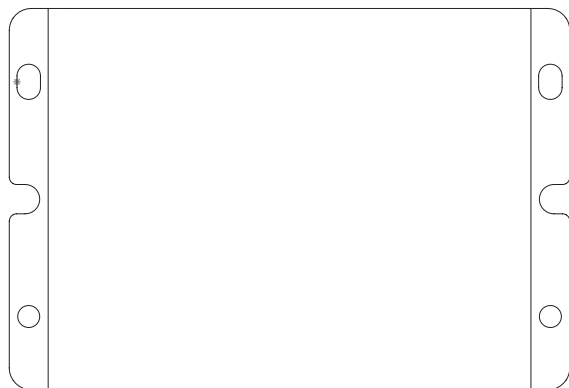


SmartTM-DC series

Solar charge controller

Suitable for Lithium battery
(Constant Current, Boost)
15/25A, 20/40W



User Manual

User Manual_Smart-DC series_QC
CE, RoHS, ISO9001:2015
Subject to change without notice!

Solar charge controller Smart-DC series User Manual

Dear Clients,

Thanks for selecting the Smart-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

Smart-DC series intelligent solar controller, is programmable and especially for boost mode LED solar street light system. It includes constant current driver function, which can make the cost of the whole system much lower.

It comes with some outstanding features, such as:

- Constant current output with adjustable output current, resolution 0.1A.
- Five-stage time and power adjustment, power adjustable from 0 to 100%.
- Operating parameters and status can be read.
- Automatic light control point adjustment function.
- Suitable for single or two lithium ternary or lithium iron phosphate batteries.
- Low-temperature charging protection, charging can be disabled or slowed when ambient temperature is below zero.
- Lithium battery pack transport mode: load off during transit, activated 1s after installation.
- Automatic reactivation after lithium battery protection board protection.
- Lithium battery overcharge protection and overcharge recovery voltage can be set.
- Configured via SU10G with LCD screen.
- Durable aluminum casing, waterproof rating up to IP67.
- Comprehensive electronic protection.

2.Safety instructions and waiver of liability

2.1 Safety

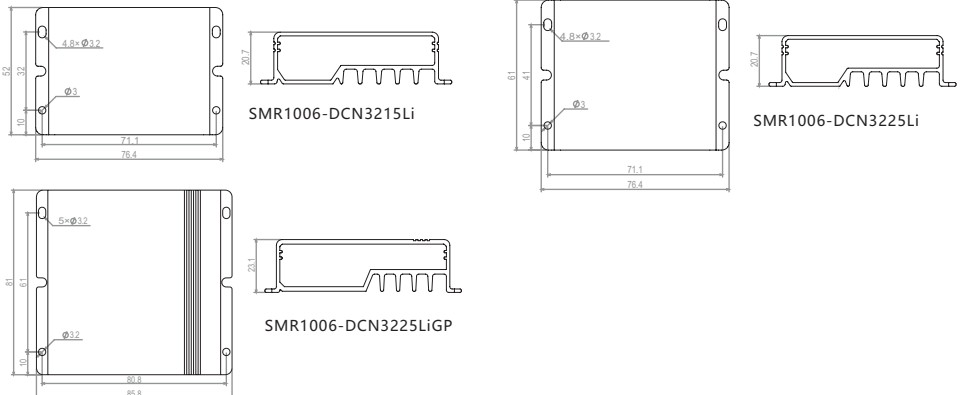
- ①The solar charge controller may only be used in PV systems in accordance with this user manual and the specifications of other modules manufacturers. No energy source other than a solar generator may be connected to the solar charge controller.
- ②Batteries store a large amount of energy, never short circuit a battery under all circumstances. We strongly recommend connecting a fuse directly to the battery to protect any short circuit at the battery wiring.
- ③Batteries can produce flammable gases. Avoid making sparks, using fire or any naked flame. Make sure that the battery 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(Uint:mm)

3.1 Controller



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3.2 Sensor dimension(Sensor lines length:400mm)

Infrared sensor head



Microwave induction head



4.Starting up the controller

4.1 Self Test

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

4.2 Battery Type

SMR1006-DCN32Li applies to Lithium rechargeable battery. The charging target and charging recovery voltage can be set according to customer requirements.

