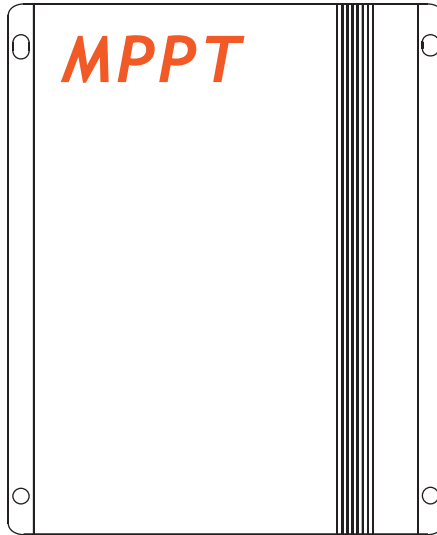# MPPT-DC series
MPPT Solar charge controller
with LED driver built-in
(Constant Current, Boost)
12/24V, 8/10/15/20A

MPPT

User Manual

Solar charge controller MPPT-DC series User Manual

Dear Clients,

Thanks for selecting the **MPPT-DC** series solar controller. Please take the time to read this user manual, this will help you to take advantage of controller's new features. This manual gives important recommendations for installing, programming, using and so on. Read it carefully in your own interest please.

1.Description of Function

MPPT-DC series intelligent MPPT solar controller is programmable and especially for boost mode LED solar street light system. It includes constant current driver function. The charging efficiency is about 20% higher than the traditional PWM controller, which can drop the cost of the whole system.

- Innovative Max Power Point Tracking(MPPT) technology, tracking efficiency >99.9%
- Full digital technology, high charge conversion efficiency up to 97.5%, discharge conversion efficiency up to 96.5%
- Can output constant current (output current can be set)
- 5 stages time and dimming can be adjusted
- Can read parameters and running status
- If battery voltage is low, it can be set to dimming
- Dimming start voltage and percentage can be set
- Day/Night threshold can adjust automatically
- AGM, Liquid, GEL and Lithium battery for selection
- 0℃ Charging Protection(Lithium)
- When BMS power off because of LVD, it can activate the system automatically
- External temperature sensor, automatic temperature compensation(AGM, Liquid and GEL)
- Four stages charge way: MPPT, boost, equalization, float
- Remote Unit to configure, with LCD display
- IP67, Strong and durable aluminum caseFull automatic electronic protect function

2.Safty Instruction and Waiver of Liability

2.1 Safety

①The solar charge controller may only be used in PV systems in accordance with this user manual and the specs of other module manufacturers. No energy source other than solar gen. may be connected to the solar charge controller.

②Batteries store a large amount of energy, never short circuit a bat. under all circumstances. We strongly recommend connecting a fuse directly to the battery to protect any short circuit at the bat. wiring.

③Batteries can produce flammable gases. Avoid making sparks, fire or any naked flame. Make sure that the bat. room is ventilated.

④Avoid touching or short circuiting wires or terminals. Be aware that the voltages on special terminals or wires can be as much as twice the battery voltage. Use isolated tools, stand on dry ground, and keep your hands dry.

⑤Keep children away from batteries and the charge controller.

2.2 Liability Exclusion

The manufacturer shall not be liable for damages, especially on the battery, caused by use other than as intended or as mentioned in this manual or if the recommendations of the battery manufacturer are neglected. The manufacturer shall not be liable if there has been service or repair carried out by any unauthorized person, unusual use, wrong installation, or bad system design.
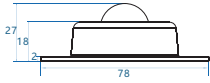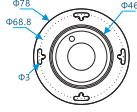
3.Dimensions(Unit:mm)

