MPPT solar charge controller

358-010277-00B

Felicitysolar®

*Make life full of hope*

# USER GUIDE

## MPPT solar charge controller

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# 1 ABOUT THIS MANUAL

## 1.1 Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

## 1.2 Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

## 1.3 SAFETY INSTRUCTIONS

**WARNING:** This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
3. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
4. **CAUTION** – Only qualified personnel can install this device with battery.
5. **NEVER** charge a frozen battery.
6. For optimum operation of this charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this charger.
7. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
8. Please strictly follow installation procedure when you want to disconnect PV or battery terminals. Please refer to Installation section of this manual for the details.
9. GROUNDING INSTRUCTIONS -This charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this charger.
10. NEVER cause short circuited on battery output.
11. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this charger back to local dealer or service center for maintenance.

# 2. INTRODUCTION

Thank you for selecting this solar charge controller. This solar charge controller is an advanced solar charger with maximum power point tracking. Applying intelligent MPPT algorithm, it allows solar charge controller to extract maximum power from solar arrays by finding the maximum power point of the array.

The MPPT battery charging process has been optimized for long battery life and improved system performance. Self-diagnostics and electronic error protections prevent damage when installation errors or system faults occur. This charger also features multifunctional LCD with communication ports for remote battery temperature and voltage measurement.

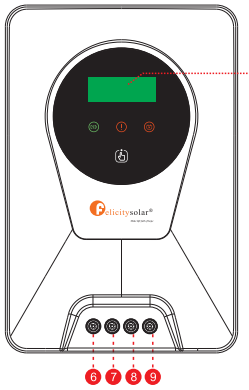




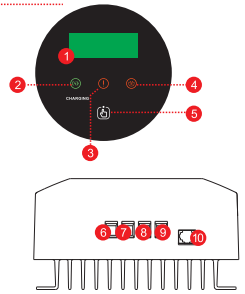
## 2.1 Features

- Intelligent Maximum Power Point Tracking technology increases efficiency 25%~30%
- Compatible for PV systems in 12V, 24V or 48V
- Three-stage charging optimizes battery performance (Two-stage charging in lithium battery mode)
- Maximum charging current up to 30A / 45A / 60A / 80A / 100A / 120A
- Maximum efficiency up to 98%
- Automatic battery voltage detection(Lithium battery voltage needs to be set manually)
- Supports lithium battery and various lead-acid batteries, AGM and gel battery
- Integrated intelligent slot compatible with MODBUS communication

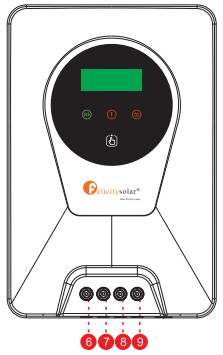
## 2.2 Product Overview



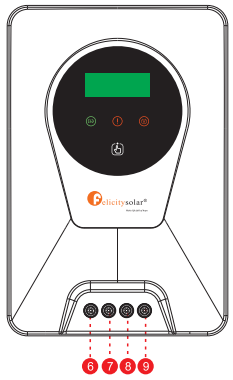
*100A / 120A (12V / 24V / 48V)*



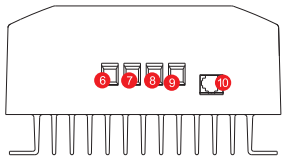
*45A / 60A / 80A (12V / 24V / 48V)*



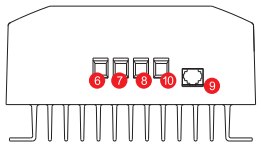
*30A/45A(12V / 24V)*



*45A / 60A / 80A(12V / 24V / 48V)*



*100A / 120A (12V / 24V / 48V)*



*30A/45A(12V / 24V)*

1. LCD display
2. Power On/Charging indicator
3. Fault and warning indicator
4. Wiring fault indicator
5. Operation button
6. PV Positive +
7. PV Negative -
8. Battery Negative -
9. Battery Positive +
10. Communication Port

# 3. INSTALLATION

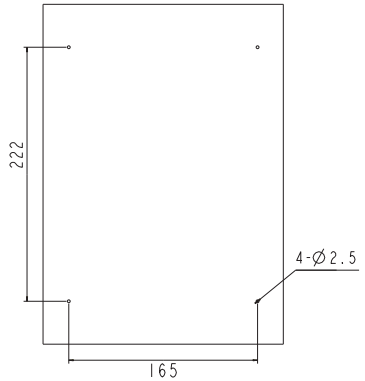
## 3.1 Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- •Solar charge controller x 1
- •User manual x 1
- •Installation hole map x 1

## 3.2 Preparation

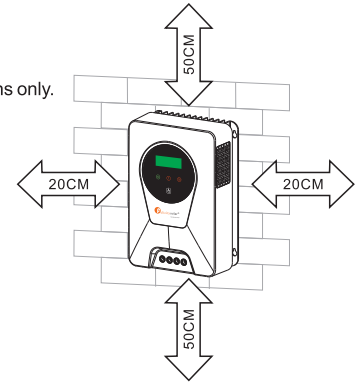
please install the mounting holes according to the mounting hole position diagram




## 3.3 Mounting the Unit

Consider the following points before selecting where to install:

- This solar charge controller is designed in IP31 for indoor applications only.
- Do not mount the unit on flammable construction materials.
- Mount on a solid surface
- Install this charger at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.