4.3 0°C Charging Protection

"0°C Chg" can be set to "Yes", "Slow" or "No".

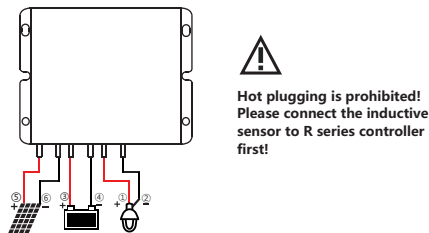
When the controller detects that the ambient temperature is higher than 0°C, the charging function is normal. when the ambient temperature is low than 0°C, if the "0°C Chg" is set to "Yes", the charging function is normal, else if the "0°C Chg" is set to "slow", the max charging current is 20% of the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

The user can select the appropriate charging method.

5.Installation

5.1 Connection sequence

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



- 1.Follow the chart, connect the load (positive pole and negative pole) with the corresponding brown and blue cables firstly, then seal them with tape.
- 2.Connect battery positive pole and negative pole to the corresponding red and black cables, the load will be on after 8s;
- 3.Connect the panel positive pole and negative pole to the corresponding red and black(or green) cables, the load will be off after 4s, and the controller begins to charge.
- 4.Confirm the LED display status: If the red LED is off and the green LED flashes or constantly light, it is normal; else it means fault, please refer to the **10.2Faults and Alarms** to identify the reason.

- Make sure the length between battery and controller is as short as possible.
- Recommended mini. wire size: 15A: 2.5mm²; 25A: 4mm².

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5.2 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.

5.2.1 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.

5.2.2 Remote control enters transport mode

When the **"Dormancy"** button on the remote control is pressed, the system enters transport mode. The remote control displays **"Dormancy OK,"** and the controller enters transport mode.

— For detailed settings, please refer to the SU10G smart remote control user manual.

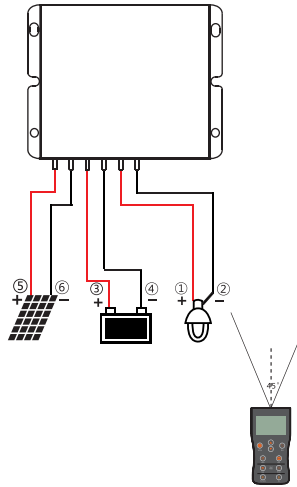
✎ If the controller enters transport mode, the red LED will slow flash(0.2s on/5s off) , the green and yellow led will be off and the remote control displays "Open CP".

5.2.3 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.

6.Remote controller, Default setting

When Smart-DC series controller is connected to the system, you can set the controller with SU10G infrared remote control, as showed below! Detailed setting operations, please read SU10G User Manual.



6.1 Test function

Press the "Test" key of SU10G, the controller will turn on load for 30s. During daytime, the testing function can help users to verify correct installation or for system trouble shooting. 30s later the load will automatically turn off.

The relationship between "Test" key press times in the 30s and the output power of the controller is shown in the following table:

"Test" press times	Output power
1	Dimming1
2	Dimming2
3	Dimming3
4	Dimming4
5	Dimming5
6	End of test function

7.Factory default settings

7.1 Read the parameters

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

Num	Name	Factory Default
1	Time1	4H
2	Dim1	100%
3	DimNP1	100%
4	Time2	0H
5	Dim2	100%
6	DimNP2	0%
7	Time3	0H
8	Dim3	100%
9	DimNP3	0%
10	Time4	0H
11	Dim4	100%
12	DimNP4	0%
13	Time5	0H
14	Dim5	100%
15	DimNP5	0%
16	D/N Thr	2.0V
17	D/N Dly	0m
18	Load I	0.3A
19	Dim Auto	Yes
20	Dim V	3.2V
21	Dim %	10%
22	Battery	Li
23	Series	1
24	CVT	3.6V
25	CVR	3.4V
26	LVD	2.6V
27	LVR	3.0V
28	0°C Chg	Yes

