> Thank you for selecting the LandStar BPL series solar charge controller. Please read this manual carefully before using the product and pay attention to the safety information.

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

1. Safety Information

- Read all of the instructions in the manual before installation.
- DO NOT disassemble or attempt to repair the controller.
- Install external fuse or breaker as required.
- Do disconnect the solar module and fuse/ breakers near to battery before installing or moving the controller.
- Power connections must remain tight to avoid excessive heating from a loose connection.
- Only charge batteries that comply with the parameters of controller.
- Battery connection may be wired to one battery or a bank of batteries.
- Risk of electric shock, the PV and load can produce high voltages when the controller is working.

2. Overview

- Thank you for selecting the LandStar BPL series solar charge controller. It combines solar charge controller and LED constant current driver into one unit which is ideal for solar LED Lighting, especially when dimmer function is needed. The control parameter can be programmed via Mobile APP, PC Monitor setting software with RS485 communication interface. The features are listed below:
- Apply to lead-acid battery and lithium battery
- 12/24VDC automatically identifying system voltage or user-defined working voltage
- 3-Stage intelligent PWM charging：Bulk, Boost/Equalize, Float
- Battery temperature compensation function
- Digital precision constant current control and the control accuracy are less than 30mA
- Maximum output efficiency of 96.7%
- The output current can be adjusted among the rated power and current range
- Intelligent power mode with 365-day lighting control technology
- Load test function for detecting the system
- Multiple load control modes
- Extensive Electronic protection
- Monitoring and setting parameter via Mobile APP, PC Monitor setting software with RS485 communication interface.
- Use of standard Modbus communication protocol for RS485 bus connections, communication protocol compatibility much better
- Connecting the IOT(Internet of Things) module and Cloud Server monitoring software to realize remote monitoring of the multi-machine system
- The RS485 connector can provide power supply
- Aluminum housing for better cooling
- IP67 waterproof degree

3. Product Features
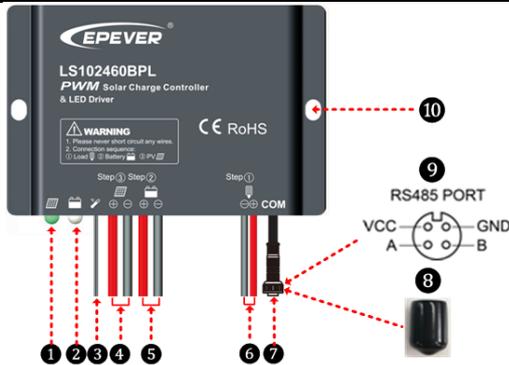
①	Charging Status LED indicator	⑥	Load Positive and Negative Wires
②	Battery Status LED indicator	⑦	RS485 waterproof connector (2)
③	Temperature Sensor (1)	⑧	Port waterproof cap(Included)
④	PV Positive and Negative Wires	⑨	Pin definition
⑤	Battery Positive and Negative Wires	⑩	Mounting hole

(1)The temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25 ºC.

(2)The connector can provide that the voltage is 5V and the current is 150mA. The pin define is shown above picture

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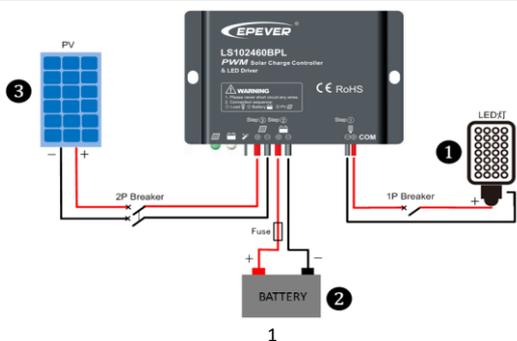
1) Connect components to the charge controller in the sequence as shown above and pay much attention to the "+" and "-". Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reserved.

2) After power on the controller, check the battery LED indicator on the controller, it will be green. If it's not green, please refer to chapter 9.

