Solar Charge Controller | LS1024EU

Polaroid Energy Systems

1. Safety Information

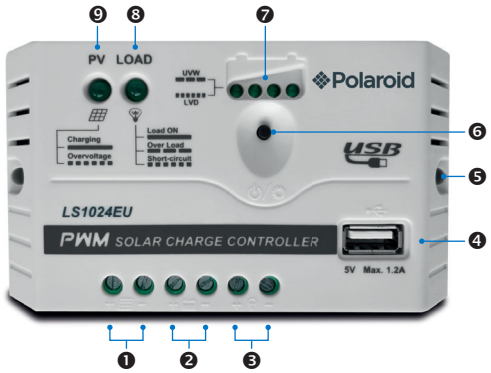
- Read all of the instructions in the manual before installation.
- **DO NOT** disassemble or attempt to repair the controller.
- Install external fuse or breaker as required.
- Do disconnect the solar module and fuse/ breakers near to battery before installing or moving the controller.
- Power connections 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 Polaroid Solar Charge 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
- Battery type and load output can be set via button
- Extensive Electronic protection

3. Product Features



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	❾ Charging status LED indicator
❺ Mounting Hole ø4.5mm	

4. Wiring

Connect the system in the order of ❶ battery ➞ ❷ load ➞ ❸ PV array and disconnect the system in the reverse order ❸ ❷ ❶ (see figure 2).

⚠ **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.

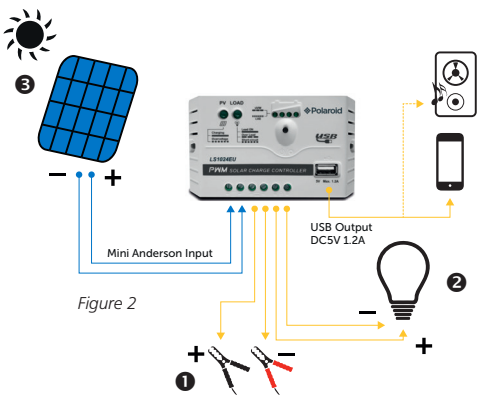


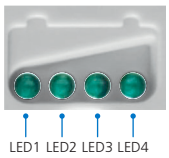
Figure 2

5. LED Indicators

- Charging and load status indicator

Indicator	Color	Status	Introduction
Charging status LED indicator	Green	ON	Charging
	Green	OFF	Not charging
	Green	Fast flashing	Battery over voltage
Load status LED indicator	Green	ON	Load ON
	Green	OFF	Load OFF
	Green	Slowly flashing	Load overload
	Green	Fast flashing	Load short circuit

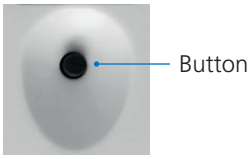
- Battery status indicator



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

NOTE:
1) Voltage value for 12V system at 25°C, please use 2x in 24V system
2) "o"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 5 seconds and LED will stop flashing.

Battery type indicator

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

Note: "o"LED indicator on | „×"LED indicator off

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6. Setting operation

Battery Voltage Control Parameters
Below parameters are for 12V systems at 25°C. Please double the values for 24V systems.

	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 upthe 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 load*	1) Please reduce the number of electric equipments 2) Press the button or repower the controller
Load status LED indicator fast flashing	Load short circuit	1) Check carefully loads connection, clear the fault 2) Press the button or repower the controller

*When load current reaches 1.25 times, 1.5 times and 2 times more than nominal value, the controller will automatically turn off loads in 60s, 5s and 1s respectively.

9. Technical Parameters

Nominal system voltage	12/24V auto
Rated charge current	10A
Rated discharge current	10A
Battery input voltage range	8~32V
Max. PV open circuit voltage	50V
Equalize charging voltage	Gel: – Sealed: 14.6V Flooded: 14.8V
Boost charging voltage	Gel: 14.2V Sealed: 14.4V Flooded: 14.6V
Float charging voltage	Gel: 13.8V Sealed: 13.8V Flooded: 13.8V
Low voltage reconnect voltage	Gel: 12.6V Sealed: 12.6V Flooded: 12.6V
Low voltage disconnect voltage	Gel: 11.1V Sealed: 11.1V Flooded: 11.1V
USB output port	5VDC/1.2A
Charge circuit voltage drop	≤0.13V
Discharge circuit voltage drop	≤0.17V
Self-consumption	≤5mA(12V); ≤7mA (24V)
Temp. compensation	-5mV/oC/2V
Enclosure	IP20
Grounding	Common Positive
Overall dimension	120.3 x 67 x 21.8mm
Mounting dimension	111.5mm
Mounting hole size	ø4.5mm
Terminals	12AWG / 4mm2
Net weight	100 gr
Working temperature	-35oC – +55oC
Humidity	≤95% N.C.

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 to this manual can be done without prior notice!**

11. Warranty and customer service

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