EPSOLAR

LS1024B / LS2024B/ LS3024B

——Solar Charge Controller

USER MANUAL

Thank you very much for selecting our product! This manual offers important information and suggestions with respect to installation, use and troubleshooting, etc. Please read this manual carefully before using the product and pay attention to the safety recommendations in it.

LandStar

LS1024B / LS2024B / LS3024B

——Solar Charge Controller

Nominal system voltage	12 / 24VDC*
Maximum PV input voltage	50V
Nominal charge / discharge current	
LS1024B	10A
LS2024B	20A
LS3024B	30A

*The solar charge controller has the system voltage 12/24V automatic recognition function and custom define function, and all charge, discharge and load control parameters can be modified.

Warranty: The charge controller is warranted to be free from defects for a period of two years from the date of shipment to the original end user.

Notice: Manufacture is not responsible for the damage of any part of controller due to operator's misuse, battery parameters mismatch, unreasonable system configuration, unauthorized repairment or exceeding the specified parameter.

Contents

1 Important Safety Information

- Please inspect the controller thoroughly after it is delivered. If any damage is seen, please notify the shipping company or our company immediately.
- Keep the controller away from rain, exposure, severe dust, vibrations, corrosive gas and intense electromagnetic interference.
- There are no user serviceable parts inside the controller. Do not disassemble or attempt to repair it.

2 General Information

LandStar B series solar charge controller adopts the most advanced digital technique and operates fully automatically. It has various unique functions：

- 12V/24V automatic identify or user-defined working voltage.
- High efficient Series PWM charging, increase the battery lifetime and improve the solar system performance.
- Use MOSFET as electronic switch, without any mechanical switch.
- Multiple load control modes, increase the flexibility of the load output
- Gel, Sealed, Flooded and user-defined battery type option.
- Adopt temperature compensation, correct the charging and discharging parameters automatically and improve the battery lifetime.
- New SOC method of calculating accurately displays the available battery capacity.
- Electronic protection: Overheating, over charging, over discharging, overload, and short circuit.
- Reverse protection: any combination of solar module and battery.
- With functions of current power calculation and real-time energy statistics recording, it is convenient for users to view charging and discharging energy of each day, month, year and total value.
- Use of standard Modbus communication protocol for RS-485 bus connections, making communication distance much longer and

communication protocol compatibility much better

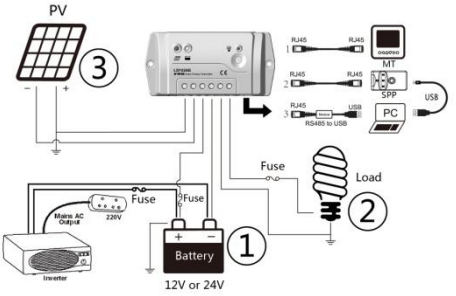
- Support firmware upgrade

3 Installation Instructions

3.1 General Installation Notes

- Be very careful when working with batteries. Wear eye protection. Have fresh water available to wash and clean any contact with battery acid.
- Never short circuit the battery positive and negative terminals and wires which may cause explosion or fire.
- Install external fuses/breakers as required.
- Disconnect the solar module and fuse/breakers near to battery before installing or adjusting the controller.
- Confirm that power connections are tightened to avoid excessive heating from loose connection.
- Uses insulated tools and avoid placing metal objects near the batteries.
- Explosive gasses may be present during charging. Be certain there is sufficient ventilation to release the gasses.
- Avoid direct sunlight and do not install in locations where water can enter the controller.
- Loose power connections and/or corroded wires may result in resistive connections that melt wire insulation, burn surrounding materials, or even cause fire. Ensure tight connections and use cable clamps to secure cables and prevent them from swaying in mobile applications.
- Only charge the batteries that comply with the parameters of controller.
- Battery connection may be wired to one battery or a bank of batteries. The following instructions refer to a singular battery, but it is implied that the battery connection can be made to either one battery or a group of batteries in a battery bank.
- Select the system cables according to 3.5A/mm^2 current density.

