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

LandStar E/EU series
——Solar Charge Controller

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

The LandStar E series controller is a PWM charge controller that adopts the most advanced digital technique. It's an easy operation and cost efficient controller featured as:

- 3-Stage intelligent PWM charging：Bulk, Boost/Equalize, Float
- Support 3 charging options: Sealed, Gel, and Flooded
- Battery status LED indicator can indicates battery situation
- Battery temperature compensation function
- With humanized settings, operation will be more comfortable and convenient
- The USB will provide power supply that can charge for electronic equipment**(LS EU series only)**
- Battery type and load output can be set via button
- Extensive Electronic protection

3. Product Features

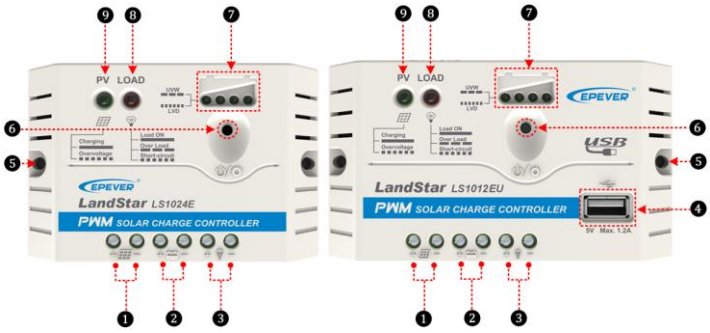


Figure 1 Product Feature

❶	PV Terminals	❻	Load Switch Button
❷	Battery Terminals	❼	Battery status LED indicator
❸	Load Terminals	❽	Load status LED indicator
❹	USB output interface (LS E series only)	❾	Charging status LED indicator
❺	Mounting Hole Φ4.5		

4. Wiring

Step 2： Connect the system in the order of ❶battery ➔❷ load➔ ❸PV array in accordance with Figure 2-2,"Schematic Wiring Diagram" and disconnect the system in the reverse order❸❷❶.

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.

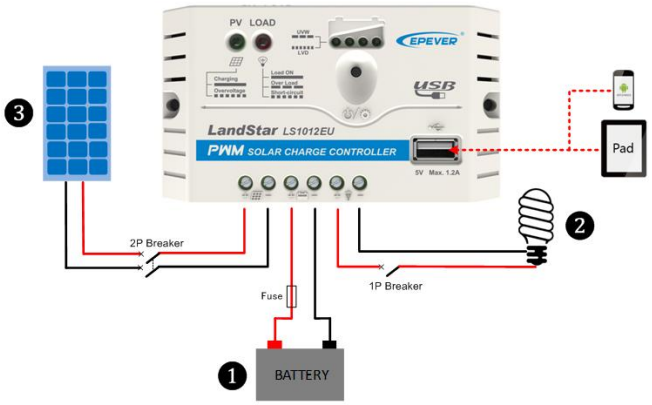


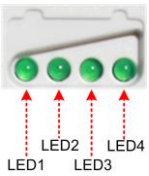
Figure 2 Connection diagram

5. LED Indicators

1) Charging and load status indicator

Indicator	Color	Status	Instruction
Charging status LED indicator	Green	On Solid	In Charging
	Green	OFF	No Charging
	Green	Fast Flashing	Battery Over Voltage
Load status LED indicator	Green	On Solid	Load ON
	Green	OFF	Load OFF
	Green	Slowly Flashing	Load over load
	Green	Fast Flashing	Load short circuit

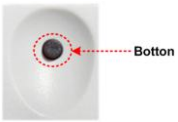
2) Battery status indicator



LED1	LED2	LED3	LED4	Battery Status
Slowly Flashing	×	×	×	Under voltage
Fast Flashing	×	×	×	Over discharge
Battery LED indicator status during voltage is up				
○	○	×	×	12.8V＜ U_{bat}＜13.4V
○	○	○	×	13.4V＜ U_{bat}＜14.1V
○	○	○	○	14.1V ＜ U_{bat}
Battery LED indicator status during voltage is down				
○	○	○	×	12.8V＜U_{bat}＜13.4V
○	○	×	×	12.4V＜U_{bat}＜12.8V
○	×	×	×	U_{bat}＜12.4V

NOTE:
①Voltage value for 12V system at 25℃, please use 2× in 24V system ;
②"○"LED indicator on; "×"LED indicator off.

6. Setting Operation



1)Load ON/OFF Setting

When the controller is powered on, press the button to control the load output.

2)Battery Type Setting

Operation:
Step 1: Enter setting mode by pressing button for 5s until the battery status LEDs are flashing.

Step 2: Select the desired mode by pressing button.

