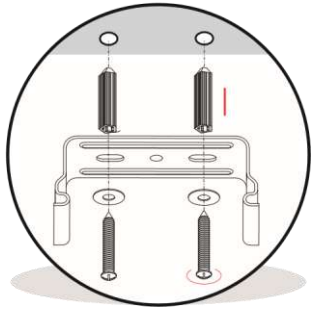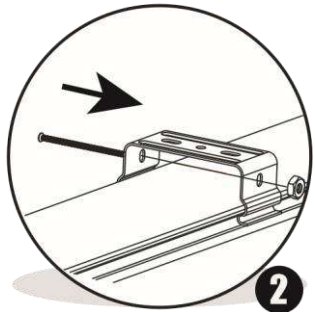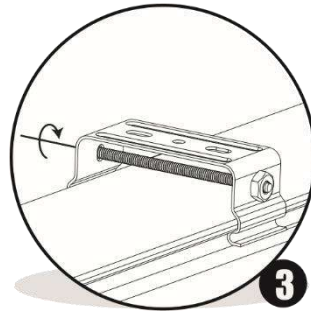# User Manual

SP-XL-Series

Connect the two metal clips into position and attach to the surface. It is recommended that each clip is positioned approximately 7.8in from each end of the SP-XL Caution : Ensure correct anchor sleeves are used for surface material.

Please see package contents before installation.

Insert Tension Bolt and attach the SP- XL to the metal clips.

Using a screw driver, secure each clip onto the SP-XL with the Tension bolt. Note : This is only to secure the SP-XL so it cannot be removed - Do not over tighten.
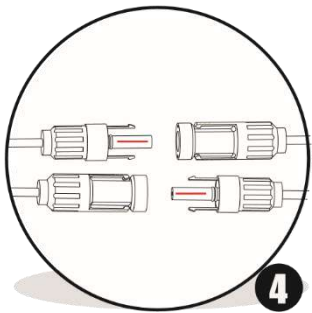
Connect the MC4 Connectors to the Solar PV panel. Note : A matching pair of MC4 connectors are included in the contents of this package. If the Solar PV Panel does NOT have an identical pair of MC4 connectors, replace them with the ones provided to guarantee a weather tight connection
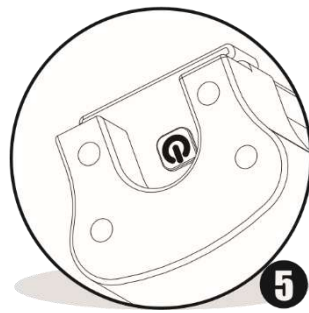
Power ON the SP-XL A RED signal light can be seen at the sensor end of the SP-XL. Program the light to best suit your installation.

Please refer to setup guide of manual properly.

SolarPath™ sun solutions

Operation Method

1. Use the MC4 connector to plug the light to the solar panel.

2. Press the button on the main body to the ON position to make the light turn on automatically after sundown (Lighting mode was set by factory before delivery).

3. The solar led light is now ready for use. You can also use the remote control to change the lighting modes or brightness.

4. Press the button to the OFF position then the light will stop working, or use the remote control to turn off the light.

Installation instructions

Accessories: 1.solar flood light;   2.solar panel;
3.solarl panel adapter bracket with screws;

① Fix the solar panel bracket with screws

② Fix solar panel bracket with solar panel

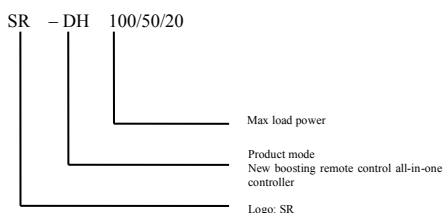③ Fix the other side of the solar panel

④ Fix solar panel on the wall

![SolarPath sun solutions logo]

