

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

LandStar B series

—Solar Charge Controller

1 Overview

LandStar B series is a PWM common positive solar charge controller that adopts the most advanced digital technique. The multiple load control modes enable it can be widely used on solar home system, traffic signal, solar street light, solar garden lamp, etc. The features are listed below:

Features:

- Adopt high quality components of ST,IR and Infineon, make sure product lifespan
- Terminals have UL and VDE certification, the product is more safer and more reliable
- 100% input and output in the environment temperature range
- 3-Stage intelligent PWM charging: Bulk, Boost/Equalize, Float
- Support 3 charging options: Sealed, Gel, Flooded and User
- RS485 communication interface and Modbus communication protocol
- Battery temperature compensation function
- Energy statistics function
- Multiple load control modes
- Extensive Electronic protection

2 Product Features

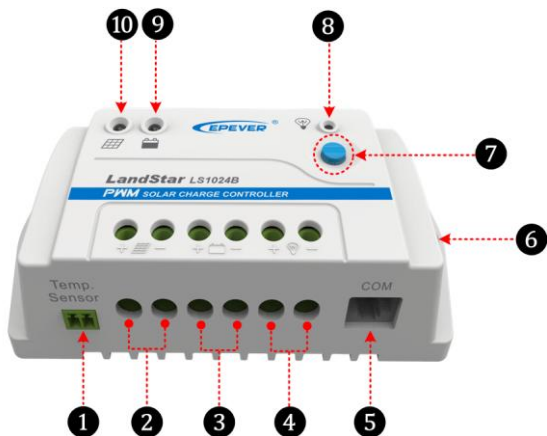


Figure 1 Characteristic

①	Remote Temperature(RTS)Port*	⑥	Mounting Hole
②	PV Terminals	⑦	Button
③	Battery Terminals	⑧	Load status indicator
④	Load Terminals	⑨	Battery status indicator
⑤	RS485 communication Port	⑩	Charge status indicator

★If the temperature sensor is short-circuited or damaged, the controller will charge or discharge at the default temperature setting of 25 °C.

3 Wiring

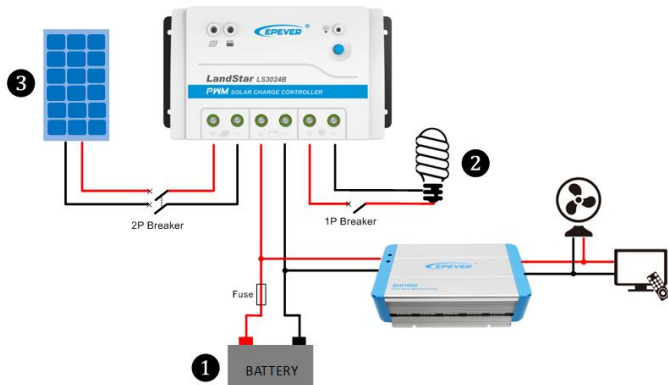


Figure 2 Connection diagram

Installation Procedure:

Connect the system in the order of ① battery → ② load → ③ PV array in accordance with Figure 2"Connection diagram" and disconnect the system in the reverse order ③ ② ①.



NOTE: The LS-B series is a positive ground controller. Any positive connection of solar, load or battery can be earth grounded as required.



NOTE:While wiring the controller do not close the circuit breaker or fuse and make sure that the leads of "+" and "-" poles are connected correctly.



NOTE: A fuse which current is 1.25 to 2 times the rated current of the controller must be installed on the battery side with a distance from the battery not greater than 150 mm.



NOTE: If an inverter is to be connected to the system, connect the inverter directly to the battery, not to the load side of the controller.

