

SMR-MPPT New Series Solar Charge Controller

(Infrared/RS485/Bluetooth)
12/24V, 10/30/40A

User Manual

User Manual_SMR-MPPT New Series_V1.1_QF
CE, RoHS, ISO9001:2015
Subject to change without notice!

SMR-MPPT New Series Solar Charge Controller User Manual

Dear Client,

Thank you for choosing the SMR-MPPT new series product! Before using this product, please read this manual carefully. This product manual provides some important recommendations related to the controller, including installation, operation, programming, and troubleshooting.

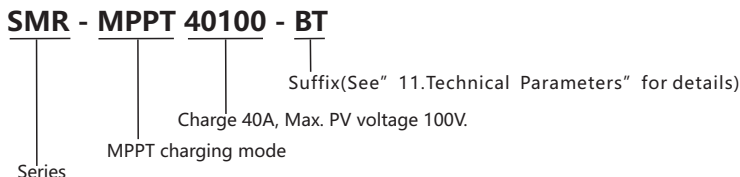
1. Product Overview

The SMR-MPPT new series solar controller is an intelligent programmable MPPT controller designed specifically for solar systems. It improves charging efficiency by about 20% compared to traditional PWM controllers, helping to reduce the overall cost of the photovoltaic system.

1.1 Product features

- Innovative Maximum Power Point Tracking (MPPT) technology with MPPT efficiency > 99.9%.
- Fully digital control technology with charging conversion efficiency up to 97.5%.
- Operating parameters and status readable.
- Dual automatic limiting function for rated charging current and charging power.
- Clear and easy-to-understand charge/discharge and fault indicators.
- Compatible with FLD, GEL, AGM batteries, and Lithium batteries.
- External temperature sensor with automatic temperature compensation.
- Automatic charging derating when temperature exceeds set value to prevent controller overheating damage.
- Four-stage charging for lead-acid batteries: MPPT, Boost, Equalization, Float.
- Automatic reactivation after lithium battery BMS protection is triggered.
- Low-temperature charging protection for lithium batteries – charging can be disabled or reduced below 0°C ambient temperature.
- Communication interface with power output capability.
- Robust aluminum housing with IP67 waterproof rating.
- Excellent EMC and thermal design.
- Comprehensive electronic protections.

1.2 Product Naming Rules



2. Safety Instructions and Disclaimer

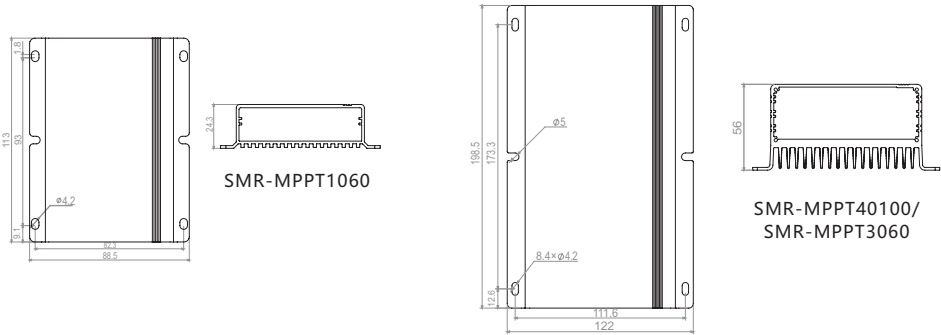
2.1 Safety Instructions

- ① The solar controller can only be used in solar photovoltaic systems. During installation and operation, this manual and the technical parameters provided by component manufacturers must be strictly followed. No other energy source other than solar modules may be connected to the controller.
- ② Batteries store a large amount of energy. Do not short-circuit the battery under any circumstances. It is recommended to connect a slow-blow fuse in series with the battery according to the controller's rated current.
- ③ Batteries can generate flammable gases. Keep batteries away from sparks, open flames, or unprotected flames, and ensure the battery storage area is well ventilated.
- ④ Do not touch or short-circuit wires or terminals, as some terminals or wires can carry voltages up to twice the battery voltage. When handling, keep your hands dry, use insulated tools, and stand on dry ground.
- ⑤ Keep children away from batteries and the controller.

