victron energy
BLUE POWER

Manual EN

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Appendix

BlueSolar PWM Charge Controller – LCD - USB

12V | 24V | 5A
12V | 24V | 10A
12V | 24V | 20A

1. General Information

IMPORTANT

- **Always connect the battery first, in order to allow the Controller to recognize system voltage**
- **Use a 12V (36 cells) solar array for a 12V system.**
- **Use a 24V (72 cells) solar array for a 24V system.**

The BlueSolar PWM Charge Controller series uses Pulse Width Modulation (PWM) charge voltage control combined with a multistage charge control algorithm.

2. Features

- Three stage battery charging [bulk – absorption – float]
- Battery type: Lead-acid and LiFePO4 (with internal BMS)
- Protected against over current.
- Protected against short circuit.
- Protected against reverse polarity connection of the solar panels and/or battery.
- Low voltage load disconnect.
- Temperature protection.

3. Installation

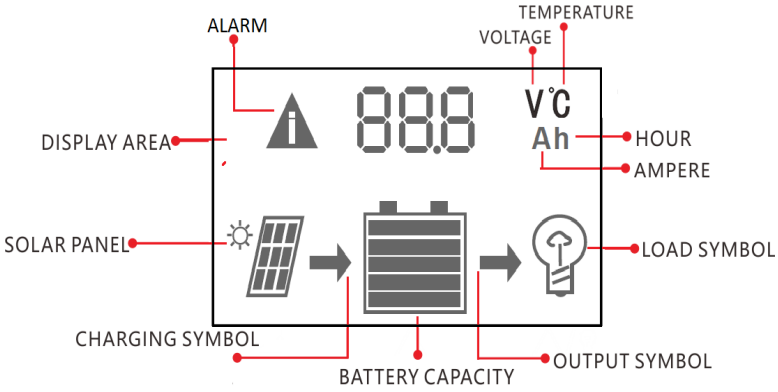
Important note: always connect the batteries first.

1. Connect the battery - plus and minus.
2. Connect the solar array - plus and minus.
3. Connect the load - plus and minus.

The reverse order applies when deinstalling.
An improper sequence order can damage the BlueSolar PWM Charge Controller!

1. Make sure the battery is charged for the BlueSolar PWM Charge Controller to recognize the battery type before first installation.
2. The battery cable should be as short as possible to minimize losses.
3. The controller is suitable only for lead-acid, and LiFePO4 batteries.
4. The BlueSolar PWM Charge Controller is suitable only for regulating solar panels. Never connect another charging source to the charge BlueSolar PWM Charge Controller.

4. LCD DISPLAY and SETTINGS



MENU: switch between different display, or to enter/exit setting by long press.

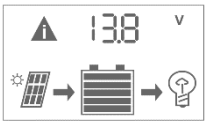
UP: press to change the settings when in setting mode.

DOWN: press to change the settings when in setting mode.
Load on/off button when in H mode.

4.1 Monitoring and settings

Values between [ ] are for 24V battery settings

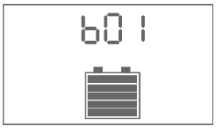
Boot Display. After connecting the battery the display shows the solar charger model and the system voltage as recognized by the solar charger.
105=BlueSolar PWM Charge Controller – LCD - USB 12V|5A
205=BlueSolar PWM Charge Controller – LCD - USB 24V|5A
110=BlueSolar PWM Charge Controller – LCD - USB 12V|10A
210=BlueSolar PWM Charge Controller – LCD - USB 24V|10A
120=BlueSolar PWM Charge Controller – LCD - USB 12V|20A
220=BlueSolar PWM Charge Controller – LCD - USB 24V|20A
Press MENU to enter next display.



Main display: battery voltage, battery state of charge, charging and discharging status.

Press MENU to enter next display.

Change settings in Main display. Press the MENU button for several seconds until the display flashes, you are in:



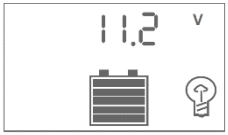
Battery type setting. See table below.

