low. You can try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated facility.

Switch testing

Inspect the switch to determine whether it is firmly soldered on to the PCB (remains static and unmoving). Look for evidence of dust accumulation or any other foreign material. If there is some, use a clean, dry brush or mini blower to remove it.

Press the switch and listen for a clip sound. If there is no sound the switch may be damaged. Note that the switch has three long terminals and one short terminal, known as the common terminal.

Set the multimeter on the continuity range

First, place the meter probes on to the first long and the short common terminal leads of the switch while pressing the switch. If the meter gives a sound, then the switch is ok. If there is no sound the switch may be damaged.

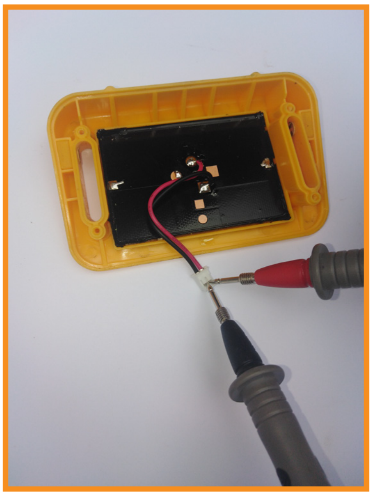
Second, place the meter probes on to the second long and the short common terminal leads of the switch while pressing the switch. If the meter gives a sound, then the switch is ok. If there is no sound the switch may be damaged.

Third, place the meter probes on to the third long and the short common terminal leads of the switch while pressing the switch. If the meter gives a sound, then the switch is ok. If there is no sound the switch may be damaged.

Panel Test

Ensure that the panel cables are firmly soldered on both the panel and the PCB. I f not, then resolder them.

Place the solar panel facing the sun and place the red meter probe lead on to the positive (+) point of the solar panel and the black meter probe lead on to the negative (-) point of the solar panel.



Set the multimeter on 20V DC setting range.

If the multimeter shows a range between 3.5V – 5.5V, the panel is working well. If the reading is below this range, or there is no reading, the panel may be damaged.

SM100 (new version) Repair Options

Now that you have diagnosed the problem with your product, we will provide you with guidance on repair options: Battery replacement and Switch replacement

Always use quality products recommended by SunnyMoney or the manufacturer.

Battery Replacement

What you will need:

- Replacement battery: LiFePO4, 3.2V, 400 mA (Form factor 14500)
- Multimeter

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery.

Test the new battery with a multimeter to ensure that it is has the required voltage: 3.2V Remove existing battery: unplug the male battery connector block from the female mounted on the PCB.

Dispose of the battery in a designated battery disposal bin/facility.

Take the replacement battery and clip the male connector into the female connector, mounted on the PCB.

Switch on the light to see if it is working before reassembling the product.

Replacing the switch

What you will need:
- Replacement switch: 12x12x9mm foot
- square push button
- Soldering iron
- Solder
- Soldering wick or desoldering iron
- Multimeter

Carefully de-solder the contact points of the switch. Remove any excess solder so that it does not block the switch terminal holes on the PCB.

Test the new switch for continuity (refer to section: Switch Testing). If it is in good working order, then it can be fitted for reuse.

Align the new switch with the switch box drawn on the PCB, while placing the switch leads onto the PCB.

Firmly solder the switch leads onto the top of the PCB (not the bottom).

When the solder is cool and dry, carry out a continuity test across the three switch terminals to make sure they are in working order. If the meter sounds, then it is working.

Replacing the switch rubber cover

What you will need:
Phillips T5/T6 screwdriver
Silicon button cover

Press the silicon button cover into the hole marked on the top lens cover.

Ensure that the top part of the silicon button cover sticks out firmly and completely. Properly align the main switch button mounted on the PCB with the fitted silicon button cover as you screw the top lens to the bottom casing.

Reassemble your product

What you will need:
- Philips T5/T6 Torx head screwdriver

Secure the PCB to the underside of the top lens cover using the two screws provided.

Firmly place the battery onto the battery slot adjacent to the PCB.

Ensure that the silicon button cover mounted on the top lens cover of the solar light is well aligned with the inner main switch mounted on the PCB.

Replace the rubber O-ring around the base cover. This will be tricky and may benefit from two sets of hands. This forms a sealing layer around the top lens and the back to prevent entry of dust and moisture.

Secure the top lens cover on to the bottom casing and screw them together.

Test it to see if the light works!

Charge the light in the sun for eight hours before using.

Common Faults

If the light does not turn ON
5. Fully charge the light
6. Check the cables and PCB, see:
Observation of Internal Components
7. Test the battery, see: **Battery Testing**
8.Test the switch, see: **Switch Testing**

If the light does not turn OFF
3. Check the cables and PCB, see:
Observation of Internal Components
4. Test the switch, see: **Switch Testing**

If the light is not charging
4. Check the cables and PCB, see:
Observation of Internal Components
5. Test the battery, see: **Battery Testing**
6. Test the panel, see: **Panel Testing**

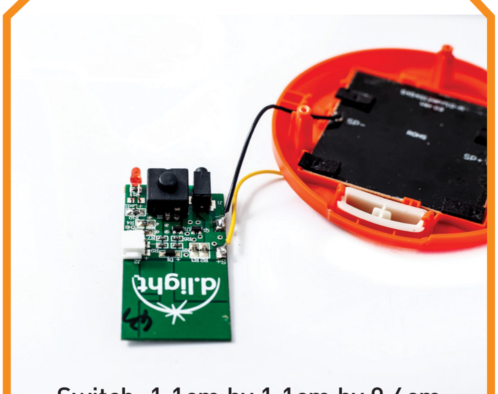
If the duration of the lighting time is reduced
3. Fully charge the light.
4. Test the battery, see: **Battery Testing**

DLight S2

Components of the S2

Screws:
Three T15 x 12.5mm screws

Battery: Lithium Iron Phosphate,
400mAh, 3.2V



Switch: 1.1cm by 1.1cm by 0.6cm
square, hard plastic

Panel:0.3W/5V

Opening the product

Tools required:

