

Thank you for selecting the LandStar LPLW 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.

## LandStar LPLW Series Solar Charge Controller ---with built-in LED Driver

### 1. Overview

The LandStar(LS) LPLW series controller combines the solar charge controller and LED constant current driver into one unit which is ideal for solar LED Lighting, especially for the application of 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 reduce the cost, and increase the system flexibility. The features are listed below:

- 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 reduce power automatically
- Load power limitation function
- Maximum output efficiency of 96%
- Digital precision constant current control and the control accuracy are no less than 30mA
- Multiple load control modes
- Load test function for detecting the system
- Light ON delay time can be adjustable, the minimum value is 10s
- Strong penetration and long communication distance with 2.4G communication technology
- Low power consumption control function of 2.4G wireless communication
- Ultra-low power consumption mode in transporting
- Enter the password when it is set parameters
- Controller's parameter can be set via the APP, RC11 and FC02
- Extensive electronic protections

### 2. Product Features

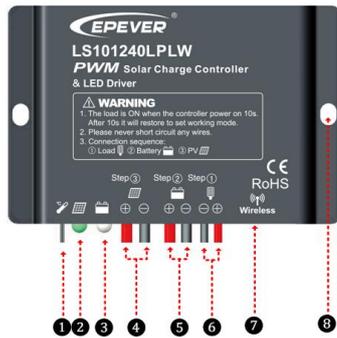


Figure 1 Product Feature

①	Temperature Sensor	⑤	Battery Positive and Negative Wires
②	Charging Status LED indicator	⑥	Load Positive and Negative Wires
③	Battery Status LED indicator	⑦	2.4G wireless communication
④	PV Positive and Negative Wires	⑧	Mounting hole size

※ The controller will charge or discharge the battery at 25°C as default and no temperature compensation, when the temperature sensor is damaged.

### 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

**⚠ NOTE:** Each LED (1W, 3.3V) light is calculated. If the user uses the unconventional LED-light, the actual input voltage of LED-light must be less than the max. output voltage.

**⚠ WARNING:** BE CAREFUL with electric shock, the output voltage is higher than the safety voltage of human body.

**⚠ WARNING:** If the LED-light connection number is wrong, it may CAUSE the damage of the LED-light or the controller.

#### ● Connection Order

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 reversed.

2) Check the battery LED indicator is ON when you powered on the controller, 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 10 seconds. After 10 seconds it will restore to set working mode.

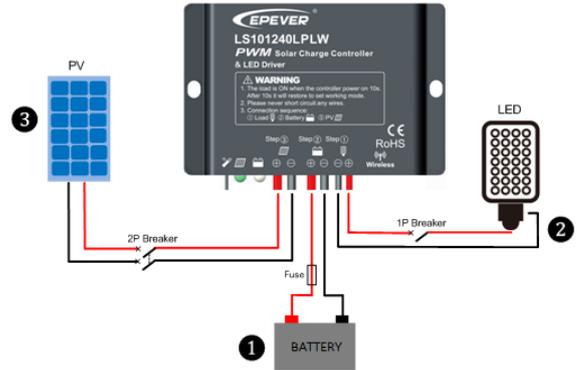


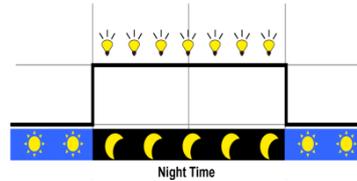
Figure 2 Wiring

### 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)	Overvoltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over-discharged
All indicators	Red	Slowly Flashing(1Hz)	Battery Overheating
	Green and orange	Flashing two times	Set parameters successfully

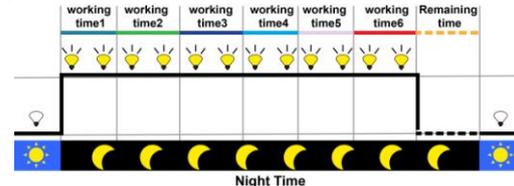
### 5. Load Working Mode

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

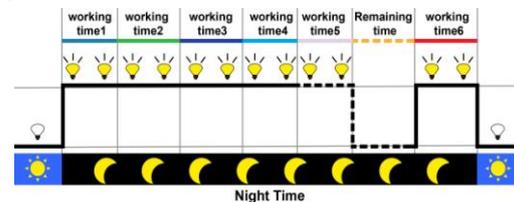


- 3) Light ON + Timer

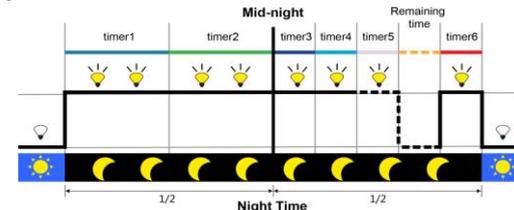
#### Light ON + Timer1



#### Light ON + Timer2



#### Light ON + Timer3



Item	Default※		Range
	Mode1	Mode2/3	
LED Rated Current	0.35A		0-2.6A(LS101240LPLW) 0-2.0A(LS102460LPLW) 0-4.0A(LS2024120/101260LPLW)
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%