4 Indicator and button

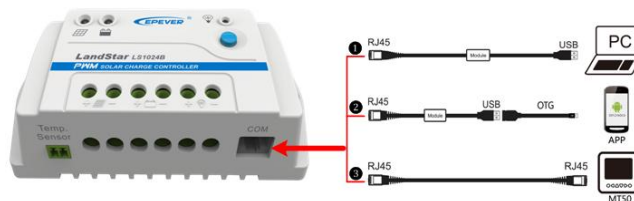
(1)Indicator

Indicator	Color	Status	Information
	Green	On Solid	PV connection normal ,but low voltage(low 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 Over voltage
	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
	Red	On Solid	Load ON
	Red	OFF	Load OFF
	Red	Slowly Flashing(1Hz)	Load overload
	Red	Fast Flashing(4Hz)	Load short circuit
Charge, Load and Battery(orange)indicator flashing			Controller Overheating
Charge, Load and Battery(red)indicator flashing			System voltage error

(2)Button

- ①The load is turned ON/OFF via the button when the working mode is Manual Control.
- ②Clear the faults for the load overload and short circuit .

5 Setting



- ① USB to RS485 converter cable: CC- RS485-RS485-150U
PC software website: www.epever.com(PC Software for the Solar Charge Controller)
- ② USB to RS485 converter cable: CC- RS485-RS485-150U
OTG cable: OTG-12CM
Phone APP software website (support Andriod system only)
www.epever.com(Andriod APP for the Solar Charge Controller)
- ③ USB to RS485 converter cable:CC-RS485-RS485-200U-MT)

(1)Battery types

Battery Voltage Control Parameters

Below parameters are in 12V system at 25 °C, please double the values in 24V system

Battery type	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	120 min	—	120 min	0~180 min
Boost Duration	120 min	120 min	120 min	10~180 min

NOTE:

- 1) When the battery type is sealed, gel, flooded, the adjusting range of equalize duration is 0 to180min and boost duration is 10 to180min.
- 2) The following rules must be observed when modifying the parameters value in user

battery type (factory default value is the same as sealed type):

- A. Over Voltage Disconnect Voltage > Charging Limit Voltage ≥ Equalize Charging Voltage ≥ Boost Charging Voltage ≥ Float Charging Voltage > Boost Reconnect Charging Voltage.
- B. Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage.
- C. Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage.
- D. Under Voltage Warning Reconnect Voltage > Under Voltage Warning Voltage ≥ Discharging Limit Voltage.
- E. Boost Reconnect Charging voltage > Low Voltage Disconnect Voltage.



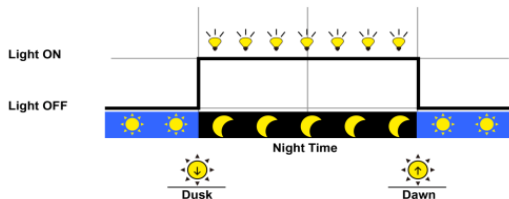
CAUTION: Please refer to user guide or contact with the sales for the detail of setting operation.

(2) Load Set Mode

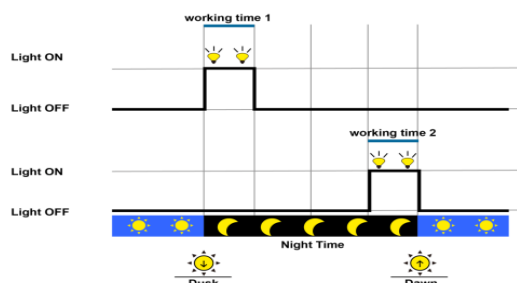
1) Manual Control (default ON)

The load is turned ON/OFF via the button.