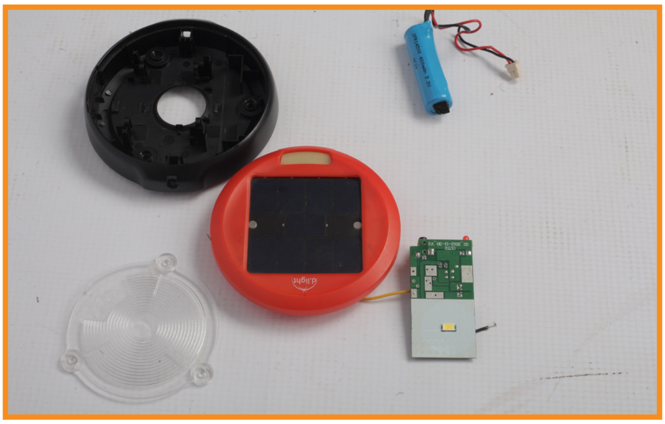
- T15 head screwdriver

- Small flathead screwdriver

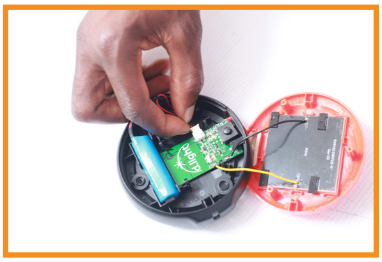
Note that the S2 has three main parts: the transparent top, the middle part upon which the PCB and the LED lights are mounted, and the bottom cover which contains the plastic switch cover and the solar panel.

Check the screw heads and use the correct screwdriver to remove the top transparent layer. Set it aside. Put the screws in a safe place.

Use a small screwdriver to gently separate the middle layer from the bottom layer via the screw holes. Remove the bottom part gently, to avoid ripping the cables soldered onto the panel.



Observation of internal components
Observe how the components are laid out and connected. This will help you during the reassembly process.



Look for possible indications of problems:

- Accumulation of dust inside or on the switch mounted on the PCB and the switch cover.
- Damaged components on the PCB, including damaged cables.
- Disconnected/ unsoldered cables on the main panel or on the PCB, or loose cable connectors.

You will now be guided through a series of tests to diagnose the problem with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

Battery testing

What you will need: Multimeter

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery

Gently unplug the male connector from the female receptacle mounted on the PCB. Note that the battery cables have a male white plastic connector at the end.

Once the battery has been removed, take note of the voltage listed on the battery. This should be 3.2V if the original battery is there.

Set the Multimeter on 20V dc value.

Place the red multimeter probe lead onto the red part of the connector terminal, and the black probe lead onto the black part of the connector terminal.

If the multimeter reading is the same as that listed on the battery, it is in good condition.

If it is 1.7V or lower, the battery's capacity is too low. You can try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated location.

Switch testing

Inspect the switch to see whether it is firmly soldered on to the PCB (remains static and unmoving).

Inspect the switch for any evidence of dust accumulation or any other foreign material. If there is some, use a clean, dry brush or mini blower to remove it.

Press the switch, while watching the LED light. If the switch makes a click and the LED lights up, then it is working well; if not then it may be faulty. To confirm, carry out switch continuity test.

With the multimeter on the continuity setting, place the cable leads on each of the switch terminals while pressing the switch. If the meter gives a sound, then the switch is ok. If there is no sound, the switch may be damaged.

Replacing the switch

What you will need:

- Replacement switch: 1.1cm by 1.1cm by 0.6cm square, hard plastic
- Soldering iron
- Solder
- Soldering wick or desoldering iron
- Insulation strippers
- Multimeter

Remove the PCB from its position. There are four plastic lockers that hold the PCB slate in position. Firmly press the two lockers at the end of the PCB, while firmly lifting the same end of the PCB, while pushing it backwards using the outer charging port.

Once the PCB is out from its position, carefully desolder the contact terminals of the switch mounted on the PCB. It is important to remove the excess solder so that it does not block the switch terminal holes on the PCB.

When placing the new switch, be sure to align it with switch box drawn on the PCB, while placing the switch leads into the PCB.

Securely solder the switch leads onto the top (not the bottom) of the PCB.

When the solder is cool and dry, carry out a continuity test across the switch terminals to make sure they are in perfect working order. If the multimeter makes a sound when the switch is in place, then it is in good working order.

Panel Test

Ensure that the cables are firmly soldered on both the panel and the PCB. If not, then resolder them.

Set the multimeter on 20V DC setting range

V⎓ DC Voltage

Face the solar panel towards the sun and place the red meter probe lead on to the positive (+) point of the panel and the black meter probe lead on to the negative (-) point of the panel.

If the multimeter shows a number in the range of 3.0 – 6.5V, the panel is working well. If there is no reading, then the panel may be damaged.

S2 Repair Options

Now that you have diagnosed the problem with your product, below is guidance on repair options. Always use quality products recommended by SunnyMoney or the manufacturer.

Battery replacement

What you will need:

- Multimeter
- Replacement battery: Lithium Iron Phosphate, 400mAh, 3.2V

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery.

Test the new battery with a multimeter to ensure that the battery has the required voltage of 3.2V.

Remove the existing battery: unplug the male battery connector block from the female mounted on the PCB.

Dispose of the battery in a designated battery disposal bin/facility.

Take the replacement battery and clip the male connector into the female connector, mounted on the PCB. Press the switch and if the LED lights up then the battery is functioning.

Align the red cover in such a way that the plastic switch cover touches the main switch button, with its legs properly fitted into the black cover slots.

Place the transparent LED cover firmly as you secure it to the casing, using the correct screwdriver.

Reassemble the product

Tools required:
- T15 head screwdriver

Ensure that PCB plate and battery pack, the green/ red charging light as well as the charging pin are properly fitted in the spaces provided.

Common Faults

If the light does not turn ON
1. Charge the light fully
2. Check the cables and PCB, see: **Observation of Internal Components**
3. Test the battery, see: **Battery Testing**
4. Test the switch, see: **Switch Testing**

If the light does not charge
1. Check the cables and PCB, see: **Observation of Internal Components**
2. Test the battery, see: **Battery Testing**
3. Test the panel, see: **Panel Testing**

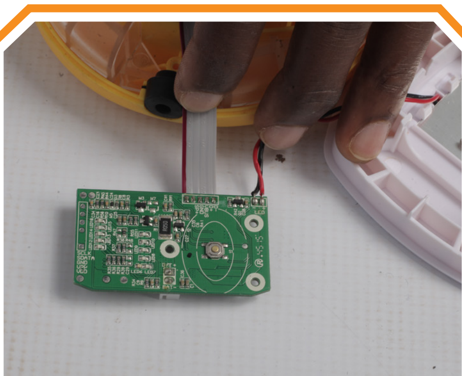
If lighting duration is poor
1. Charge the light fully
2. Test the battery, see: **Battery Testing**