3.1 Controller dimension

MPPT0850-DCLi

MPPT0875/1050-DCLi
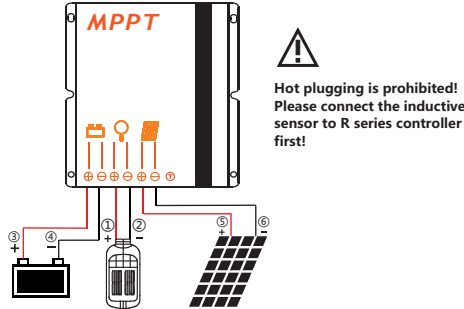

MPPT1575-DCLi

MPPT2075-DCLi
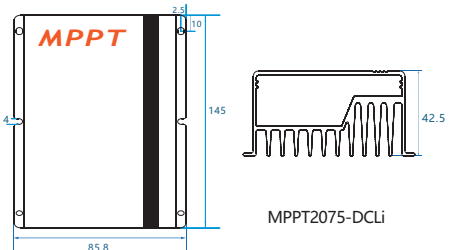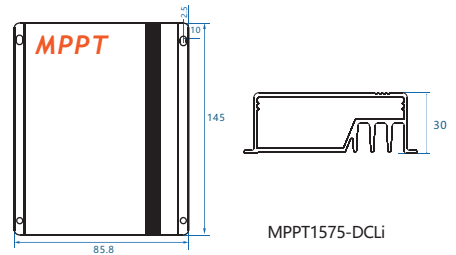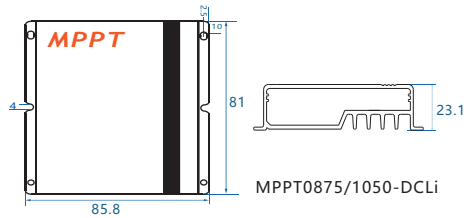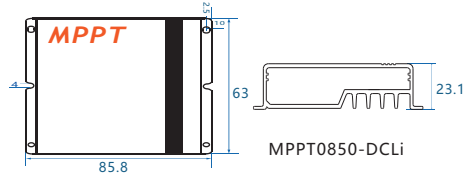
3.2 Sensor dimension(Unit:mm)

Sensor lines length：400mm

4.Installation

The following diagrams provide an overview of the connections and the proper order

MPPT

⚠️

Hot plugging is prohibited! Please connect the inductive sensor to R series controller first!

1. As the chart, connect the load with the corresponding brown(positive) and blue(negative) cables firstly, then seal them with tape.

2. Connect battery with the corresponding red(positive) and black(negative)cables. Load will be on after5s.

3. Connect panel with the corresponding red(positive) and black/green(negative) cables, the load will be off after 5s,and the controller begins charging.

4. Refer to **9.1 LED indications and Faults&Alarms** to confirm the LED display status.

■ Make sure the wire length between battery and controller is as short as possible.

■ Recommended minimum wire size:
8/10A: 2.5 mm²; 15/20A: 4 mm².

4.2 Transportation mode(Lithium)

The controller is generally integrated with the lithium battery in the lithium battery pack for transport, if the controller works normal during transport, it will waste of energy and increase the transport risk. If the controller is set to transport mode, the load has no output, then the power consumption is reduced by about 60%, to avoid lithium battery voltage too low.

4.2.1 Open circuit protection

If the controller is only connected with the battery, but not connected with solar and load, the controller will enter transportation mode after 5 minutes.

4.2.2 Press the "Test" key in transport mode

Press the "**Back**" and "**Backlight**" key at the same time more than 3s, the remote controller will work in transport mode.

Press the "**Test**" key in the transport mode, the remote controller displays "**Transport OK**" and will beep a long sound, the controller enters into transport mode.

🖉 If the controller enters transport mode, the red LED will slow flash(0.2s on/5s off)，the green and yellow led will be off and the remote control displays "Open CP".

4.2.3 Exit the transportation mode

When the load is properly connected, press the test key or connect the solar more than 1s during daytime , the transport mode will terminate and the controller will work normally.

5.Remote controller, Default setting

Setting can be changed using the "S/SG-Unit" infared remote programmer. For detailed instructions and settings, please see the S/SG-Unit programmer remote manual.

