

Installation and Operating Instructions

Solar System Controller

SCP050

ABOUT THIS MANUAL

These operating instructions come with the product and should be kept with it as a reference to all user's of the product.

- Read these operating instructions carefully before use,
- Keep them over the entire life of the product,
- And pass them on to any future owner or user of this product.

This manual describes the installation, function, operation and maintenance of the solar system controller SCP050.

These operating instructions are intended for end customers. A technical expert must be consulted in cases of uncertainty.

SAFETY

1. The solar controller may only be used in PV systems for charging STD, AGM, LiFePO4 battery.

Note; User's should always refer to battery manufacturer/supplier's recommended values for battery charging settings and float voltage setting.

2. No energy source other than a solar panel (PV) may be connected to the solar charge controller.
3. Do not connect any defective or damaged measuring equipment.
4. Follow the general and national safety and accident prevention regulation.
5. Never alter or remove the factory plates and identification labels.
6. Keep children away from PV & Battery systems.
7. Never open the device. (No user serviceable parts inside)
8. One set solar module can connect with one controller only.
9. Never touch bare cables.

OTHER RISKS

Danger of fire and explosion

- ◆ Do not use the solar charge controller in dusty environments, in the vicinity of solvents or where inflammable gases and vapors can occur.
- ◆ No open fires, flames or sparks in the vicinity of the batteries.
- ◆ Ensure that the room is adequately ventilated.
- ◆ Check the charging process regularly.
- ◆ Follow the charging instructions of the battery manufacturer.

Battery acid

- ◆ Acid splashes on skin or clothing should be immediately treated with soap water and rinsed with plenty of water.
- ◆ If acid splashes into the eyes, immediately rinse with plenty of water. Seek medical advice

Fault behavior

Operating the solar charge controller is dangerous in the following situations:

- ◆ The solar charge controller does not appear to function at all.
- ◆ The solar charge controller or connected cables are visibly damaged.
- ◆ Emission of smoke or fluid penetration.
- ◆ When parts are loose.

If any of these occur, immediately disconnect the solar charge controller from the solar panels and battery.

Function

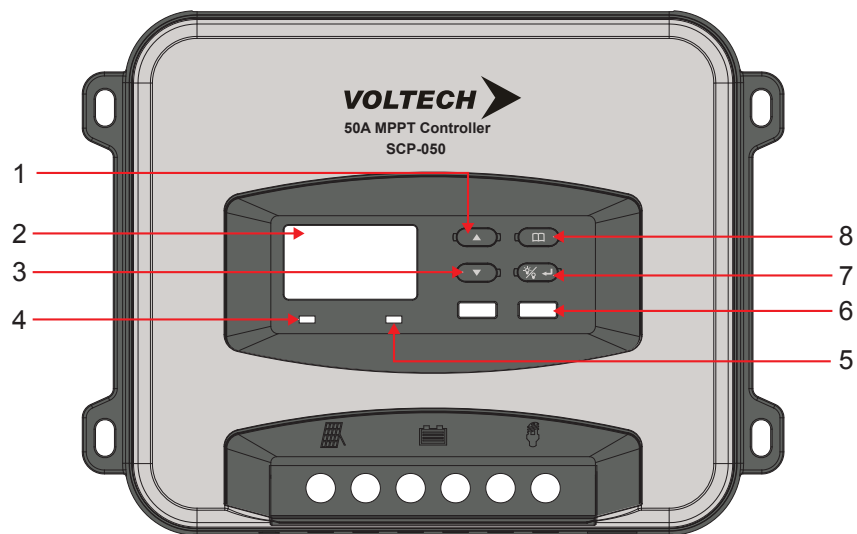
This solar system controller is designed to

- ◆ Monitor the state of charge of the battery;
- ◆ Controls the charging process,
- ◆ Make sure Solar system works at proper condition.

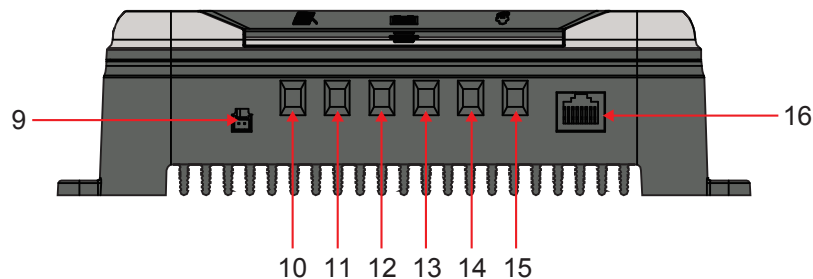
OPERATING THE CONTROLLER

The display shows a variety of system data by symbols and digits. Both buttons control all settings and display windows.