Install the unit to the wall by screwing four screws.
Refer to right chart.

## 3.4 Power Connection

***Wire size***

The four large power terminals are sized for 14 - 2 AWG (2.5 - 35 mm 2 ) wire. The terminals are rated for copper and aluminum conductors. Use UL-listed Class B 300 Volt stranded wire only. Good system design generally requires large conductor wires for solar module and battery connections that limit voltage drop losses to 2% or less.

***Minimum Wire Size***

The table below provides the recommended minimum wire size allowed for the charger. Wire types rated for 75°C and 90°C are listed.

***Recommended wire size:***

| Typical Amperage | Wire Type | 75° °C Wire | 90° °C Wire |
|---|---|---|---|
| 30A | Copper | 8 AWG (10 mm² ) | 8 AWG (10 mm² ) |
| | Aluminum | 6 AWG (16 mm² ) | 6 AWG (16 mm²) |
| 45A | Copper | 4 AWG (25 mm² ) | 6 AWG (16 mm² ) |
| | Aluminum | 2 AWG (35 mm² ) | 4 AWG (25 mm²) |
| 60A | Copper | 4 AWG (25 mm² ) | 6 AWG (16 mm² ) |
| | Aluminum | 2 AWG (35 mm² ) | 4 AWG (25 mm²) |
| 80A | Copper | 2 AWG (35 mm² ) | 4 AWG (25 mm²) |
| 100A | Copper | 2AWG(35 mm²) | 2AWG(35 mm²) |
| 120A | Copper | 2 AWG (35 mm² ) | 2 AWG (35 mm²) |

***Overcurrent Protection and Disconnects***

**CAUTION:** Circuit breakers or fuses must be installed in both battery and solar circuits. The battery circuit breaker or fuse must be rated to 125% of the maximum current or more. The recommended breaker/fuse rating for use with the charger is listed in the below table.

***Recommended breaker rating:***

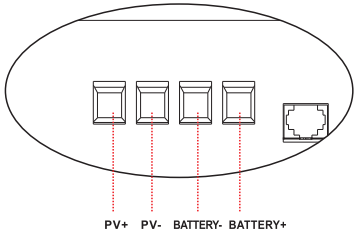
| Minimum battery circuit breaker/fuse rating | |
|---|---|
| 1.25 x 30Amps = 37.5 Amps | 1.25 x 45Amps = 56.3 Amps |
| 1.25 x 60Amps = 75.0 Amps | 1.25 x 80Amps = 100.0 Amps |
| 1.25*100Amps = 125Amps | 1.25*120Amps = 150Amps |

A disconnect is required for the battery and solar circuits to provide a means for removing power from the charger. Double pole switches or breakers are convenient for disconnecting both solar and battery conductors simultaneously.

# Connect the Power Wires

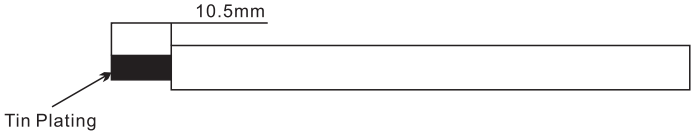
## WARNING: Shock Hazard

The solar modules can produce open-circuit voltages in excess of 100 Vdc when in sunlight. Verify if solar input breaker or disconnect has been opened (disconnected)before connecting system wires.



Connect terminals by following below steps (Refer to diagram above):

1. Make sure that the system input and output disconnect switches are both turned off before connecting power wires to the charger. There are no disconnecting switches inside the charger.
2. Make 4 power wires first. Remove insulation sleeve 10.5mm and the conductor should be plated Tin. Refer to the chart below.




3. Pull all wires into the wiring box. The Remote Temperature Sensor and Battery Sense wires can be inside the conduit with the power conductors. It is easier to pull RTS and Sense wires before the power cables.

### *WARNING: Risk of Damage*

Be sure that the battery connection is made with correct polarity. Turn on the battery breaker/disconnect and measure the voltage on the open battery wires BEFORE connecting to the controller. Disconnect the battery breaker/disconnect before wiring to the controller.

4. Connect positive terminal (+) of battery to the battery positive terminal (+) on the controller.
5. Connect negative terminal (-) of battery to one of the Common Negative terminals (-) on the controller.

### *WARNING: Risk of Damage*

Be sure that solar connection is made with correct polarity. Turn on the solar breaker/disconnect and measure the voltage on the open wires BEFORE connecting to the controller. Disconnect solar breaker/disconnect before wiring to the controller.

6. Connect positive wire (+) of solar module to the solar positive terminal (+) on the controller.
7. Connect negative wire (-) of solar module to one of the Common Negative terminals (-) on the controller.
8. Screw four (4) power terminals tightly with 50 in-lbs torque. (5.65 Nm)

## *3.5 Grounding and Ground Fault Interruption*

Use a copper wire to connect the grounding terminal in the wiring box to earth ground.The grounding terminal is identified by the ground symbol shown below that is stamped into the wiring box just below the terminal:

The minimum size of the copper grounding wire is 8 AWG (10 mm2).