SR-DH with motion sensor Intelligent Wireless Dimming LED Solar Charge Controller Specification
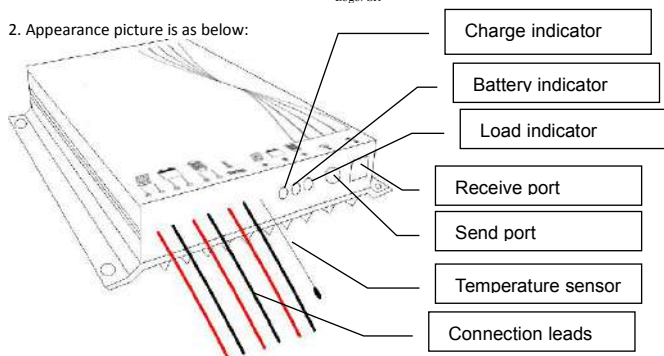
Main Features:
1. New design of wireless remote-control can modify the controller parameter and read the system message according to the handheld device.
2. Digital high precision constant-current control, the maximum efficiency can reach 96%.
3. The working current can be adjusted from 0.15A to 3.3A, the regulating precision is 30mA.
4. High dynamic performances of load insure current output stability even though the battery voltage and load sudden change.
5. 3 section time frame dimming function design, work time can be set range from 0h to 15 hours, power can be set range from 0% to 100%.
6. Intelligent power mode, the load power can be adjust automatically according to the battery power, can extend the maximum working time of the battery.
7. Record the system status, can record at a max 7days and monitor the whole system.
8. The true constant current but not limited the current, insure the current output stability thus decrease LED light failure, increase the LED service life.
9. Metal case, IP68 waterproof degree, can suitable use in all kinds of bad conditions.
10. With modified calculation of charging, the charging efficiency is improved, which lengthen the using time of solar energy.
11. Overheat preventing function, above a certain temperature will decrease the load or close the load.
12. Varies system protection function. Including the battery reverse connection, LED short circuit, open circuit protection and so on.
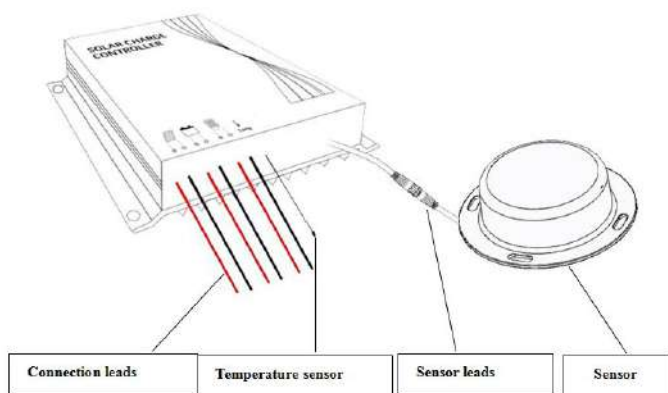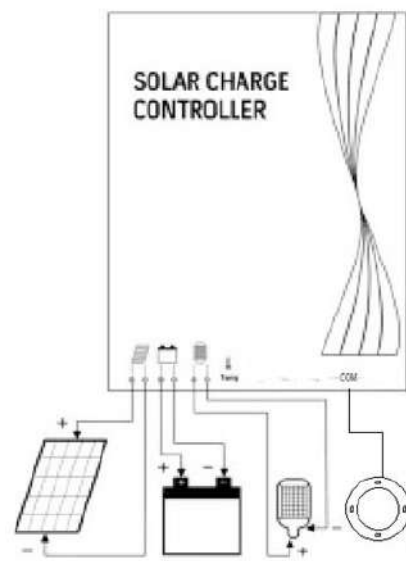
Installation and Wiring:

1. Mode identification:

2. Appearance picture is as below:

- Charge indicator
- Battery indicator
- Load indicator
- Receive port
- Send port
- Temperature sensor
- Connection leads

2.Appearance picture is as below::

| Connection leads | Temperature sensor | Sensor leads | Sensor |

3.Wiring diagram is as below:

SOLAR CHARGE CONTROLLER
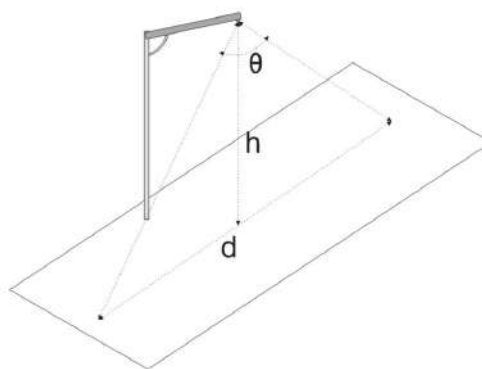
4.Connection sequence: Please connect the load first, then connect the sensor, and then connect the battery,last is the solar panel. Pay attention to the "+" and "–" in case of reverse connection.

