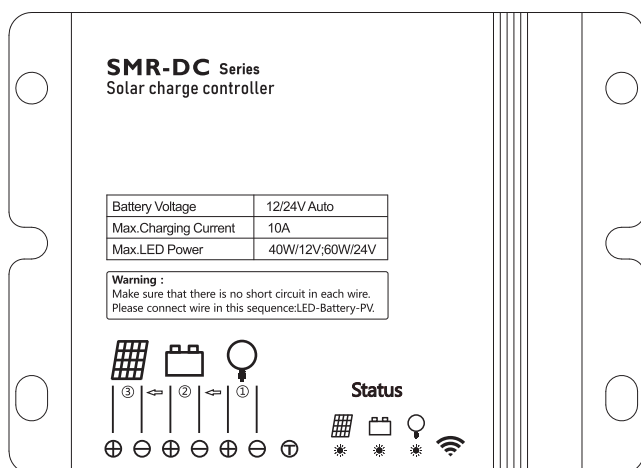


SMR-DC series

Solar charge controller

(Constant Current, Boost)

12/24V, 10A



User Manual

User Manual_SMR-DC series_PH
CE, RoHS, ISO9001:2015
Subject to change without notice!

Dear Clients,

Thanks for selecting the SMR-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 this user manual in full before installing or connecting the solar controller.

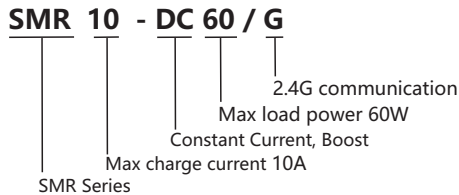
1. Product overview

Smart-DC series intelligent solar controller, is programmable and especially for boost mode LED solar street light system.

1.1 Product features

- Can output constant current.
- Adjustable 5-stage timer for load output.
- Human infrared induction.
- Monitoring of the running status and parameters Suitable for Gel, Liquid, AGM and Lithium battery .
- 12V/24V system voltage automatic recognition Automatic temperature compensation(Liquid/GEL) .
- Four stages charge: fast, boost, equal, float(Liquid/GEL) .
- If battery voltage is low, it can be set to dimming automatically.
- Dimming start voltage and percentage can be set .
- Auto sleeping during transportation(Lithium).
- When BMS power off because of LVD, it can activate the system automatically (Lithium).
- Charging target and recovery voltage can be set(Lithium)
- 0°C Charging Protection(Lithium)
- Day/Night threshold can adjust automatically .
- Configurable with an LCD remote programmer .
- Waterproof IP67, Strong and durable aluminum case.
- Full automatic electronic protect function.

1.2 Product naming rules



2. Safety Instruction and Waiver of Liability

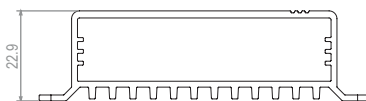
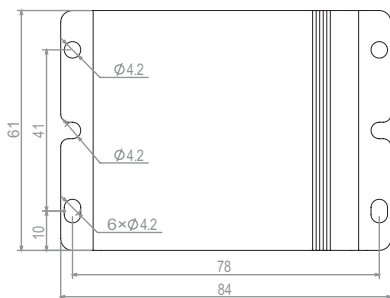
2.1 Safety

- 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)

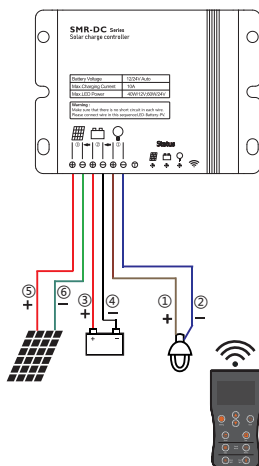


SMR10-DC60/G

4. Installation

4.1 Electrical connection diagram

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



4.2 Wiring steps

- ① As the chart, Connect the load first with corresponding brown(positive) and blue (negative) cables, then seal them with tape.
- ② Connect the battery with corresponding positive and negative cables, load will be on.
- ③ Connect panel with the corresponding red(positive) and green(negative) cables, the controller begins charging.
- ④ Confirm the LED display status, please refer to the “9. Faults and Alarms” to identify the reason.