2.2 Disclaimer

Please follow the safety recommendations provided by the battery manufacturer. If you have any questions, contact your distributor or installer. The manufacturer assumes no liability for any loss resulting from failure to comply with the recommendations or specifications mentioned in this manual, or from disregarding the battery manufacturer's recommendations. The manufacturer shall not be held responsible in cases where maintenance is provided by unauthorized personnel, improper use occurs, incorrect installation is carried out, or the system is improperly designed.

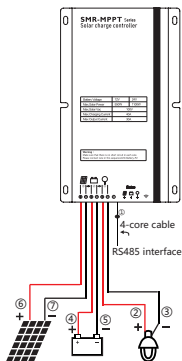
3.Dimensions(Unit:mm)



4.Installation

4.1 Electrical Connection Diagram

Connect the controller to the solar system in the order shown in the figure.



RS485:



Female connector

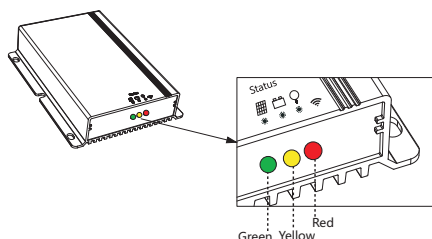
Num	Wire	RS485
1	Black	GND
2	Blue	RS485-A
3	Green	RS485-B
4	Brown	B+

Do not hot-plug this interface!
GND is not connected to B-!

4.2 Wiring steps

- As shown in the figure, plug in both ends of the waterproof RS485 interface connector. Avoid plugging or unplugging this interface while powered on. (If no RS485 interface is available, proceed directly to step 2.);
 - Connect the positive and negative terminals of the load to the corresponding red and black wires. Seal them with tape, then proceed to the next step;
 - Connect the positive and negative terminals of the battery to the corresponding red and black wires. The load will then turn on;
 - Connect the positive and negative terminals of the solar panel to the corresponding red and black wires. Wait approximately 5 seconds, and the controller will enter charging mode;
 - Refer to " 9. Faults and Alarms " to check the controller's operating status via the LED indicators.
- Ensure that the cable length between the battery and the controller is as short as possible to prevent controller misjudgment caused by excessive voltage drop on the cable.
 - Recommended wire gauge: 10A: 2.5mm²; 30A: 6mm²; 40A: 10mm².

5.LED Status Indication



LED	Status	Function
Green LED	On	Not charged
	Fast flash(0.1s on/0.1s off)	Normal charging
	Flash(0.5s on/0.5s off)	Boost or Equalization charging(GEL,FLD,AGM)
	Slow flash(0.5s on/2s off)	Float Charging
Yellow LED	On	Battery is normal
	Slow flash(0.5s on/2s off)	Battery voltage is low
	Fast flash(0.1s on/0.1s off)	Low voltage protection
	Off	Over voltage protection
Red LED	Off	Work normal
	On	Output power is 0
	Flash(0.5s on/0.5s off)	Over temperature protection
	Fast flash(0.1s on/0.1s off)	Short circuit and overcurrent protection *

※ If all three LEDs flash simultaneously, it indicates that the system is not recognized.

※ If the controller is in multiple protection states at the same time, the priority order for displaying fault information is: short-circuit protection → overcurrent protection → low voltage protection → overvoltage protection → overtemperature protection.

6.Factory default settings

6.1 Read the running status

Press the "Status" key of the SU10G to read the running status of the controller.

Num	Name	Name describe	Unit	Example
	Status :	Charge		
1	BattVolt	Battery voltage	V	12.5V
2	LoadCurr	Load current	A	0.00A
3	Load V	Load voltage	V	15.0V
4	PV	PV voltage	V	50.0V
5	PV I	PV current	A	3.0A
6	Energy	Total generating capacity	Ah	15Ah
7	OD Times	Over discharge times	Times	0
8	FC Times	Fully charge times	Times	0
9	Day1-HV	A day ago highest voltage	V	14.5V
10	Day1-LV	A day ago lowest voltage	V	12.8V
11	Day2-HV	Two days ago highest voltage	V	14.6V
12	Day2-LV	Two days ago lowest voltage	V	12.2V
13	Day3-HV	Three days ago highest voltage	V	14.3V
14	Day3-LV	Three days ago lowest voltage	V	11.9V

6.2 Factory default settings

Press the "Data" key of the SU10G to read the controller's setting parameters.