MPPT

🖉 **Remark:**
S-Unit:
Be sure to set only one controller at a time.
SG-Unit:
(1) It's ability to set up multiple controllers at the same time.
(2) The indicators and load will be turned off for 1 second and on for 3 seconds after the controller receives the parameters successfully(according to the actual current), and then return to normal status.

45°
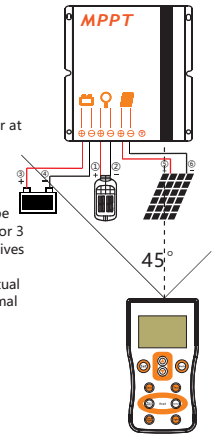
5.1 Test function

Press the "Test" key of S/SG-Unit, the controller will turn on load for 10s. During daytime, the testing function can help users to verify correct installation or for system trouble shooting. 10s later the load will automatically turn off.

5.2 Read the running status

Press the "Status" key of the S/SG-Unit to read the running status of the controller.

Num	Name	Name describe	Unit
	Status：	Charge	
1	Batt V	Battery voltage	V
2	Load I	Load current	A
3	Load V	Load voltage	V
4	PV V	PV voltage	V
5	PV I	PV current	A
6	Energy	Total generating capacity	AH
7	OD Times	Over discharge times	Times
8	FC Times	Fully charge times	Times
9	Day1-HV	A day ago highest voltage	V
10	Day1-LV	A day ago lowest voltage	V
11	Day2-HV	Two days ago highest voltage	V
12	Day2-LV	Two days ago lowest voltage	V
13	Day3-HV	Three days ago highest voltage	V
14	Day3-LV	Three days ago lowest voltage	V

5.3 Read the parameters

Press the "Parameter" key of the S/SG-Unit to read the setting parameters of the controller.

Num	Name	MPPT-DC
1	Time1	4H
2	Dim1	100%
3	Time2	0H
4	Dim2	100%
5	Time3	0H
6	Dim3	100%
7	Time4	0H
8	Dim4	0%
9	Time5	0H
10	Dim5	100%
11	D/N Thr	5.0V
12	D/N Dly	0min
13	Load I	0.3A
14	Dim Auto	Yes
15	Dim V	12.2V
16	Dim %	8%
17	Battery	Li
18	CVT	12.6V
19	CVR	12.4V
20	LVD	9.0V
21	LVR	9.8V
22	DelayOff	10s
23	Dim NP	10%
24	Password	0000

Password only applies to SG-Unit.

6.Starting up the controller

6.1 Self Test

As soon as the controller is connected to battery, it starts self test. Then the display changes to normal operation.

6.2 Battery Type

The controller applies to Lithium, AGM, Liquid and Gel battery, the factory default setting is suitable for Lithium battery.

When the controller is set to Lithium battery, the charging target voltage and charging recovery voltage can be set according to customer requirements.

The controller adjusts itself automatically to 12V or 24V system voltage when it is set to Gel, Liquid or AGM battery. If the battery voltage on start-up is 0V-15.5V then the controller infers a 12V system.

If the battery voltage is 20V-30V the controller infers a 24V system.If the battery voltage is not within the normal operating rang(ca.0 to 15.5V or ca.20 to 30V) at start-up, please refer to **9.2 Faults & Alarms**.

6.3 0℃ Charging Protection

"0℃ Chg" can be set to "Yes", "Slow" or "No". When the controller detects that the ambient temperature is higher than 0℃, the charging function is normal. when the ambient temperature is low than 0℃, if the "0℃ Chg" is set to "Yes", the charging function is normal, else if the "0℃ Chg" is set to "slow", the max charging current is 20% of the rated current, else if the "0℃ Chg" is set to "No", the controller does not charge the battery.

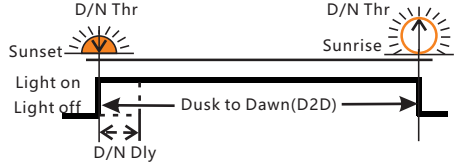The user can select the appropriate charging method.