1. Display and operation elements:

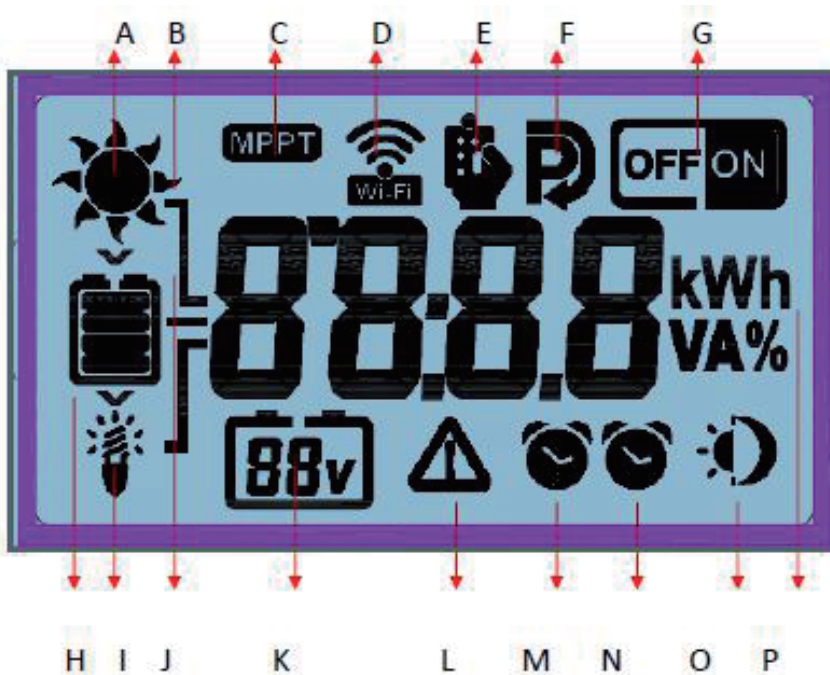


1. Up for toggling through the menus
2. LCD screen
3. Down for toggling through the menus
4. Green LED light (off when not charging, flashing during charging, on when fully charged)
5. Red LED light (off when no error, on when error/alarms)
6. USB output 2 x 3.4A
7. Enter/OK button
8. MENU



9. Temperature Sensor connecting point
10. PV+
11. PV-
12. Battery+
13. Battery-
14. Load+
15. Load-
16. RJ45 port. Connected to remote control board through the network cable (This port is reserved. Do no use)

2. Display window:



- A. Sun icon, displayed when solar panel is connected.
- B. Sunlight icon, 8 in total, display according to the charging current
- C. MPPT/PWM indication.
- D. WIFI icon; turn on WIFI through button settings, read product data and control load output through APP.
- E. Remote control icon; displayed when the remote control is connected (remote control optional).
- F. Settings icon; turn on when entering the setting parameters, and turn off when exit.
- G. Load function ON/OFF icon; Load ON/OFF optional, default ON.
- H. Battery level icon; display the corresponding icon according to the battery voltage.
- I. Load icon; turn on when the load is turned on, synchronized with the load switch ON.
- J. Connections: Three segments. Top corresponding to PV, middle corresponding to battery, down corresponding to load.
- K. Currently identified battery type (12V/24V/36V/48V).
- L. Protection icon. When this icon appears, it indicates that the machine has some protection, such as load overcurrent, short circuit protection, under-voltage protection, etc. (Refer to the fault code).
- M. Load timing clock 2.
- N. Load timing clock 1.
- O. Daytime and Night Icons. When $PV > 12V$ it show half sun icon. When $PV < 12V$ it show half moon icon.
- P. Numerical Display (8888 characters). Can be switched by the mode button to display Battery Voltage/Load Voltage/PV voltage/time