Num	Name	Default settings	Setting range
1	Time1	24H	0~6.5H+D2D
2	Dim1	100%	0/100% *1
3	Dim NP1	—	— *2
4	Time2	0H	0~7.5H
5	Dim2	100%	0/100%
6	Dim NP2	—	—
7	Time3	0H	0~7.5H
8	Dim3	100%	0/100%
9	Dim NP3	—	—
10	Time4	0H	0~7.0H+TOT
11	Dim4	0%	0/100%
12	Dim NP4	—	—
13	Time5	0H	0~7.5H
14	Dim5	100%	0/100%
15	Dim NP5	—	—
16	D/N Thr	5.0V	3.0~20.0V
17	D/N Dly	0m	0~30min
18	Load I	—	—
19	Dim Auto	—	—
20	Battery	GEL	LI/GEL/FLD/AGM
21	LVD	11.2V	10.8~11.8V
22	LVR	12.2V	11.4~12.8V
23	Delayoff	—	—
24	Password	—	—

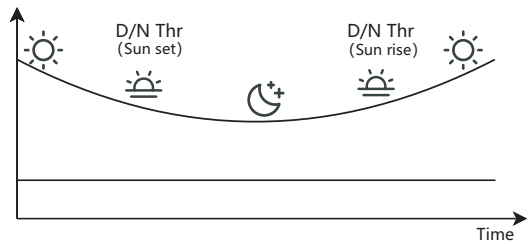
*1 Indicates that here, 0 and 100% can be set. Values other than 0 default to 100% as well.

*2 The "—" position may have a numerical value, but it has no practical meaning.

7.Operation Modes

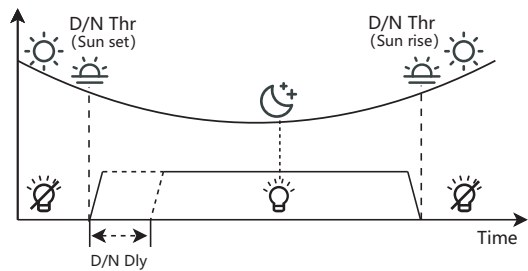
The SMR-MPPT new series solar charge controller features advanced load control functions. Both the operating time and mode of the load can be flexibly programmed according to customer needs.

7.1 Normally On Mode (24H)



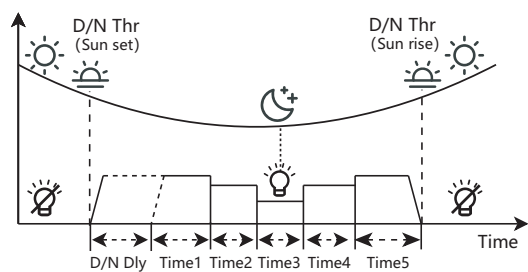
When the controller's load is set to normally open mode and is not in a protection state, the load will remain on 24 hours a day.

7.2 Dusk to Dawn(D2D)



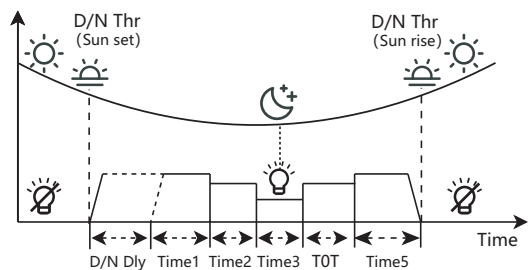
When the SMR-MPPT new series solar charge controller is set to D2D mode, the "Dim1" set at the "Time1" is effective for the entire time period.

7.3 Five-stage night mode



By setting time points 1 to 5 and their corresponding power levels via the SU10G smart remote control, various time and power combination modes can be achieved.