7.2 Read the running status

Press the "Status" key of the SU10G 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

8. Work mode

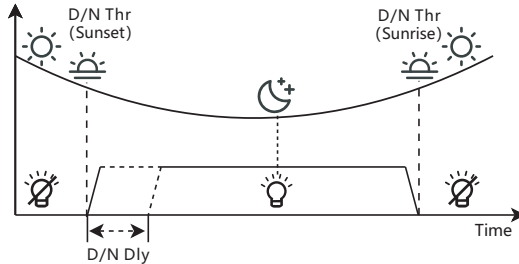
The SMR-DC controller features advanced street light control functions. The timing and method of load illumination can be flexibly programmed according to customer needs.

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 All time periods.

"DelayOff" setting range: 10~150s.

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

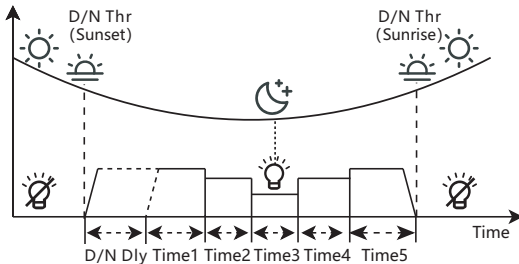
8.1 Dusk to Dawn(D2D)



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

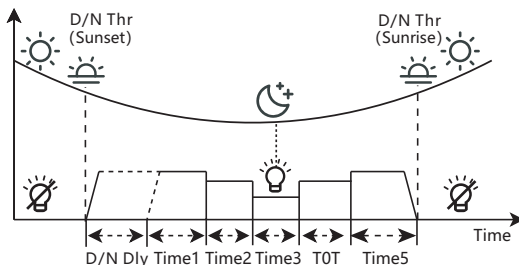
If "Time1" is set to D2D mode, "Time4" can not be set to T0T mode.

8.2 Five-stage Night Mode



You can set the Time 1-5 and Dim 1-5 with SU10G.

8.3 T0T Mode (Morning brightness time can be set)



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 time period, set the Time 4 power to 0%.

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

9.LVD, LVR, Threshold, Dimming

9.1 Low Voltage Disconnect(LVD)

Low voltage disconnect setting range: 2.4~7.2V.

9.2 Low Voltage Reconnect(LVR)

Low voltage reconnect setting range: 2.6~7.4V.

※1. After the controller enters the low-voltage protection state, it can only be restored by recharging the battery through the controller and reaching the set "low-voltage reconnect" voltage.

2. The low-voltage reconnect voltage should be at least 0.2V higher than the low-voltage protection voltage.

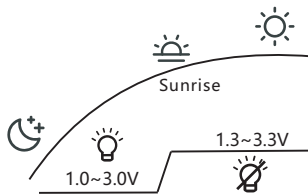
9.3 Day/Night Threshold, Day/Night Delay

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: 1.0 ~ 3.0V.

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.

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



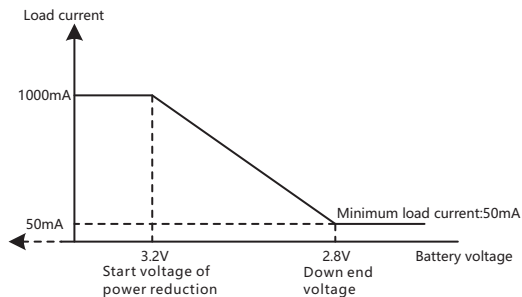
※ Day/Night threshold voltage of load disconnect is 0.3V higher than the setting data, means the load will disconnect when the solar voltage at 1.3~3.3V.