SunKing Pro2

Components of the Pro2

Screws: round head
cross tapping screws, M2x6mm

Battery: Lithium Iron Phosphate,
3000mAh, 3.2V



Switch: small, round button
covered by an SK-303-SP-switch
rubber cover

LED: Five LEDs, 150 lumen

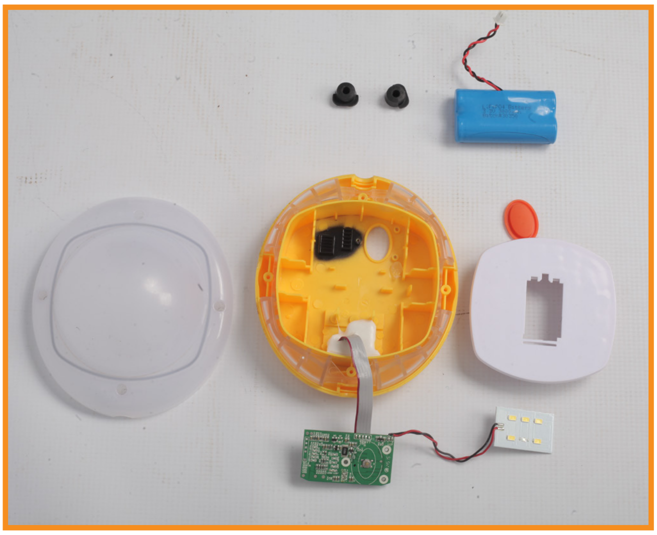
Panel: 3.3 Watts, 5.8V polycrystalline
panel with aluminum frame
and 5m wire.

USB charger:
two 5.5V usb chargers

Opening the product

Tools required:
- R6 x 200mm, 8 inch star screwdriver
- Small flathead screwdriver

There are ten primary parts to the PRO2: 1. Top shell diffuser; 2. Reflector; 3. Yellow bottom shell kit; 4. LED light; 5. Battery pack; 6. Rubber bushing/ grommet; 7. Switch rubber cover; 8. Main PCB; 9. DC wire; 10. PCB indicator.



Check the screw heads and use a R6 x 200mm 8 inch screwdriver to unscrew the top shell diffuser from the bottom shell kit.

Once the screws are completely out, use a small flathead screwdriver to gently separate the layers.

Put the side rubbers, upon which the solar stand fits, and the screws in a safe place.

Gently remove the black strap (branded Sun King) from the slots on both sides of the lamp. Make sure the rubber bushing (grommets) are firmly removed from the sides of the solar light.

Observation of internal components

Observe how the components are laid out and connected. This will help you during the reassembly process.

Look for possible indications of problems:
- Accumulation of dust inside the light.
- Damaged components on the PCB. Inspect the M6, in particular.

M6 component burnt

- Disconnected, unsoldered or damaged cables connecting the parts including the main panel, LED, charging port or PCB, or loose cable connectors.

You will now be guided through a series of tests to diagnose any problems with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

Battery testing

What you will need: Multimeter

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery.

Gently unplug the male connector from the female receptacle mounted on the PCB. Note that the battery pack contains two batteries wired in parallel, with a male white plastic connector at the end of the cable.
Once the battery has been removed, take note of the voltage listed on the battery. This should be 3.2V if the original battery is there.

Set the Multimeter on 20V DC value

Place the red multimeter probe lead on to the red part of the connector terminal, and the black probe lead onto the black part of the connector terminal.

If the multimeter reading is in the range of 3.2V - 2.7V, the battery is in good condition. If it is below 2.0V, the battery's capacity is too low. You can try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated facility.

Switch testing

Inspect the condition of the switch, mounted on the underside of the PCB. If it works well, it should be easily pressed and depressed.

Inspect the switch for any evidence of dust accumulation or any other foreign material. If there is any, use a clean, dry brush or mini blower to remove it.

If the battery test was positive and it has the correct voltage, you can test the integrity of the switch by pressing the switch, while watching the LED light. If the switch makes a click, and the LED lights up, then it is working well. If not, then it may be damaged.

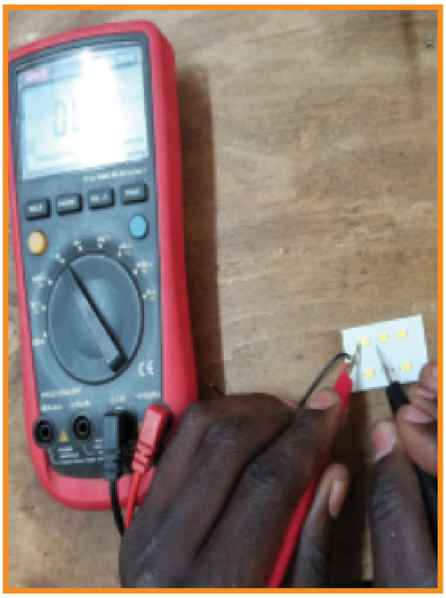
LED light continuity testing

What you will need:
- Digital Multimeter
- Soldering iron
- Soldering wire

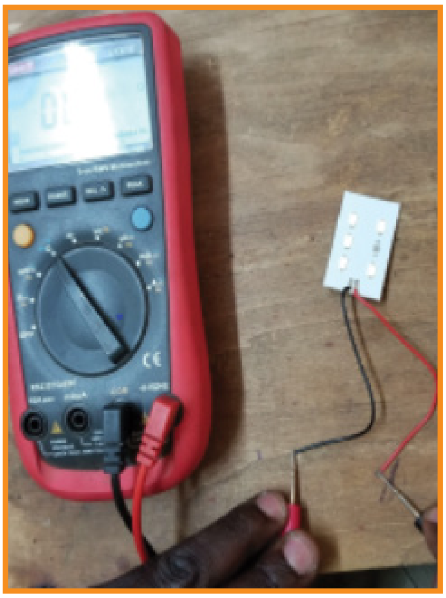
Note that the LED lights are connected with two cables; the red (positive +) and the black (negative -) cables respectively.

Observe any evidence of desoldered cables. If so, then resolder solder using the soldering tools. To determine whether the LED lights are in good working order, carry out a continuity test.

Set the multimeter to the continuity range, place the red multimeter probe on to the red cable of the LED light, and the black multimeter probe on to the black cable of the LED light. If the multimeter gives a sound, then the LED lights are in good working order, if it not, then the LED lights are damaged and must be replaced.