- Make sure the wire length between battery and controller is as short as possible.
- Recommended Wire size: 10A:2.5mm²

4.3 Transportation mode

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.

4.3.1 Open circuit protection

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

4.3.2 Press the "Test" key in transport mode

Press the "Back" and "Backlight" key at the same time,the remote controller will enter into 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.

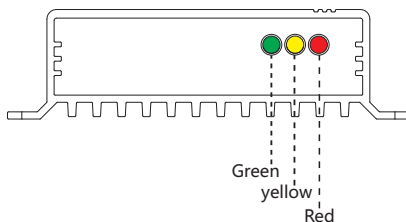
——For detailed Settings, please refer to the SU10G intelligent remote control instruction manual.

※ After the controller enters transport mode, the red LED will super slow flash(0.2s on/5s off) ,the remote control displays "Open CP".

4.3.3 Exit the transportation mode

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

5. LED indications



5.1 Controller LED light status indication

LED	Status	Function
Green LED	On	Solar panel is correctly connected, but not charged
	Fast flash(0.1s on/0.1s off)	MPPT charging
	Flash(0.5s on/0.5s off)	Boost or Equalization charging(GEL,Liquid,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(Standard version)
	On	Output power is 0
	Super slow flash(0.2s on/5s off)	Open circuit, hardware protection,transportation mode
	Flash(0.5s on/0.5s off)	Over temperature protection
	Fast flash(0.1s on/0.1s off)	Short circuit and overcurrent protection*

*If the controller is in multiple protection states at the same time, the priority order of displaying fault information is: short circuit protection -->overcurrent protection -->low voltage protection -->overvoltage protection -->over temperature protection -->open circuit protection.

6. Factory default settings

6.1 Factory default settings

Num	Name	Setting data	Setting range
1	Time1	4.0H	0~6.5H+D2D
2	Dim1	100%	0~100%
3	Dim NP	100%	0~100%
4	Time2	0H	0~7.5H
5	Dim2	100%	0~100%
6	Dim NP	0%	0~100%
7	Time3	0H	0~7.5H
8	Dim3	100%	0~100%
9	Dim NP	0%	0~100%
10	Time4	0H	0~7.0H+T0T
11	Dim4	0%	0~100%
12	Dim NP	0%	0~100%
13	Time5	0H	0~7.5H
14	Dim5	100%	0~100%
15	Dim NP	0%	0~100%

16	D/N Thr	5.0V	3.0~20.0V
17	D/N Dly	0m	0~30min
18	Load I	0.3A	0.1~2.0A
19	Dim Auto	Yes	Yes/No
20	Dim V	12.5V	10.0~32.0V
21	Dim %	8%	1~20%
22	Battery	LI	LI/GEL/LIQ/AGM
23	CVT	14.4V	10.2~32.0V
24	CVR	14.0V	9.8~31.8V
25	LVD	10.8V	9.0~30.0V
26	LVR	11.8V	9.6~31.0V
27	0°C Chg	Yes	Yes/Slow/No
28	Delayoff	10s	10s~150s
29	Password	0000	0000~9999

※ The password function is only applicable to 2.4G remote control mode.

6.2 Read the running status

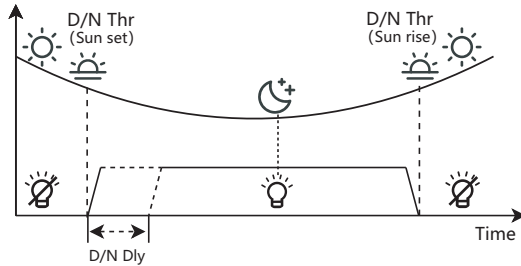
Pressing the "Status" key of the SU10G to read the running status of the controller.

