

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

Solar Charge Controller

---with built-in LED Driver

1. Overview

The LS LPLI series controller combines the solar charge controller and LED constant current driver in one unit. It is ideal for solar LED lighting, especially for the LED lamp application, which requires dimmer function. The advanced pulse width modulation charging methods enables system charging and discharging management to obtain the most radical optimization. Make the system cost reduce and increase system flexibility.

Features:

- Apply to lead-acid battery and lithium battery
- Lithium battery self-activating function
- Lithium battery low-temperature protection function
- Intelligent power mode with 365-day lighting control technology
- Load power reduction 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
- Configurable multiple load control modes, LED rated current, and the current percentage
- Load test function for detecting the system
- Extensive electronic protections
- Without any button, parameter setting via RC-10 and FC-01 with IR function.
- Fully encapsulated PCB, IP68 protection
- Aluminum housing for better cooling

2. 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

※ If the temperature sensor connection is short-circuited or open-circuit, the controller charges or discharges the battery at 25°C and no temperature compensation.

3. 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

WARNING	<ul style="list-style-type: none"> • DO NOT electric shock! With the built-in boost LED driver, the output voltage is higher than the human safety voltage. • If the LED connection number is wrong, the load or controller is damaged.
CAUTION	The above 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.

● Connection Order

- 1) Connect components to the charge controller in the sequence, as shown in **Figure 2 Wiring**, 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, reverse the order.
- 2) After powering on the controller, check the controller's battery LED indicator; it usually is green. Otherwise, please refer to chapter 8.
- 3) Connect a fuse in series through battery positive (+) in the circuit. The battery circuit fuse must be 1.25 to 2 times the rated current. The installed distance is within 150mm.

● Load self-test function

The load is ON when the controller power on for 10 seconds. After 10 seconds, it restores the working mode setting.

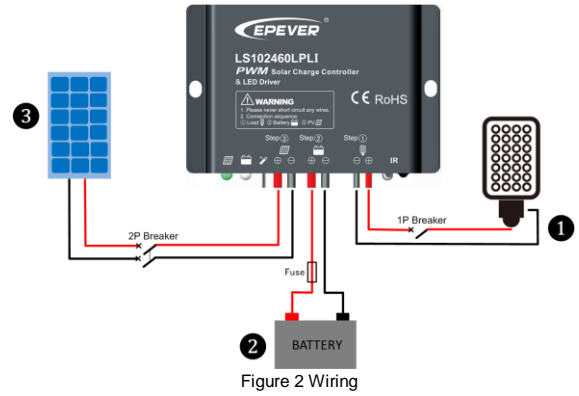


Figure 2 Wiring

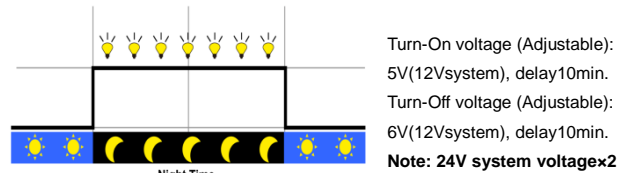
4. LED Indicators

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
All indicators	Green and orange	Flashing two times	Set parameters successfully

5. Load Working Mode

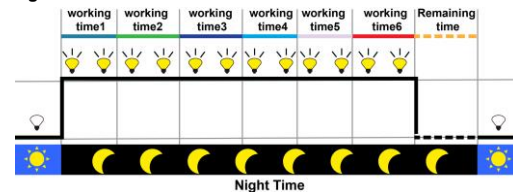
1) Manual Mode

2) Light ON/OFF(default)