3.2 Wiring



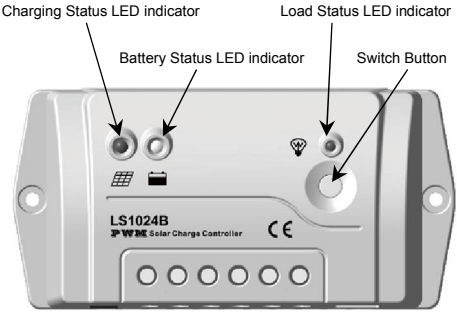
1， Connect components to the charge controller in the sequence as shown in above picture and pay much attention to the “+”（Red）and “-“（Black）.Always power the battery First.

2， After power the battery, check the battery indicator on the controller, it will be green. If it’s not green, please refer to chapter 5.

3， The battery fuse should be installed as close to battery as possible. The suggested distance is within 150mm.

4 Operation

4.1LED Indicators



Indicator Status Description

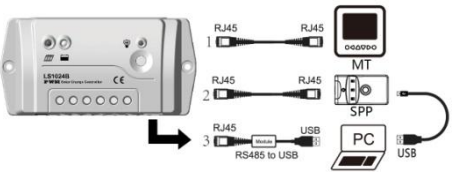
	Green	On Solid	Normal
	Green	Slowly Flashing	In charging
	Green	OFF	No charge
	Green	On Solid	Normal
	Green	Slowly Flashing	Full
	Green	Fast Flashing	Over voltage
	Orange	On Solid	Under voltage
	Red	On Solid	Over discharged
	Red	Flashing	Battery over temperature
	Red	On Solid	Normal

	Red	Slowly Flashing	Overload
	Red	Fast Flashing	Short circuit
Charging, load and battery indicator (red)flashing simultaneously			System voltage error
Charging, load and battery indicator(orange)flashing simultaneously			Controller overheating

Switch Button Function

1) Manual Control ON/OFF of the load.
2) Resume to normal work after the fault is cleared up.

4.2Setting Operation



Three methods to program the controller:

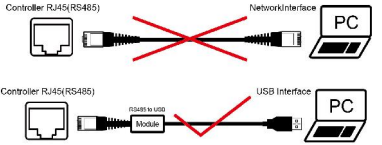
1-Remote Meter,MT50/MT100(Use standard network communication cable with CC-RS485-RS485-200U-MT）

2-Super Parameter Programmer, SPP-01(Use standard network communication cable with CC-RS485-RS485-200U）

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

3–PC monitoring setting software “Solar Station Monitor”（Use dedicated RS485 to USB communication cable with CC-USB-RS485-150U）

Through the remote meter and PC software, it can realize real-time monitoring, modification of control parameter, charge mode, load work mode, inquiry of failure information etc.



WARNING: Connecting the controller with PC network communication port by network cable is forbidden. It may cause the damage to the components of the controller.

Note: Please refer to the user manual of MT, SPP-01, and PC software for more details.

·Load Set

1．Manual Control (default)

2．Light ON/Off

3．Light ON+ Timer

4．Time Control

·Battery Type

1．Gel　2．Sealed(default)　3．Flooded　4．User

5 Protection, Troubleshooting

5.1 Protection

·PV Array Short Circuit

If PV array short circuit occurs, clear it to resume normal charge automatically.

·Load Overload

If the load current exceeds the rated current of controller（≥1.05 times rated discharge current）, the controller will disconnect the load. Overloading must be cleared up, then pressing the switch button.

·Load Short Circuit

Fully protected against load wiring short-circuit（≥2 times rated discharge current）. After one automatic load reconnect attempt, the fault must be cleared by restarting the controller or pressing the switch button.

·PV Reverse Polarity

Fully protection against PV reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

·Battery Reverse Polarity

Fully protection against battery reverse polarity, no damage to the controller will result. Correct the miswire to resume normal operation.

·Battery working voltage error

If battery voltage does not match controller working voltage, controller will stop working. After correcting the voltage, the failure can be eliminated through pushing load button.

·Damaged Temperature Sensor

If the temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25℃ to prevent the battery damaged from overcharging or over discharged.

·Overheating Protection

If the temperature of the controller heat sink exceeds 85°C, the controller will automatically start the overheating protection and stop the charging and discharging. When the temperature is below 75□, the controller will resume to work.

·High Voltage Transients

PV is protected against smaller high voltage surge. In lightning prone areas, additional external suppression is recommended.