7.4 T0T mode (Can set the load on time before morning coming)



On the SU10G smart remote control, time point 4 can be set to T0T mode. If the load is required to be turned off during the T0T time period, set the power of time point 4 to 0%.

※ When “Time4” is set to T0T mode, “Time1” cannot be set to D2D.

8.Default Voltage Parameters,Threshold,Advanced Settings

8.1 Default Voltage Parameters Table

Battery type	AGM	GEL	FLD	Range	LI	Range
OVD	15.5V	15.5V	15.5V	/	14.6V	/
OVR	15.0V	15.0V	15.0V	/	14.4V	/
Equalization	14.7V	/	14.8V	/	/	/
BCV	14.5V	14.5V	14.5V	/	14.4V	10.0~32.0V
BVR	/	/	/	/	14.0V	9.2~31.8V
Float	13.6V	13.7V	13.7V	/	/	/
LVD	11.2V	11.2V	11.2V	10.8~11.8V	10.8V	9.0~30.0V
LVR	12.2V	12.2V	12.2V	11.4~12.8V	11.8V	9.6~31.0V
Remarks	/				The setting range for LI batteries is the same for both 12V and 24V systems.	

※ The voltage parameters for AGM, GEL, and FLD batteries are all based on a 12V system. For a 24V system, these values are automatically multiplied by 2.

※ For lithium batteries, the range can be set according to the battery type and the number of cells in series.

8.2 Low Voltage Disconnect(LVD) and Low Voltage Reconnect(LVR)

1.GEL、 FLD and AGM

LVD setting range:10.8~11.8V/21.6~23.6V(Default:11.2V/22.4V);

LVR setting range:11.4~12.8V/22.8~25.6V(Default:12.2V/24.4V).

2.Lithium

LVD setting range:9.0~30.0V(Default:10.8V);

LVR setting range:9.6~31.0V(Default:11.8V).

※ 1.After the controller enters the low-voltage protection state, it can only be restored when the battery is recharged via the controller and reaches the set "low-voltage recovery" voltage.

※ 2.The low-voltage recovery voltage should be at least 0.6V/1.2V higher than the low-voltage protection voltage.

8.3 Boost Charging Voltage(BCV) and Boost Voltage Reconnect Voltage(BVR)(Lithium)

BCV setting range:10.0~32.0V(Default:14.4V);

BVR setting range:9.2~31.8V(Default:14.0V).

8.4 Day/Night Threshold, Day/Night Delay

The controller automatically distinguishes between day and night by measuring the open-circuit voltage of the solar panel. Depending on the region and the type of solar panel used, users can set different light control threshold voltages (the critical voltage between day and night).

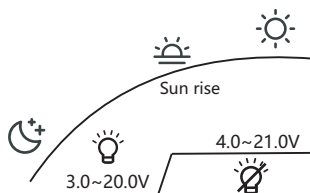
Day/Night threshold setting range: 3.0~20.0V (default: 5.0V).

When night falls, after the panel voltage reaches the set light control threshold, the lighting can be delayed by setting a light control delay time.

Day/Night delay time setting range: 0~30min.

①Lithium:

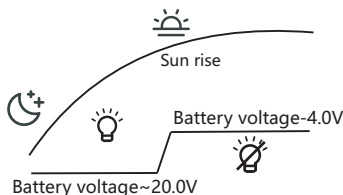
When the Day/Night threshold is lower than the battery voltage, the load off light control point voltage is 1V higher than the set value. This means that during the early morning, the load will only turn off when the solar panel voltage is between 4.0V and 21.0V.



②GEL,AGM and FLD:

When the Day/Night threshold Day/Night threshold voltage is 1V higher than the set value (for 12V systems); when the battery voltage is 24V, the load will only turn off when the load off Day/Night threshold voltage is 2V higher than the set value.

③When the Day/Night threshold is higher than the battery voltage, the load off Day/Night threshold voltage is (battery voltage-4.0V).



※ 1.The Day/Night threshold should be set to approximately 0.22 times the open-circuit voltage of the solar panel.

2.The controller features an automatic light control point adjustment function. If the minimum night voltage of the solar panel is higher than the controller's Day/Night threshold, the controller will not be able to enter the discharge state that night, and the load will have no output. After 24 hours, the controller will automatically adjust the Day/Night threshold to meet the night lighting requirements.