**WARNING: Risk of Fire**

DO NOT bond system electrical negative to earth ground at the controller.

## *3.6 Remote Temperature Sensor*

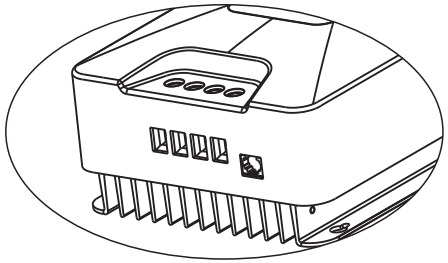
The included Remote Temperature Sensor (RTS) is recommended for effective temperature compensated charging. Connect the RTS to the 2-pole terminal (see figure as below). The RTS is supplied with 33 ft (10 m) of 22 AWG (0.34 mm2) cable. There is no polarity, so either wire (+ or -) can be connected to either screw terminal.





The RTS cable may be pulled through conduit along with the power wires. Tighten the connector screws with 5 in-lb (0.56 Nm) torque.

**NOTE:** The RTS is optional package. Please check local dealer for the details.



**CAUTION:** The controller will not activate temperature compensate charging function if the RTS is not used.

**CAUTION: Equipment Damage**

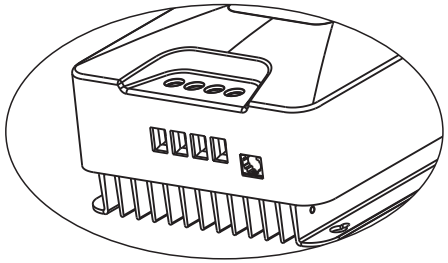
Never place the temperature sensor inside a battery cell. Both the RTS and the battery will be damaged.

**NOTE:** The RTS cable may be shortened if the full length is not needed.

## *3.7 Battery Voltage Sense*

The voltage at the battery connection on the controller may differ slightly from the voltage directly at the battery bank terminals due to connection and cable resistance. The Battery Voltage Sense connection enables the controller to measure the battery terminal voltage precisely with small gauge wires that carry very little current, and thus have no voltage drop. Both battery voltage sense wires are connected to the 2-pole terminal inside of wiring box (see figure as below).

Be careful to connect the battery positive (+) terminal to the voltage sense positive (+) terminal and battery negative (-) terminal to the voltage sense negative terminal (-). No damage will occur if the polarity is reversed, but the controller cannot read a reversed sense voltage.



A battery voltage sense connection is not essential required to operate your controller, but it is recommended for best performance. The battery voltage sense will ensure that the voltage display in LCD is very accurate.

The voltage sense wires should be cut to length as required to connect the battery to the voltage sense terminal. The wire size can range from 16 to 24 AWG (1.0 to 0.25mm2). A twisted pair cable is recommended but not required. Use UL rated 300 Volt conductors. The voltage sense wires may be pulled through conduit with the power conductors. Tighten the connector screws with 5 in-lb (0.56 Nm) torque.The maximum length allowed for each battery voltage sense wire is 98 ft (30 m).

# 4. OPERATION

## 4.1 Power-Up

***WARNING: Risk of Damage***

Connecting the solar module to the battery connector will permanently damage the controller.

• Confirm that the solar and battery polarities are correctly connected to the controller.

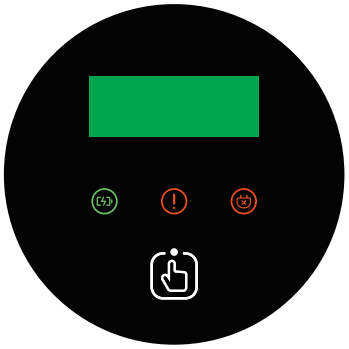
• A battery must be connected to the controller before operating it. The controller will not operate only with solar input. Solar input can trigger the controller to start up when the battery is connected without pressing the button.

• Turn on battery disconnect switch first. And press operation button for a while. Then, it will indicate a successful start-up in LCD display.

• Turn on solar disconnect switch. If the solar module is in full sunlight, the controller will begin charging.

## 4.2 Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the controller. It includes three indicators, one operation button and a LCD display, indicating the operating status and input/output power information.



