

LandStar EPLI Series Solar Charge Controller ---with built in LED Driver

Thank you for selecting the LandStar EPLI series 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 control parameter can be programmed by Mobile APP, Remote Meter and SPP-02 with infrared(IR) function.

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

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:

- 12/24VDC automatic identify or user-defined working voltage
- Without any key, parameter setting via Mobile APP, Remoter Meter and SPP-02 with IR function
- Maximum output efficiency of 96%
- Dimming function
- Digital precision constant current control and the control accuracy are less than 30mA
- With functions of current power calculation and real-time energy statistics recording, it is convenient for users to view charging and discharging energy of each day, month, year and total value
- Adopting temperature compensation and correcting the charging and discharging parameters automatically, improving the battery lifetime
- Widely used, automatic recognize day/night
- Fully encapsulated PCB, IP68 protection
- Aluminum housing
- Support firmware upgrade

3. Product Features and Wiring

- ① Mounting hole
- ② Aluminum housing
- ③ Charging Status LED indicator
- ④ Battery Status LED indicator
- ⑤ Temperature Sensor
- ⑥ PV Positive and Negative Wires
- ⑦ Battery Positive and Negative Wires
- ⑧ Load Positive and Negative Wires
- ⑨ Infrared Receiver Module
- ⑩ Infrared LED

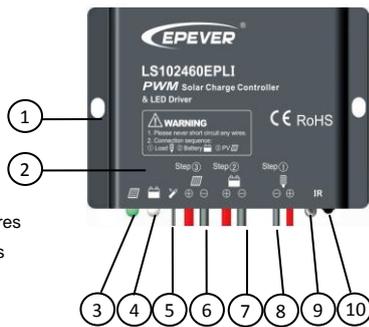


Figure 1 Product Feature

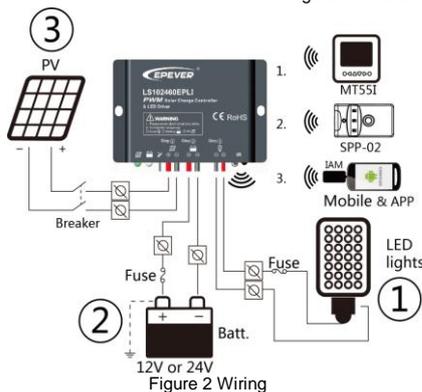


Figure 2 Wiring

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.

4. 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
Charging(green) and battery indicator (red)flashing simultaneously			System voltage error

5. Setting Operation



Figure 3 Setting Ways

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

- 1) Infrared Remote Meter—MT551.
- 2) Super Parameter Programmer—SPP-02.

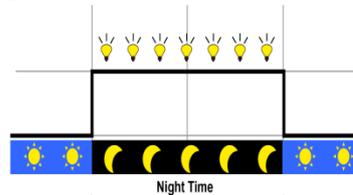
This method can realize one-key setting operation which is suitable for bulk quantity products setting or applied in the projects.

- 3) Ir-Android-Micro—IAM, Mobile and APP. APP software can be downloaded from the website of <http://www.epsolarpv.com>.

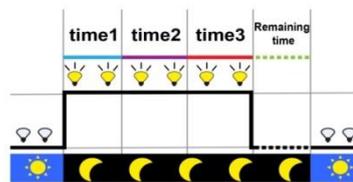
NOTE: Please refer to the user manual of handheld device.

6. Load Set

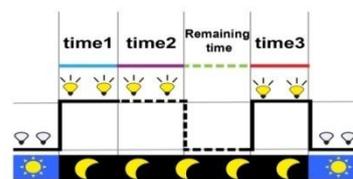
- 1) Manual Mode
- 2) Light ON/OFF(default)



- 3) Light ON + Timer
- Light ON + Timer1



- Light ON + Timer2



- 4) Time Control

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

NOTE: In the mode of Light ON/OFF and Light ON/Timer, the Load is turned on after 10Min. delay.