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

#### 4) Time Control

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

#### 5) Intelligent Power Mode

When the battery voltage is lower than "Under Voltage Warning Recover Voltage (UVWR adjustable)", the intelligent power mode is enabled; at this time, the LED current percentage will be automatically reduced in linear with the voltage drop of battery. When the battery voltage is lower than "Under Voltage Warning Voltage (UVW adjustable)", a minimum LED current percentage (default 2%, adjustable) will be output. In addition, when the battery voltage is higher than UVWR, the controller will exit the intelligent power mode.



**NOTE:** The load is ON when the controller power on 1seconds. After 1 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.

### 6. Setting Operation



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

1) 2.4G Remote Controller—RC11

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

2) Super Parameter Programmer—FC02

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



### 7. 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°C	Output is OFF
	Temperature sensor is less than 55°C	Output is ON
Lithium battery 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 $\geq 2.5$ times rated current 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 <b>Clear the fault:</b> Restart the controller or wait for one night-day cycle (night time>3 hours).
Load Open Circuit(Load over voltage)	Max. load voltage $\geq 68V$ One open circuit, the output is OFF 5s; Two open t 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 OFF5s; Seven open circuits, the output is OFF5s	Output is OFF (Cycle to perform)



★Warning: If selecting a lithium battery, it must be set at low-temperature value(LTV) according to the charging/discharging temperature of lithium battery; otherwise, the lithium battery will be damaged.

### 8. Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator off during the 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	①Disconnect 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 discharged <sup>①</sup>	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 working.
All the LED indicator	System voltage error	Check whether the battery voltage

flashing(battery red indicator flashing)		matches the controller working voltage. Please change to a suitable battery or reset the working voltage
Power on normally, the load is off	①Unreliable wiring, connection fails. ②The loading 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 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	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.



**WARNING:** The LVRV can be set, but must be more careful that it maybe damages the battery if the LVRV is set too low.

### 9. Technical Specifications

Item	LS101240LPLW	LS101260LPLW	LS102460LPLW	LS2024120LPLW
Nominal system voltage	12VDC		12/24VDC◆ or Auto	
Rated charge current	10A		10A	20A
Max. PV open circuit voltage	30V		50V	
Battery input voltage range	9~16V		9~32V	
Max. output power	40W	60W	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	$\leq 30mA$			
Battery Type	<b>Lead-acid battery:</b> Sealed(default)/Gel/Flooded/User <b>Lithium battery:</b> 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		
	UVWR▼	Sealed/Gel/Flooded:12.2V;User:9-17V		
	UVW▼	Sealed/Gel/Flooded:12.0V;User:9-17V		
Lithium battery	Low Voltage Reconnect Voltage▼	Sealed/Gel/Flooded:12.6V;User:9-17V		
	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		
	UVWR▼	LiFePO4(4s):12.8V/Li-NiCoMn(3s):12.2V/User:9-17V		
	UVW▼	LiFePO4(4s):12.0V/Li-NiCoMn(3s):10.5V/User:9-17V		
Lithium battery	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	$\leq 19mA(12V); \leq 35mA(24V)$			
Charge Circuit Voltage Drop	$\leq 0.17V$			
Communication way	2.4G			
Communication distance	$\leq 20m$			
Working environment temperature	-40°C ~ +55°C			
Enclosure	IP68(1.5m,72h)			
Overall dimension(mm)	87x58x22.8	87x63x24.8	108.5x118x25.6	
Mounting dimension(mm)	80		100.5 x 76	
Mounting hole size(mm)	Φ4		Φ5	
Power cable(AWG/mm <sup>2</sup> )	PV/BAT:14/2.5 LOAD:18/1.0		PV/BAT:12/4.0 LOAD:18/1.0	
Net weight	0.17kg	0.20kg	0.40kg	

◆ The controller is not recognized system voltage and no temperature compensation when the battery connects the lithium battery.  
▼The parameters are 12V system at 25 °C, please double the values in 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 exceeding the rated value of the controller.
- The controller is working temperature exceeds the limit working environment temperature.
- User disassembly or attempted 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!**

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