8.5 Advanced Settings

This function can only be viewed visually using the remote control; the controller provides no indication.

①① Once the short-circuit protection switch (On/Off) is successfully set via the remote control, it will take effect immediately: Capacitive loads may draw a large inrush current at startup, which could trigger the controller's short-circuit protection and cause the output to shut down. In this case, the user can disable the short-circuit protection function. This function is On by default. Setting suggestion: It is recommended to keep the default value.

Setting	N	Key	Value
01SCP	Key :	Yes	
02PWM	Key :	Yes	
03OTP	Key :	75	

②② Once the PWM switch (On/Off) is successfully set via the remote control, it will take effect immediately: PWM may cause noise and interference in the system, especially when using lithium batteries with a BMS. PWM charging may trigger BMS protection, causing system failure. Therefore, the customer can choose to turn off PWM. In this mode, once the battery voltage is charged to the preset voltage, the controller immediately stops charging. When the battery voltage drops back down, charging will resume.

This function is On by default. Setting suggestion: It is recommended to keep the default value.

Note: This function does not work for this series of controllers.

③Remote control over-temperature protection setting: The over-temperature protection value can be adjusted between 55°C and 87°C. When the internal temperature exceeds this set value, the controller will activate over-temperature protection and stop working. Over-temperature protection default value: 85°C.

9. Faults and Alarms

Fault	Status	Reason	Remedy
Load are not powered	low voltage protection	Battery capacity is low	Load will be reconnected when battery is recharged
	Overcurrent, short protection circuit	Loads are over current or short circuit	Switch off all loads, remove short circuit, load will be reconnected after 1 minute automatically
	Over temperature protection	Controller temperature is too high	Load reconnects after temperature reduces
High battery voltage	Over voltage protection	High battery voltage *	Check if other sources overcharge the battery. If not, controller is damaged
		Battery wires or damaged battery fuse battery has high resistance	Check battery wires, fuse and battery.
Unable to recognize the system voltage	The red, yellow, and green lights flash at the same time	The battery voltage is out of the normal range during startup	Charge or discharge the battery to keep the battery voltage within the normal operating range
Battery is empty after a short time	Low voltage protection	Battery has low capacity	Change battery
Battery can't be charged	The green light stays on	PV panel fault or reverse connection	Check panels and connection wires

*Lithium battery: Battery voltage too high > (overcharge protection voltage + 0.2V);
GEL, AGM, and FLD batteries: Battery voltage too high > 15.5V/31.0V.

10.Safety Features

●Waterproof Protection

Protection rating: IP67

●Lithium Battery BMS Overcharge Detection Protection

When the controller detects BMS overcharge protection, it immediately stops charging to prevent high voltage from the PV side from being applied across the BMS for an extended period, which could cause high-voltage damage to the BMS.

●Low-Temperature Charging Protection for Lithium Batteries

When the 0°C charging disable function is enabled and the ambient temperature drops below 0°C, the controller stops charging to prevent irreversible damage to the lithium battery caused by low-temperature charging.

●Over-Temperature Protection

When the ambient temperature or the internal temperature of the controller becomes too high, the controller stops charging and discharging to prevent the risk of damage to the lithium battery or controller due to excessive temperature.

●Battery Reverse Polarity Protection

The system will not operate if the battery is reverse-connected, and the controller will not be damaged.

●PV Input Overvoltage Protection

If the input voltage from the solar panel is too high, the controller will automatically disconnect the PV input.

●PV Input Reverse Polarity Protection

The controller will not be damaged if the PV array is reverse-connected. It will resume normal operation after the wiring error is corrected.

●Load Power Limiting Protection

When the customer sets an excessive load current, the controller limits the load output power to the rated power, ensuring that neither the controller nor the LED load is damaged.

●Load Short-Circuit Protection

When a short circuit occurs, the controller immediately disconnects the load output to prevent damage. Once the short-circuit condition is removed, the controller automatically resumes output after a short moment.