5.Sensitive scope：

Controller Model	θ (Angle)	h（Height）	d（Width）
SR－DH100－IR（IR）	60°	6m	7m
SR－DH10－WB（Microwave）	65°	8m	10m

Connection sequence: Please connect the storage battery first, then connect the load, last is the solar panel. Pay attention to the "+" and "–" in case of reverse connection.

LED Connection:

1. The SR-DH Controller is internally installed with constant current source. The max output voltage is 60V. The max amount of LED lights can be connected is 18pcs in series.

2. The SR-DH controller can automatically identify 12V and 24V system voltage. While connect to LED load, please ensure the number of LED lights in series is appropriate.
Please refer to the recommend as below:

System voltage	The Min No.(n) Of LED lights In series	Output voltage of load (V_{out})	Output power of load (V_{out})
12V	n ≥ 5	$V_O ≥ 15V$	$P_{LED} ≤ 50W$
24V	n ≥ 10	$V_O ≥ 30V$	$P_{LED} ≤ 100W$

3. Before open the load, Please connect LED light first.

⚠ **Warning: if the number of LED in series is not appropriate, the controller or the LED load will be damaged.**

Status Indication:

LED light	Indications	Status	Functions
▦	Charging indication	Long-term On	The solar panel voltage is higher than light control voltage
		Long-term Off	The solar panel voltage is lower than light control voltage

		Slow twinkling	charging
		Fast twinkling	System over voltage
	Battery indication	Long-term On	battery works normally
		Long-term Off	battery unconnected
		Fast twinkling	battery is excessively discharged
	Load indication	Long-term On	Load is on
		Slow twinkling	The load is open circuit.
		Fast twinkling	The load is short circuit.
		off	Load is off

Test Mode

Normally the controller is under the light + time control mode, Can use the remote control open the load and the load power will be changed according to the remote control setting during installation or need testing. The test mode will last 1min, after 1min the system will automatically recover to the normal working mode.

Load Working Mode:

Load connect to the SR-DH controller have four working time frame, each working time and working power can be adjusted arbitrary. Different combination can realize different control mode.

A. Normal Working Mode.
B. Delay Light Time Mode : For example, setting the first time working 4hours,the first power is 0%,system will lighting 4hours later.
C. Double Time Frame Mode: For example, setting the third time working 4 hours, the third power is 0%, system will be off 4hours after work through the first and second time and then enter the fourth time continue lighting until sunrise.(Remark: this mode do not have the correct function for the night length, different season will show various lighting time in the morning.)

Adjust item	Parameter	Default value
The first working time	0hour ～ 15hours	4
The first working power	0% ～ 100%	100%
The second working time	0hour ～ 15hours	0
The second working power	0% ～ 100%	70%
The third working time	0hour ～ 15hours	4
The third working power	0% ～ 100%	50%
The fourth working time	0hour ～ 15hours	0
The fourth working power	0% ～ 100%	30%

LED Intelligent Power Control

While customer open the "Intelligent power" mode, currently the controller will enter to the intelligent power control mode, The LED load power will adjust automatically according to the battery power. The working time and load power preset before is still valid; system will compare with the automatically power and the preset power, and then choose the small one as the load output power.
For example: when the battery power is 50%,intelligent power mode calculate the load power is 60%,if now customer preset the load power is 100%,the system will choose 60% as load power. If now customer preset the load power is 20%, the system will choose 20% as load power.
Intelligent power typical diagram is as below:
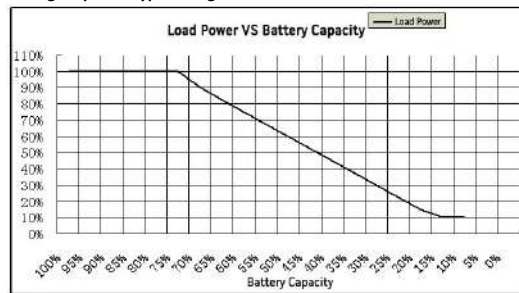
Read and Modify The Parameter:

SR-DH solar charge controller can setting including the load working time、load working power、light control delay、charging voltage and so on. After setting finish on remote control, aim at the controller and press the "Send" key will set up successfully .Also can read the currently setting parameter of the controller, then check the parameter setting correct or not.

System Status Record:

SR-DH solar charge controller can record the whole system running status, including the running day、over discharge times、full charged time. Also can record the battery's voltage changing conditions in one week which convenient for customer analysis and understanding about the system. Customer can read the running status by remote control, after read successfully; the parameter will be record in the remote control.