### LED Indicator

| LED Indicator | | | Messages |
|---|---|---|---|
| POWER ON/ CHARGING | Green | Solid On | The controller is on. |
| | | Flashing | The controller is charging.<br>Bulk charge stage: flashing every 0.5 second<br>Absorption stage: flashing every second<br>Equalize stage: flashing every 3 seconds<br>Float stage: flashing every 5 seconds |
| FAULT/ WARNING | Red | Solid On | Fault occurs. |
| | | Flashing | Warning situation occurs. |
| WIRING FAULT | Red | Solid On | Battery polarities are not connected correctly. |

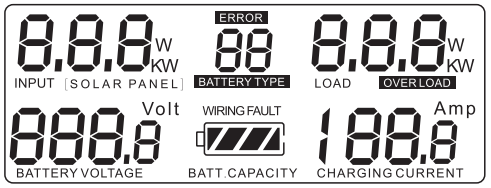




### Button Operation

| Function | Action Description |
|---|---|
| Power on | Press the button until LCD backlight is on. |
| Backlight on | Press shortly |
| Enter LCD setting mode | Press the button for 3 seconds. |
| Select LCD setting programs or modify parameter | Press shortly. |
| Confirm selection in setting programs or return back to previous menu | Press the button for 1.5 seconds. |

## 4.3 LCD Display Icons




| Icon | Function description |
|---|---|
| **Input Source Information** | |
| INPUT [SOLAR PANEL] | Indicates the PV input voltage. |
| **Configuration Program and Fault Information** | |
| E9 | Indicates battery equalization is activated. |
| ERROR | Indicates fault codes. |
| | Indicates warning codes. |
| **Output Information** | |
| Volt BATTERY VOLTAGE | Indicate battery voltage. |
| W KW | Indicate charging power. |
| Amp CHARGING CURRENT | Indicate charging current. |
| BATT.CAPACITY | Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode. |

### *Battery Charging Status.*

| Status | Battery voltage | LCD Display |
|---|---|---|
| Constant Current mode / Constant Voltage mode | < 2V/cell | 4 bars will flash in turns. |
| | 2 ~ 2.083V/cell | The right bar will be on and the other three bars will flash in turns. |
| | 2.083 ~ 2.167V/cell | The two right bars will be on and the other two bars will flash in turns. |
| | > 2.167 V/cell | The three right bars will be on and the left bar will flash. |
| Floating mode | Batteries are fully charged. | 4 bars will be on. |

### *4.4 LCD setting*

After pressing button for 3 seconds, the unit will enter setting mode. Shortly press button to select setting programs. And then, pressing button for at least 1.5 seconds to confirm the selected program. After that, shortly press button to modify the parameter of the program. If pressing button for at least 1.5 seconds, you will return to previous menu. After waiting for 10 seconds without any action, it will automatically exit setting mode.

***Setting Programs:***

| Program | Description | Options | |
|---|---|---|---|
| 00 | Exit setting mode | Escape<br>00 ESC | |
| 01 | Maximum charging current | 30A(Default)<br>01 30A | Setting range is from 30A ,45A ,60A , 80A,100A or 120A. Increment of each short press is 1A. The value will be back to 10A once the value is a 30A, 45A ,60A , 80A, 100A or 120A. |
| | | 45A(Default)<br>01 45A | |
| | | 60A(Default)<br>01 60A | |
| | | 80A(Default)<br>01 80A | |
| | | 100A(Default)<br>01 100A | |
| | | 120A(Default)<br>01 120A | |





| | | | |
|---|---|---|---|
| 02 | Battery type | Use-Defined(Default)<br>02 USE | If “Use-Defined” is selected, battery charge voltage can be set up in program 3 and 4.If “LIb” is selected, battery charge voltage can be set up in program 3 .<br>Note: "Lib" mode can only be displayed after parameter 05 is set as one of 12V 24V / 48V.If you want to set “Lib”, first set the 05 battery rated voltage (MPPT 45A(12/24V) can't set the Absorption voltage to 48v, LIb mode can't set the AUO), then set 02 to "LIb" |
| | | AGM<br>02 AGn | |
| | | Flooded<br>02 FLd | |
| | | LIB<br>02 LIb | |
| 03 | Absorption voltage | 14.40V (Default)<br>03 14.4 | If “Use-Defined” is selected in program 02, this program can be set up. The setting range is from12.0V to 15.0V.<br>If “LIb” is selected in program 02, the setting range is from 12.0V to 15.0V/24.0V to 30.0V/48.0V to 60.0V |
| | | If this program is selected to modify,the changeable figure will be shown as below.<br>03 14.4 | Increment of each short press is 0.1. Once the value is achieved 15.0V, the value will jump back to 12.0V. |
| 04 | Float voltage | 13.6V (Default)<br>04 13.6 | If “Use-Defined” is selected in program 02, this program can be set up. The setting range is from 12.0V to 15.0V.<br>If “LIb” is selected in program 02,this parameter is consistent with Absorption voltage |
| | | If this program is selected to modify, the changeable figure will be shown as below.<br>04 13.6 | Increment of each short press is 0.1V. The value will jump back to 12.0V after 15.0V is achieved. |