Note: The controller has daily automatic fault recovery function which will reduce the manual operation and can intelligently eliminate the fault caused by non-actual hardware failure.

5.2 Troubleshooting

Faults	Possible reasons	Troubleshooting
Charging LED indicator off during daytime when sunshine falls on PV modules properly.	PV array disconnection	Check that PV and battery wire connections are correct and tight.
Green Battery LED indicator fast flashing	Battery voltage higher than over voltage disconnect voltage(OVD)	Check the battery voltage. If it over high, disconnect the solar module immediately and change a new controller.
Battery LED indicators orange	Battery under voltage	Load output is normal. Charging LED indicator will return to green automatically when fully charged.
Battery LED indicators RED color and loads not working.	Battery over discharged	The controller cut off the output automatically. LED indicator will return to green automatically when fully charged.
Load status indicator red and slow flashing	Over load	Remove or cut out the additional load and press the button , the controller will resume to work after 3s
Load status indicator red and fast flashing	Short circuit	Clear short circuit and press the button, the controller will resume to work after 3s
All the led indicator flashing (battery orange indicator flashing)	Too high temperature of controller	When heat sink of the controller exceeds 85 □, the controller will automatically cut input and output circuit. When the temperature below 75□, the controller will resume to work. Please reduce

		the environment temperature, the power of solar module or the power of the load.
All the led indicator flashing (battery red indicator flashing)	System voltage error	Check whether the battery voltage match with the controller working voltage. Please change to a suitable battery or reset the working voltage. If there is no abnormal, please press load button to clear the malfunction.
SOC value incorrect	Choose the wrong battery type; Using the reconfigured profile of the user defined battery type.	Correct the right battery type; Using the configuration of the charging voltage compensation if choosing the user defined battery type and ignore the SOC

6Technical specifications

Electrical Parameters

Description	Parameter
Nominal System Voltage	12 /24VDC
Max. PV input voltage	50V
Max. Battery Terminal Voltage	34V
Rated Battery Current	LS1024B 10A LS2024B 20A LS3024B 30A
Charge Circuit Voltage Drop	≤0.28V
Discharge Circuit Voltage Drop	≤0.20V
Self-consumption	≤8.4mA/12V; ≤7. 8mA/24V
Temperature compensation coefficient	-3mV/℃/2V (Default)
Grounding	Positive grounding

Battery Voltage Parameters (parameters is in 12V system at 25□, please use X 2 in 24V system)

Control Parameters				
Battery charging setting	Gel	Sealed	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	14.2V;	14.4V	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	——	2 hrs.	2 hrs.	0~3 hrs.
Boost Duration	2 hrs.	2 hrs.	2 hrs.	0~3 hrs.

Notes:

1．The default battery type is Sealed. For Gel, Sealed, Flooded battery type, the voltage point is fixed, unable to modify it.

2．User type is the user defined battery type. The default value is the same as sealed type. When modify it, please follow the below logistic relation:

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.

***Please carefully to select battery type. It will damage battery if the setting is incorrect.**

Environmental parameters

Environmental parameters	Parameter
Working temperature	-35℃ to +50℃
Storage temperature	-35℃to +80℃
Humidity	≤95% NC
Enclosure	IP30

LS1024B Mechanical parameters

Mechanical Parameter	Parameter
Overall dimension	138.6(5.46)x69.3(2.73)x37(1.46) mm/inches
Mounting dimension	126(4.96) mm/inches
Mounting hole size	Φ4.3
Terminal	$4mm^2$
Net weight	0.13kg

LS2024B Mechanical parameters

Mechanical Parameter	Parameter
Overall dimension	159.6(6.28)x81.4(3.2)x47.8(1.88) mm/inches
Mounting dimension	147(5.79)x50(1.97) mm/inches
Mounting hole size	Φ4.3
Terminal	$10mm^2$
Net weight	0.3kg

LS3024B Mechanical Parameters

Mechanical Parameter	Parameter
Overall dimension	200.6(7.9)x101.3(3.99)x57(2.24) mm/inches
Mounting dimension	190(7.48)x70(2.76) mm/inches
Mounting hole size	Φ4.5
Terminal	$10mm^2$
Net weight	0.5kg

Final interpretation right of the manual belongs to our company.

Any changes without prior notice!

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