The factory setting is b01

	Battery type	Battery voltage	Absorb tion voltage	Float voltage	Low voltage disconnect factory setting	Low voltage disconnect range	Low voltage reconnect factory setting	Low voltage reconnect range
b01	LEAD-ACID [AGM]	12.0V [24V]	14.4V [28.8V]	13.7V [27.4V]	11.2V [22.4V]	10.5V-12.0V in steps of 0.1V	12.6V [25.2V]	12.0V-13.5V in steps of 0.1V
b02	LEAD-ACID [Gel]	12.0V [24V]	14.2V [28.4V]	13.7V [27.4V]	11.2V [22.4V]	10.5V-12.0V in steps of 0.1V	12.6V [25.2V]	12.0V-13.5V in steps of 0.1V
b03	LEAD-ACID [Wet]	12.0V [24V]	14.6V [29.2V]	13.7V [27.4V]	11.2V [22.4V]	10.5V-12.0V in steps of 0.1V	12.6V [25.2V]	12.0V-13.5V in steps of 0.1V
b04	12V LiFePO4*	12.8V	14.2V	13.35V	11.2V	10.5V-12.0V in steps of 0.1V	12.6V	12.0V-13.5V in steps of 0.1V
b05	24V LiFePO4*	25.6V	28.4V	26.7V	22.4V	21.0V-24.0V in steps of 0.1V	25.2V	24.0V-27.0V in steps of 0.1V

***The controllers do not have a remote on/off input. Therefore use LiFePO4 batteries with integrated BMS only (such as the Victron SuperPack batteries)**

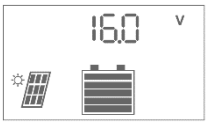
Press on the MENU key again and you are in:



Low voltage disconnect
The factory setting is 11.2V [22.4V]

Press on the MENU key again and you are in:

Low voltage reconnect
The factory setting is 12.6V [25.2V]

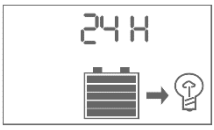


PV Voltage display: PV voltage and the state of charge of the battery.
Press MENU to enter next display.

Charge current display: PV to battery current and the state of charge of the battery.
Press MENU to enter next display.

Load output settings.
The factory setting is 24h (load output always on)

Change load output settings.
Press the MENU button for several seconds until the number flashes.



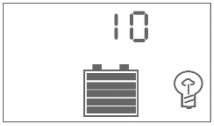
Load output setting.
See table below.

H	The load can switched on and off by the ▽/💡 Load on/off switch.
L	Load D2D Load will switch on at sunset and switch off at sunrise.
L01-L23	The load output will switch on after sunset and switch off after 1-23 hours.
24H	The BlueSolar PWM Charge Controller will continuously supply power to the load.

Press MENU to enter the next display
(Note: the Phoenix VE.Direct inverters can be controlled by connecting to the left side connection of the remote control to the load output)

Trigger level
When the BlueSolar PWM Charge Controller is set to L01-L23 the solar panel voltage will be measured to decide whether it is night or day to switch the load on or off.
The factory setting is 4V.

Press MENU to enter the next display



Trigger delay time
When the BlueSolar PWM Charge Controller measures a solar panel voltage lower than the trigger value it will delay for 10 seconds and measure again to make sure night falls.
Factory setting: 10 seconds

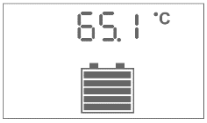
Press MENU to enter the next display

Short-circuit protection setting.
Some inductive or capacitive loads will trigger the short-circuit protection during start up. Therefore the SC-protection can be disabled manually. Sc.F = OFF, Sc.n = ON. The default is ON.

Discharge current display: load current and battery capacity, Press MENU to enter next display.