| | | | |
|---|---|---|---|
| 05 | Battery rated voltage | Auto (Default)<br>05 AUO | If “AUO” is selected, connected battery voltage system will be automatically detected.<br>Note:LIb mode can't set the AUO |
| | | 12V<br>05 12V | If “12V” is selected, the unit is considered as 12V battery system. |
| | | 24V<br>05 24V | If “24V” is selected, the unit is considered as 24V battery system. |
| | | 48V<br>05 48V | If “48V” is selected, the unit is considered as 48V battery system.<br>Note:MPPT 30A,45A(12/24V) can't set the Absorption voltage to 48v. |
| 06 | Battery C.V. charging duration | 150 minutes(Default)<br>06 150 | The setting range is from 5 minutes to 900 minutes. Increment of each short press is 5 minutes. It will jump back to 5minutes after 900 is achieved. |
| 07 | BTS temperature compensation ratio | 0mV (Default)<br>07 0.0 | The setting range is from 0mV to 60.0mV. Increment of each short press is 0.1 mV. The value will jump back to 0mV after 60.0mV is achieved. For each 12V battery, the derated battery charging voltage is followed the below formula:(Battery temperature – 25 o C) * BTS ratio. |
| 08 | Battery equalization enable/disable | Disable (Default)<br>08 E9d | In lithium battery mode, it is disabled by default and cannot be set |
| | | Enable<br>08 E9E | |
| 09 | Battery equalization voltage | 14.60V(Default)<br>09 14.6 | The setting range is from 12.0V to 15.5V. |
| | | If this program is selected to modify, the changeable figure will be shown as below.<br>09 14.6 | Increment of each short press is 0.1V. The value will jump back to 12.0V after 15.5V is achieved. |
| 10 | The maximum current of battery equalization | 15A (Default)<br>10 15A | The setting range is from 30A,45A, 60A,80A,100A or 120A.Increment of each short press is 1A. The value will jump back to 30A,45A ,60A ,80A, 100A or 120A is achieved. |





| | | | |
|---|---|---|---|
| 11 | Battery equalized time | 60 minutes(Default)<br>11 60 | The setting range is from 5 minutes to 900 minutes. Increment of each short press is 5 minutes. The value will jump back to 5 minutes after 900 minutes are achieved. |
| 12 | Battery equalized timeout | 120 minutes(Default)<br>12 120 | The setting range is from 5 minutes to 900 minutes. Increment of each short press is 5 minutes. The value will jump back to 5 minutes after 900 minutes are achieved. |
| 13 | Equalization interval | 30 days (Default)<br>13 30d | The setting range is from 0 day to 90 days. |
| 14 | Equalization activated immediately | Disable (Default)<br>14 AdS | If equalization function is enabled in program 08, this program can be set up. If “Enable” is selected in this program, it’s to activate battery equalization immediately and LCD main page will shows “ E9 ”. If “Disable” is selected, it will cancel equalization function until next activated equalization time arrives based on program 13 setting. At this time, “E9” will not be shown in LCD main page. |
| | | Disable (Default)<br>14 AEn | |

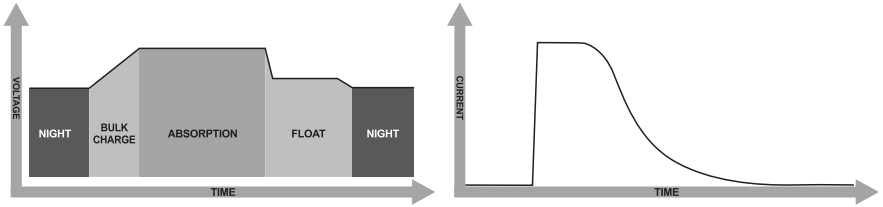
### 4.5 Reference Code

| Type | Code | Event |
|---|---|---|
| Fault | 01 | Over charge current |
| | 02 | Over temperature |
| | 03 | Battery voltage is too low |
| | 04 | Battery voltage is high |
| | 05 | PV is high loss |
| | 06 | Battery temperature is too low |
| | 07 | Battery temperature is too high |
| Warning | 20 | PV is low loss |
| | 21 | Output derating caused from high PV voltage |
| | 22 | Output derating caused from high temperature |
| | 23 | Low alarm for battery temperature |

# 5. CHARGING LOGIC

## 5.1 3-stage Charging

In general, this solar charge controller is designed with 3-stage battery charging algorithm for fast, efficient, and safe battery charging. The following picture shows the sequence of charging stages.

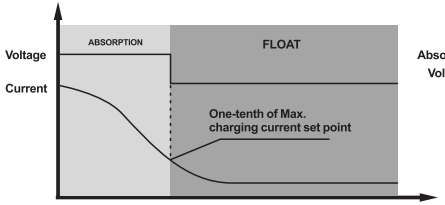


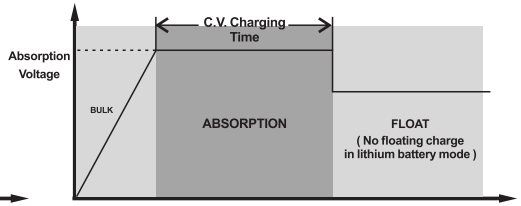

**1) Bulk charge stage**

In bulk charge stage, charge current begins to flow, typically at the maximum rate of the charge source. The controller will supply solar power to charge battery as much as possible.

**2) Absorption stage**

When battery charging voltage is reached to Absorption voltage point, the charging stage changes from bulk charge to Absorption. Constant-voltage regulation is used to maintain battery voltage at the Absorption stage. If the charging current drops to one-tenth of the maximum charging current setting point, the charging status will change to Float stage.




If the elapsed time of absorption stage is over setting value for C-V charging time, it will also transfer to Float stage.