Num	Name	Name describe	Unit	Example
	Status :	Charge		
1	Batt VI	Battery voltage	V	12.5V
2	Load I	Load current	A	0.00A
3	Load V	Load voltage	V	15.0V
4	PV V	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

7. Operation mode

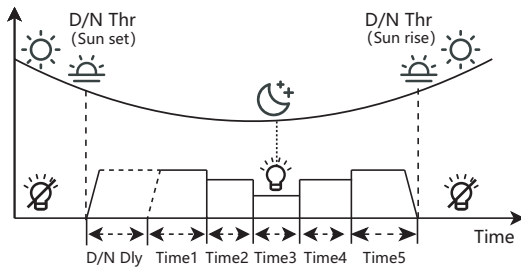
SMR-DC series controller with advanced street light control function. The modes of lighting can be based on customer needs.

7.1 Dusk to Dawn(D2D)



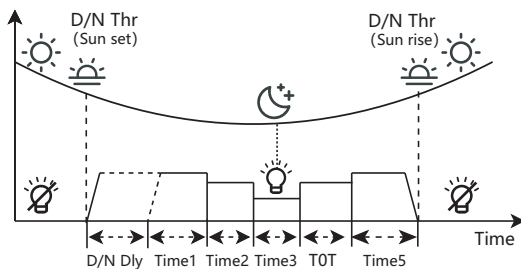
The MPPT-DC controller is set to D2D mode, and the manned power and unmanned power values set at the first time are valid for all time periods.

7.2 Five-stage Night Mode



By SU10G remote control for time 1~5 and its human power, unmanned power Settings, can achieve a variety of time and power combination mode.

7.3 T0T mode (can set the load on time before morning coming)



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

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

8. LVD, LVR, Threshold, Dimming

8.1 Low Voltage Disconnect(LVD)

1. Liquid, Gel and AGM

Low voltage disconnect setting range: 10.8~11.8V/21.6~23.6V

2. Lithium

Low voltage disconnect setting range: 9.0~30.0V

8.2 Low Voltage Reconnect(LVR)

1. Liquid, Gel and AGM

Low voltage reconnect setting range: 11.4~12.8V/22.8~25.6V

2. Lithium

Low voltage disconnect setting range: 9.6V~31.0V

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

2.LVR should be higher than LVD at least 0.6/1.2V.

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.

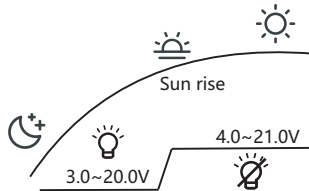
In the evening, when the solar array open circuit voltage reaches the setting day/night threshold, you can adjust the day/night delay time to make the load turn on a little later.

Day/Night threshold setting range: 3.0~20.0V.

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

①Lithium:

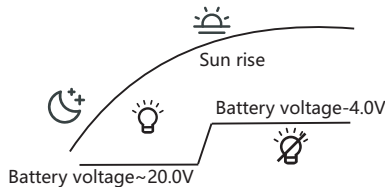
When setting light control point < battery voltage, Day/Night threshold voltage of load disconnect is 1.0V higher than the setting data, means the load will disconnect when the solar voltage at 4.0~21.0V.



②Liquid, Gel and AGM:

When setting light control point < battery voltage, Day/Night threshold voltage of load disconnect is 1.0V higher than the setting data(12V system),When the battery voltage is 24V, the voltage of the load turn off light control point is 2V higher than the set value,means the load will disconnect.

③When setting light control point > battery voltage, Day/Night threshold voltage of load disconnect is (Battery voltage-4.0V).



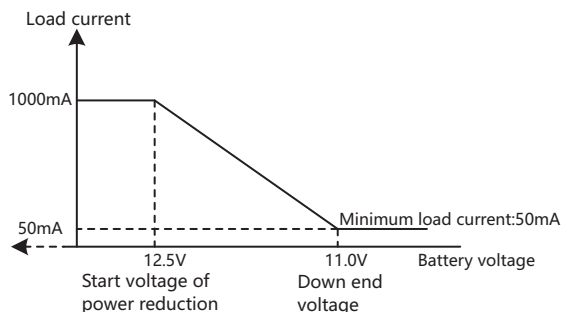
※ 1.Day/Night threshold voltage should be set around 0.22 times of open circuit voltage.

2.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

The "Dim Auto" item of SU10G 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 0.1V, load current decreased according to the set of "Dim %".