7. Streetlight Function

For controllers with infrared sensing function(R series), if work mode is set to "Five-stage Night Mode" or "T0T mode", "DelayOff "and "Dim NP" work in "Time3"and "Time4".

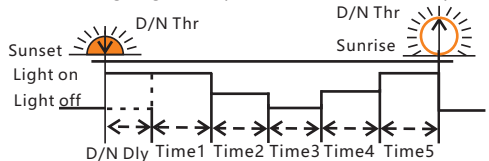"DelayOff" setting range: 10~150s.

"Dim NP" setting range: 0~100%.

7.1 Dusk to Dawn (D2D, no induction function)

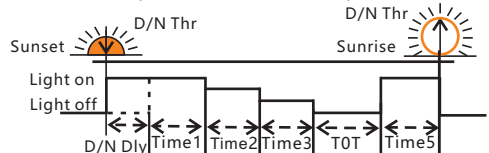If "Time1" is set to "D2D",the controller works in dusk to dawn mode.

1.MPPT-DC controller is set to D2D mode, the corresponding dimming setting is still valid.
2. If "Time1" is set to D2D mode, "Time4" can not be set to T0T mode.

7.2 Five-stage Night Mode(Time3、Time4 can induction)

You can set the Time 1-5 and Dim 1-5 with S/SG-Unit.

7.3 T0T mode(Time3、T0T can induction)

If "Time4" is set to "T0T", this mode is T0T mode.

* If "Time4" is set to T0T mode, "Time1" can not set to D2D mode.

Parameter setting example:

Time1: 1.0H/100%   Time2: 2.0H/80%
Time3: 3.0H/60%   Time4: T0T/40%
Time5: 2.0H/100%
DelayOff: 10s   Dim NP: 10%

The controller works as follows:

After the arrival of the evening the first time the load is lit for 1 hour (full power 100%), the second time the load is lit for 2 hours (power 80%), the third time load light for 3 hours (when people is near the lamp then the load is 60% light, when people is away from the lamp the load is 60% * 10% light), and then the controller according to the actual night time automatically calculate the length of the fourth paragraph (when people is near the lamp then the load is 40% light, when people is away from the lamp the load is 40% * 10% light), the fifth time load light 2 hours (full power 100%).

8. LVD, LVR, Threshold, Dimming

8.1 Low Voltage Disconnect (LVD)

When the battery voltage drops below the LVD voltage, the controller will disconnect the load to prevent deep discharge of the battery. If this occurs, the battery should be well charged before resuming use.

	Gel, Liquid and AGM	Lithium
MPPT0850/0875/1050-DCLi	10.8~11.8V	9.0V~15.0
MPPT1575/2075-DCLi	10.8~11.8/21.6~23.6V	9.0V~30.0V

8.2 Low Voltage Reconnect (LVR)

If the controller goes into low voltage disconnect, it will restore only when the battery being recharged to the recovery voltage.

|	Gel, Liquid and AGM	Lithium
MPPT0850/0875/1050-DCLi	11.4~12.8V	9.6V~16.0
MPPT1575/2075-DCLi	11.4~12.8/22.8~25.6V	9.6V~31.0V

8.3 Day/Night Threshold, Day/Night Delay

The controller recognizes day and night based on the solar array open circuit voltage. This day/night threshold can be modified according to local light conditions and the solar array used.

Day/Night threshold setting range:

MPPT0850/0875/1050-DCLi	3.0~8.0V
MPPT1575/2075-DCLi	3.0~20.0V

In the evening, when the solar array open circuit voltage reaches the setting day/night threshold, you can adjust the day/night delay time to make the load turn on a little later.
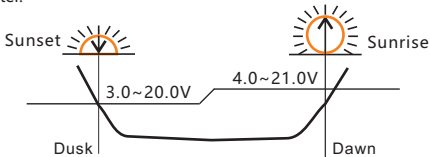
🖉 1. Day/Night threshold voltage should be set around 0.22 times of open circuit voltage.
2. Day/Night threshold voltage of load disconnect is 1V higher than the setting data, means the load will disconnect when the solar voltage at 4.0~9.0/4.0~21.0V.
3. The controller has an automatic day/night threshold adjustment function. If the lowest voltage of solar array is higher than the setting day/night threshold, the load has no output in first night, 24 hours later the controller can automatically adjust the day/night threshold to meet the requirements of lighting at night.