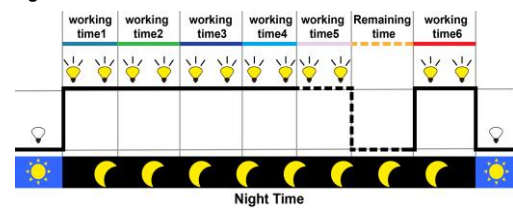


3) Light ON + Timer

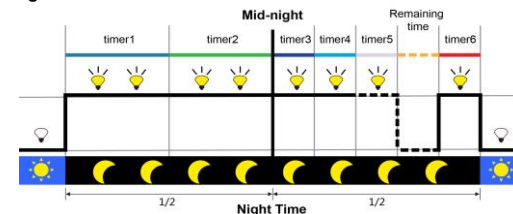
Light ON + Timer1



Light ON + Timer2



Light ON + Timer3



Item	Default※		Range
	Mode1	Mode2/3	
LED Rated Current	0.35A		0-2.6A(LS101240LPLI) 0-2.0A(LS102460LPLI) 0-4.0A(LS101260/2024120LPLI)
Timer1 LED Rated Current Percentage	2H 100%	1H 100%	00:00~23:59H 0~100%
Timer2 LED Rated Current Percentage	2H 80%	1H 50%	00:00~23:59H 0~100%

Timer3 LED Rated Current Percentage	2H 50%	0H 0%	00:00—23:59H 0—100%
Timer4/5 LED Rated Current Percentage	0H 0%	0H 0%	00:00—23:59H 0—100%
Timer6 LED Rated Current Percentage	0H 0%	2H 100%	00:00—23:59H 0—100%

※ **Modify the default value according to the user's requirement.**

4) Time Control

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

5) Intelligent Power Mode

When the battery voltage goes lower than the "Reduce Power Start Voltage (adjustable)," the intelligent power reduction mode is enabled. The LED output current is automatically reduced in linear with the battery's voltage drop. When the battery voltage goes lower than the "Reduce Power End Voltage (adjustable)," the LED output current is 2% of the rated load current. The minimum percentage can be set to 1%. Also, when the battery voltage is higher than "Reduce Power Start Voltage," the controller exits the intelligent power reduction mode.

	• In the mode of Light ON/OFF and Light ON/Timer, the load is turned on after a 1-minute delay, the delay time can be set.
	• The controller's real-time clock is an analog clock, valid at power-on and invalid after power-off. When using the time mode, the clock needs to be calibrated by handheld devices. Do not power off the controller after calibration.

6. Setting Operation



There are two methods to check and set the controller's parameters:

- 1) IR Remote Controller—RC-10
- 2) Super Parameter Programmer—FC-01

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

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



7. Protection

Protection	Conditions	Status
PV Reverse Polarity	When the battery is correctly connecting, the PV can be reversed.	The controller is no damage
Battery Reverse Polarity	When the PV is not connected, or the connection is reversed, the battery can be reversed. WARNING: Controller is damaged when the PV connection is correct, and the battery connection is reversed!	
Battery Over Voltage	The battery voltage reaches the OVD	Stop charging
Battery Over Discharge	The battery voltage reaches the LVD	Stop discharging
Battery Overheating	The temperature sensor is higher than 65°C	Output is OFF
	The temperature sensor is less than 55°C	Output is ON
Li-battery Low Temperature★	The temperature sensor is less than the low-temperature value	Stop charging or discharge
	The temperature sensor is higher than the low-temperature value	Begin charging or discharge
Load Short Circuit	Load current ≥2.5 times rated current In one short circuit, the output is OFF 5s; Two short circuits, the output is OFF 10s; Three short circuits, the output is OFF 15s; Four short circuits, the output is OFF 20s; Five short circuits, the output is OFF 25s; Six short circuits, 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 circuits, the output is OFF 10s; Three open circuits, the output is OFF 15s; Four open circuits, the output is OFF 20s; Five open circuits, the output is OFF 25s; Six open circuits, the output is OFF 5s; Seven open circuits, the output is OFF 5s	Output is OFF (Cycle to perform)

★ If selecting a lithium battery, set the low-temperature value(LTV) according to the specification; otherwise, the lithium battery is damaged.