●Load Open-Circuit Protection

If the load connection is suddenly disconnected while the LED load is operating normally, the controller immediately turns off the load output to protect itself. After the load connection is restored, the controller automatically resumes output within 1 minute, or output can be restored by pressing the test button on the remote control.

●Night Anti-Reverse Charging Protection

Prevents the battery from discharging through the solar panel at night.

●TVS Lightning Protection

11. Technical Parameters

	Item	Standard product	SMR-MPPT1060
		Suffix Description	BT: Bluetooth communication RS485: 485 communication
	System Voltage		12V/24V automatical recognition
Battery Parameters	Max. charging current		10A
	Max volt on Bat. Terminal		35V
	Battery Type		Lithium, Liquid, GEL, AGM(Default: GEL)
	Temp. Compensation		-4.17mV/K per cell(Boost, Equalization), -3.33mV/K per cell(Float)
	0°C Charging protection		Yes, No, Slow(Programmable)
Panel Parameters	Max volt on PV terminal *1		60V
	Max input power		130W/260W
	Dusk/Dawn detect volt.		3.0~20.0V(Programmable)
	Day/Night delay time		0~30min(Programmable)
	MPPT tracking range *2		(Battery Voltage +1.0V) ~Voc*0.9
Load	Output Current		10A
System Parameters	Max tracking efficiency		>99.9%
	Max charge conversion		97.5%
	Communication mode		Infrared/RS485/Bluetooth
	Self consumption		6~25mA
	Dimensions		113*88.5*24.3mm
	Net weight		370g
	Ambient temperature		-35°C~+60°C
	Ambient humidity		0~100%RH
	Protection degree		IP67

*1.This value represents the maximum voltage of the solar panel at the minimum operating ambient temperature.

*2.Voc means the open circuit voltage of the solar panel.

*3.Around oblique line value separately on behalf of 12V and 24V system's value.

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	Item	Standard product	SMR-MPPT3060	SMR-MPPT40100
		Suffix Description	BT: Bluetooth communication RS485: 485 communication	
	System Voltage		12V/24V automatical recognition	
Battery Parameters	Max. charging current		30A	40A
	Max volt on Bat. Terminal		35V	
	Battery Type		Lithium, Liquid, GEL, AGM(Default: GEL)	
	Temp. Compensation		-4.17mV/K per cell(Boost, Equalization), -3.33mV/K per cell(Float)	
	0°C Charging protection		Yes, No, Slow(Programmable)	
Panel Parameters	Max volt on PV terminal ^{*1}		60V	100V
	Max input power		130W/260W	550W/1100W
	Dusk/Dawn detect volt.		3.0~20.0V(Programmable)	
	Day/Night delay time		0~30min(Programmable)	
	MPPT tracking range ^{*2}		(Battery Voltage +1.0V) ~Voc*0.9	
Load	Output Current		30A	
System Parameters	Max tracking efficiency		>99.9%	
	Max charge conversion		97.5%	
	Communication mode		Infrared/RS485/Bluetooth	
	Self consumption		10~20mA	6~25mA
	Dimensions		198.5*122*56mm	
	Net weight		1.78Kg	
	Ambient temperature		-35°C~+60°C	
	Ambient humidity		0~100%RH	
	Protection degree		IP67	

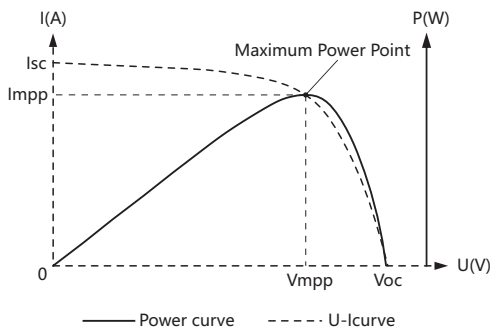
*1.This value represents the maximum voltage of the solar panel at the minimum operating ambient temperature.

*2.Voc means the open circuit voltage of the solar panel.

*3.Around oblique line value separately on behalf of 12V and 24V system's value.