3. Menu Setting:



Menu



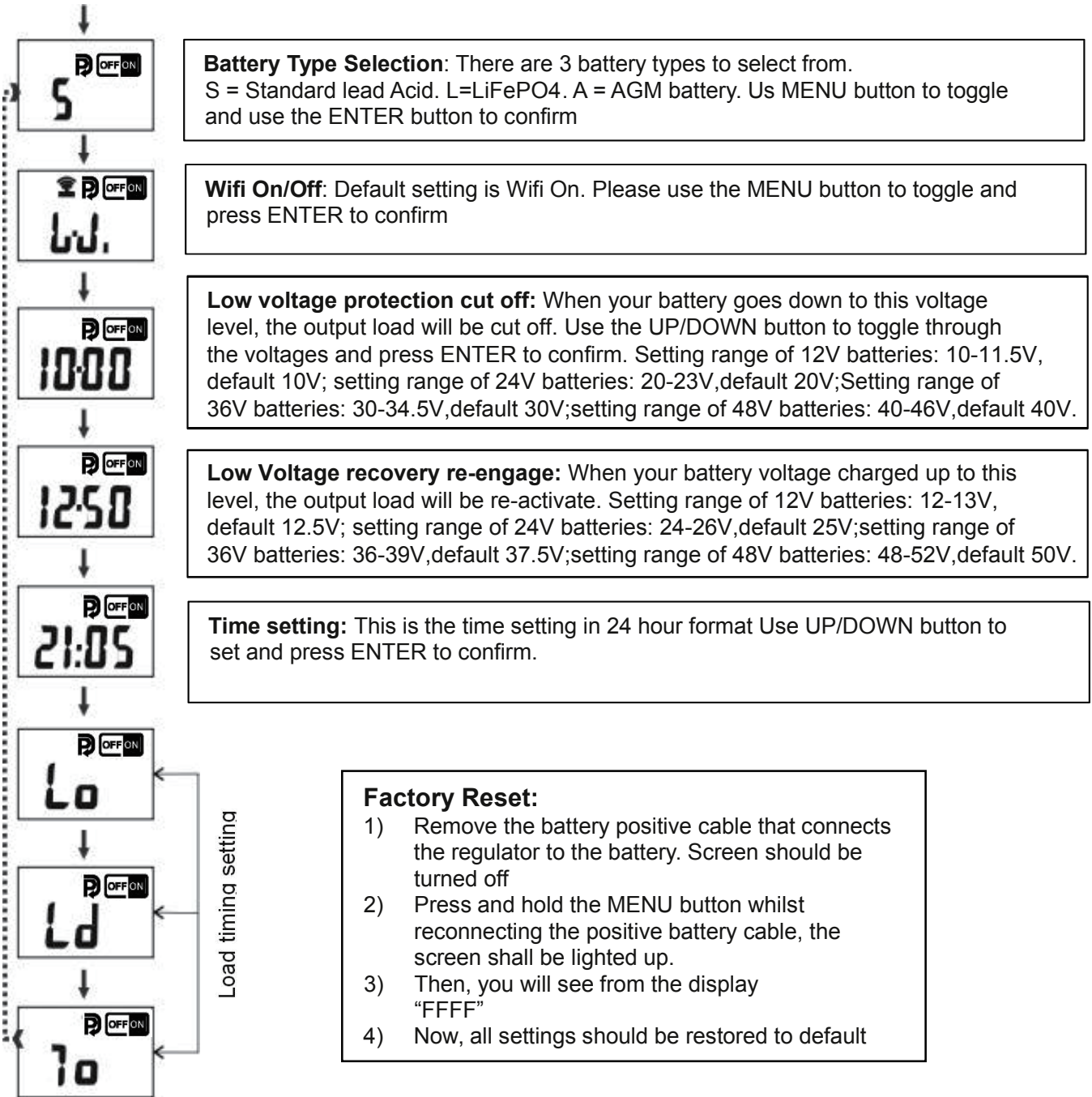
Enter

Press the MENU button once, and press again to hold the Menu button for 2 seconds to enter the

setting interface. 

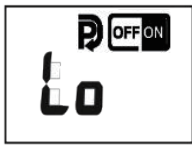
Press the Menu button again to toggle the mode selection.

Press the Enter button to confirm the setting.

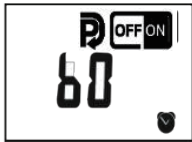


4. Load Timing Setting:

› Lo Mode: Load On/Off based on the PV input voltage (Day and Night)



When the PV input voltage drops below 10V (during the night time/bad weather) you can set the regulator to activate the load output automatically. Set the Off/On bar to ON by using the UP/DOWN and ENTER button

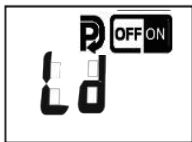


Clock 1 symbol on. The default is 60 minutes. This means when the PV input voltage drops below 10V, after 60 minutes and load output will be activated. Clock 1 is a power on timer, ranged from 0 – 120 minutes. Press ENTER to confirm



Next screen you will see the Clock 2 symbol on. The default is 30 minutes. When the PV input voltage rise up to 10.5V (Morning time), after 30 minutes the output load will be cut off. It is a power off timer, ranged from 0-120 minutes

› Ld Mode: Load On/Off based on a set length of time



It can allow you to set the load output to be activate for a set length of time



Clock 1 symbol on. The default is 3 hours. When the PV input voltage drops to 10V, the output load will be activate for 3 hours, ranged from 0 – 12 hours



Clock 2 symbol on. The timer will begin after the Clock 1 counting finished. In this case, after the PV input voltage drop to 10V (night time), the output load will power on for 3 hours, and then switch off for 4 hours, then it will on again until the PV input voltage rise to 10.5V, the load will be cut off.

› To mode: Load On/Off based on the real time



It can allow you to set the load on/off based on the real time



Clock 1 symbol on. It is a power on timer, the output load will be activated at 18:00. Press ENTER to confirm. It is a 24 hour format.

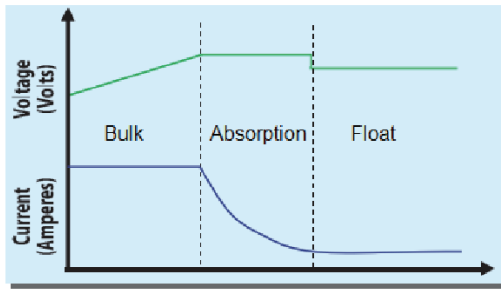


Clock 2 symbol on. It is a power off timer, the output load will cut off at 6:00. Press ENTER to confirm. It is a 24 hour format.

TECHNICAL INFORMATION

PV Input	Max. PV Array Power@12V	700W
	Max. PV Array Power @24V/36V/48V	1400W
	PV Array Voc max.	135VDC
	PV Array MPPT Voltage range	16~108VDC
	PV Array open circuit Voltage Range @12V	16~80VDC
	PV Array open circuit Voltage Range @24V	32~80VDC
	PV Array open circuit Voltage Range @36V	48~108VDC
	PV Array open circuit Voltage Range @48V	64~108VDC
	MPPT efficiency	≥99%
	Suggested PV cable	8AWG~10AWG
Battery	Battery Rated Voltage	12V STD/AGM/ LiFePO4 24V/36V/48V STD/AGM/-
	Max. Charging Current	50A
	Max. Charging Voltage	STD:14.4V/28.8V/43.2V/57.6V LiFePO4:14.5V/- AGM:14.6V/29.2V/43.8V/58.4V
	Suggested battery cable	6AWG min , length <2metre
DC load & Output	Max. Load Burrent	50A
	Low Battery Protection Voltage Range (programmable)	12V Battery: 10V~11.5V 24V Battery: 20V~23V 36V Battery: 30V~34.5V 48V Battery: 40V~46V
	Low Battery Recover Voltage (programmable)	12V Battery: 12V~13V 24V Battery: 24V~26V 36V Battery: 36V~39V 48V Battery: 48V~52V
	USB Output Voltage	5V
	Single USB Port Output Current	3A
	Total Output Current for 2 USB	3.4A
	USB Low Battery Protection Voltage	10.5V
	USB Low Battery Recover Voltage	11.0V
	Standy Current (Wifi off mode)	≤60mA
Standy Current (Wifi on mode)	≤160mA	
Operation Temperature Range	-10°C/+50°C	
Other Function	WIFI/Cloud	
Product Dimension	238x177x73mm	
Net Weight	2.3kg	