Charge-Discharge Control Case:

The parameter of the case is as below:

The setting of the case	Setting value
Working time of first stage	3 hours
Working power of first stage	100%
Working time of second stage	5 hours

Working Power of second stage	70%
Working time of third stage	2 hours
Working power of second stage	50%
Working time in the morning	2 hours
Working power in the morning	30%
Load current	1.74A
Boost charge voltage	14.4V
Float charge voltage	13.8V
Light-operated voltage	8V
Light-operated delay time	5Min

Run Stage Specification:

| stage	description
1	Daytime：When the light strengthened, the charging current will increase rapidly, Battery voltage will rise.
2	Daytime: the light changes, the battery voltage is unstable.
3	Daytime: boost charge stage.
4	Daytime: boost charge finished and enter float charge stage.
5	Night: when the solar panel voltage is lower than light-operated voltage, The load will be open after delay. At the first stage, the load power is 100%.
6	Night: at the second stage, the load power is 70%.
7	Night: at the third stage, the load power is 50%.
8	Night: the fourth stage is morning time, the power is 30%. **Tip: because of the total setting time(12h) exceeds the night time, The load hasn't been shut, But the light is on over the night.**
9	Daytime：The solar panel voltage is higher than light-operated voltage, Close the load after delay. The battery voltage will raise contemporary.

System State Record:

SR-DH series controller can record the operation status of whole system, including operation day, over discharge time, full charged time, etc. It can also record the change of battery voltage weekly, give customer clearer knowledge of the system. Users need to use remote control to read its operation status, when read successfully; the data will be recorded in the remote control.
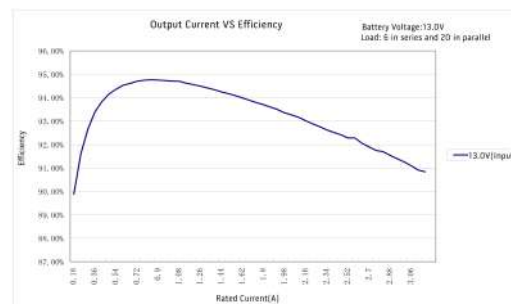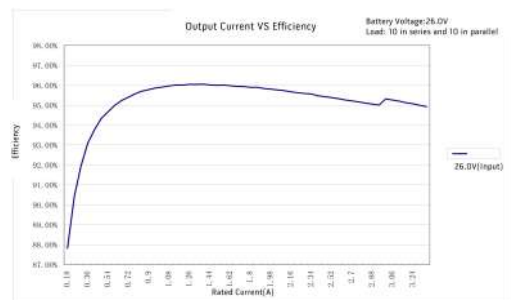
Installation Dimension:
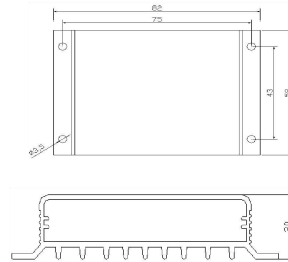
1.The size of SR-DH100 is as follows：
Boundary dimension：82×100×20(mm)
Installation dimension：86×75(mm)
Installation aperture：3.5(mm)
2.The size of SR-DH50 and SR-DH20：
Boundary dimension：82×58×20(mm)
Installation dimension：43×75(mm)
Installation aperture：3.5(mm)

Typical Efficiency Curve:

1.12V system

2.24V system

The Parameters:

| Parameter name	Parameter value			Adjustable	Default value
Model	SR-DH100	SR-DH50	SR-DH20		
System voltage	12V/24V	12V/24V	12V		
Output power	50W/12V 100W/24V	30W/12V 50W/24V	20W		
Output current	0.15A ～ 3.3A	0.15A～1.98A	0.15A ～ 1.67A	√	330mA
No-load loss	9mA/12V; 12mA / 24V		9 mA /12V		
Charging current	15A	8A	5A		
Solar input voltage	< 55V		< 30V		
Efficiency of constant current source	90% ～ 96%				
Overvoltage protection	16.0V；×2/24V				
Charging limits voltage	15.5V；×2/24V				
Equal charging voltage	15.2V；×2/24V（25℃）				
Equal charging interval	30 days				
Ascending charging voltage	14.2V ～ 15.0V；×2/24V（25℃）			√	14.4V
Float charging voltage	13.2V ～ 14.0V；×2/24V（25℃）			√	13.8V
over-discharging recover voltage	12.0V ～ 13.0V；×2/24V			√	12.6V
over-discharging voltage	9.8V ～ 11.8V；×2/24V			√	11.0V
Temperature compensation	-4.0mv/℃/2V；				
Current precision	±3%（Load current＞300mA）				
Load output voltage	＜60V	＜60V	＜60V		
over-temperature protection	ambient temperature:80℃ (load drop power)				
overheat protection	internal temperature:120℃(Load off)				
light control voltage	5V ～ 11V			√	5V
light control delay	5min ～ 50min			√	5min
Working temperature	-35℃ ～ +65℃；				
Protection level	IP68				
Weight	280g	170g	160g		
Dimension（mm）	100*82*20	58*82*20			