A. Set up to test LED and Multimeter



B. Measured from cable terminals

C. Measured from the LED terminal

Panel Testing

The panel has two main parts: the junction box, mounted behind the solar panel, and the pin which goes into the solar light when charging.

Ensure that the panel cable insulation is not bruised anywhere as this has potential to break the delicate wires inside.

Set the multimeter to the 20V DC knob setting

Face the solar panel towards the sun and place the red meter probe lead onto the positive (+) point of the panel, which is the inner part of the solar charging pin, and the black meter probe lead onto the negative (-) point of the solar panel, which is the outer part of the solar charging pin.

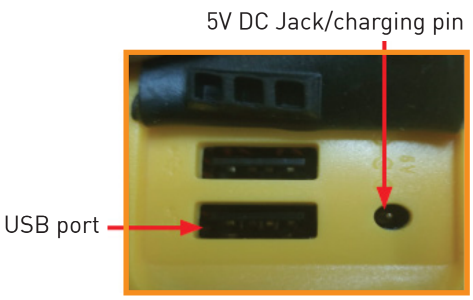
If the multimeter shows a range between 6.5 - 10 V, the panel is working well. If the panel does not register a reading then it may be damaged.

Charging jack (port) / USB inspection

Inspect the charging port for evidence of dust accumulation or any other foreign material. If there is, use a clean, dry brush or mini blower to remove them.

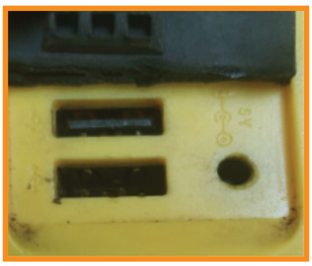
Inspect the DC charging jack (port) to see whether the interior charging pin is firmly in place or whether it is loose or broken.

Inspect the USB Port, to assess any evidence of damage. If the black rubber cover on the charging system is damaged, we suggest to repair it so as to ensure that no dust accumulates.



Both USB and 5V pin OK

Broken 5V pin



Broken 5V pin

Pro2 Repair Options

Now that you have diagnosed the problem with your product, we will provide you with guidance on repair options.

Always use quality products recommended by SunnyMoney or the manufacturer.

Battery replacement

What you will need:

- Multimeter
- Replacement battery: Lithium Iron Phosphate, 3000mAh, 3.2V

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery

Test the new battery with a digital multimeter to ensure that the voltage output is the same as that which labelled on it. This should be 3.2V.

Remove the existing battery. Unplug the male battery connector block from the female receptacle mounted on the PCB. Dispose of the battery in a designated battery disposal bin/facility.

Gently push the male connector of the new battery into the female connector block mounted on the PCB.

Switch on the light to test that the replacement has worked. Charge the light for eight hours before using.

Charging jack / USB replacement

What you will need:

- R6 x 200mm 8 inch star screwdriver
- Replacement bottom shell
- Desoldering wick
- Soldering iron
- Soldering wire

Open the PRO 2 unit by unscrewing the top shell from the bottom shell.

Unplug the battery from the female connector on the PCB, desolder the LED and DC jacks/ USB connecting cables to separate them from the PCB.

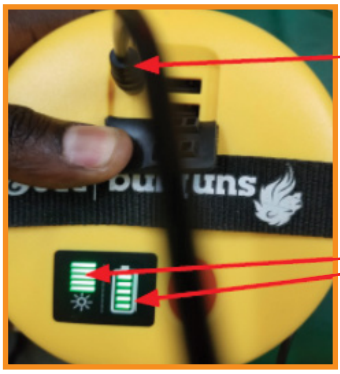
PRO 2 bottom shell kit

Bottom shell kit after disconnecting battery

Unscrew the PCB from the old bottom shell.

Solder the DC jacks / USB cables and the LED connecting cables of the new bottom shell onto the PCB.

After replacing the bottom shell, confirm that the PRO 2 can now charge before re-assembling the PCB to the top shell.

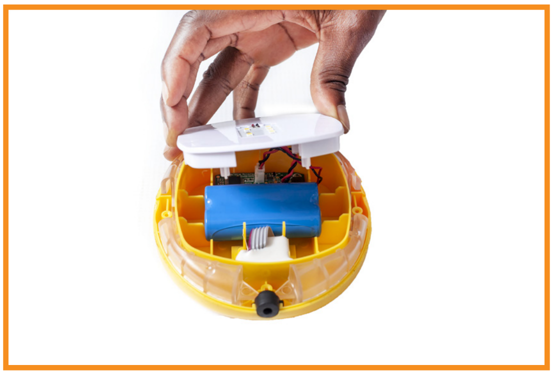


Reassemble the Light

Tools required:

- R6 x 200mm 8 inch start screwdriver

Ensure that the PCB plate and battery pack are properly fitted in the spaces provided.



Make sure the white middle cover fits tightly as it covers the battery pack and the PCB.

Fit the black strap (branded Sun King) into the slots on both sides of the lamp.

Fit the round rubbers in their sockets on either side of the light as you close the top cover.

Firmly press the transparent LED cover as you screw it to the bottom casing, using the correct screwdriver. Make sure it fits tightly, in line with the casing.

Common Faults

If the light does not turn ON

1. Fully charge the light
2. Check the cables and PCB, see: **Observation of Internal Components**
3. Test the battery, see: **Battery Testing**
4. Test the LEDs, see: **Continuity for the LED lights**

If the light is not charging

1. Check the cables and PCB, see: **Observation of Internal Components**
2. Test the battery, see: **Battery Testing**
3. Test the panel, see: **Panel Testing**
4. Examine and test the charging port, see: **Charging jack/USB inspection**

If the USB port is not working

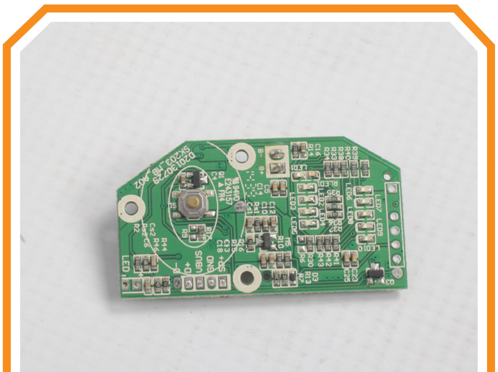
5. Examine the charging jack, see: **Charging jack/USB inspection**

SunKing Mobile

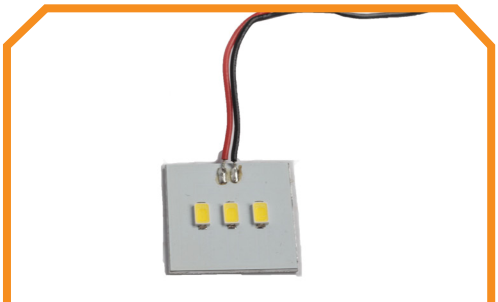
Components of the Sun King Mobile

Screws:
Iron S-Z PA 2x 2mm

Battery: LiFepo4,
1500 mAh, 3.3V



Switch: small round button covered by an SK-203-SP-switch rubber cover



LED: Three LEDs of 83 lumens

Panel: 1.5 watt, 5.8V polycrystalline panel with aluminum frame and 5M wire.