12. Charging Instructions

12.1 MPPT charging introduction



The full name of MPPT is "Maximum Power Point Tracking," which is an advanced charging method. The MPPT controller can monitor the power generated by the solar panel in real time and track the maximum voltage and current point (VI), enabling the system to charge the battery with the highest efficiency. Compared with traditional PWM controllers, the MPPT controller can maximize the power output of the solar panel, thus providing a larger charging current. Generally speaking, MPPT can improve energy utilization by 15% to 20% compared to PWM controllers.

12.2 MPPT-Four Charging Stage

Battery type: AGM/GEL/LIQ.

As shown in Figure 2-2, the lead-acid battery is charged in the following stages: MPPT charge, constant voltage charge (Equalization charge/Boost charge/Float charge).

The constant voltage charging stage is divided into three stages: Equalization charge, Boost charge and Float charge:

■ MPPT Charge:

When the battery voltage has not yet reached the target constant voltage value, the controller will perform MPPT charging. Once the battery voltage reaches the constant voltage value, it automatically exits MPPT charging and switches to constant voltage charging (Equalization/Boost/Float).

■ Boost Charge:

When the battery voltage reaches the set boost voltage value, the controller will perform constant voltage charging, while the charging current gradually decreases over time. This process lasts for 120 minutes, after which it switches to float charging.

■ Equalization Charge:

Certain types of batteries require equalization charging under specific conditions to stir the electrolyte, balance the battery voltage, and complete the chemical reaction. Equalization charging will increase the battery voltage, causing the battery electrolyte to gasify.

※ If the controller detects that the battery voltage is too low, it will automatically start equalization charging. The equalization charging lasts for 120 minutes, after which it switches to float charging.

※ Equalization charging and boost charging are not repeated during a single full charge cycle to avoid excessive gas release or battery overheating.



WARNING: Risk of explosion!

Equalizing flooded battery can produce explosive gases, so well ventilation of battery box is necessary.

■ **Float Charge:**

After the Boost voltage stage, the controller will reduce the battery voltage to Float voltage setpoint. When the battery is fully recharged, there will be no more chemical reactions and all the charge current transmits into heat and gas at this time. Then the controller reduces the voltage to the floating stage, charging with a smaller voltage and current. It will reduce the temperature of battery and prevent the gassing, also charging the battery slightly at the same time. The purpose of Float stage is to offset the power consumption caused by self consumption and small loads in the whole system, while maintaining full battery storage capacity. In Float stage, loads can continue to draw power from the battery. In the event that the system load(s) exceed the solar charge current, the controller will no longer be able to maintain the battery at the Float setpoint. Should the battery voltage remains below the boost reconnect charging voltage, the controller will exit Float stage and return to Bulk charging.

13.3 Lithium battery charging mode

Battery types are available in four and eight series lithium iron phosphate.As shown in Figure 2-3, the lithium battery charging stage includes: MPPT charging/constant voltage charging.

- **MPPT charging stage:** When the battery voltage has not reached the overcharge protection voltage, the controller will charge MPPT. When the battery voltage reaches the overcharge protection voltage, the MPPT charging will automatically exit and enter the constant voltage charging.
- **Constant voltage charging stage:** the lithium battery is in the constant voltage charging stage, when the battery voltage reaches the overcharge protection voltage, the controller will carry out constant voltage charging, and the charging current will gradually decline over time, this process will remain for 60 minutes, and then stop charging, and re-enter the next charging cycle when the battery voltage reaches the overcharge recovery voltage.