2) Light ON/OFF



3) Light ON/OFF + Timer



4) Time Control

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

6 Protections

- **PV Over Current**
When the charging power of the PV array exceeds its rated power, it will be charged at the rated power.
- **PV Short Circuit**
When not in PV charging state, the controller will not be damaged in case of a short-circuiting in the PV array.
- **PV Reverse Polarity**
When the polarity of the PV array is reversed, the controller may not be damaged and can continue to operate normally after the polarity is corrected.
- **Battery Reverse Polarity**
Fully protected 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 the over voltage disconnect voltage, it will automatically stop battery charging to prevent battery damage caused by over-charging.
- **Battery Over Discharge**
When the battery voltage reaches the low voltage disconnect voltage, it will automatically stop battery discharging to prevent battery damage caused by over-discharging. (Any controller connected loads will be disconnected. Loads directly connected to the battery will not be affected and may continue to discharge the battery.)
- **Battery Overheating**
The controller can detect the battery temperature through an external temperature sensor. The controller stops working when its temperature exceeds 65 °C and begins working when its temperature is below 55 °C.
- **Load Overload**
When the load is overloading (The overload current is ≥ 1.05 times the rated load current), the controller will automatically cut off the output. If the load reconnects automatically five times (delay of 5s, 10s, 15s, 20s, 25s), it needs to be cleared by pressing the Load button restarting the controller, switching from Night to Day (nighttime > 3 hours).
- **Load Short Circuit**
When the load is short circuited (The short circuit current is ≥ 2 times the rated controller load current), the controller will automatically cut off the output. If the load reconnects the output automatically five times (delay of 5s, 10s, 15s, 20s, 25s), it needs to be cleared by pressing the Load button, restarting the controller or switching from Night to the Day (nighttime > 3 hours).

- **Controller Overheating**

The controller is able to detect the temperature inside the battery through an optional remote sensor. The controller stops working when its temperature exceeds 85 °C and begins to working when its temperature is below 75 °C.

- **TVS High Voltage Transients**

The internal circuitry of the controller is designed with Transient Voltage Suppressors (TVS) which can only protect against high-voltage surge pulses with less energy. If the controller is to be used in an area with frequent lightning strikes, it is recommended to install an external surge arrester.

7 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
Wire connection is correct, the controller is not working.	Battery voltage is lower than 8V	Please check the voltage of battery. At least 8V voltage to activate the controller.
Battery indicator green slowly flashing	Battery over voltage	Check if battery voltage is higher than OVD(over voltage disconnect voltage), and disconnect the PV.
Battery indicator red on solid	Battery over discharged	When the battery voltage is restored to or above LVR(low voltage reconnect voltage), the load will recover
Battery indicator red slowly flashing	Battery Overheating	The controller will automatically turn the system off. But while the temperature decline to be below 55 °C, the controller will resume.
Charge, Load and Battery (orange) indicator flashing	Controller Overheating	When heat sink of controller exceeds 85 °C, the controller will automatically cut input and output circuit. When the temperature below 75 °C, the controller will resume to work.
Load indicator red slowly flashing	Load Overload	①Please reduce the number of electric equipments. ②Restart the controller. ③wait for one night-day cycle (night time>3 hours).
Load indicator red fast flashing	Load Short Circuit	①Check carefully loads connection, clear the fault. ②Restart the controller. ③wait for one night-day cycle (night time>3 hours).

8. Technical Specifications

Item	LS1024B	LS2024B	LS3024B
System nominal voltage	12/24VDC Auto		
Battery Types	Sealed/Gel/Flooded/User		
Rated charge current	10A	20A	30A
Rated discharge current	10A	20A	30A
Working Voltage range of controller	8~32V		
Max. PV open circuit voltage	50V		
Self-consumption	≤8.4mA/12V; ≤7.8mA/24V		
Charge circuit voltage drop	≤0.28V		
Discharge circuit voltage drop	≤0.20V		
Temperature compensate coefficient	-3mV/°C/2V (default)		
Working environment temperature	-35°C ~ +50°C		
Relative humidity	≤95% (N.C.)		
Enclosure	IP30		
Grounding	Common Positive		
Dimension	138.6x69.3 x37mm	159.6x81.4 x47.8mm	200.6x101.3 x57mm
Mounting dimension	126mm	147x50mm	190x70mm
Mounting hole size	Φ4.3	Φ4.3	Φ4.5
Terminal	4mm ²	10mm ²	10mm ²
Weight	0.13kg	0.3kg	0.5kg

9. 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 lightning.
- The controller is damaged during transportation and shipment.

Any changes without prior notice! Version number: V2.5