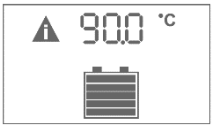
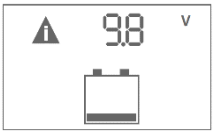
USB Voltage display: USB voltage
5V (2A max)

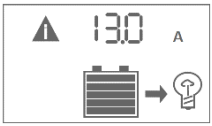
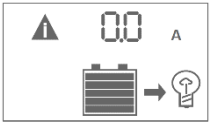
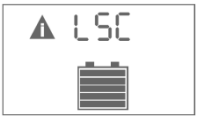
Press MENU to enter next display.



Internal controller temperature. If the controller overheats it will shut down and wait for the temperature to drop to normal level and then it will start working again.
Press MENU to enter Main display.

5. Alarms

	**High temperature** When temp ≥ 85℃, the controller will enter into the first protection phase: the PV input current will be lowered in order to reduce the temperature. There is no alarm on the LCD display. When temp >90℃, the controller will enter into the second protection phase: the PV input current will be reduced to zero, the load output will be switched off and a high temperature alarm icon will show on the LCD. After the temperature has decreased to less than 82℃, the controller will resume normal operation.
	**Low battery voltage** When the battery is discharged to less than the Low Voltage Disconnect (LVD) voltage, the controller will disable the load output. After over-discharge the load output will be re-enabled when the battery voltage reaches the Low Voltage Reconnect (LVR) level.

	**Over-current protection.** A load output over-current or short-circuit is indicated by a flashing load icon. The controller will disable the load output and try to re-enable after 30 seconds. Shut down after 60s in case of 110%-130% load. Shut down after 5s in case of 130%-160% load.
	**Short circuit protection** In case of a short circuit the controller will switch off the load output and wait for 30s and then try to restart.
	USB voltage high. Disconnect the USB load. If the alarm persists the USB output is defect.
	Wiring error or short circuit in the charge controller • Wiring error: the minus of the solar panel is connected to the minus of the battery. • Internal defect.
	Open circuit in the charge controller • Internal defect.
	Open circuit in the load output circuit • Internal defect.
	**Wiring error or short circuit in the load output circuit** • Wiring error: the minus of the load and the minus of the battery are interconnected. • Internal defect.

6.Specifications

BlueSolar PWM Charge Controller	12V|24V|5A		12V|24V|10A		12V|24V|20A	
	12V	24V	12V	24V	12V	24V
Battery Voltage	12/24V Auto Select					
Charge & Load Current	5A		10A		20A	
Charge mode	PWM, Time and Lighting Control					
Automatic load disconnect	Yes					
Maximum solar array voltage	55V					
Solar voltage range	15-28V [30-55V][2]					
Self-consumption	<10mA					
Protections	Reverse polarity connection of the solar panels. Reverse polarity connection of the battery. Low voltage disconnect. 130% load: Shuts down after 60sec. 160% load: Shuts down after 5sec. Short circuit: immediate shut down. Over-temperature protection.					
Solar Panel						
Recommended solar panel array	36cell [72cell][2]					
Max Solar Input Power	60W	120W	120W	240W	240W	480W
USB outputs						
Voltage	5V					
Current	2A (total from 2 USB outputs)					
Default settings						
Absorption charge (b01)[1]	14.4V [28.8V][2]					
Float charge (b01)[1]	13.7V [27.4V][2]					
Load disconnect (b01)[1]	11.2V [22.4V][2]					
Load reconnect (b01)[1]	12.6V [25.2V][2]					
Enclosure						
Terminal size	6mm² / AWG10					
Weight	150gr					
Dimension (h x w x d)	96 x 169 x 36 mm					
Mounting	Vertical wall mount, indoor only					
Humidity (non condensing)	Max. 95%					
Operating temperature	-35°C to +60°C (full load)					
Cooling	Natural convection					
Protection class	IP20					
Standards						
Safety	EN60335-1, IEC62109-1					
EMC	EN61000-6-1, EN61000-6-3					

[1] See also 3.1 Battery type setting.
[2] [V] values for 24V system.