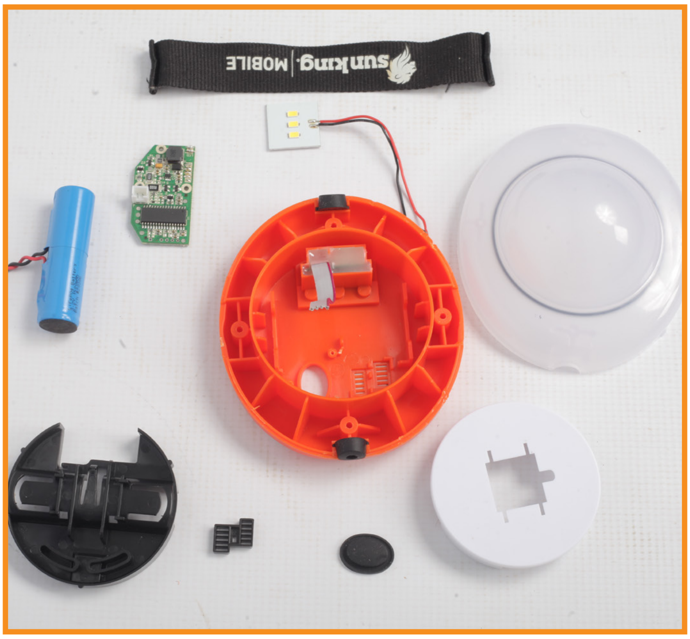
USB charger:
two 5.5V usb chargers

Opening the product

Tools required:
- R6x150mm 6 inch star head screwdriver

- Flathead screwdriver

There are ten primary parts to the Mobile:
1. Top shell diffuser; 2. Reflector; 3. Orange bottom shell kit; 4. LED light; 5. Battery pack; 6. Rubber bushing/ grommet; 7. Switch rubber cover; 8. Main PCB; 9. DC wire; 10. Indicator block



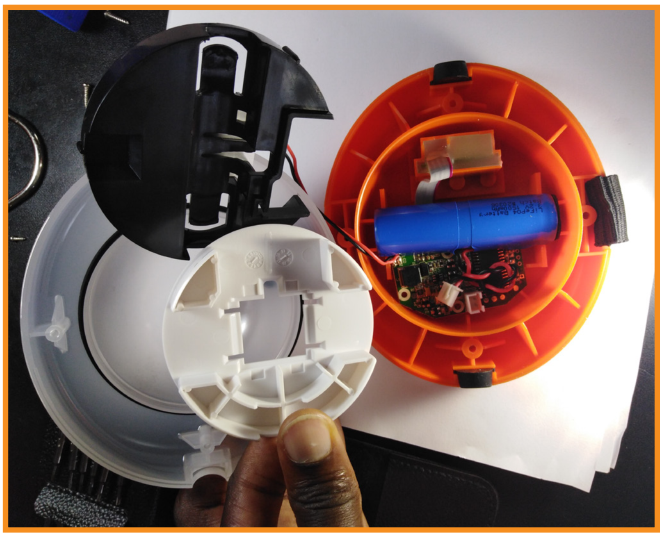
Check the screw heads and use the R6x150mm, 6 inch starhead screwdriver to unscrew the bottom shell kit from the top shell diffuser.

Once the screws are out, use a small flathead screwdriver to gently separate the layers.

Put the side rubbers upon which the solar stand fits, and the screws in a safe place. Remove the black strap (branded Sun King Mobile) from the slots on both sides of the lamp.

Observation of internal components

Identify the various parts on the photo: the PCB, the battery pack, cables from the PCB to the LED lights, cable connectors from the battery to the PCB and the status of the switch mounted on the PCB



Observe how the components are laid out and connected. This will help you during the reassembly process.

Look for possible indications of problems:
- Accumulation of dust inside the light.
- Damaged components on the PCB. Inspect the M2, in particular.
- Disconnected, unsoldered or damaged cables connecting the parts including the main panel, LED, charging port or PCB, or loose cable connectors.

Before continuing with the diagnosis, ensure the rubber rings are firmly removed from the sides of the solar light.

You will now be guided through a series of tests to diagnose the problem with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

Battery testing

What you will need: Multimeter

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery

Gently unplug the male connector from the female receptacle mounted on the PCB

Once the battery has been removed, take note of the voltage listed on the battery. This should be 3.3V if the original battery is there.

Set the Multimeter on 20V DC value

V DC Voltage

Place the red multimeter probe lead on to the red part of the connector terminal, and the black probe lead onto the black part of the connector terminal:

Check the reading. If the multimeter reading is within the range of 3.3V - 2.9V, the battery is in good condition. If the battery is below 2.0V try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated location.

Switch testing

Inspect the condition of the switch, mounted on the underside of the PCB. If it works well, it should be easily pressed and depressed.

Inspect the switch for any evidence of dust accumulation or any other foreign material. If there is any, use a clean, dry brush or mini blower to remove it.

If the battery test was positive and it has the correct voltage, you can test the integrity of the switch by pressing the switch, while watching the LED light. If the switch makes a click, and the LED lights up, then it is working well. If not, then it may be damaged.