8.4 Auto Dimming

8.4.1 Auto Dimming mode

The "Dim Auto" item of S/SG-Unit is set to "Yes", set "Dim V" and "Dim %" at the same time, press the "Send" key to set up the controller. when the battery voltage is lower than the voltage of "Dim V" , it starts to dimming automatically. Battery voltage reduces per 0.1/0.2V, load current decreased according to the set of "Dim %", the minimum output current is 10% of the setting current.

🖉 If the controller is set to "Dim" or "Auto Dim", the minimum output current can be as low as 100mA.

8.4.2 365mode (Lithium)

365 mode is based on the battery power (charge power, discharge power) energy control. If the battery charge more during the day, then discharge more at night. The controller can calculate the dimming ratio according to the charging power and the remaining power of battery, so as to avoid the load shutdown due to the low battery voltage.

🖉 When using the 365 mode, the system should be designed to meet the requirements of three rainy days.

9. LED indications and Faults & Alarms
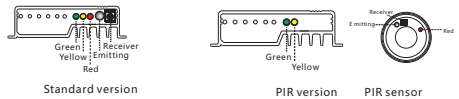
9.1 LED Display Explanation

LED	Status	Function
Green LED	On	Solar panel is correctly connected, but not charged
	Fast flash(0.1/0.1s)	Charging
	Flash(0.5s/0.5s)	Equal or Boost Charging
	Slow flash(0.5/2s)	Float Charging
Yellow LED	Off	Over voltage protection
	On	Battery is normal
	Slow flash(0.5/2s)	Battery voltage is low
	Fast flash(0.1/0.1s)	Low voltage protection
Red LED	Off	Work normal(Standard version)
	On	The output power is 0.
	Super slow(0.2/5s)	Open circuit protection
	Flash(0.5s/0.5s)	Over temperature
	Fast flash(0.1/0.1s)	Short circuit or Over current protection *
Red LED PIR sensor	Slow flash(2.5s/2.5s)[*1]	Work normal(PIR version)

Detailed fault information can be read by S/SG-Unit remote controller.
*1. This data indicates the red indicator status of PIR sensor of infrared induction version.

9.2 Faults & Alarms

Fault	Status	Reason	Remedy
Loads are not powered	Low volt. protection	Battery capacity is low	Load will be reconnected when battery is recharged
	Overcurrent, short circuit protection	Loads are over current or short circuit	Switch off all loads, remove short circuit, load will be reconnected after 1 minute automatically
	Over temp. protection	Controller temp. is too high	Load reconnects after temp. reduces
High voltage at battery terminal	Over voltage protection	High battery voltage >15.5V/31.0V	Check if other sources overcharge the battery. If not, controller is damaged.
		Battery wires or battery fuse damaged, battery has high resistance.	Check battery wires, fuse and battery.
Can't recognize system voltage	All LED fast flashing	Battery voltage is not in right range	Charge or discharge, make battery voltage in the right range
Battery is empty after a short time	Low voltage protection	Battery has low capacity	Change battery
Battery can't be charged	Green LED is on	PV panel fault or reverse connection	Check panels and connection wires

* Lithium: Battery overvoltage >(CVT+0.2V)
Gel, Liquid and AGM: Battery overvoltage >15.5/31.0V

10. Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected *2	Protected	Protected
Short circuit	Protected*1	Protected *2	Switches off immediately
Over current	——	——	Switches off with delay
Reverse Current	Protected	——	——
Over voltage	Max *3	Max*4	——
Under voltage	——	——	Switches off
Over temp.	The controller cuts off the load if the temperature reaches the set value.		