CHARGING CURVE



Bulk: This is the first stage (MPPT) where the battery is in a low charge state. During this stage the controller delivers all of the available solar power to the Battery system.

Absorption: In this stage (Constant Voltage) the controller charges at a constant voltage as the amount of current required to charge the battery is decreasing. The constant voltage regulation prevents overheating and excessive battery out-gassing; this stage will end when the battery charge current reduces to below 4 Amps OR after 4 hours of entering absorption mode.

Float (Maintenance): After the battery is fully charged, the controller reduces to a lower Constant Voltage setting to maintain the Battery (also called trickle charge).

PROTECTION FUNCTIONS

- ◆ Overcharge protection
- ◆ Battery under-voltage protection
- ◆ Solar panel reverse current protection

The following installation faults do not destroy the controller. After correcting the fault, the device will continue to operate correctly:

- ◆ Overcharge protection
- ◆ Reverse polarity protection of panel and battery
- ◆ Automatic electronic fuse
- ◆ Open circuit protection without battery
- ◆ Reverse current protection at night

MAINTANANCE

The controller is maintenance-free. We strong suggest that all components of the PV system must be checked at least annually,

- ◆ Ensure adequate ventilation of the cooling element
- ◆ Check the cable strain relief
- ◆ Check that all cable connections are secure
- ◆ Tighten screws if necessary
- ◆ Terminal corrosion

ERROR MESSAGES

Caution! Please do not open the controller or attempt to replace components when troubleshooting. Improper maintenance can be hazardous to the user and the system.

If the controller detects errors or unauthorized operating states, it shows error codes on the display. Error codes can generally be differentiated, whether there is a temporary malfunction, e.g. regulator overload or a more serious system error that can be remedied by appropriate external measures.

Since not all errors can be simultaneously displayed, the error with the highest error number (priority) is displayed. If several errors are present, the second error code is displayed after remedying the more significant error.

The following meaning is assigned to the different error codes:

Fault Codes:

- E1** Battery reverse connection / reverse polarity (please correct).
- E2** Battery open circuit protection / low DC voltage (battery not connected / or battery voltage too low, <8V/18V)
- E3** Battery over current protection (circuit has constant current function; the machine may be damaged if there is a problem).
- E4** Load over current / short circuit protection (error 10S, turn on the load after eliminating the error).
- E5** Battery over voltage (battery damaged or battery voltage too high, >15V/31V/45V/60V).
- E6** PV (solar) input over voltage protection. (PV voltage exceed the limit)
- E7** Over temperature protection, automatically stop charging when heat sink temperature $\geq 90^{\circ}\text{C}$; resume when temperature $\leq 60^{\circ}\text{C}$.
- E8** PV reverse connection (please check voltage and fix) - please ensure polarity is correct.

Remark: Please eliminate the fault according to the error code. If the regulator does not respond after the error is eliminated remove the power source (battery). If the error still persists the device may be damaged and may need after sales service.

Temperature Compensation/Temp sensor:

(Only for STD/Lead Acid battery)

1. The system will automatically adjust the float voltage according to the ambient temperature. If the external temperature probe is not connected (or the external temperature is $<40^{\circ}\text{C}$), use (temperature $\geq 20^{\circ}\text{C} - 5^{\circ}\text{C}$) by default.
2. The voltage may vary when the input energy is insufficient to stabilize the energy required for the float charging.
 - i. For 12V/24V/36V/48V batteries, when the external probe temperature $\leq 0^{\circ}\text{C}$, the float charging voltage is 14.1V/28.2V/42.3V/56.4V
 - ii. For 12V/24V/36V/48V batteries, when the external probe temperature is $0^{\circ}\text{C}\sim 20^{\circ}\text{C}$, the float charging voltage is 13.8V/27.6V/41.4V/55.2V
 - iii. For 12V/24V/36V/48V batteries, when the external probe temperature $\geq 20^{\circ}\text{C}$, the float charging voltage is 13.5V/27V/40.5V/54V

Remark: If internal head sink temperature exceeds 75 Deg C, the device shall go into approximately half power mode. Shall resume normal operation when internal head sink drops below 70 Deg C.

If internal head sink exceeds 90 Deg C, the device shall turn off. Shall resume charging again when temperature drops below 60 Deg C.