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.

5. LED Indicators

Indicator	Color	Status	Instruction
(PV)	Green	On Solid	PV connection normal but low voltage(irradiance) from PV, no charging
	Green	OFF	No PV voltage(night time) or PV connection problem
	Green	Slowly Flashing(1Hz)	In charging
	Green	Fast Flashing(4Hz)	PV reverse polarity
(Battery)	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 (orange) flashing simultaneously			Controller overheating
Charging (green) and battery indicator (red) flashing simultaneously			System voltage error

6. Setting Operation

➢ **Load Set**
1) Manual Mode
2) Light ON/OFF(Default)
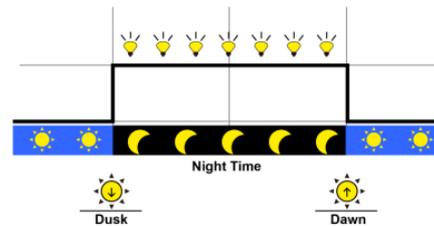
3) Light ON + Timer
   Light ON + Timer1
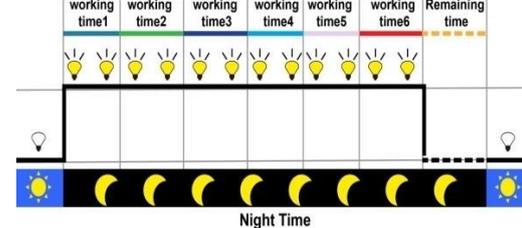
Light ON + Timer2
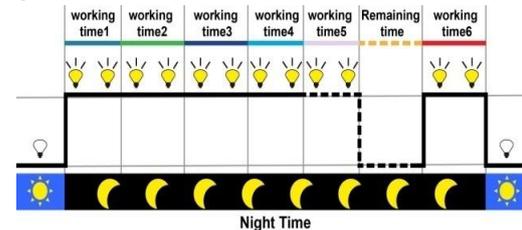
Light ON + Timer3
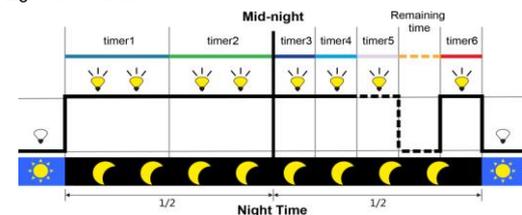
4) Real-time Control
   Control the load ON/OFF time through setting real-time clock.
5) Intelligent Power Mode
When the battery voltage is lower than "Under Warning Recover Voltage (UWRV adjustable)", the intelligent power mode is enabled; at this time, the LED current percentage will be automatically reduced in linear with the voltage drop of battery. When the battery voltage is lower than "Under Warning Recover Voltage (WRW adjustable)", a minimum LED current percentage (default 2%, adjustable) will be output. In addition,

when the battery voltage is higher than UWRV, 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 1Min. delay.**

7. Accessories(optional) and Software
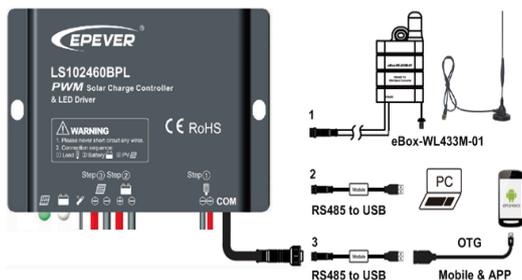
Software
(1)Solar station Monitor
• Download software
  www.epsolarpv.com/en/index.php/Technical/download——PC Software for the Solar Charge Controller
(2)Mobile APP software setting(Only android phones are supported)
•www.epsolarpv.com/en/index.php/Technical/download——Andriod APP for the Li-Battery Solar Charge Controller
※**Specific instructions refer to the list of accessories and software.**

