Thank you for selecting the LandStar LPLI series lithium battery solar charge controller with built in LED driver. Please read this manual carefully before using the product and pay attention to the safety information.

LandStar LPLI Series Solar Charge Controller

---with built in LED Driver

1. Safety Information

- Read all of the instructions and cautions in the manual before beginning installation.
- There are no user serviceable parts inside the controller. Do not disassemble or attempt to repair it.
- Install external fuses/breakers as required.
- Disconnect the solar module and fuse/breakers near to battery before installing or adjusting the controller.
- Power connections must remain tight to avoid excessive heating from a loose connection.
- Only charge the batteries that comply with the parameters of controller
- Battery connection may be wired to one battery or a bank of batteries.

2. Overview

Thank you for selecting the LandStar LPLI series lithium battery solar charge controller. It combines the solar charge controller and LED constant current driver into one unit which is ideal for solar LED Lighting, especially for the application for LED lamp which requires dimmer function. The advanced pulse width modulation charging methods enables the system charging and discharging management to obtain the most radical optimization. Make the system cost reduce, and increase the system flexibility. The features are listed below:

- Apply to lithium battery
- Lithium battery self-activating function
- Lithium battery low temperature protection function
- Load reduce power automatically
- Load power limitation function
- Maximum output efficiency of 96%
- Digital precision constant current control and the control accuracy are less than±2%
- Discharging power calculation and real-time energy statistics recording function
- Multiple load control modes, LED rated current and current percentage can be set
- Load test function for detecting the system
- Extensive electronic protections
- Without any button, parameter setting via Mobile APP, IR Remote Controller and SPP-02 with IR function.
- Fully encapsulated PCB, IP68 protection
- Aluminum housing for better cooling

3. Product Features

Figure 1 Product Feature

①	Charging Status LED indicator	⑤	Battery Positive and Negative Wires
②	Battery Status LED indicator	⑥	Load Positive and Negative Wires
③	Temperature Sensor	⑦	Infrared Receiver Module
④	PV Positive and Negative Wires	⑧	Infrared LED

※Temperature sensor is short circuit or open circuit, the controller will charge or discharge battery for 25℃ and no temperature compensation.

4. Wiring

● Reference for Serial connection of LED

System Voltage	Serial connection	Min. Output Voltage	Max. Output Voltage
12V	5～18 LED	15V	60V
24V	10～18 LED	30V	60V

NOTE: The above one LED (1W, 3.3V) is calculated. If the user uses the unconventional LED, The actual LED voltage must less than the Max. Load Output Voltage.

WARNING：DO NOT electric shock! The product built-in boost LED driver, the output voltage is higher than the human safety voltage.

WARNING: If the LED connection number is wrong, the load or controller is damaged.

● **Connection Order**

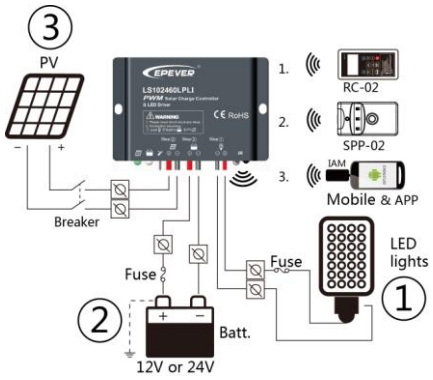


Figure 2 Wiring

1) Connect components to the charge controller in the sequence as shown above and pay much attention to the "+" and "-". Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reserved.

2) After power on the controller, check the battery LED indicator on the controller, it will be on solid green. Otherwise please refer to chapter 8.

3) Connecting a fuse in series through battery positive (+) in the circuit and the battery circuit fuse must be 1.25 to 2 times to the rated current. The installed distance is within 150mm.

● **Load self-test function**

The load is ON when the controller power on 10seconds. After 10 seconds it will restore to set working mode.