7. Protection

- PV Reverse Polarity**
 Fully protection against PV reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.
- Battery Reverse Polarity**
 Fully protection against battery reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.
- Battery Over Voltage**
 When the battery voltage reaches to the set point of Over Voltage Disconnect Voltage, the controller will stop charging the battery to protect the battery from being over charged to break down.
- Battery Over Discharge**
 When the battery voltage reaches to the set point of Low Voltage Disconnect Voltage, the controller will stop discharging the battery to protect the battery from being over discharged.
- Battery Overheating**
 The controller detect the environment temperature through the external temperature sensor. If the environment temperature exceeds 65 °C, the controller will automatically start the overheating protection to stop working, and recover below 50 °C.
- Load Short Circuit**
 Load will be switched off when load short circuit (≥ 4 times rated current) happens. Controller will automatically attempt to reconnect load for 5 times. If short circuit protection still exist after controller's 5 times attempts, user have to clear short circuit ,then disconnect and restart the controller or wait for one night-day cycle (night time>3 hours).
- Damaged Local Temperature Sensor**
 If the temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25°C to prevent the battery damaged from overcharging or over discharged.
- High Voltage Transients**
 PV is protected against small high voltage surge. In lightning prone areas, additional external suppression is recommended.

8. 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; ② Change the controller; ③ Change the battery
Battery LED indicator red	Battery over discharged	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 °C, 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	① The connecting wires are error or virtual connection ② Load mode is wrong ③ The controller does not match with the LED light. ④ Output short circuit	① Check the connecting cables ② Check the load mode and parameter ③ The voltage of LED light source is not in the output voltage range of controller ④ Check 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.	① Replace the LED light ② Reduce system rated voltage grade and replace the product model For example 24V system change to 12V system, and replace the corresponding controller.
Parameter settings fail	Infrared communication error	See handheld the user device manual

9. Technical Specifications

Item	LS101240EPLI	LS102460EPLI	LS2024100EPLI
Nominal system voltage	12VDC	12/24VDC Auto	12/24VDC Auto
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	$\leq 30\text{mA}$		
Battery Type	Sealed(Default) / Gel / Flooded / User		
Self-consumption	$\leq 9.1\text{mA}(12\text{V}); \leq 7.0\text{mA}(24\text{V})$		
Charge Circuit Voltage Drop	$\leq 0.16\text{V}$		
Temperature compensation coefficient	$-3\text{mV}/^\circ\text{C}/2\text{V}$		
Communication distance of IR	$\leq 6\text{m}$		
Communication angle of IR	$\leq 15^\circ$		
Working environment temperature	$-35^\circ\text{C} \sim +55^\circ\text{C}$		
Enclosure	IP68(1.5m,72h)		
Overall dimension	107x68x20mm	108.5x88x25.6 mm	
Mounting dimension	100mm	100.5mm	
Mounting hole size	$\Phi 4$	$\Phi 5$	
Power cable	PV/BAT:14AWG(2.5mm ²) LOAD:18AWG(1.0mm ²)		PV/BAT:12AWG(4.0mm ²) LOAD:18AWG(1.0mm ²)
Net weight	0.23kg	0.39kg	

Battery Voltage Parameters (parameters is in 12V system at 25°C, please use X 2 in 24V system)

Battery charging setting	Sealed	Gel	Flooded	User
Over Voltage Disconnect Voltage	16.0V	16.0V	16.0V	9~17V
Charging Limit Voltage	15.0V	15.0V	15.0V	9~17V
Over Voltage Reconnect Voltage	15.0V	15.0V	15.0V	9~17V
Equalize Charging Voltage	14.6V	—	14.8V	9~17V
Boost Charging Voltage	14.4V	14.2V	14.6V	9~17V
Float Charging Voltage	13.8V	13.8V	13.8V	9~17V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V	9~17V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V	9~17V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V	9~17V
Under Voltage Warning Voltage	12.0V	12.0V	12.0V	9~17V
Low Voltage Disconnect Voltage	11.1V	11.1V	11.1V	9~17V
Discharging Limit Voltage	10.6V	10.6V	10.6V	9~17V
Equalize Duration	120min	—	120min	0~180min
Boost Duration	120min	120 min	120min	10~180min

NOTE:

- The default battery type is Sealed, For Sealed, Gel, Flooded battery type, the voltage point is fixed, unable to modify it. The adjusting range of equalize duration is 0 to180min and boost duration is 10 to180min.**
- User type is the user defined battery type. The default value is the same as sealed type. When modify it, please follow the below logistic relation:**
 - Over Voltage Disconnect Voltage > Charging Limit Voltage \geq Equalize Charging Voltage \geq Boost Charging Voltage \geq Float Charging Voltage > Boost Reconnect Charging Voltage.
 - Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage.
 - Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage \geq Discharging Limit Voltage.
 - Under Voltage Warning Reconnect Voltage > Under Voltage Warning Voltage \geq Discharging Limit Voltage.
 - Boost Reconnect Charging voltage > Low Voltage Disconnect Voltage.

Any changes without prior notice!

Version number: V2.2