

2LT dual load and dual time-series

Solar Charge Controller

USER'S MANUAL



Dear users:

Thank you for choosing our product!

Before using this product, please read the manual carefully.

Main features

1. Different batteries can be used, like Lead-acid batteries, gel batteries, lithium batteries.
2. Double output design and each output working time can be set separately.
3. Dual time period to adjust the time freely
4. Various choices for the data of controller, such as the choice for start-up voltage of lighting control, the time of lighting, the delay of lighting.
5. Automatically recognize the period of night to keep the lighting time accurate.
6. Temperature compensation
7. The storage battery is charged every 7 days to prevent the battery from Vulcanization
8. Various protections include over-charge, over-discharge and over-load, as well as unique electron short circuit protection and connection-reverse protection.
10. 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.

Product instructione

The controller is designed for solar Street light and yard lamp. There are two loads output and each one can separately control the two period of lighting (one period is in the evening and the other one is in the earlier morning). Various technical data of the controller can be adjusted by user, like the voltage of light control, light control judgment of time, the time of delayed lighting, the type of storage battery. The user can adjust these date according to the different requirements and environment. The controller can be used with various types of storage battery, such as Lead-acid batteries, gel batteries, lithium batteries and so on. The controller can recognize the time of night and intelligently adjust the second period of lighting (light is on in the earlier morning). With the test button, the user can set the controller much more easily. The short circuit, over-load, connection-reverse protection, as well as over-charge, over-discharge protection are available. There are detailed indications for charging, the state of storage battery, loads and so on. 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. To the controllers with 12V/24V automatic identification function, the system will identify the voltage when the controllers are charged initially. When LED shows "12", it means the system voltage is 12V. While shows "24", means 24V.

Intrudction of function

1. Various choices for storage battery

The controller can be used with various storage batter, like Lead-acid batteries, open battery,

gel batteries, lithium iron battery. Before using the controller, please choose the right mode of storage battery.

2. Double periods of lighting

There are two loads output for the controller and each one can separately control the two periods of lighting. When choosing this function, the light is off automatically after working in the evening for a certain time. In the earlier morning, the light is on till daytime.



	The light is on in the evening	the light is off	the light is on in the earlier morning	
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3. With adoption of PWM charging mode, the storage battery is charged every 7 days to prevent the battery from Vulcanization. After over-discharging, the battery will also be charged. Normally the battery should be charged with direct charge in the first 30 minutes. Then it should be float charge. The controller automatically controls the state of load. When the battery is over discharged, the controller will cut off the connection between the load and battery.

4. Temperature compensation

The controller adjusts the charging voltage according to the environment temperature, which makes the perfect charging.

5. The controller will identify the voltage when the controllers are charged initially. When LED shows "12", it means the system voltage is 12V. While shows "24", means 24V.

6. Test function

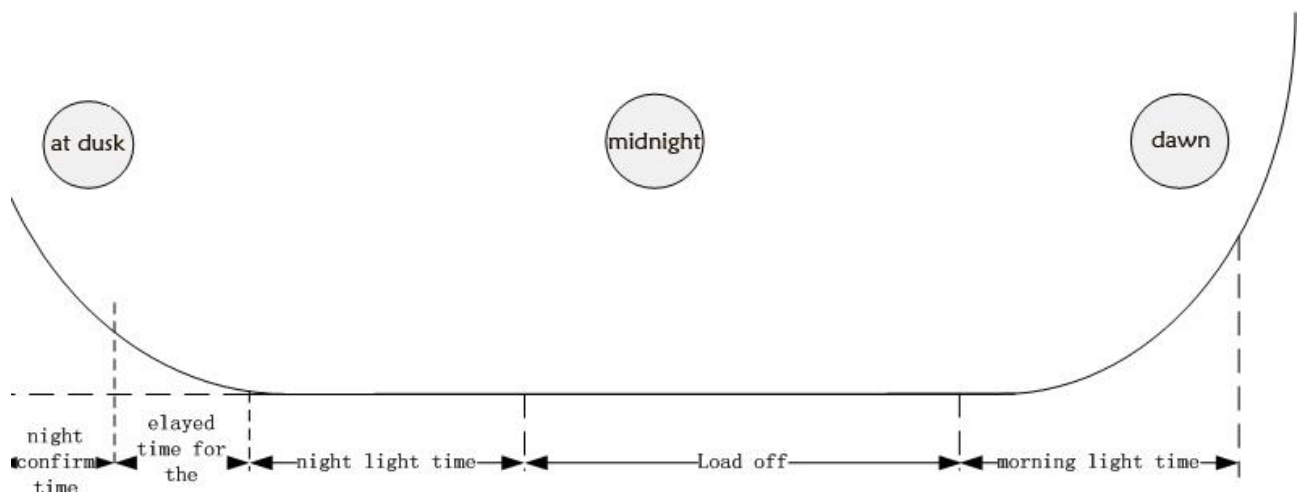
In the day time, press the "test" button, the load is on. Press the test button again, the load is off. If the test button is pressed only once, the load will be off after 1 minute to guarantee the setting.