Faults and Solutions

Faults	Solutions
After open circuit of the load, it has no output when reconnect.	Check out if the connection is correct and reliable, wait for 10s until the load is on.
After debugging short circuit of the load, it has no output.	When the load is short circuit, wait for 1min until the load is reopened.
The light of storage battery flashes quickly without any output.	The storage battery has been over discharged, when charging to the return voltage of over discharge, it will self-recovered.
The indicator light of the solar panel is off even if there has sunshine.	Check out if the connection of the solar panel is correct and reliable, or if the solar panel is under sunshine.
The load current hasn't reach to the set value.	Check if the current value has exceeded the rated current of the controller.

Tips：The detail parameters and status please refer to the specification of SR-CU-D.

Load working mode.

SR-SES controller working time separate to Normal working+Sensitive+Morninglight. Each section the working time and power both can be setting.

Normal working time　Sensitive time　Light off time　Morning light time

The working mode diagram
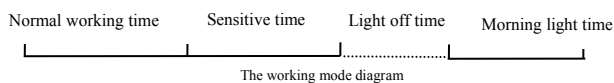
A. Test Mode : Normally the controller is under the light + time control mode, when during installation or debugging, you can open the load by remote controller and the load power will be changed according to the set value in the remote controller. The test mode will last 1 minute, after 1min the system will automatically recover to the normal working mode.

B. Sensitive delay mode： For example, setting the normal working time is 4hours,normal working power is 100%,system will enter sensitive mode after 4hours later.

C. Sensitive all night mode: For example,setting the first working time is 0hour, sensitive working time is 15hours, sensitive working power(when people coming) is 100%, Sensitive power(after people Leave) is 30%,the system will enter sensitive all night mode. The load will working on 100% power with people coming. People leave ,after 10s will running in 30% power.

D. Delay Light Time Mode： For example, set the first time working 4hours,the first power is 0%,system will lighting 4hours later.

E. Morning lighting mode: our controller can auto calculate the night length and adjust the morning lighting time so as to make a precise morning lighting time.
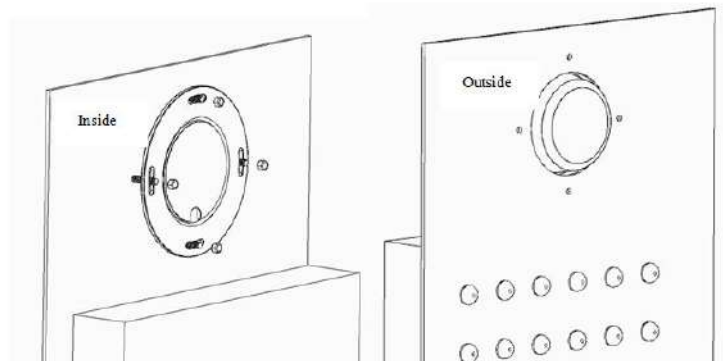

Sensor dimension：Unit mm.
Sensor lines' length：320mm
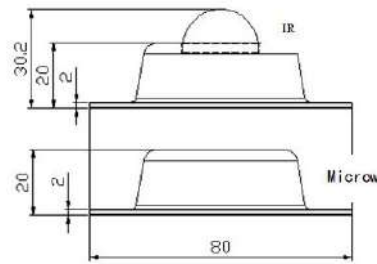
3、IR /Microwave sensor installation dimension
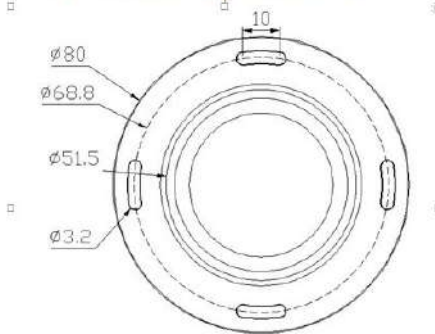
Hole Diameter φ 52mm