Step 3: The mode will be saved automatically without any operation for 5S and LED will stop flashing.

Battery Type Indicator

LED1	LED2	LED3	Battery type
○	×	×	Sealed(Default)
○	○	×	Gel
○	○	○	Flooded

NOTE: "○"LED indicator on "×"LED indicator off

Battery Voltage Control Parameters

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

Battery Type	Sealed	Gel	Flooded
Over Voltage Disconnect Voltage	16.0V	16.0V	16.0V
Charging Limit Voltage	15.0V	15.0V	15.0V
Over Voltage Reconnect Voltage	15.0V	15.0V	15.0V
Equalize Charging Voltage	14.6V	——	14.8V
Boost Charging Voltage	14.4V	14.2V	14.6V
Float Charging Voltage	13.8V	13.8V	13.8V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V
Under Voltage Warning Voltage	12.0V	12.0V	12.0V
Low Voltage Disconnect Voltage	11.1V	11.1V	11.1V
Discharging Limit Voltage	10.6V	10.6V	10.6V
Equalize Duration	120 min.	——	120 min.
Boost Duration	120 min.	120 min.	120 min.

7. Protection

- Battery Over Voltage Protection
  When the battery voltage reaches to the set point of Over Voltage Disconnect Voltage(OVD), the controller will stop charging the battery to protect the battery from being over charged to break down.
- Battery Over Discharge Protection
  When the battery voltage reaches to the set point of Low Voltage Disconnect Voltage(LVD), the controller will stop discharging the battery to protect the battery from being over discharged.
- Load Overload Protection
  Load will be switched off when 1.25 times rated current overload happens. User has to reduce load appliance, then press the button or repower the controller.
- Load Short Circuit Protection
  Load will be switched off when load short circuit (≥3 times rated current) happens. User has to clear short circuit, then press the button or repower the controller.
- High Voltage Transients Protection
  The controller is protected against small high voltage transients. In lightning prone areas, additional external suppression is recommended.

8. 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	Battery voltage maybe less than 8V	Measure battery voltage with the multi-meter. Min.8V can start up the controller
Charging status LED indicator Fast flashing	Battery Over Voltage	Check if battery voltage is higher than OVD, and disconnect the PV
LED1 Fast flashing	Battery over discharged	When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover
Load status LED indicator slowly flashing	Load over load①	①Please reduce the number of electric equipments. ②Press the button or repower the controller.
Load status LED indicator fast flashing	Load short circuit	①Check carefully loads connection, clear the fault. ②Press the button or repower the controller.

①When load current reaches1.25 times 1.5 times and 2 times more than nominal value, the controller will automatically turn off loads in 60s, 5s and 1s respectively.

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 controller.
- 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：V2.0

9. Technical Specifications

Item	LS0512E	LS1012E	LS1024E	LS2024E	LS0512EU	LS1012EU	LS1024EU	LS2024EU	LS3024EU
Nominal system voltage	12VDC		12/24VDC Auto		12VDC		12/24VDC Auto		
Rated charge current	5A	10A		20A	5A	10A		20A	30A
Rated discharge current	5A	10A		20A	5A	10A		20A	30A
Battery input voltage range	8V～16V		8V～32V		8V～16V		8V～32V		
Max. PV open circuit voltage	30V		50V		30V		50V		
Self-consumption	12V≤5mA; 24V≤7mA								
Charge Circuit Voltage Drop	≤0.21V				≤0.13V				
Discharge Circuit Voltage Drop	≤0.12V				≤0.17V				
USB input interface	—				5VDC/1.2A				5VDC/2A
Temperature compensation coefficient	-5mV/℃/2V								
Working environment temperature	-35℃ ～ +55℃								
Humidity	≤95%,(N.C.)								
Enclosure	IP30				IP20				
Grounding	Common Positive								
Overall dimension	92.8x65 x20.2mm	101.2x67 x21.8mm	101.2x67 x21.8mm	128x85.6 x34.8mm	109.7x65.5 x20.8mm	120.3x67 x21.8mm	120.3x67 x21.8mm	148x85.6 x34.8mm	148x106.8 X43.7mm
Mounting dimension	84.4mm	92.7mm	92.7mm	118mm	100.9mm	111.5mm		138mm	
Mounting hole size	Φ4.5								
Terminals	14AWG/2.5mm²	12 AWG/4mm²	12AWG/4mm²	10AWG/6mm²	14AWG/2.5mm²	12AWG/4mm²	12AWG/4mm²	10AWG/6mm²	8AWG/10mm²
Net weight	0.07kg	0.08kg	0.08kg	0.15kg	0.09kg	0.10kg	0.10kg	0.18kg	0.29kg