**3) Float Stage**

After the battery is fully charged in the Absorption stage, the controller will reduces the battery voltage to the setting point of Float voltage. Once in Float stage, constant-voltage regulation is used to maintain battery voltage at setting point of float voltage.

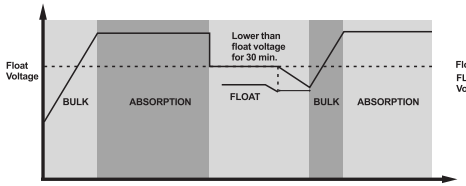
In lithium battery mode: the charging logic has no floating charge stage

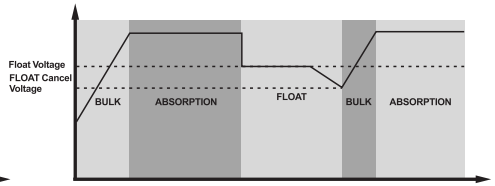
### • *Float timeout*

If the battery voltage remains lower than the Float voltage for 30 minutes, the controller will return to Bulk charging stage.

### • *Float cancel voltage*

Once the battery voltage drops to setting point of Float cancel voltage, the controller also returns to Bulk charging stage. Float cancel voltage = Floating charging voltage – (1V x battery numbers in series)



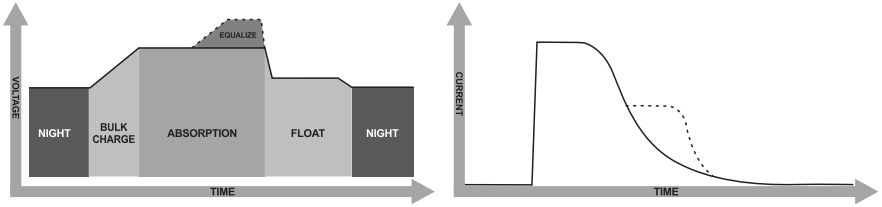







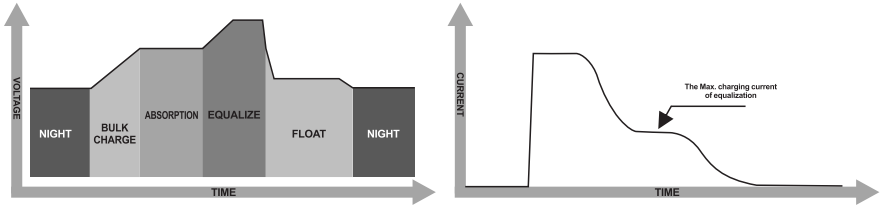

## 5.2 Equalize Stage

Equalization function is added into solar charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

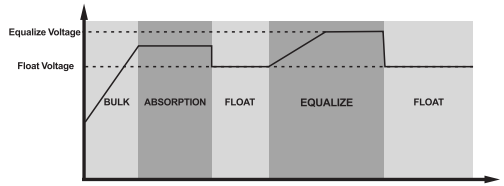



### • *When to Equalize*

In Absorption stage, if the charging current drops lower than the maximum charging current of battery equalization, the controller will start to enter Equalize stage.

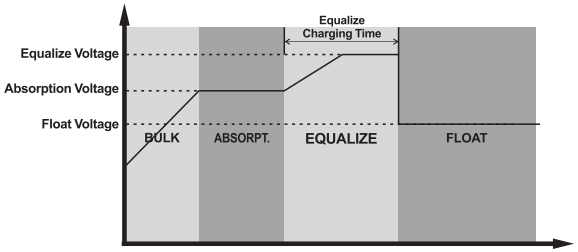



If solar charge controller is working in float stage, but at this time, the setting equalization interval (battery equalization cycle) is arrived, it will transfer to equalize stage.

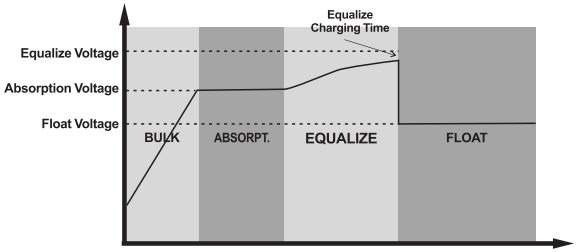


### • *Equalize charging time and timeout*

In Equalize stage, based on maximum charging current of battery equalization, the controller will supply solar power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.




However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the solar charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the solar charge control will stop equalization and transfer to float stage.