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 the battery voltage with a multi-meter. Min.9V can start up the controller.
Battery LED indicator green Fast Flashing	Battery over voltage	①Disconnect the solar array and measure the battery voltage; ② Change the controller; ③ Change the battery
Battery LED indicator red	Battery over discharged ^①	When the battery voltage is restored to or above setpoint (low voltage reconnect voltage), the load work
Battery Status LED red indicator flashing	Battery Overheating	The controller automatically stops working. When the temperature is below 50 °C, the controller resumes
All the LED indicator flashing(battery red)	System voltage error	Check whether the battery voltage matches the controller's working

indicator flashing)		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 ②Check the load mode and parameter ③The voltage of the LED light source is not in the output voltage range of the controller ④Check the connecting cables and LED light source
	The dimming function is invalid	①Replace the LED light ②Reduce system rated voltage grade, and replace the product model For example, switch the 24V system to the 12V system, and replace the corresponding controller.

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



The LVRV can be set, but it must be done carefully to avoid damaging the battery if the LVRV is set too low.

9. Technical Specifications

Item	Models			
	LS101240LPLI	LS101260LPLI	LS102460LPLI	LS2024120LPLI
Nominal system voltage	12VDC		12/24VDC◆	
Rated charge current	10A	10A	10A	20A
Max. PV open circuit voltage	30V		50V	
Battery input voltage range	9~16V		9~32V	
Max. output power	40W/12V	60W/12V	30W/12V 60W/24V	60W/12V 120W/24V
Max. output Current	2.6A	4.0A	2.0A	4.0A
Output voltage range	(Max. Battery Voltage +2V)~60V			
Load open circuit voltage	60V			
Maximum output efficiency	96%			
Output current control accuracy	≤2%			
Battery Type	Lead-acid battery: Sealed(default)/Gel/Flooded/User Lithium battery:LiFePO4/Li-NiCoMn/User			
Lead-acid battery	Equalization Voltage▼	Sealed:14.6V; Flooded:14.8V;User:9-17V		
	Boost Voltage▼	Sealed:14.4V;Gel:14.2V;Flooded:14.6V;User:9-17V		
	Float Voltage▼	Sealed/Gel/Flooded: 13.8V; User: 9-17V		
	Reduce Power Start Voltage ▼	Sealed/Gel/Flooded: 12.2V; User: 9-17V		
	Reduce Power End Voltage ▼	Sealed/Gel/Flooded: 12.0V; User: 9-17V		
	Low Voltage Reconnect Voltage▼	Sealed/Gel/Flooded: 12.6V; User: 9-17V		
Lithium battery	Low Voltage Disconnect Voltage▼	Sealed/Gel/Flooded: 11.1V; User: 9-17V		
	Boost Voltage▼	LiFePO4(4s):14.5V/Li-NiCoMn(3s):12.5V/User:9-17V		
	Reduce Power Start Voltage ▼	LiFePO4(4s):12.8V/Li-NiCoMn(3s):12.2V/User:9-17V		
	Reduce Power End Voltage ▼	LiFePO4(4s):12.0V/Li-NiCoMn(3s):10.5V/User:9-17V		
Low Voltage Reconnect Voltage▼	LiFePO4(4s):12.8V/Li-NiCoMn(3s):10.5V/User:9-17V			
Low Voltage Disconnect Voltage▼	LiFePO4(4s):11.1V/Li-NiCoMn(3s):9.3V/User:9-17V			
Self-consumption	≤18mA(12V);≤23mA(24V)			
Charge Circuit Voltage Drop	≤0.14V			
Com. way	IR			
Com. distance of IR	<6m			
Working environment temperature	-40°C~+55°C			
Enclosure	IP68(1.5m,72h)			
Overall dimension(mm)	87x60x22.8	87x63x24.8	87x63x24.8	108.5x88x25.6
Mounting dimension(mm)	80	80	80	100.5
Mounting hole size(mm)	Φ4	Φ4	Φ4	Φ5
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	0.18kg	0.21kg	0.21kg	0.40kg

◆ When selecting a lithium battery, the controller cannot automatically recognize the nominal system voltage and has no temperature compensation.

▼ The parameters are the 12V system at 25 °C, double the values in the 24V system.

10. 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 is exceeding the rated value of the controller.
- The controller's working temperature exceeds the limit working temperature.
- User disassembly or attempted to repair the controller without permission.
- The controller is damaged due to natural elements such as lightning.
- The controller is damaged during transportation and shipment.

Any changes without prior notice!

Version number: V2.2