Example:



※ 1.If the controller is set to "Dim" or "Auto Dim", the minimum output power can be as low as 50mA.

2. The power drop point should not be greater than the overcharge protection voltage. When the battery voltage is close to the low voltage protection point, it is directly reduced to the minimum power operation.

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>(CVT+0.2V)	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

10. Safety Features

●Waterproof protection

waterproofing grade: IP67

●Lithium battery BMS overcharge detection protection

When the controller detects that the BMS is overcharged, the controller immediately stops charging to prevent the high voltage of the photovoltaic end from being added to both ends of the BMS for a long time, resulting in high voltage damage to the BMS.

●Lithium battery low temperature charging protection

When 0 ° C is enabled and the ambient temperature is lower than 0 ° C, the controller stops charging to prevent irreversible damage to the lithium battery caused by low temperature charging.

●High temperature protection

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

●Battery reverse connection protection

After the battery is reversed, the system does not work and will not burn the controller.

●PV input overvoltage protection

If the input voltage of the PV panel is too high, the controller automatically cuts off the PV input.

● PV input reverse protection

When the photovoltaic array polarity is reversed, the controller will not be damaged, and will continue to work normally after correcting the wiring error.

● Load limit power protection

When the customer sets the load current is too large, the controller load power output is rated power to ensure that the controller and LED load will not be damaged.

● Load short circuit protection

When a short circuit occurs, the controller immediately cuts off the load output to prevent damage to the controller. After the load short-circuit condition is lifted, the controller automatically restores the output within a moment.

● Load open circuit protection

When the LED load light is on normally and the load connection is suddenly disconnected, the controller can immediately turn off the load output to protect the controller from damage. After the load connection is restored, the controller automatically restores the output within 1 minute, or press the test button of the remote control to restore the output.

● Anti-charge protection at night

Prevent the battery from discharging through the panel at night.

● TVS lightning protection

11. Technical Data

	Item	SMR10-DC60	SMR10-DC60G
	System Voltage	12V/24V automatical recognition	
Battery Parameters	Max Charging Current	10A	
	Max volt on Bat. Terminal	35V	
	Battery Type	Liquid, Gel, AGM and Lithium(Programmable, default: Lithium)	
	Liquid, Gel and AGM	PWM Charging Voltage	<14.5/29.0V@25°C
		Boost Voltage	14.5/29.0V @25°C
		Equalization Voltage	14.8/29.6V @25°C(Liquid, AGM)
		Float Voltage	13.7/27.4V @25°C
		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	10.2~32.0V(Programmable)
		Charging voltage recovery	9.8~31.8V(Programmable)
		Low voltage disconnect	9.0~30.0V(Programmable)
		Low voltage reconnect	9.6~31.0V(Programmable)
		0°C Charging protection	Yes, Slow, No(Programmable)
Parameter	Max volt on PV terminal	25V/55V *1	
	Dusk/Dawn detect volt.	3.0~11.0V/3.0~20.0V(Programmable)	
	Day/Night delay time	0~30min(Programmable)	
Load Parameters	Output Power	3~40W/6~60W	
	Current setting range	0.1~2.0A(Programmable)	
	Min current	50mA(Dimming)	
	Output Voltage	(Battery voltage + 2V)~60V	
	Current precision	±2%	
	Auto dimming	Yes, No(Programmable)	
	Dimming	0~100% (Programmable)	
	Voltage of start dimming	11.8~12.5V/23.6~25.0V(Gel,AGM and Liquid); 9.5~32.0V(Lithium)	
	Dimming percentage	1~20%(Programmable)	
	Work mode	5 Stages, D2D, T0T(Programmable)	
System Parameters	Max LED driver efficiency	95%	
	communication mode	Infrared	2.4G
	Dimensions	61*84*22.9mm	
	Net weight	175g	
	Wire size	2.5mm ²	
	Self consumption	6~17mA	33~39mA
	Ambient temperature	-35°C~+60 °C	
	Ambient humidity	0~100%RH	
	Ambient humidity	IP67	
	Max. Altitude	4000m	

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

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