### *5.3 Setting Parameter and Default Value*

Recommended and default parameter settings are listed below.

| Parameter | Battery type | Absorp. Stage | Float Stage | Equalize Stage | Equlize Activation | Absorp. Time | Equalize Time | Equalize Timeout | Equalize Interval |
|---|---|---|---|---|---|---|---|---|---|
| Unit | - | Volt | Volt | Volt | En/Disable | Minutes | Minutes | Minutes | Days |
| Option | AGM | 14.4 | 13.6 | 14.6 | Disable | 150 | 60 | 120 | 30 |
| Option | Flooded | 14.6 | 13.8 | 14 .6 | Disable | 150 | 60 | 120 | 30 |
| Default | Customized | - | - | - | Disable | 150 | 60 | 120 | 30 |
| Option | LIb | - | - | - | Disable | - | - | - | - |





# 6. TROUBLE SHOOTING

| Situation | | Situation |
|---|---|---|
| Fault Code | Fault Event | |
| 01 | Over charge current | 1. Restart the charger.<br>2. If the problem remains, please contact your installer. |
| 02 | Over temperature | 1. Keep the charger in the cool environment.<br>2. If the problem remains, please contact your installer. |
| 03 | Battery voltage low | 1. Check the battery wire connection.<br>2. If the wire connection is ok, please contact your installer. |
| 04 | Battery voltage high | 1. Reconnect the battery to the charger.<br>2. If the problem remains, please contact your installer. |
| 05 | PV high loss | 1. Please check the voltage of the solar panel, it should be less than 140V or 190V.<br>2. If the voltage is ok, please contact your installer. |
| 06 | Battery temperature too low | 1. Check your remote temperature sensor and your battery ambient temperature.<br>2. If the problem remains, please contact your installer. |
| 07 | Battery temperature too high | 1. Check your remote temperature sensor and your battery ambient temperature.<br>2. If the problem remains, please contact your installer. |
| No display in LCD screen. | | 1. Check battery wire connection.<br>2. Push the button, if the problem remains, please contact your installer. |

# 7. SPECIFICATIONS

Table 1 Electrical Specifications

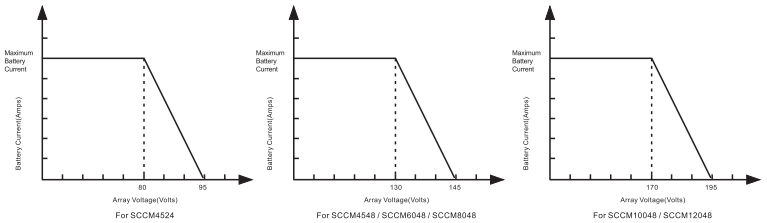
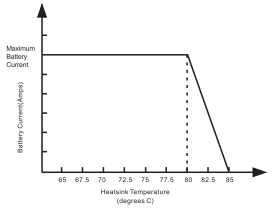
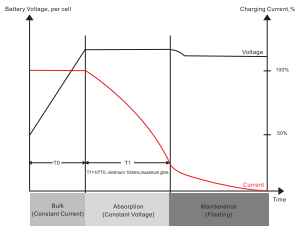
| MODEL | SCCM3024 | SCCM4524 | SCCM4548 | SCCM6048 | SCCM8048 | SCCM10048 | SCCM12048 |
|---|---|---|---|---|---|---|---|
| Maximum Battery Current | 30Amps | 45Amps | 45Amps | 60 Amps | 80 Amps | 100Amps | 120 Amps |
| Nominal System Voltage | 12,24VDC(Auto detection) | | 12V, 24V, 48V DC (Auto detection) | | | | |
| Maximum Solar Input Voltage | 95V | | 145V | | | 195V | |
| PV Start-up Voltage | 15V | | | | | | |
| PV Array MPPT Voltage Range | 12VDC/24VDC | | 12 VDC / 24 VDC / 48 VDC | | | | |
| | 15-80VDC/30-80VDC | | 15-130VDC / 30-130VDC 60-130VDC | | | 15-170VDC / 30-170VDC 60-170VDC | |
| Maximum Input Power | 12V - 420W | 12V - 625W | 12V - 625W | 12V - 825W | 12V - 1100W | 12V - 1375W | 12V - 1650W |
| | 24V - 830W | 24V - 1250W | 24V - 1250W | 24V - 1650W | 24V - 2200W | 24V - 2750W | 24V - 3300W |
| | / | / | 48V - 2500W | 48V - 3300W | 48V - 4400W | 48V - 5500W | 48V - 6600W |
| PV Array voltage & Battery current |   | | | | | | | |
| Heatsink temperature & Battery current |   | | | | | | |
| Transient Surge Protection | 4500 Watts / port | | | | | | |
| Protections | Solar high voltage disconnect<br>Solar high voltage reconnect<br>Battery high voltage disconnect<br>Battery high voltage reconnect<br>High temperature disconnect<br>High temperature reconnect | | | | | | |





Table 2 Battery Charging

| MODEL | SCCM3024 | SCCM4524 | SCCM4548 | SCCM6048 | SCCM8048 | SCCM10048 | SCCM12048 |
|---|---|---|---|---|---|---|---|
| Charging Algorithm | 3-Step | | | | | | |
| Charging stages | Bulk, Absorption, Float | | | | | | |
| Temperature compensation coefficient | -5 mV / °C / cell (25 °C ref.) | | | | | | |
| Temperature compensation range | 0 °C to +50 °C | | | | | | |
| Charging Curve |   | | | | | | |