The Leading Edge in Solar Technology



Waste electrical products should not be disposed of with household waste
Please recycle where facilities exist
Check with your local authority or retailer for recycling advice

Specifications are subject to change without prior notice
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Instruction manual Ver. 2.1

FOR TECHNICAL
ADVICE OR HELP
PLEASE CONTACT:

Electro Parts Australia Pty Ltd

PH: 07 3219 6655

FAX: 07 3219 6644

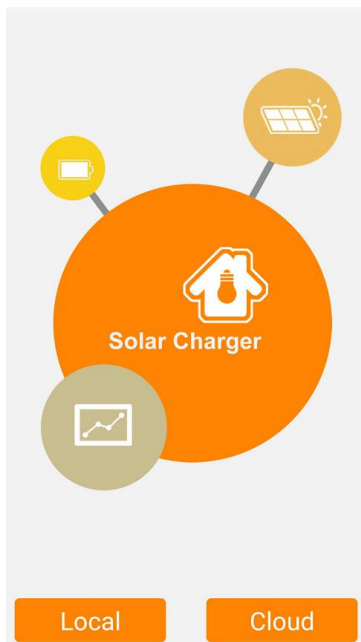
EMAIL: support@electroparts.com.au

WEB: www.electroparts.com.au

ECO Solar App

Download the APP by searching ECO SOLAR in Google play/IOS APP store.

1. Main Interface



Main Interface

1. Click Local to enter Local mode
2. Click Cloud to enter Cloud mode

2. Local



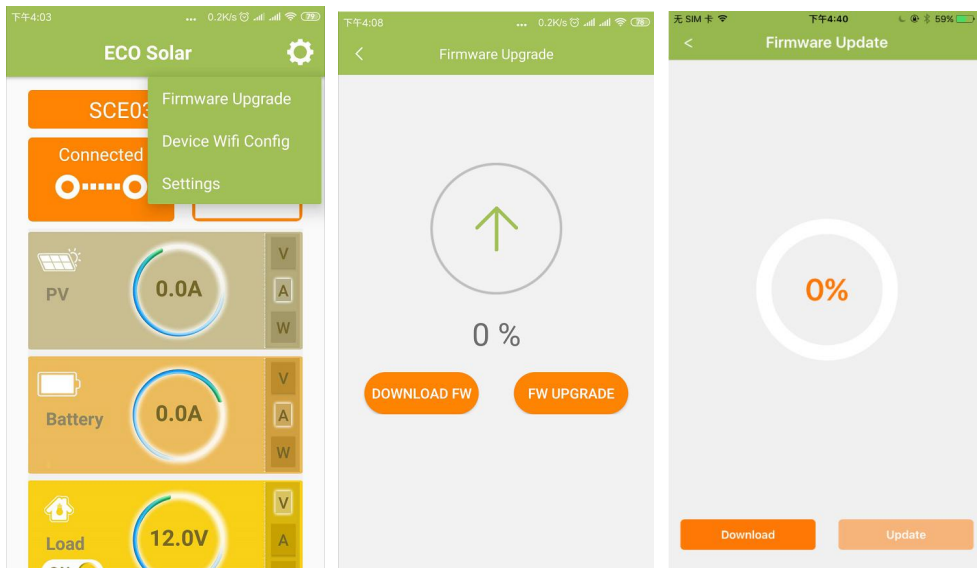
1. Turn on WiFi according to the prompt, and manually or automatically connect the WiFi of the device (some mobile phones need to manually connect the device, password is 12345678)
2. The weather is the current location of the phone
3. After connecting the device, click V/A/W of PV/Battery/Load for details
4. After connecting the device, click the OFF/ON switch to control the load switch
5. There are differences between Android and iOS versions (as follows)



Android

IOS

2.1 Firmware Update



picture1

picture 2 (android)

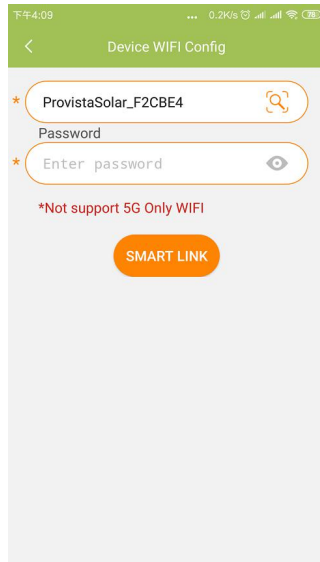
picture3 (IOS)

1. Click Firmware Upgrade to enter the offline Upgrade interface
2. In the upgrade interface, switch to the available network (mobile network or normal WiFi) and click DOWNLOAD FW to DOWNLOAD the latest upgrade package
3. After downloading the UPGRADE package, connect the device WiFi and click FW UPGRADE to UPGRADE. There will be corresponding prompts if

the UPGRADE fails or cannot be upgraded

4. If you don't download the latest Update package, you can't click the Update of IOS version and click the Update of Android version