*1. When the PV doesn't charge, the controller will not be damaged if short-circuit just happened in the PV array.
Warning: It is forbidden to short-circuit the PV array during charging .Otherwise, the controller may be damaged.
*2. Battery must be protected by fuse, otherwise battery will be damaged.
*3. Please refer to "12.Technical Data" to get the max voltage of PV panel.
*4. Please refer to "12.Technical Data" to get the max voltage of battery.
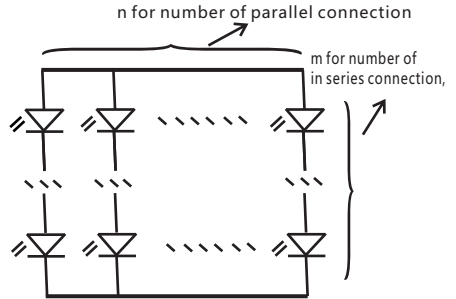
Warning: The combination of different error conditions may cause damage to the controller. Always remove the error before you continue connecting the controller.

## 11. Recommended connection of LED lights

11.1 Load

Following connect ways is for the LED lights
(Vf: 2.9V~3.4V; I: 300mA, Power: 1W)

n for number of parallel connection

m for number of in series connection,

System Voltage	Output Voltage	Load current	LED chips connection
MPPT0850-DCLi	20~35V	0.15~3.0A	M=7~10 N=1~10
MPPT1050-DCLi	20~45V		M=7~14 N=1~10
MPPT0875-DCLi	20~58V		M=7~18 N=1~10
MPPT1575/2075 -DCLi	20~55V	0.15~6.0A	M=7~18 N=1~20

11.2 Sensor
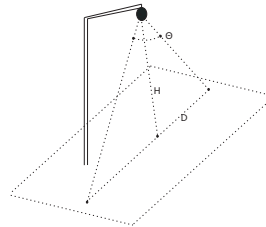
Infrared sensor
θ(Angle)：60°
H(Height)：7m
D(Width)：8m

Microwave sensor
θ(Angle)：150°
H(Height)：15m
D(Width)：7m

1) The sensor which installed in the plastic and glass lampshade will reduce the sensitivity.
2) Sensor range will change with temperature, light conditions and so on, subject to the actual measurement.
3) The distance between any inductive sensors should be greater than 3m.
4) Please ensure that there are no moving signals around the sensor, such as fan, DC motor, sewer pipe, air outlet, etc., the sensor may generate false trigger.

12.Technical Data

	Item	MPPT0850-DCLi	MPPT0875-DCLi	MPPT1050-DCLi
Battery Parameters	System Voltage	12V		
	Max Charging Current	8A		10A
	Max volt on Bat. Terminal	25V		
	Battery Type	Liquid, Gel, AGM and Lithium（Programmable, default: Lithium)		
	Liquid, Gel and AGM — MPPT Charging Voltage	<14.5V@25℃		
	Boost Voltage	14.5V @25℃		
	Equalization Voltage	14.8V @25℃（Liquid, AGM)		
	Float Voltage	13.7V @25℃		
	Low Volt. Disconnect	10.8~11.8V（Programmable)		
	Reconnect Voltage	11.4~12.8V（Programmable)		
	Overcharge Protect	15.5V		
	Temp. Compensation	-4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float)		
	Lithium — Charging Volt. target	10.0~17.0V(Programmable, default: 12.6V)		
	Charging Volt. recovery	9.2~16.8V(Programmable, default: 12.4V)		
	Low voltage disconnect	9.0~15.0V(Programmable, default: 9.0V)		
	Low voltage reconnect	9.6~16.0V (Programmable, default: 9.8V)		
	0℃ Charging protection	Yes, Slow, No(Programmable)		
Panel Parameters	Max volt on PV terminal	35V	60V	45V
	Max input power	100W~120W		120W~150W
	Dusk/Dawn detect volt.	3.0~8.0V（Programmable)		
	Day/Night delay time	0~30min（Programmable)		
	MPPT tracking range	（Battery Voltage +1.0V) ~Voc*0.9 ***2**		
Load Parameters	Output Power	1~50W	1~60W	
	Output Voltage	20 ~ 35V	20 ~ 58V	20~45V
	Current setting range	0.15~3.0A（Programmable)		
	Min current	100mA（Dimming)		
	Current precision	±2%		
	Dimming	0~100%（Programmable)		
	Voltage of start dimming	11.8~12.5V(Gel,AGM and Liquid); 10.0~17.0V(Lithium)		
	Dimming percentage	1~20%（Programmable)		
System Parameters	Max tracking efficiency	>99.9%		
	Max charge conversion	96.5%		
	Max LED driver efficiency	96%		
	Self consumption	6mA	9mA	6mA
	Dimensions	85.8*63*23.1mm	85.8 * 81 * 23.1mm	
	Weight	230g	260g	
	Ambient temperature	-35~+60℃		
	Ambient humidity	0~100%RH		
	Protection degree	IP67		
	Max Altitude	4000m		