## Table 3 Mechanical and Environment

| Model | SCCM3024 | SCCM4524 | SCCM4548 | SCCM6048 | SCCM8048 | SCCM10048 | SCCM12048 |
|---|---|---|---|---|---|---|---|
| Product Size (W x H x D,mm) | 190x151x74 | 205x160x78 | 283x160x105 | | 283x180x105 | 333x215x120 | |
| Product Weight (Kg) | 1.2 Kg | 1.8 Kg | 4.0 Kg | | 5.1 Kg | 6.4 Kg | 7.0 Kg |
| Ambient Temperature Range | 0°C to +55°C | | | | | | |
| Storage Temperature | - 40°C to 75°C | | | | | | |
| Humidity | 0%-90%RH(No condensing) | | | | | | |
| Enclosure | IP31(indoor&vented) | | | | | | |

# 8.MPPT charger controller match to the Inverter

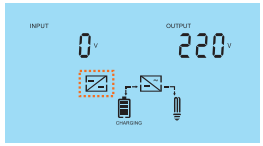
In actual application system, MPPT controller and inverter will charge the battery at the same time, the charging current will excessive to occur unsafe situation, so we add the function of matching the inverter to limit the charging current of the battery. However, since it needs to be matched with MPPT of different manufacturers , but the MPPT charging current cannot be limited. The current solution is to limit the charging current of the inverter.

The inverter match to the MPPT controller is mainly including two function:
1.Enabling or disable inverter to match the MPPT function. (Special attention: when upgrading the firmware of the inverter, it needs to disable the function matching MPPT first);

2.Limited the charging current of the inverter. The methods are as follows:
a) When the MPPT charging current ≥ inverter setting charging current, the maximum allowable charging current of the inverter equal to 0;
b) When the MPPT charging current ＜ inverter setting charging current, the maximum allowable charging current of the inverter equal to inverter setting charging current subtract MPPT charging current;

## 8.1 Match the inveter to the MPPT controller:

1.To enable the inverter to match the MPPT controller, the inverter and MPPT controller should be switched on first, and the communication lines between them have been connected;
2.Then press the “Down”button of the inverter for more than 2.5 seconds, until the MPPT charger icon flashes. At this time, you can release the button. The icon flashing indicates that the inverter is trying to communicate with the MPPT. The inverter is releasing. After pressing the button for 10 seconds, the icon stops flashing. When the communication is successful, it means that the function is successfully enabled.
3.After successfully enabling, the matching MPPT function flag will be saved in the EEPROM. Restarting the inverter does not need to be manually enabled again.
4.After successfully enabling, turning the page on the LCD screen will display MPPT PV voltage, power and other information.

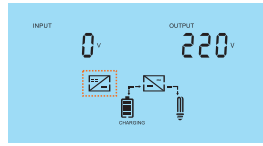
| Action | Instruction | LCD display |
|---|---|---|
| Match the MPPT function enable | Long press “Down”button until the icon in the red box in the right picture flashes, indicating that the inverter is trying to communicate with MPPT. The icon stops flashing after the inverter loosens the button for 10 seconds. |  |

## 8.2 Matching MPPT function is prohibited:

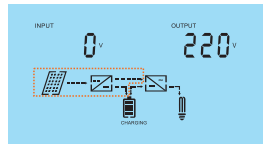
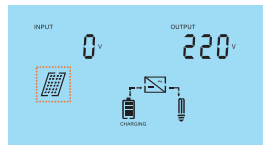
1.To prevent the inverter from matching the MPPT function, the MPPT should be turned off or the communication connection between the two should be disconnected.
2.Then long press the “Down”button of the inverter for more than 2.5 second, until the MPPT charger icon flashes. At this point, the button can be released. The flashing icon indicates that the inverter is trying to communicate with MPPT. The flashing icon will stop 10 seconds after the button is released. When communication fails, it means it is forbidden successfully.



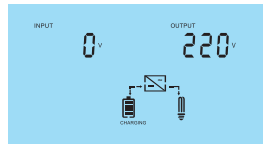
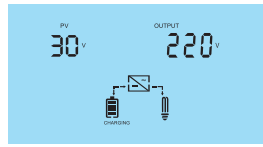


| Action | Instruction | LCD display |
|---|---|---|
| Matching MPPT function is prohibited | Long press“Down”button until the icon in the red box in the right picture flashes, indicating that the inverter is trying to communicate with MPPT. The icon disappears after the inverter loosens the button for 10 seconds. |  |

## 8.3 Matching MPPT function successfully enabled:

| Action | Instruction | LCD display |
|---|---|---|
| Match MPPT function to enable successfully | If MPPT is in charging state：When the MPPT function is successfully enabled, the icon in the red box in the right picture will appear |  |
| Match MPPT function to enable successfully | If MPPT is not in the charging state, but PV voltage is greater than 30V and is in the startup state：When the MPPT function is successfully enabled, the icon in the red box in the right picture will appear |  |

## 8.4 Matching MPPT function is prohibited successfully:

| Action | Instruction | LCD display |
|---|---|---|
| Match MPPT function | When the matching MPPT function is prohibited successfully，MPPT icon information will no longer be displayed |  |
| Whether matching MPPT function enables judgment | 1. If the MPPT function is enabled, the LCD interface page turning will display PV voltage, power and other information;<br>2. If the matching MPPT function is prohibited, the LCD interface page turning will not display PV voltage, power and other information; |  |