2.2 Device WiFi Config

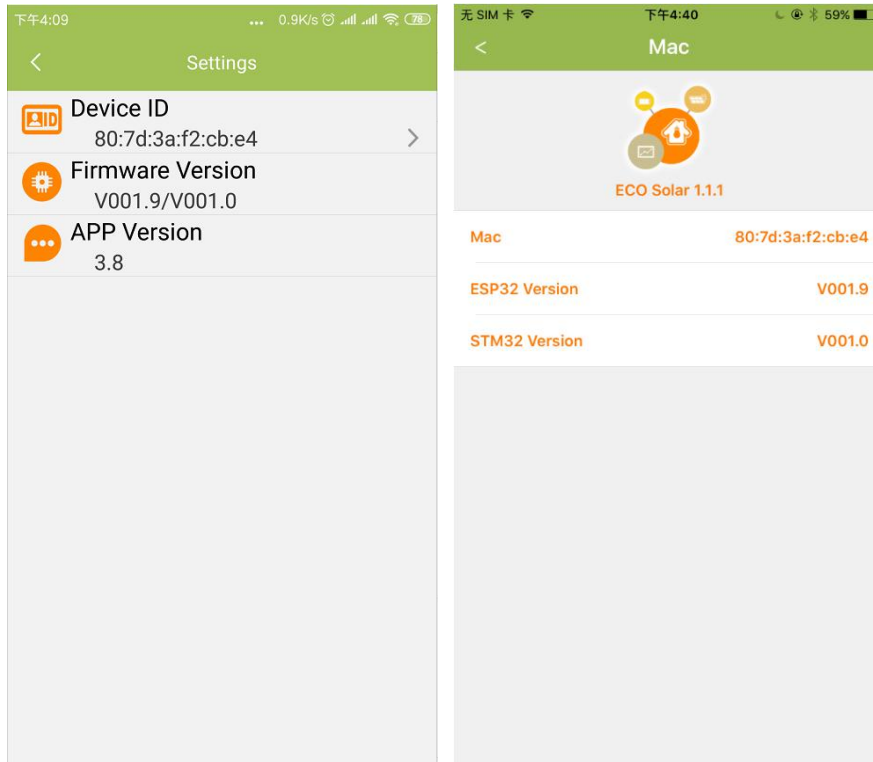


Note: this feature is only available near the device

1. Click the search button to search the WiFi near the phone, or manually input the corresponding WiFi name (not the WiFi of the device).
2. Due to permissions, iOS only supports manual input of WiFi name, and does not support selection of WiFi
3. After entering the corresponding WiFi password, approach the device according to the prompt and turn on the bluetooth switch (if the phone has already turned on the bluetooth switch, there is no hint). Click SMART LINK to bring the device online to the cloud
4. If you enter the wrong WiFi name or password, click connect and the device will restart automatically. You need to wait for the device to restart and re-enter the correct WiFi name and password
5. The device cannot be connected to 5G WiFi, only 2.4GWiFi can be connected
6. After entering the password, it can be saved automatically. Next time, the password can be displayed automatically by entering or selecting the corresponding WiFi name
7. When the device is connected to the cloud (check the WiFi icon of the device is always on), enter the correct WiFi name and password to switch the device to connect to WiFi (PS: this function is not available on some phones, please refer to special circumstances for details)
8. When the device is connected to the cloud (check the WiFi icon of the device

is always on), and the WiFi name or password is incorrectly entered, the device will not restart, and manual restart is required; Or re-enter the correct WiFi name and password (PS: this function is not available on some phones, please refer to special circumstances for details)

2.3 Settings/Version

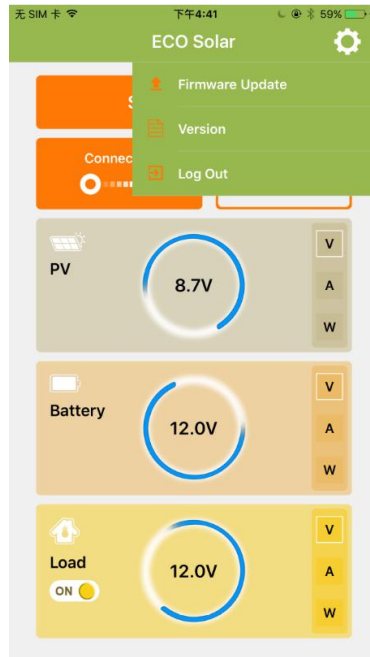


Android

iOS

1. Click Device ID(Android)/Mac (iOS) to copy the Device address
2. You can check the latest version of the chip and the latest version of the APP

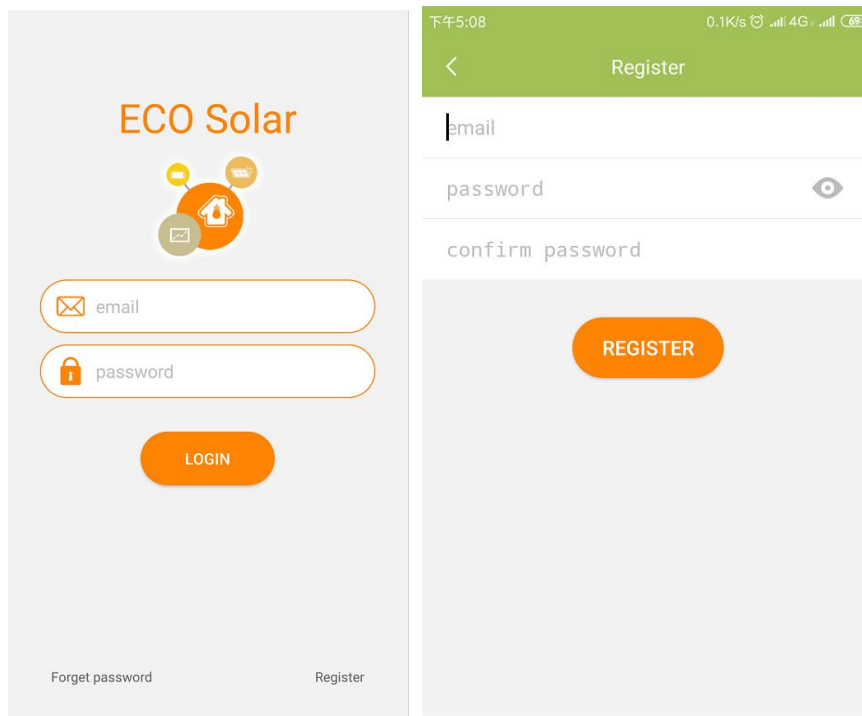
2.4 Log Out(Only iOS)



