SR-L Series solar power intelligent PV controller
Instruction book

Main features

1. Intelligent control is realized by using microprocessor and dedicated control calculation.
2. Four load working modes: Pure lighting control, lighting control & timing control, hand operation and debug mode.
3. Scientific management of battery: as it is overcharged, the battery will get booster tension charge. As a result compulsory maintenance is available for the battery. In normal working state, the direct charge and floating charge are both available, so that the battery life-span is increased. Besides, the adoption of high precision temperature compensation makes the charging more accurate.
4. Comparing with the charging loops using diodes, the one that adopts double MOS series circuit control makes the voltage loss dropped by 50%. With the PWM fuzzy control in charging, the charge efficiency is improved a lot.
5. LED screen shows the working state of solar battery, storage battery and load. LED shows the adjusted parameter. In this way, users can learn the operation state in ream time. Besides, there are various choices for parameter; users can select the proper working mode based on the different conditions.
6. Various protections include over-charge, over-discharge and over-load, as well as unique electron short circuit protection and connection-reverse protection. All the protections are harmless to any parts and fuse. TVS thunder proof protection is also available. Non wire jumpers design improves the reliability and durability of the products.
7. Technical grade chips and precision components are adopted for all the controls. Therefore, the controller performs well in very low and high temperature, as well as humid environment. At the same time, with the use of crystal timing control, the timing function of controller is much more reliable.
8. Digital LED display and one button setup make the device easy to handle.
9. Discharge rate revision controls: Different discharge rate matches with different cut-off voltage, which is in compliance with the characters of storage battery.

System description

Our controllers are specially designed for solar power DC supply system, solar power DC street lamp system and mini solar power station system. Intelligent control is realized by using dedicated computer chips. The controllers can be used in hard environment, since its adoption of technical grade chips. To the controllers with 12V/24V automatic identification function, the system will identify the voltage when the controllers are charged initially. When LED shows "0", it means the system voltage is 12V. While shows "1", means 24V.

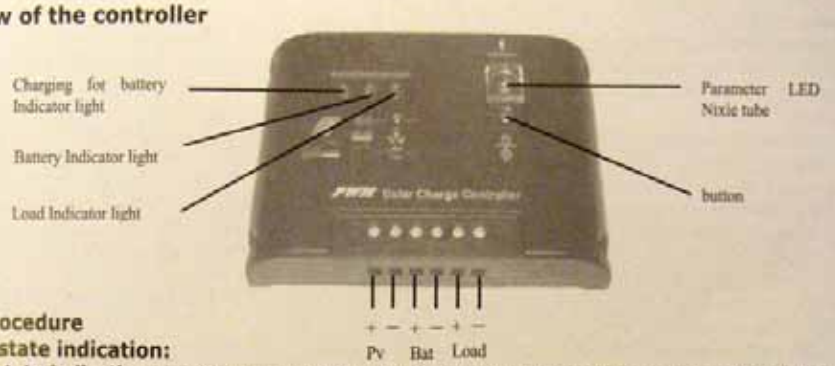
The short circuit, over-load, connection-reverse protection, as well as over-charge, over-discharge protection are available. Besides, the complete indications are usable, including indications for states of charge, storage battery and faults.

Through the computer chips, the controllers take samples from the parameters of storage battery voltage, photo battery, discharge current and environment temperature, and then use the dedicated control mode calculation to control the discharge rate and make it matched with the characters of storage battery, realize the high accurate temperature compensation. PWM fuzzy charge mode and 7 phase voltage control are available for the storage battery, so that storage battery is always in the perfect working state .The various working modes of controllers can meet customers' different requirements.

Installment and use

1. The controller must be well fixed. The dimension of the controller is as following:
   Outside dimension: 140×90×25 (mm); installation dimension: 133.5×69.5 (mm)
2. Leads: the leads must be matched with the current. The length of stripped leads at the end of controller should be about 5mm. The longer the leads, the more the loss.
3. The connection to storage battery: Pay attention to the "+" and "–" in case of reverse connection. If it is connected well, the indication light will be on. Otherwise, please check the connection.
4. The connection to solar panel: Pay attention to the "+" and "–" in case of reverse connection. If it is connected well, the indication light will be on. Otherwise, please check the connection.
5. The connection to load: connect the leads with load of controller. The two interfaces are in parallel connection, and the total current must be less than rated current. Pay attention to the "+" and "–" in case of reverse connection which may damage of the device.

outside view of the controller



Operation procedure

A. Working state indication:

①. **Charged state indication**: the solar indicator light is on, as the input voltage of solar battery panel reaches a certain point. The indicator light flashes slowly, as the storage battery is charging. The indicator light will flash quickly, as the system is over voltage.