4、Installation Instruction

The remote control SR-CU-D
Instruction Manual

Main features

1. Wireless IR remote control can set up the SR-DH, SR-DL series product one to one.
2. The data communications base on the multiple handshake protocol and compression algorithm which made the data transfer fast and accurate.
3. Work on two batteries (Model: AA).
4. LCD indicator showed the parameter and data.
5. The remote control will enter intelligent sleep state after One min no any operate, and press any key to resume.
6. Low-energy sleep mode, less than 0.2uA.
7. Fast wake-up function.
8. Battery capacity indicator.
9. Emergency light and hazard lights.
10. with ergonomic design, suitable for the hand-held operation.

Panel graphics

Display area

Emergency light

Setting key

IR Communication interfaces

Functional key area

Battery compartments (Back)

Wrist bands interface

Key operate instruction

KEY	Key name	Executive function	Long press key function
Setting area	+	A、menu page down	Continuous increase the

			B、increase the setting data	setting data
	-		A、menu page up B、decrease the setting data	Continuous decrease the setting data
	set		Parameter setting	-
Functional area	Send		Working parameter send	-
	receive	state	Running state received	-
		parameter	Working parameter received	-
	Test		Send the test order	-
	Backlight		Backlight on	-
	Light		A、the emergency light on B、switch the hazard light	Combine with "+"key to lock the parameter

The parameter setting

Item	Name abbreviation	data scope	Name describe	step-length	unit	Factory Default
a	1st time	0 ~ 15H	The first working time	1H	hour	4 hour
b	1st power	0 ~ 100%	The first working time power	10%	Power (percentage)	100%
c	2nd time	0 ~ 15H	The second working time	1H	Hour	0 hour
d	2nd power	0 ~ 100%	The second working Time power	10%	Power (percentage)	70%
e	3rd time	0 ~ 15H	The third working time	1H	Hour	4 hour
f	3rd power	0 ~ 100%	The third working Time power	10%	Power (percentage)	50%
g	Mor time	0 ~ 15H	Lighting time in the morning	1H	Hour	0 hour
h	Mor power	0 ~ 100%	Lighting power in the morning	10%	Power (percentage)	30%
i	L-Con-V	5 ~ 11V	Light control voltage	1V	Volt	5V
j	L-Con-DT	5 ~ 50Mins	Light control delay time	5M	Min	5min
k	L-Current	0.15~ 3.42A	LED load current	0.03A	A	0.30A
l	L-On-EN	0 ~ 1	Lights on every night	1	0：Off1：On	1
m	Smart Power	0 ~ 1	Smart power control	1	0：Off1：On	0

n	**Over-DV**	9.8 ~ 11.8V	over-discharging protected voltage	0.2V	Volt	11.0V
o	**Over-DRV**	12.0 ~ 13.0V	over-discharging recover voltage	0.2V	Volt	12.6V
p	**Boost-CV**	14.2 ~ 15.0V	Ascending charging voltage	0.2V	Volt	14.4V
q	**Float-CV**	13.2 ~ 14.0V	Float charging voltage	0.2V	Volt	13.8V
r	**Re-Def**	0 ~ 1	Return to default value	1	1：On	-