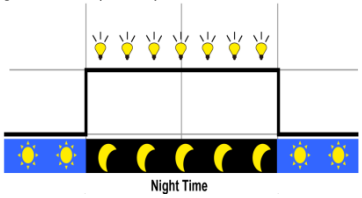
5. LED Indicators

Indicator	Color	Status	Instruction
	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging
	Green	Slowly Flashing(1Hz)	In charging
	Green	Fast Flashing(4Hz)	PV reverse polarity
	Green	OFF	No PV voltage(night time) or PV connection problem
	Green	On Solid	Normal
	Green	Slowly Flashing(1Hz)	Full
	Green	Fast Flashing(4Hz)	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharged
	Red	Slowly Flashing(1Hz)	Battery Overheating

6. Load Working Mode

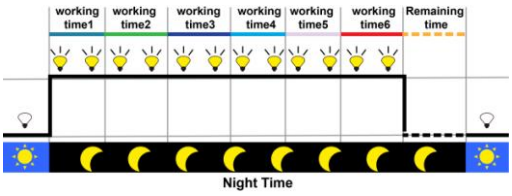
1) Manual Mode

2) Light ON/OFF(default)

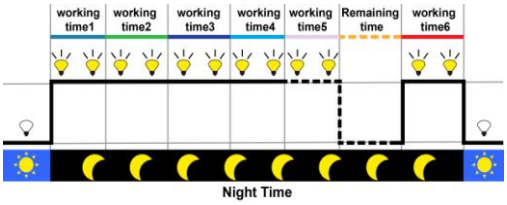


3) Light ON + Timer

Light ON + Timer1



Light ON + Timer2



Item	Default※		Range
	Mode1	Mode2	
LED Rated Current	0.35A		0-2.6A (LS101240LPLI) 0-2.0A (LS102460LPLI) 0-3.3A (LS2024100LPLI)
Timer1 LED Rated Current Percentage	4H 100%	8H 100%	00:00—23:59H 0—100%
Timer2 LED Rated Current Percentage	2H 50%	2H 50%	00:00—23:59H 0—100%
Timer3 LED Rated Current Percentage	2H 100%	2H 50%	00:00—23:59H 0—100%
Timer4/5 LED Rated Current Percentage	2H 50%	2H 50%	00:00—23:59H 0—100%
Timer6 LED Rated Current Percentage	2H 50%	2H 100%	00:00—23:59H 0—100%

※The default value can be changed according to the user requirement.

4)Time Control

Control the load on/off time through setting real-time clock.

5) Intelligent Power Mode

After the intelligent mode power reduction is turned on and the capacity of the storage battery is lower than 50%, the load will make adjustment by automatically reducing the power in a linear manner according to the capacity of the storage battery, and meanwhile the load will operate based on the minimum value between the set value and the value after power reduction. Moreover, the mode of intelligent power reduction will be exited after charging is started on the next day.

NOTE：The load is ON when the controller power on 10seconds. After 10 seconds it will restore to set working mode.

NOTE：In the mode of Light ON/OFF and Light ON/Timer, the load is turned on after 10Min. delay，the delay time can be set.

7. Setting Operation

There are three methods that it can realize controller work mode and parameters through IR function:

1) IR Remote Controller—RC-02

2) Super Parameter Programmer—SPP-02.

This method can realize one-key setting operation which is suitable for bulk quantity products setting or applied in the projects.

3) Ir-Android-Micro—IAM, Mobile and APP.

APP software can be downloaded from the website of http://www.epsolarpv.com.

NOTE: Please refer to the user manual of handheld device.

8. Protection

Protection	Conditions	Status
PV Reverse Polarity	When the battery is correct connecting, the PV can be reversed.	The controller is not damage
Battery Reverse Polarity	When the PV is not connecting, the battery can be reversed.	
Battery Over Voltage	The battery voltage reaches to the OVD	Stop charging
Battery Over Discharge	The battery voltage reaches to the LVD	Stop discharging
Battery Overheating	Temperature sensor is higher than 65℃	Output is OFF
	Temperature sensor is less than 55℃	Output is ON
Libattery Low Temperature	Temperature sensor is less than the low temperature value	Stop charging or discharge
	Temperature sensor is higher than the low temperature value	Begin charging or discharge
Load Short Circuit	Load current ≥2.5 times rated current One short circuit, the output is OFF 5s; Two short circuit, the output is OFF 10s; Three short circuit, the output is OFF 15s; Four short circuit, the output is OFF 20s; Five short circuit, the output is OFF 25s; Six short circuit, the output is OFF	Output is OFF **Clear the fault:** Restart the controller or wait for one night-day cycle (night time>3 hours).
Load Open Circuit(Load over voltage)	Max. load voltage≥68V One open circuit, the output is OFF 5s; Two open t circuit, the output is OFF 10s; Three open circuit, the output is OFF 15s; Four open circuit, the output is OFF 20s; Five open circuit, the output is OFF 25s; Six open circuit, the output is OFF5s; Seven open circuit, the output is OFF5s	Output is OFF (Cycle to perform)

9. Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator off during daytime when sunshine falls on PV modules properly	PV array disconnection	Confirm that PV and battery wire connections are correct and tight
No LED indicator	Min.9V can start up the controller.	Measure battery voltage with multi-meter. Min.9V can start up the controller.
Battery LED indicator green Fast Flashing	Battery over voltage	① Disconnect the solar array and measure the battery voltage whether is too high; ②Change the controller; ③ Change the battery
Battery LED indicator red	Battery over discharged①	When the battery voltage is restored to or above setpoint (low voltage reconnect voltage), the load work
Battery Status LED indicator red flashing	Battery Overheating	The controller will automatically stop working. When the temperature is below 50 ºC, the controller will resume to work.
All the LED indicator flashing(battery red indicator flashing)	System voltage error	Check whether the battery voltage match with the controller working voltage. Please change to a suitable battery or reset the working voltage
Powering on normally, the load is off	①The connecting wires are error or virtual connection ②Load mode is wrong ③The controller does not match with the LED light. ④Output short circuit	①Check the connecting cables ② Check the load mode and parameter ③The voltage of LED light source is not in the output voltage range of controller ④Check the connecting cables and LED light source
The dimming function is invalid	The controller does not match with the LED light source. This product is a step-up current control, If input voltage is lower than the rated voltage, it is not working.	①Replace the LED light ②Reduce system rated voltage grade and replace the product model For example 24V system change to 12V system, and replace the corresponding controller.

①When the battery is over discharged, the battery indicator will be red and the load will be off all the time before the voltage is more than the Low Voltage Reconnect Voltage (LVRV). In order to judge the system is normal or not, firstly measuring the battery voltage whether is more than LVRV, if not, restarting the controller to detect the load whether it is normal.

Note: The LVRV can be set, but it must pay more attention that it maybe damages the battery if the LVRV is too low.

10. Technical Specifications

Models / Item	LS101240LPLI	LS102460LPLI	LS2024100LPLI
Nominal system voltage	12VDC	12/24VDC	
Rated charge current	10A	10A	20A
Max. PV open circuit voltage	30V	50V	50V
Battery input voltage range	9～16V	9～32V	9～32V
Max. output power	40W	30W/12V 60W/24V	50W/12V 100W/24V
Max. output Current	2.6A	2.0A	3.3A
Output voltage range	(Max. Battery Voltage +2V)～60V		
Load open circuit voltage	60V		
Maximum output efficiency	96%		
Output current control accuracy	≤2%		
Battery Type	LiFePO4 / Li-NiCoMn / User		
Boost Charging Voltage	LiFePO4:14.6V/Li-NiCoMn:12.51V/User:9-34V		
Float Charging Voltage	LiFePO4:14.4V/Li-NiCoMn:12.39V/User:9-34V		
Low Voltage Reconnect Voltage	LiFePO4:12.0V/Li-NiCoMn:10.8V/User:9-34V		
Low Voltage Disconnect Voltage	LiFePO4:10.6V/Li-NiCoMn:9.3V/User:9-34V		
Self-consumption	≤18mA(12V);≤23mA(24V)		
Charge Circuit Voltage Drop	≤0.14V		
Communication way	IR		
Communication distance of IR	≤6m		
Working environment temperature	-40℃～+55℃		
Enclosure	IP68(1.5m,72h)		
Overall dimension	107x68x20mm		108.5x88x25.6 mm
Mounting dimension	100mm		100.5mm
Mounting hole size	Φ4		Φ5
Power cable	PV/BAT:14AWG(2.5mm²) LOAD: 18AWG(1.0mm²)		PV/BAT:12AWG(4.0mm²) LOAD:18AWG(1.0mm²)
Net weight	0.26kg		0.40kg

①The controller is not recognize system voltage and no temperature compensation when the battery connect the lithium battery

11. Disclaimer

This warranty does not apply under the following conditions:

- Damage from improper use or use in an unsuitable environment.
- PV or load current, voltage or power exceeding the rated value of controller.
- The controller is working temperature exceed the limit working environment temperature.
- User disassembly or attempted repair the controller without permission.
- The controller is damaged due to natural elements such as lighting.
- The controller is damaged during transportation and shipment.

Any changes without prior notice! Version number：V1.2