Click to exit to the main screen

3. Cloud

3.1 Register

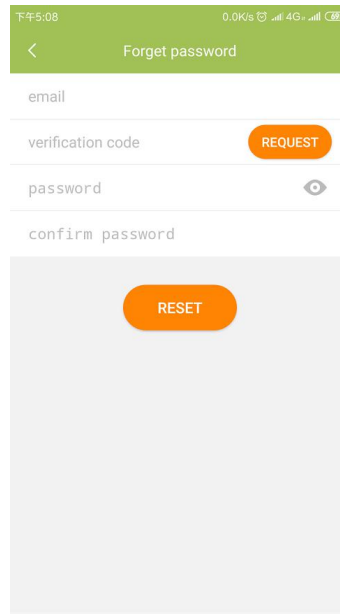


- login interface register form
1. Click the registration button on the bottom right foot to enter the registration

interface

2. According to the prompt, enter the correct email address as the login account, and enter any password as the login password to register

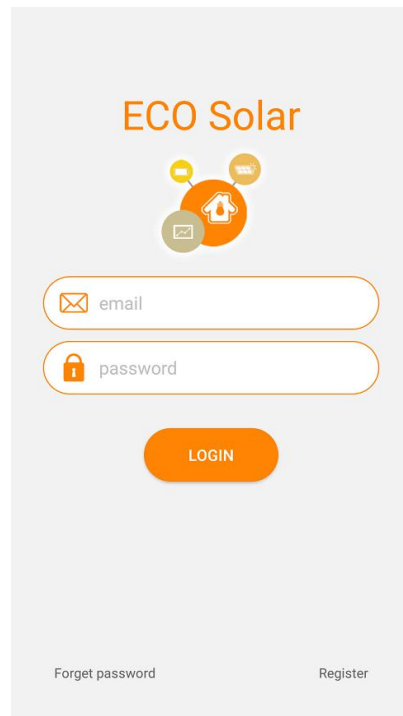
3.1 Forget Password



Forget password interface

Enter the correct login email address, verification code and modified password according to the prompt to modify the password. There are corresponding prompts for input errors

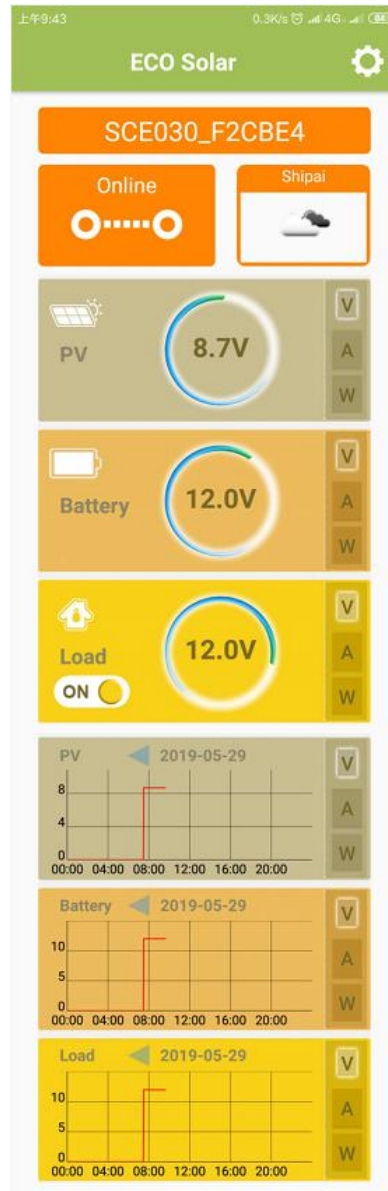
3.2 Login In



The image shows a login form for 'ECO Solar'. At the top, the text 'ECO Solar' is displayed in orange. Below it is a logo consisting of three overlapping circles: a green one with a leaf, a yellow one with a sun, and a larger orange one with a house icon. The form contains two input fields: the first is labeled 'email' with an envelope icon, and the second is labeled 'password' with a lock icon. Below these fields is an orange 'LOGIN' button. At the bottom of the form, there are two links: 'Forget password' on the left and 'Register' on the right.

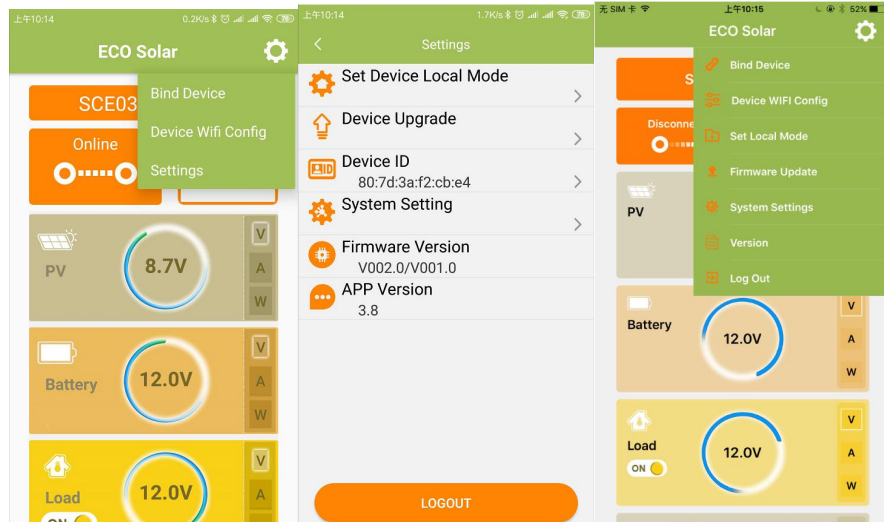
Enter the correct account password to log in successfully, input errors have corresponding prompts