②. **Storage battery indication:** when the battery is under voltage, the indicator light flashes slowly. Over-charged for more than 10 seconds, the indicator light flashs quickly and the load is off. In normal working state, the indicator light is on continually.

③. **Load indication:** when the load is in normal working state, indicator light is on continually. In over current, indicator light flashs slowly. In short circuit, the load is off at once and the indicator light flashs quickly. While the current is more than 1.25 times of rated current or more than 1.5 times for 5 seconds, the load of controller will be off.

state / Indicator light	Off	On	Flash slowly	Flash quickly
Solar panel	Low voltage (at night)	Full voltage (daytime)	Charging	Over voltage
Storage battery	-	Norm	Under voltage	Over discharge
load	Load is off	Norm	Over current	Short circuit

state of indicator light

B. Setting methods:

To press the button for 3 seconds, the LED flashes and the system of the device is under mode of regulation. After releasing the key, the data in the LED changes along with every key-press till matches with the model designated by customers. To finish the setting, please wait until the LED stops to flash. Or just press the button for 3 seconds.

C. Modes description

①.**Lighting control:** without sunshine the light intensity decreases to start point. Then the controller recognizes the start signal after 10 minutes. Based on the parameter, the load is on. While under sunshine, the light intensity increase to start point, and then the controller recognizes the close signal after 3 minutes. The load is off.

② **Time control:** The starting procedure is the same with that of pure lighting control. Timing control is dual period control; hence the double load can be regulated respectively. The load-on and load-off are alternated till the load is off in daytime. The time for the load-on and load-off can be adjusted to realize the different control effect. If the time for load-on is zero, the load will be off at night till the time for load-off is past. If the time for load-off is zero, the control effect will be the same with that of pure lighting control.

③**Manual mode:** Regardless of the daytime or night, users can control the load-on and load-off by key-press under this mode. This mode is used for some special load or regulation.

④**Test mode:** this mode is designed for system regulation. It is almost the same with pure optical mode except that the cancelation of 10 minutes delay (Please refer to pure lighting control). The load is on with optical signal. In reverse, without optical signal, the load is off. This feature makes it easier to check the system installation.

Working mode setting table

Data in LED	Mode	Data in LED	Mode
0	Dusk-to-Dawn, light is on all light	9	9 hours light is turn on after sundown
1	1 hours light is turn on after sundown	0.	10 hours light is turn on after sundown
2	2 hours light is turn on after sundown	1.	11 hours light is turn on after sundown
3	3 hours light is turn on after sundown	2.	12 hours light is turn on after sundown
4	4 hours light is turn on after sundown	3.	13hours light is turn on after sundown
5	5 hours light is turn on after sundown	4.	14 hours light is turn on after sundown
6	6 hours light is turn on after sundown	5.	Manual mode
7	7 hours light is turn on after sundown	6.	Test mode, lights on after it detects no light, lights off after it detects light.
8	8 hours light is turn on after sundown	7.	Load open all times

Parameter Description

Model	SR-L series	
rated charging current	□5A □10A □15A □20A	
Rated discharging current	□5A □10A □15A □20A	
Working Voltage	□12V； □24V； □12V/24V Auto	
No load losses	<5mA;	
Charging circuit voltage drop	Less than or equal to 0.20V	
Discharge circuit voltage drop	Less than or equal to 0.15V	
Over voltage protection	17V; ×2/24V;	
boost charge voltage	14.6V; ×2/24V (time of duration: 30 minutes)	
Direct charge voltage	14.4V; ×2/24V (time of duration: 30 minutes)	
Float charge voltage	13.6V; ×2/24V	
Charge recover voltage	13.2V; ×2/24V	
Over discharge recover voltage	12.5V; ×2/24V	
Lower voltage indication	12.0V; ×2/24V	
Over discharge voltage	11.1V; ×2/24V	
Temperature compensation	-4.0mV/℃/2V(boost voltage, direct charge, float charge and charge return voltage compensation)	
Control method	PWM Smart Charging	
Working temperature	From -35℃ to +65℃;	
Over-load and short circuit protection	Over-load protection: when the current of controller is 1.25 times of the rated current, the controller works for 30 seconds; 1.5 times of rated current, works for 5 seconds Short circuit protection: when the current of controller is more than or equal to 3 times of rated current, the protection starts.	
Circuit protection	Over-charge, over-discharge, short circuit and over-load protection	All the protections are harmless to any parts and fuse of controller
	Anti- connection-reverse protection for solar battery and storage battery.	