7. The light control point adjustment

The light control point is the voltage of solar panel at the night while the light is on. The user can adjust the voltage based on the environment. For example, in the evening with the influence of other light wave to the solar panel, the load can not work normally. The user should adjust the voltage and choose the higher voltage. In this case, the start working time of lighting should be earlier.

8. night confirm time

While the voltage of solar panel reaching.



9. Adjustment of the delayed time for the lighting.

The user can adjust the data of controller to delay the lighting time in the evening.

10. Forced to light on every evening.

While the battery is over-discharged, the voltage is lower than the back voltage in the next day, the load is off in the evening of the next day. After choose the function 10, the system will erase the sign of over-discharged and open the load. Only when the battery voltage is lower than the over-discharged voltage, the load is off. .

11. Adjustment of the delayed time for the lighting.

System integration intelligent self-learning function, automatically identify the length of the night, turn on the lights automatically adjust the time of the morning light, and make the morning time are precise control.

Suggestions:

1. Please choose the right mode of storage batter, or the battery may be harmed in the wrong mode.
2. In the first several days of using the controller, the lighting time may be not accurate. After working for several days, the controller will automatically recognize the data in these days and the lighting time will be accurate no matter whether the power is on or off.
3. Although the light on every night function can be chosen, it may influence the battery. Therefore, it should be better not choosing this function. Please set the controller in the place easy to Cooling.
4. Please put the storage battery and controller in the same place, because the controller can test the environment temperature to make the temperature compensation for the battery.
5. Please choose the cable with enough capacity to avoid much energy loose.

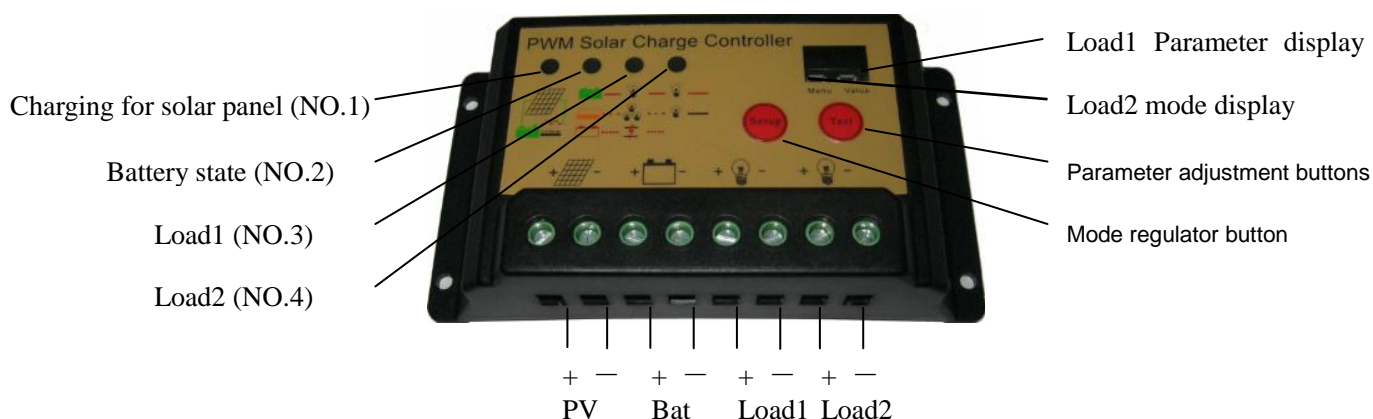
Installment and use

1. The controller must be well fixed. Please keep a certain distance between the controller and the around setting board.
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. If the solar panel is placed under sunshine, the voltage will caused immediately. While use the system whose voltage is over 24V, please take care.
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



1. Working state indication:

- ①. **Solar panel indication:** the solar indicator light is on, as the output 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 flashes 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 flashes slowly. In short circuit, the load is off at once and the indicator light flashes quickly. While the current is more than 1.25 times of rated current for more than 30 seconds or more than 1.5 times of rated current for 5 seconds, the load of controller will be off.

state Indicator light	Off	On	Flash slowly	Flash quickly
Solar panel	at night	daytime	Charging	Over voltage
Storage battery	-	Norm	Under voltage	Over discharge
Load 1	Load is off	Load is on	Over load	Short circuit
Load 2	Load is off	Load is on		

CONTROL OPTIONS

1. Mode and parameter Browse

Control panel has two LEDs, the first display work mode, the other display the parameters of work mode.

When Normal operate, press the Setup button, The mode and parameters are displayed, then press the Setup button mode, the work mode will change a value, and the parameters of this work mode are displayed the other LED. Model and parameter settings table as shown below.

2. The test button

during the day, press the Test button, the load will open, and press again the off will load. If you have no operated the load will automatically turn off after 1 minute. This function is only used for testing during the day, during the night, this function is disabled.

3.Parameter adjustment

According to the step 1, browse to the mode of parameters that the value to be adjusted, then press the Setup button for 3 seconds, the LEDs 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.