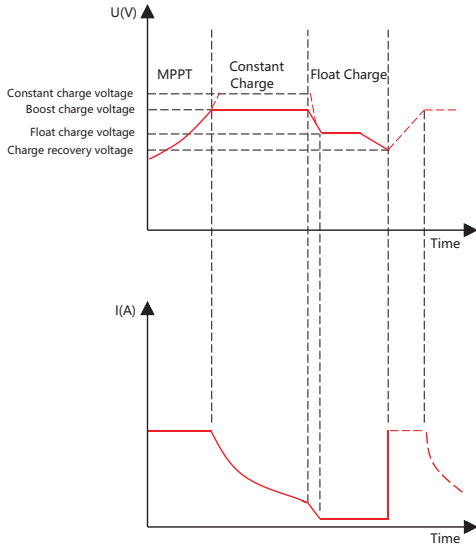


Figure 2-2 Lead-acid battery charging curve

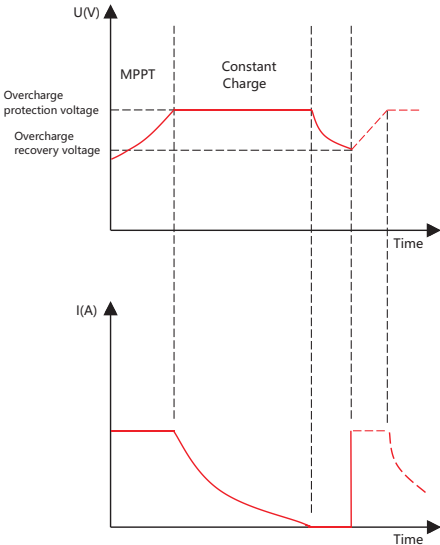


Figure 2-3 Lithium battery charging curve

13. Bluetooth and APP installation

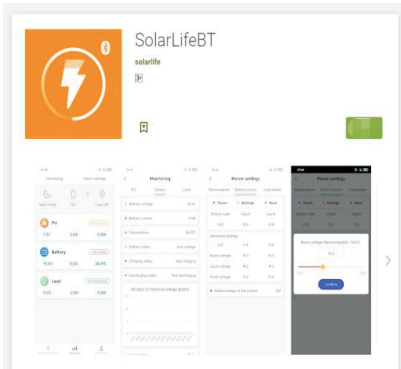
13.1 Bluetooth

The controller features Bluetooth communication. After installing the APP, the controller's Bluetooth module can connect to a mobile phone. For detailed operation, please refer to the "Bluetooth APP User Manual". The application on the mobile phone allows you to view the real-time operating status of the controller and configure parameters, including device and battery parameters.

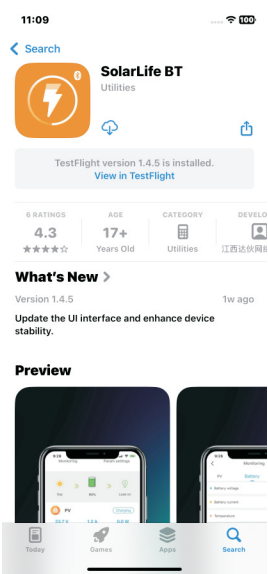
13.2 App installation

Search for "SolarLifeBT" in Google Play or the App Store and download the app. For detailed instructions and settings, please read the "Bluetooth APP User Manual".

Android APP :



iOS APP :

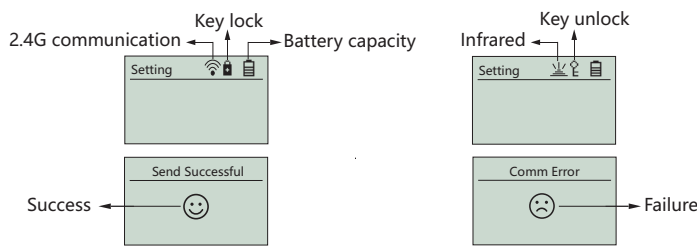


14.Remote Control Introduction

14.1 Remote Control Diagram



14.2 Remote Control Icon Positions and Descriptions



☆Battery capacity indication:

	Capacity ≥ 75%
	50% ≤ Capacity < 75%
	25% ≤ Capacity < 50%
	Capacity < 25%

14.3 Remote Control Button Descriptions

Key	Function	Key	Description
	Parameter setting/confirmation		Test the setting
	1.Menu Page Up 2.Increase the setting data		Read Parameters
	1.Menu Page Down 2.Decrease the setting data		Read running status
	Return to the menu/exit		Send dormancy command
	Send Parameters		Function keys(Combined application)

Combina- tion keys	Function	Combina- tion keys	Description
+	Enter the remote controller setting interface	+	Turn on the light / Switch to SOS mode
+	Lock/Unlock parameter settings	+	Advanced function setting interface
+	Switch between old and new versions	/	/