LED light continuity testing

What you will need:
- Digital Multimeter
- Soldering iron
- Soldering wire

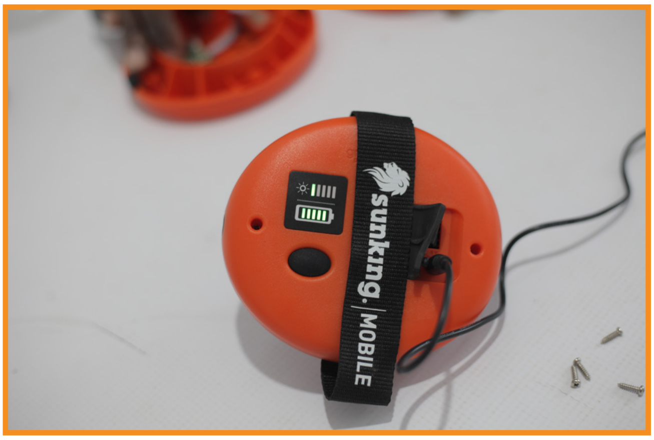
Note that the LED lights are connected with two cables; the red (positive +) and the black (negative -) cables respectively.

Observe any evidence of desoldered cables. If so, then resolder using the soldering tools. To determine whether the LED lights are in good working order, carry out a continuity test.

Set the multimeter to the continuity range, Continuity place the red multimeter probe on to the red cable of the LED light, and the black multimeter probe on to the black cable of the LED light, if the multimeter gives a sound, then the LED lights are in good working order, if it not, then the LED lights are damaged and they need to be replaced.

Panel Testing

The panel has two main parts: 1. the junction box, mounted behind the solar panel, and 2. the pin which goes into the solar light when charging.

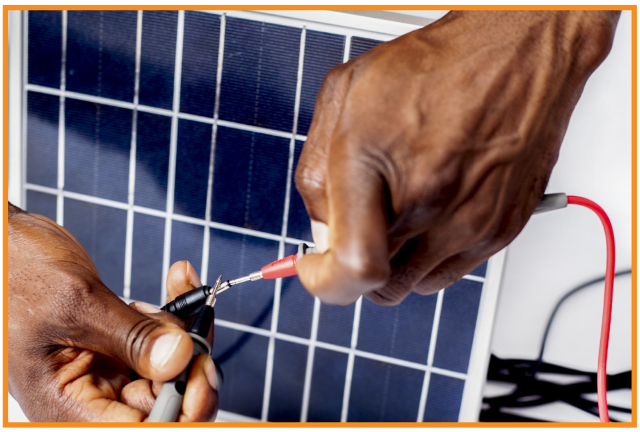


Ensure that the panel cable insulation is not bruised as this has potential to break the delicate wires inside.

Set the multimeter on 20 V DC knob setting

V DC Voltage

Face the solar panel towards the sun and place the red meter probe lead on to the positive (+) point of the panel, which is the inner part of the solar charging pin, and the black meter probe lead on to the negative (-) point of the solar panel which is the outer part of the solar charging pin.



If the multimeter shows a range between 7.5V – 6.5V (with full, direct sunlight), the panel is working well, if the panel does not register a reading, then it may be faulty.

Charging jack (port) / USB inspection

Inspect the charging port for evidence of dust accumulation or any other foreign material. If there is, use a clean, dry brush or mini blower to remove them.

Inspect the DC charging jack (port) to see whether the interior charging pin is firmly in place or whether it is loose or broken. Inspect the USB Port, to assess any evidence of damage.

SunKing Mobile Repair Options

Now that you have diagnosed the problem with your product, we will provide you with some guidance on repair options.

Always use quality products recommended by SunnyMoney or the manufacturer.

Battery replacement

What you will need:

- Multimeter
- Replacement battery: LiFepo4, 1500 mAh, 3.3V

Safety precaution: Use goggles and gloves to protect yourself against any battery leakages while handling the battery

Test the new battery with a digital multimeter to ensure that the voltage output is the same as that which labelled on it. This should be 3.3V.

Remove existing battery. Unplug the male battery connector block from the female receptacle mounted on the PCB. Dispose of the battery in a designated battery disposal bin/facility.

Gently push the male connector of the new battery into the female connector block mounted on the PCB. Switch on the light to ensure it is working.

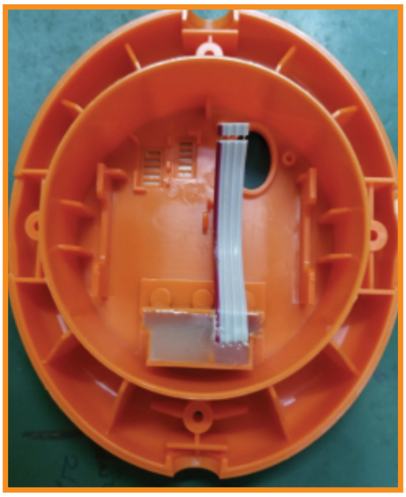
Charge the new battery for a full eight hours before using.

Charging jack / USB replacement

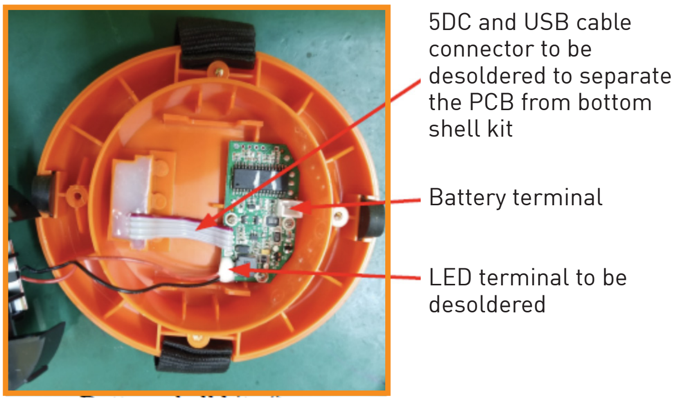
What you will need:
- R6x150mm 6 inch star head screwdriver
- New bottom shell kit
- Desoldering wick
- Soldering iron
- Soldering wire

Open the unit by unscrewing the top shell diffuser from the bottom shell kit.

Unplug the battery from the female connector on the PCB and unsolder the LED and DC jacks/ USB connecting cables to separate them from the PCB as below.



Mobile bottom shell kit

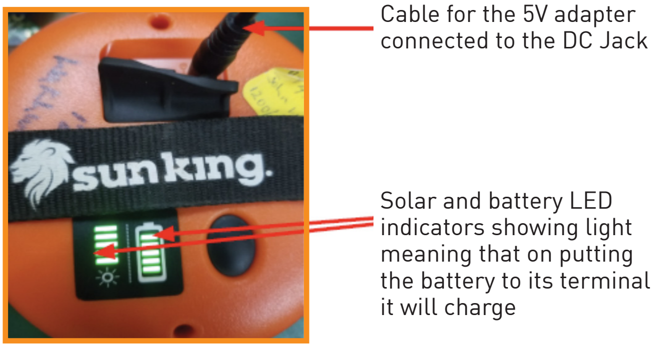


Mobile bottom shell kit after disconnecting battery

Unscrew the PCB from the old bottom shell kit.