Model and parameter setting table

mode LED1	Mode Description	Parameter range	parameter LED2	Parameter Description	Parameters Default
1 .	load1 night light time	0 ~ 14 hous	0 ~ 4 .	0 ~ 9 Equal 0 ~ 9 hours 0 . ~ 4 . Equal 10 ~ 14 hours	-
2 .	load1 morning light time	0 ~ 14 hous	0 ~ 4 .	0 ~ 9 Equal 0 ~ 9 hours 0 . ~ 4 . Equal 10 ~ 14 hours	-
3 .	Load2 night light time	0 ~ 14 hous	0 ~ 4 .	0 ~ 9 Equal 0 ~ 9 hours 0 . ~ 4 . Equal 10 ~ 14 hours	-
4 .	Load2 morning light time	0 ~ 14 hous	0 ~ 4 .	0 ~ 9 Equal 0 ~ 9 hours 0 . ~ 4 . Equal 10 ~ 14 hours	-
5 .	the light control point	4 ~ 10 V	4 ~ 0 .	4 ~ 9 Equal 4 ~ 9V 0 . Equal 10V	12V:5 24V: 0 .
6 .	night confirm time	1 ~ 10 minutes	1 ~ 0 .	1 ~ 9 Equal 1 ~ 9 min 0 . Equal 10 min	0 .
7 .	delayed time for the lighting	0 ~ 50 minutes	0 ~ 0 .	0 ~ 9 Equal 0×5 ~ 9×5 = 0 ~ 45 minutes 0 . Equal 10×5 = 50 minutes	0
8 .	Forced to light	0 ~ 1	0 ~ 1	0: Forced to light function turn off 1: Forced to light function turn on	0
9 .	Battery Type	1 ~ 4	1 ~ 4	1: Lead-acid batteries 2: open battery 3: gel batteries	1

				4: lithium iron battery	
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3.1 light time

The longest time can be set to 14 hours, if you want to achieve double-time function, please confirm the time that the sum of night light time and morning light time are no more than the time of whole night

Parameter LED	1	2	3	4	5	6	7	8	9	0 .	1 .	2 .	3 .	4 .
Light time	1h	2h	3h	4h	5h	6hn	7h	8h	9h	10h	11h	12h	13h	14h

3.2 the light control point adjustment

the light control point adjustment: 4V ~ 10 V, Parameters Default 5V/12; 10V/24V。

Parameter LED	4	5	6	7	8	9	0 .
light control point	4V	5V	6V	7V	8V	9V	10V

3.3 Night confirm time

Parameter LED	1	2	3	4	5	6	7	8	9	0 .
Night confrim time	1min	2min	3min	4min	5min	6min	7min	8min	9min	10 min

3.4 delayed time for the lighting

3.5 delayed time for the lighting = N * 5 Min, Default delay time is 0 minutes。

Parameter LED	1	2	3	4	5	6	7	8	9	0 .
delayed time for the lighting	5min	10min	15min	20min	25min	30min	35min	40min	45min	50min

Battery Parameters

Parameters	Lead-acid batteries	open battery	gel batteries	lithium iron battery
Over voltage protection	17. 0V			
boost charge voltage	14. 6V	14. 4V	14. 8V	15. 0V
Direct charge voltage	14. 4V	14. 2V	14. 6V	14. 8V
Float charge voltage	13. 6V	13. 6V	13. 8V	14. 4V
Charge recover voltage	13. 2V	13. 2V	13. 2V	13. 2V
Over discharge recover	12. 5V	12. 5V	12. 4V	12. 6V

voltage				
Lower voltage indication	12. 0V	12. 0V	11. 8V	11. 8V
Over discharge voltage	11. 1V	11. 3V	10. 8V	10. 8V

Parameter Description

Model	2LT 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	
Temperature compensation	-4.0mV/°C/2V(boost voltage, direct charge, float charge and charge return voltage compensation)	
Control method	PWM Smart Charging	
Working temperature	From -35°C to +65°C ;	
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.	

FAQ

phenomenon	solution
Under the sunshine, the indicator light (NO.1) of solar panel is off	Please check the line connected to photocell and make sure the proper connection
As the cell panel is charged, the indicator light (NO.1) flashes quickly.	The system is over-voltage. Please check whether the storage battery is well connected, or its voltage is too high.
The indicator light (NO.2) of storage battery is off	Please check whether the storage battery is well connected.
The indicator light (No.2) of storage battery flashes quickly without output.	The storage battery is over-discharged.
The indicator light (No.3) of load flashes slowly without output.	The load power is higher than the rated power. Please stop the operation of some

	equipment which consumes power, and then press the key for a longer time.
The indicator light (No.3) of load flashes quickly without output.	The load is short circuit and need to be adjusted. Then press the key for a longer time or wait till the next day, it will restart to work.
The indicator light (No.3) is on continually without output.	Please check whether the equipment which consumes power is well connected.
Others	Please check the connection, 12/24v Auto identified