*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.Model name +"G", means 2.4G communication, R series have PIR function.

Solar charge controller MPPT-DC series User Manual

	Item	MPPT1575-DCLi	MPPT2075-DCLi
	System Voltage	12V/24V automatical recognition	
	Max Charging Current	15A	20A
	Max volt on Bat. Terminal	35V	
	Battery Type	Liquid, Gel, AGM and Lithium (Programmable, default: Lithium)	
Battery Parameters	Liquid, Gel and AGM — MPPT Charging Voltage	<14.5/29.0V@25℃	
	Boost Voltage	14.5/29.0V @25℃	
	Equalization Voltage	14.8/29.6V @25℃ (Liquid, AGM)	
	Float Voltage	13.7/27.4V @25℃	
	Low Volt. Disconnect	10.8~11.8V/21.6~23.6V (Programmable)	
	Reconnect Voltage	11.4~12.8V/22.8~25.6V (Programmable)	
	Overcharge Protect	15.5/31.0V	
	Temp. Compensation	-4.17mV/K per cell (Boost, Equalization), -3.33mV/K per cell (Float)	
	Lithium — Charging voltage target	10.0~32.0V(Programmable, default: 12.6V)	
	Charging voltage recovery	9.2~31.8V(Programmable, default: 12.4V)	
	Low voltage disconnect	9.0~30.0V(Programmable, default: 9.0V)	
	Low voltage reconnect	9.6~31.0V (Programmable, default: 9.8V)	
	0℃ Charging protection	Yes, Slow, No(Programmable)	
Panel Parameters	Max volt on PV terminal	55V *1	
	Max input power	200W/400W	260W/520W
	Dusk/Dawn detect volt.	3.0~20.0V (Programmable)	
	Day/Night delay time	0~30min (Programmable)	
	MPPT tracking range	(Battery Voltage +1.0V) ~Voc*0.9 *2	
Load Parameters	Output Power	10~90W/20~180W	
	Output Voltage	20~55V/30~55V	
	Current setting range	0.15~6.0A (Programmable)	
	Min current	100mA (Dimming)	
	Current precision	±2%	
	Dimming	0~100% (Programmable)	
	Voltage of start dimming	11.8~12.5V/23.6~25.0V(Gel,AGM and Liquid); 10.0~32.0V(Lithium)	
	Dimming percentage	1~20% (Programmable)	
System Parameters	Max tracking efficiency	>99.9%	
	Max charge conversion	97.5%	
	Max LED driver efficiency	96.5%	
	Self consumption	6mA	
	Dimensions	85.8 * 145 * 30mm	85.8 * 145 * 42.5mm
	Weight	550g	700g
	Ambient temperature	-35~+60℃	
	Ambient humidity	0~100%RH	
	Protection degree	IP67	
	Max Altitude	4000m	

*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.
*4.Model name +"G", means 2.4G communication, R series have PIR function.