Solder the DC jacks / USB cables and the LED connecting cables of the new bottom shell kit onto the PCB.

After replacing the bottom shell kit, confirm that the light is charging before re-assembling the PCB and the top shell as in the picture below.



If the black rubber cover on the charging system is damaged, we suggest to repair it so that no dust accumulates.

Reassemble the Light

Tools required:
- R6x150mm 6 inch star head screwdriver

Ensure that PCB plate is firmly secured to the orange bottom shell kit, with three screws. Make sure the black middle cover, with the battery pack underneath, fits tightly to cover the PCB.

Fit the rubber rings in their sockets on either side of the light as you close the top cover. Hold the transparent LED cover firmly in place as you tighten the screws using the correct screwdriver.

Ensure that the light is charged for eight hours before using.

Common Faults

If the light does not turn ON

5. Fully charge the light
6. Check the cables and PCB, see: **Observation of Internal Components**
7. Test the battery, see: **Battery Testing**
   Test the LEDs, see: **Continuity for the LED lights**

If the light is not charging

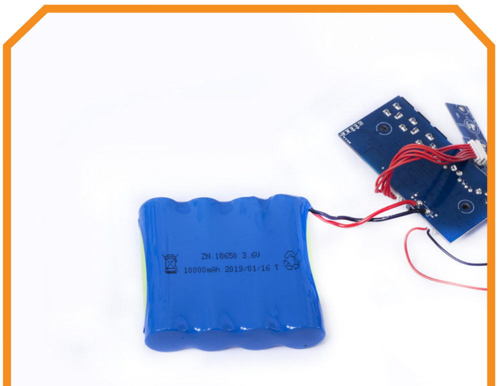
6. Check the cables and PCB, see: **Observation of Internal Components**
7. Test the battery, see: **Battery Testing**
8. Test the panel, see: **Panel Testing**
9. Examine and test the charging port, see: **Charging jack/USB inspection**

If the USB port is not working

1. Examine the charging jack, see: **Charging jack/USB inspection**

OV HP30 Home System

Components of the OV HP30



Battery: 3.7 V, 10 Ah
(8000mAh) Lithium Ion,
18650 Four batteries in parallel

Screws: Iron S-Z PA 2x 2mm,
start self-tapping screws

Switch: 1x1.5mm rectangular
gang power switch

Ports: Two 5V USB ports:
Three 3.3V Barrel jacks

Panel: Polycrystalline
silicon, 8 watts

Opening the product

Tools required:
• R6x1500mm 6inch star head screwdriver

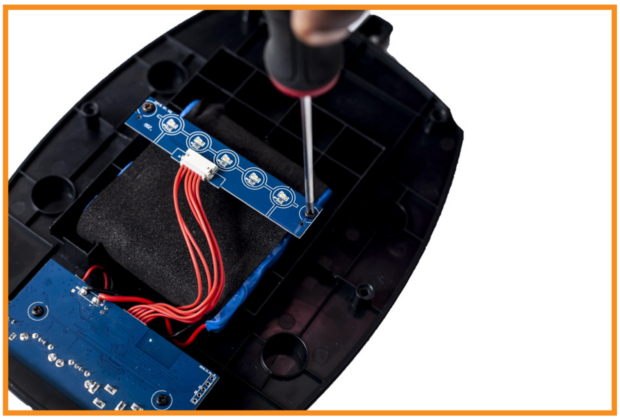
Using the correct screwdriver, unscrew the six screws, from the bottom of the casement containing the battery and PCB.

Once the screws are out, pull the top, rounded cover with the product branding from the bottom which has three 'legs' that can be held onto while pulling the top part off.

Ensure that all the screws are kept in a safe place.

Observation of internal components

The Light Emitting Diode (LED) indicator board, the PCB (Printed Circuit Board), upon which the battery as well as the switch terminals are mounted, the battery pack, cables from the PCB to the LED lights, cables from the main switch to the PCB, the status of the switch mounted on the underside of the bottom cover.



Observe how the components are laid out and connected. This will help you during the reassembly process.

Look for possible indications of problems:
• Accumulation of dust outside the black plastic casing. Check the underside of the black plastic casing including switch gang, the USB charging ports, the panel charging port and main connecting pins for the lights.

• Evidence of burning or melting on the PCB and LED indicator board, cables leading from the LED to the PCB, from the main switch to the PCB and those from the battery to the PCB.

• Disconnected/ unsoldered cables on the LED indicator board or on the PCB, or loose cable connectors.

• Make sure the battery pack is firmly placed in the slot provided, to avoid undue movement.

You will now be guided through a series of tests to diagnose the problem with the product. We suggest proceeding through all of the diagnostic tests before attempting repair as there may be more than one problem with your product.

Battery testing

What you will need: Multimeter

Note that OV HP30 battery pack contains four batteries connected together in series, with cables soldered onto the main PCB. In order to properly assess and test the HP30 battery pack, gently unscrew the LED display panel mounted on top of the battery pack. Ensure to use the correct screw driver.

Once the LED panel has been removed and the battery pack is free to move, remove the thin, flexible black cushion wrapper covering the battery pack, and check the voltage specifications. The battery voltage should indicate 3.7 V if the original battery is there.

Set the multimeter on 20V dc value

DC Voltage

As the battery terminals are soldered onto the main PCB, place the red multimeter probe lead on to the red soldered part on the PCB, and the black probe lead onto the black soldered part on the PCB.

Check the reading. If the multimeter reading is the same or slightly below 3.7V, the battery is in good condition.

If the battery is below 2.0V, the battery's capacity is too low. You can try to recharge it using a battery recharger.

If the battery does not recharge, dispose of it in a safe, designated facility.

If the battery has been tested and has full rated voltage measurement, yet when switched ON the light remains OFF, then you may need to reset the light.

Switch testing

Inspect whether the switch, mounted on the underside of the pack, to determine if it is in good working condition. If it works well, it should be able to move up and down easily when pressed.

Inspect the switch for any evidence of dust accumulation or any other foreign material. If there is any, use a clean, dry brush or mini blower to remove it.