8. Protection

• PV Short Circuit
• If the PV array short circuit, the controller will stop charging, clear it to resume normal operation.
• PV Reverse Polarity
• Fully protection against PV reverse polarity, correct the wire connection to resume normal operation.
• Battery Reverse Polarity
• Fully protection against battery reverse polarity, correct the wire connection 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 to break down.
• Battery Overheating
• The controller detect the environment temperature through the external temperature sensor. If the environment temperature exceeds 65 ºC, the controller will automatically start the overheating protection to stop working, and recover below 50 ºC.
• Libattery low temperature★
• The controller detect the environment temperature through the external temperature sensor. If the temperature sensor is less than the low temperature value, the controller will automatically stop charging or discharge and recover higher than the low temperature value.
• 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 restart the controller or wait for one night-day cycle (night time>3 hours).
• Controller Overheating
• If the temperature of the controller exceeds 85 ºC, the controller will automatically start the overheating protection, and recover below 75 ºC.
• High Voltage Transients
• The controller is protected against small high voltage transients. In lightning prone areas, additional external suppression is recommended.

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

9. Troubleshooting

Faults	Possible reasons	Troubleshooting
LED Charging indicator turn 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	The lithium battery protection plate is disconnected at low pressure and the photocell is not connected; Battery voltage maybe less than 9V	Measure battery voltage with the multi-meter. Min.9V can start up the controller
Battery LED indicator green fast Flashing	Battery over voltage	Check if battery voltage is higher than OVD, and disconnect the PV
Battery LED indicator red	Battery over discharged	When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover
Battery LED	Battery Overheating	The controller will automatically turn

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		the system off. But while the temperature decline to be below 50 ºC, the controller will resume.
indicator red flashing		
Charging(green) and battery indicator (orange)flashing simultaneously	Controller overheating	please try to decline the environment's temperature, or the power of PV or the power of the load
	System voltage error	Check whether the battery voltage match with the controller's working voltage, If not please change to a suitable battery or reset the working voltage
Powering on normally, the load is off	①The connecting wires are error or virtually connected ②Load mode is not appropriate. ③This controller does not match with the LED light. ④Output short circuit.	①Check the connecting cable. ②Check the load's mode and parameters. ③The voltage of LED light is not within the output voltage range of controller. ④Check the connecting cables and LED light.
The dimming function is invalid	The controller does not match with the LED light source. This product is a step-up voltage 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

10. Technical Specifications

Item	LS102460BPL	LS2024100BPL
Nominal system voltage	12/24VDC Auto	
Battery input voltage range	9V～32V	
Max. PV open circuit voltage	50V	
Rated charge current	10A	20A
Max. output current	2.0A	3.3A
Max. output power	30W/12V;60W/24V	50W/12V;100W/24V
Output voltage range	Max. battery voltage+2V～60V	
Load open circuit voltage	60V	
Max. output efficiency	96.7%	
Output current control accuracy	≤30mA	
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	
	Low Voltage Reconnect Voltage▼	Sealed/Gel/Flooded:12.6V;User：9-17V	
	Low Voltage Disconnect Voltage▼	Sealed/Gel/Flooded:11.1V;User：9-17V	
Lithium battery	Boost Voltage▼	LiFePO4(4s):14.5V/Li-NiCoMn(3s):12.5V/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	≤11mA/12V;≤9mA/24V	
Charge Circuit Voltage Drop	≤0.3V	
Temperature compensation coefficient	-3mV/℃/2V	
Working environment temperature	-35℃～+55℃	
Enclosure	IP67	
Grounding	Common Positive	
Overall dimension	107x73x20mm	108.5x102x25.6mm
Mounting dimension	100mm	100.5x80mm
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	0.28kg	0.46kg

★When the battery type is lithium battery, the controller doesn't support self-activation.
▼Battery Voltage Control Parameters (below parameters are in 12V system at 25 ºC, please double the values in 24V system）

⚠ **DO NOT connect the PV array when change the lithium battery type via the phone APP or PC software.**

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：V3.0