3.3 Cloud Interface



Cloud function interface

1. After login, bind the Device (Device can connect WiFi to enter cloud mode through Device WiFi Config). When the Device is online, the Device functions can be remotely controlled
2. After the device is online, click the OFF/ON switch to control the load switch
3. Click the left and right date button to view the latest date data; You can also click the date directly to select the corresponding date to view the data
4. UI differences between android and IOS (as shown below)

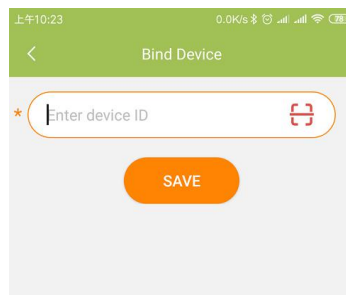


Android (1)

Android (2)

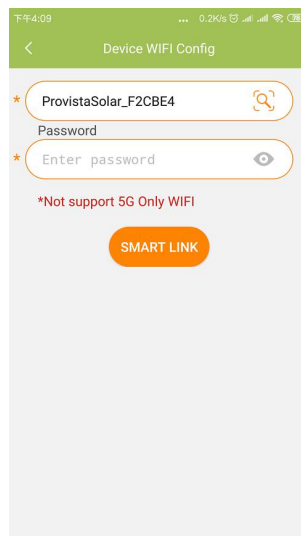
IOS

3.4.1 Bind Device



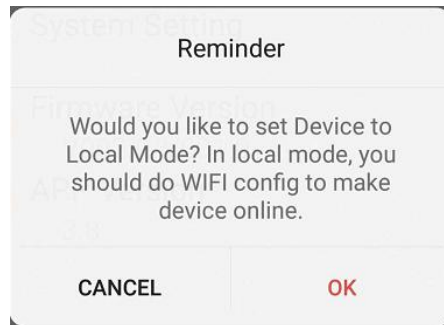
You can bind the device by directly entering or clicking the icon on the right to scan the QR code

3.4.2 Device WiFi Config



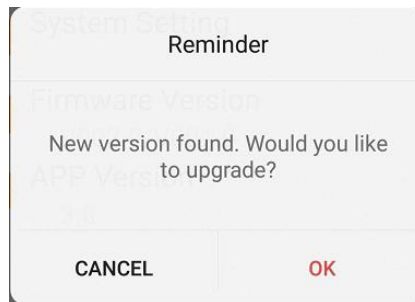
Device WiFi Config for local mode

3.4.3 Set Local Mode/Set Device Local Mode



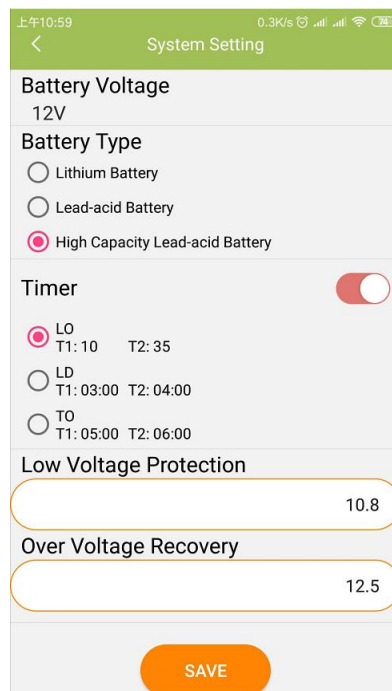
Click and a prompt box will pop up. Click OK to set the device to local mode. Click CANCEL and it will do nothing

3.4.4 Firmware Update/Device Upgrade



Click and a prompt box will pop up. Click OK and the device will be automatically updated to the latest version. Click CANCEL and it will do nothing

3.3.5 System Settings



1. Load voltage can be viewed, not selected and modified
2. Select the appropriate Battery Type for the loaded Battery
3. Turn on or off the switch to control whether the timer function is enabled; After opening the switch, you can select different time types and modify the time period to enable different timer functions
4. When there is an error in modifying low-voltage protection data and overvoltage recovery data, the corresponding range prompt will pop up

3.4.6 Version (iOS)

Consistent with local mode functionality

3.4.7 logout

Click and return to the cloud login interface

4. Special Situation

Due to unstable bluetooth connection when the device is in cloud mode, some mobile phones cannot connect to the device via bluetooth

1. When the device is in local mode, if WIFI can not be connected by using the Device WiFi Config function, please restart the device manually so that you can re-set the device to the local mode. Then, re-use the Device WiFi Config function to bring the device to the cloud.
2. The device is in the cloud mode. When WiFi connection is unavailable, restart the device and the device cannot be set to local mode. Please forcibly reset the device and reconnect to the new WiFi