※ 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.

9.4 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 %", the minimum output current is 10% of the setting current.

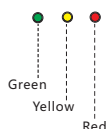
Example:



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

2. Dimming voltage should not be greater than the voltage of "CVT" (Charging voltage target). When the battery voltage is reduced to close to the LVD voltage, the output current of the controller is reduced to 50mA.

10.LED indications and Faults & Alarms



10.1 LED Display Explanation

LED	Status	Function
Green LED	On	not charging
	Slow flash(0.5/2s)	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
	On	The output power is 0
	Fast flash(0.1/0.1s)	Short circuit or Over current protection
	Flash(0.5/0.5s)	Over temperature protection
	Super slow flash (0.2s on/5s off)	Open circuit or transport mode. *

*If the controller is in transport mode, the red LED is super slow flash(0.2s on/5s off), the green and yellow led is off.

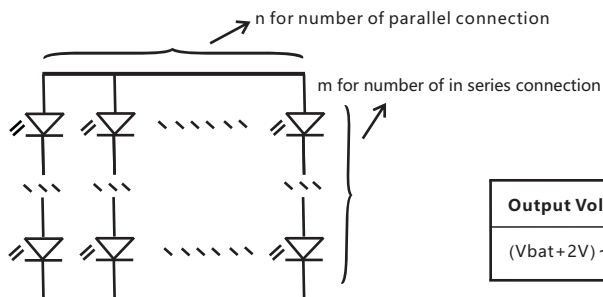
*Specific fault information can be read through the SU10G intelligent remote control. If the controller is in multiple protection states at the same time, the priority order of displaying fault information on the remote control is: short circuit protection --> overcurrent protection --> low voltage protection --> overvoltage protection --> over temperature protection --> open circuit protection --> hardware protection.

10.2 Faults & Alarms

Fault	Status	Reason	Remedy
Loads are not powered	Low-voltage protection	The battery has no power	Automatically connect the load after the battery is charged.
	Overcurrent and short-circuit protection	Load overcurrent or short circuit	Turn off all loads to clear the fault; the load terminal will automatically turn on after one minute.
	Over-temperature protection	Controller temperature is too high	Check surrounding heat sources and ventilation; the load will automatically turn on after the temperature drops.
Battery terminal voltage is too high	Over-voltage protection	High battery voltage > (" CVT" + 0.2V)	Check whether the setting parameters match the lithium battery or if there is another energy source charging the battery.
		The internal resistance is very high due to damage to the battery connection or fuse.	Check the battery connections, fuses, and the battery itself.
The battery runs out of power shortly after use.	Low-voltage protection	The battery capacity is already very low.	Replace the battery.
The battery cannot be charged.	Green LED is always on	PV panel fault or reverse polarity connection	Check the panels and wiring to troubleshoot the issue.

11.Recommended connection of LED

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



Output Voltage	Load	Recommendatory connect way
(Vbat+2V) ~ 34V	0.1~2.0A	M=2~10 N=1~6

※ Note: If the current setting requirements exceed the current range of the controller, then the controller is unable to set successfully.

12.Safety Features

	Solar terminal	Battery terminal	Load terminal
Reverse polarity	Protected	Protected	Protected
Short circuit	Protected	Protected *1	Switches off immediately
Over current	—	—	Switches off with delay
Reverse Current	Protected	—	—
Over voltage	Max.15V *2	Max. 10V	—
Low voltage	—	—	Switches off
Over temp.	If the temperature reaches the set value, the controller cuts off the load. *3		

※ 1.We strongly recommend connecting a fuse between the battery and the controller; otherwise, the battery may be permanently damaged.

※ 2.The solar terminal voltage cannot exceed this voltage for an extended period.

※ 3.When the controller temperature exceeds 70°C, the controller's over-temperature protection activates, cutting off charging and discharging. When the temperature drops to 60°C, the controller recovers from over-temperature protection.