Note that the switch is labeled 1 (for ON) and 0 (for OFF) Press the switch, while checking the LED light. If the LED lights up, then it is working well, if not the switch may be damaged.

Then, with the multimeter on the continuity setting, place the leads on each of the switch terminals (on the terminal block, on the PCB), while pressing the switch in an ON and OFF position. If the meter gives a sound, then the switch is ok, but If does not, the switch may be damaged.

Panel Test
Note that panel has two main parts:
the junction box, mounted behind the solar panel, and the pin which goes into the solar light when charging.

Ensure that the panel cable insulation is not bruised anywhere as this has potential to break the delicate wires inside.

Set the multimeter on 20 V DC knob setting Place the solar panel facing the sun and place the red meter probe lead on to the positive (+) point of the panel (the inner part of the solar charging pin) and the black meter probe lead on to the negative (-) point of the solar panel (the outer part of the solar charging pin).

If the multimeter shows the range between 6.5 - 8.0V (on a full sunny day), the panel is working well. If there is no reading then the panel may be damaged.

SunKing Mobile Repair Options
Now that you have diagnosed the problem with your product, we will provide guidance on repair options. Always use quality products recommended by SunnyMoney or the manufacturer.

Resetting the Light

Tools required:
- smaller sized screw driver or any cable conductor stripped on both ends.

If the battery has been tested and has full voltage, yet when switched ON the light remains OFF, then try resetting the product.

The process of resetting involves discharging the capacitor mounted on the main PCB. Note that this is done through the capacitor legs on the underside of the PCB.

Inspect the inside of the pack and ensure that all connections inside are sound

Place the Switch in an OFF position and short / bridge the capacitor legs with a screw driver or any conductor. Notice that there will be a small discharge sound / very minimal spark. This is capacitor current being discharged then Switch OFF the light.

Place the solar panel in the sun, plug in the solar panel and switch ON. If you see the blue solar charging lights as well as the green LED lights on the display, then the light has been reset. If you only see a blue solar charging light alone, then the reset has not taken place, try again.

Battery replacement
What you will need:
- Multimeter
- Replacement batteries: 3.7 V, 10 Ah (8000mAh) Lithium Ion

Test the new battery with a digital multimeter to ensure that the voltage output is the same as that which labelled on it. This should be 3.7 for this product.

Remove the existing battery: unsolder the battery terminals from the PCB

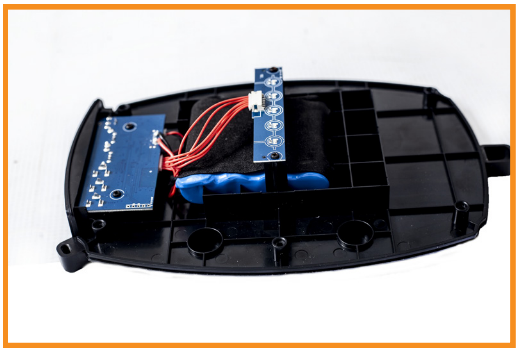
Dispose of the battery in a designated battery disposal bin/facility.

Gently solder the positive (red) + and the negative (black) - of the battery cables on to positive (+) and negative (-) of the PCB. Wait for two minutes to let the solder cool down, then try to switch on the light.

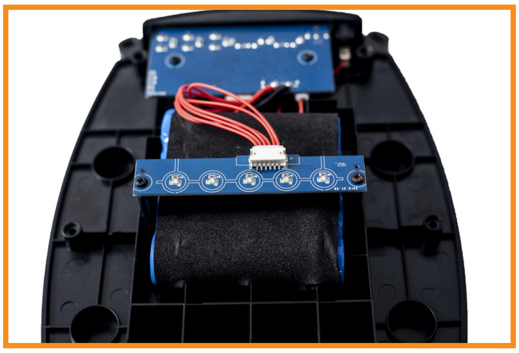
Reassemble the Light

Tools required:
• R6x1500mm 6inch star head screwdriver

Ensure that PCB plate and battery pack, are properly fitted in the spaces provided.



Make sure the LED panel display is secured firmly on top of the battery pack.



Tighten the main PCB with the screws provided, while the other cables soldered on it remain firm.

Place the top cover firmly and tighten using the correct screws.

Common Faults

If the light does not turn ON
1. Fully charge the light
2. Check the cables and PCB, see: **Observation of Internal Components**
3. Test the panel, see: **Panel Testing**
4. Test the switch, see: **Switch Testing**
5. Test the battery, see: **Battery Testing**
6. If all of the above are functional and the battery has the required voltage, reset the battery pack, see: **Reset the battery pack**

If the light is not charging
1. Examine the blue LED on the indicator board for damage
2. Test the battery, see: **Battery Testing**
3. Test the panel, see: **Panel Testing**

The USB output does not charge
1. Check for the accumulation of dust or other materials, see: **Observation of Internal Components**

If you own a smartphone check the Google Play store to download the online version of this manual as an app which includes videos for some diagnosis and repair techniques.

Measurement Functions On Multimeters

Switch Position	Measurement Function
AUTO-V LoZ	Automatically selects ac or dc volts based on the sensed input with a low impedance input.
$\tilde{V}$ Hz Hz (button)	AC voltage from 0.06 to 600 V. Frequency from 5 Hz to 50 kHz.
$\overline{V}$	DC voltage from .001 V to 600 V.
mV ⎓	AC voltage from 6.0 to 600 mV, dc-coupled. DC voltage from 0.1 to 600 mV.
Ω	Ohms from 0.1 Ω to 40 MΩ.
)))	Continuity beeper turns on at < 20 Ω and turns off at >250 Ω.
⊳|	Diode Test. Displays OL above 2.0 V.
⊣⊢	Farads from 1 nF to 9999 μF.
$\tilde{A}$ Hz Hz (button)	AC current from 0.1 A to 10 A (>10 to 20 A, 30 seconds on, 10 minutes off). >10.00 A display flashes. >20 A, **OL** is displayed. DC-coupled. Frequency from 45 Hz to 5 kHz.
$\overline{A}$	DC current from 0.001 A to 10 A (>10 to 20 A, 30 seconds on, 10 minutes off). >10.00 A display flashes. >20 A, **OL** is displayed.
Volt Alert	Non-contact sensing of ac voltage.

Repair Record Keeping Spread Sheet

Client's contact	Type of light	Type of fault	Repair status (tick)		Date of collection	Signature	Comments
			Yes	No			

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