Instruction

1. Install Battery: please install two batteries (Size: AA). Pay attention to the "+" and "–" ,in case of reverse connection.
2. The boot process: press any key to starting up, then the remote control be rouse and executive the function under the key u press.
3. Power off: System will power off automatically then enter intelligent sleep state after 1min later no any operate.
4. Browse the parameter: after power on, press "+" and "–"key can browse the parameter preset before.
5. Modify the parameters: Browse to the parameter which u want to set, press "set" key, the data begin flash, then press "+" and "–"key to adjust. Setting over, press the "set" key to confirm.
6. Sending parameter: After all the parameters are set up, aim at the solar charge controller and press the "send" key. If sending successfully, three LED lights of the controller will flash, at the same time the remote control will keep a long sound; If failed, the remote control will keep three short sound and prompt delivery failure.
7. Read the state: aim at the solar controller and press the "state" key, the remote control will read the running state of the controller, If reading successfully, the remote control will keep a long sound and store the data; If failed, the remote control will keep three short sound and will show the old status.
8. Read the parameter: aim at the solar controller and press the "parameter" key, the remote control will read the setting value of the controller. If reading successfully, the remote control will keep a long sound and store the data(if press the "send" key now, the store parameter will be send immediately) ; If failed, the remote control will keep three short sound and will show the parameter which u are in setting.
9. Backlight: Press the "backlight" key, the backlight of the LCD will be on which suitable use in poor light.
10. Light: Press the "light" key, the emergency light will be on. Press again will switch to the hazard light. Press the key the third time, the light will be off.
11. Test: Aim at the solar controller and press the "test" key, the load will be on, then the power of the load will match with the remote control. Press the "test" key several times, the output power of the load will range to 100%,70%,50%,30%,0%.The controller will work on 1min under the test mode, after 1 min will enter the normal work mode.
12. Lock key: Press "+" and "light" key at the same time more than 3s,the remote control keep two short sounds, then the "set" and "Parameter" key will be lock to prevent carelessness ensure the

correct value. Press the "+" and "light" again at the same time more than 3s to unlock.
13. The remote control setting up the solar charge controller one to one. Could not set up several controllers at the same time.
14. Open the backlight the lights will decrease the battery energy.
15. When appear the low power sign, please replace the battery in time.
16. When out of service for long period, the battery should be taken out.

Running status

Item	Name abbreviation	Name describe	Unit	Describe
a	**System-State**	Display the system state currently remark 1	-	-
b	**Battery Volt**	Currently battery voltage	V	Volt
c	**Load Volt**	Currently load voltage remark 2	V	Volt
d	**Temp**	Currently ambient temperature	℃	Centigrade
e	**Run-Day**	**Total running days**	D	days
f	**Over-D- T**	**Battery over-discharge times**	N	days
g	**C- Fully -T**	Charge the battery fully times	N	days
h	**Today- HV**	Today highest voltage	V	Volt
i	**Today- LV**	Today lowest voltage	V	Volt
j	**1- Ago- LV**	A day ago lowest voltage	V	Volt
k	**1-Ago- HV**	A day ago highest voltage	V	Volt
l	**2—Ago- LV**	Two days ago lowest voltage	V	Volt
m	**2- Ago- HV**	Two days ago highest voltage	V	Volt
n	**3-Ago -LV**	Three days ago lowest voltage	V	Volt
o	**3-Ago- HV**	Three days ago lowest voltage	V	Volt
p	**4-Ago -LV**	Four days ago lowest voltage	V	Volt
q	**4-Ago- HV**	Four days ago highest voltage	V	Volt
r	**5-Ago- LV**	Five days ago lowest voltage	V	Volt
s	**5-Ago- HV**	Five days ago highest voltage	V	Volt
t	**6-Ago- LV**	Six days ago lowest voltage	V	Volt
u	**6-Ago- HV**	Six days ago highest voltage	V	Volt
v	**7-Ago- LV**	Seven days ago lowest voltage	V	Volt
w	**7-Ago- HV**	Seven days ago lowest voltage	V	Volt
x	**Pro -Date**	Date of production	-	-
y	**Model**	Product model	-	-
z	**Version**	version number	-	-

Remark 1: The system state shows "E-LED" means that the Load was short circuit or open circuit.

Remark 2: The load voltage means that the voltage of positive pole between load and battery, when the

load working normally, this voltage is equal to both ends of the load voltage.

Sign instruction

Remote control energy	sending	Send successful	Send failed	Test mode	Key lock	Key unlock

Hummer respond

Hummer respond	Instruction
---（three short sounds）	Send failed
—（a long sound）	Send successful
——（two long sounds）	Return to default value
--（two short sounds）	Key lock
-（a short sound）	Lock release

Technical parameters

Battery model	**（AA）× 2pcs**
power supply voltage	**3.0V**
Effective distance	**＜5m**
power consumed of sleep mode	**＜0.2uA**
Normal power consumed	**5mA**
Send instant power consumed	**＜50mA**
Light consumption	**12mA**
Backlight consumption	**15mA**
Size	**122mm×61.5mm×22mm（L×W×H）**
Weight	**60g（without the battery）**
Auto power off time	**1 min**
Backlight time	**10 S**
Lighting time	**10 S**
2000mAH battery setting quantity	**50000 pcs（back light and lights both are closed）**
Working temperature	**-25℃ ~ 55℃**