Warning: The presence of two or more different error conditions simultaneously may damage the controller. Therefore, before proceeding to the next step, first troubleshoot and resolve the existing faults.

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12. Technical Data

	Item	Standard product	SMR1006-DCN3215Li	SMR1006-DCN3225Li
		Suffix description	G: 2.4G wireless remote control (default infrared remote control without suffix); R: Infrared sensing; V: Microwave induction; GV: 2.4G remote control+microwave induction; GR: 2.4G remote control+infrared sensing;	
Battery Parameters	Max Charging Current	15A	25A	
	Charging voltage target	3.0~9.0V(Programmable)		
	Charging voltage recovery	2.9~8.9V(Programmable)		
	Low voltage disconnect	2.4~7.2V(Programmable)		
	Low voltage reconnect	2.6~7.4V(Programmable)		
	Battery Type	Lithium		
	0°C Charging protection	Yes、No、Slow(Programmable)		
Panel Parameters	Max volt on Bat. Terminal	10V		
	Max volt on PV terminal	7V(Single cell), 15V(Two lithium batteries in series)		
	Dusk/Dawn detect volt.	1.0~3.0V(Programmable)		
Load Parameters	Day/Night delay time	0~30min(Programmable)		
	Output Current	0.1~2.0A(Programmable)		
	Output Voltage	(Battery voltage+ 2V) ~ 34V		
	Output power	1~20W		
	Mincurrent	50mA(Dimming)		
	Current precision	±2%		
	Max LED driver efficiency	92%		
	Dimming	0~100%(Programmable)		
	Auto dimming	Yes、NO (Programmable)		
	Dim V	2.8 ~ Charging voltage target(Programmable)		
	Dim %	5~40%(Programmable)		
System Parameters	Communication	Infrared/2.4G		
	Self consumption	6~25mA		
	Dimensions	52*76.4*20.7mm	61*76.4*20.7mm	
	Weight	140g	150g	
	Wire size	2.5mm²	4mm²	
	Ambient temperature	-35~ +60°C		
	Ambient humidity	0~100%RH		
	Protection degree	IP67		
	Max Altitude	4000m		

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	Item	Standard product	SMR1006-DCN3225LiGP
		Suffix description	GP: 2.4G wireless remote control (default infrared remote control without suffix); RP: Infrared sensing; VP: Microwave induction;
Battery Parameters	Max Charging Current	25A	
	Charging voltage target	3.0~9.0V(Programmable)	
	Charging voltage recovery	2.9~8.9V(Programmable)	
	Low voltage disconnect	2.4~7.2V(Programmable)	
	Low voltage reconnect	2.6~7.4V(Programmable)	
	Battery Type	Lithium	
	0°C Charging protection	Yes、No、Slow(Programmable)	
Panel Parameters	Max volt on Bat. Terminal	10V	
	Max volt on PV terminal	7V(Single cell), 15V(Two lithium batteries in series)	
	Dusk/Dawn detect volt.	1.0~3.0V(Programmable)	
Load Parameters	Day/Night delay time	0~30min(Programmable)	
	Output Current	0.1~3.0A(Programmable)	
	Output Voltage	(Battery voltage+ 2V) ~ 34V	
	Output power	1~40W	
	Mincurrent	50mA(Dimming)	
	Current precision	±2%	
	Max LED driver efficiency	92%	
	Dimming	0~100%(Programmable)	
	Auto dimming	Yes、NO (Programmable)	
	Dim V	2.8 ~ Charging voltage target(Programmable)	
	Dim %	5~40%(Programmable)	
System Parameters	Communication	Infrared/2.4G	
	Self consumption	6~25mA	
	Dimensions	81*85.8*23.1mm	
	Weight	280g	
	Wire size	4mm²	
	Ambient temperature	-35~ +60°C	
	Ambient humidity	0~100%RH	
	Protection degree	IP67	
	Max Altitude	4000m	