



# GVB-8-WP (Boost) Manual

Waterproof Voltage Boosting Solar Charge Controllers with Maximum Power Point Tracking

For models:

GVB-8-Pb-12V-WP:	12V Lead-Acid/AGM/Gel/Sealed/Flooded
GVB-8-Pb-24V-WP:	24V Lead-Acid/AGM/Gel/Sealed/Flooded
GVB-8-Pb-36V-WP:	36V Lead-Acid/AGM/Gel/Sealed/Flooded
GVB-8-Pb-48V-WP:	48V Lead-Acid/AGM/Gel/Sealed/Flooded
GVB-8-Li-14.2V-WP:	12V (4s) Lithium Iron Phosphate
GVB-8-Li-28.4V-WP:	24V (8s) Lithium Iron Phosphate
GVB-8-Li-41.7V-WP:	36V (10s) Lithium Cobalt/Magnesium/Nickel
GVB-8-Li-54.2V-WP:	48V (13s) Lithium Cobalt/Magnesium/Nickel
GVB-8-Li-56.8V-WP:	48V (16s) Lithium Iron Phosphate
GVB-8-Li-58.4V-WP:	52V (14s) Lithium Cobalt/Magnesium/Nickel

**8A Input - 105W/210W/325W/350W**

GENASUN GV-BOOST WP (ALL MODELS) MANUAL, REVISION 5.0 | 2019

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IMPORTANT SAFETY INSTRUCTIONS | SAVE THESE INSTRUCTIONS

# Safety Instructions:

This manual contains important instructions for the GV-Boost GVB-8-Pb-**\*\***V-WP and GVB-8-Li-**\*\***.**\***V-WP solar charge controllers that shall be followed during installation and maintenance. Various models of the GVB-WP are available to charge different battery types as follows:

- **GVB-8-Pb-12V-WP:** 12V Lead-Acid/AGM/Gel/Sealed/Flooded
- **GVB-8-Pb-24V-WP:** 24V Lead-Acid/AGM/Gel/Sealed/Flooded
- **GVB-8-Pb-36V-WP:** 36V Lead-Acid/AGM/Gel/Sealed/Flooded
- **GVB-8-Pb-48V-WP:** 48V Lead-Acid/AGM/Gel/Sealed/Flooded
- **GVB-8-Li-14.2V-WP:** 12V (4s) Lithium Iron Phosphate
- **GVB-8-Li-24.8V-WP:** 24V (8s) Lithium Iron Phosphate
- **GVB-8-Li-41.7V-WP:** 36V (10s) Lithium Cobalt/Mg/Ni
- **GVB-8-Li-54.2V-WP:** 48V (13s) Lithium Cobalt/Mg/Ni
- **GVB-8-Li-56.8V-WP:** 48V (16s) Lithium Iron Phosphate
- **GVB-8-Li-58.4V-WP:** 52V (14s) Lithium Cobalt/Magnesium/Nickel

Consult your battery charging specifications to ensure that the GVB is compatible with your chosen batteries.

The GVB-8-WP includes an external 10A In-Line fuse rated for the maximum battery voltage.




**WARNING: EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED. DO NOT REMOVE OR REPLACE FUSES UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS. ATTENTION: RISQUE D'EXPLOSION. NE PAS CONNECTER NI DÉCONNECTER PAS LORSQU'IL EST SOUS TENSION. NE PAS CONNECTER LE CIRCUIT ALORS QUE EST VIVANT OU A MOINS QUE LA ZONE EST LIBRE DE CONCENTRATIONS IGNITAIRES. CAUTION for the GVB-8-Pb-**\*\***V-WP (Lead-Acid Versions Only): INTERNAL TEMPERATURE COMPENSATION. RISK OF FIRE, USE WITHIN 0.3 m (1 ft) of BATTERIES.** Lead-acid batteries can create explosive gases. Short circuits can draw thousands of amps from a battery. Carefully read and follow all instructions supplied with the battery. **DO NOT SHORT CIRCUIT** the solar array when plugged into the controller. **DO NOT MEASURE SHORT CIRCUIT CURRENT** of the array while connected to the controller. This may damage the controller, and such damage will not be covered under warranty. Grounding is not necessary for operation and is at the user's discretion. If the GVB-WP is to be used with a solar array electrically connected to earth ground, please note the following: **WARNING: THIS UNIT IS NOT PROVIDED WITH A GFDI DEVICE.** Consult Article 690 of the National Electrical Code (or the standards in force at the installation location) to determine whether a GFDI is necessary for your installation.

**WARNING: THIS UNIT IS NOT PROVIDED WITH DISCONNECT DEVICES.** Consult Article 690 of the National Electrical Code (or the standards in force at the installation location) to determine whether disconnect devices are necessary for your installation.

**LITHIUM WARNING:** Use caution when working with lithium systems. Genasun Li controllers use the CC/CV charging profile indicated on the controller. CHECK the specifications of the battery pack to ensure that the CV voltage is correct. Further check that the power supplied by the solar array and Genasun controller is within the battery specified design limits.

**LITHIUM BMS WARNING:** Genasun recommends using a lithium battery with a Battery Management System capable of disconnecting the solar charge controller in the event that any cell in the pack is outside of its rated temperature, current, or voltage range. Failure to do so may result in property damage, injury or death. Genasun highly recommends the use of a BMS with cell balancing. Cell balancing is mandatory for lithium iron phosphate. Use only copper conductors suitable for a minimum of 60 degrees C. If operation at high power or at high ambient temperatures is expected, wire with a higher temperature rating may be necessary.

## Product Certifications

		
<b>EMC</b> Conforms to: EN 61000-6-3:2007+A1:2011 EN 61000-6-2:2005 AS/NZS 61000-6-3:2012	<b>EMC</b> Conforms to: FCC (CFR Title 47) Part 15 Radio frequency Devices, Subpart B - Unintentional Radiators. Tested for compliance.	<b>Restriction Hazardous Substances</b> Conforms to: EN 50581:2012

## Inspection & Maintenance

Inspect the controller at least once per year to ensure proper performance.

- Check for animal or insect damage.
- Inspect for corrosion / water damage.
- Inspect the security of all connections.
- Ensure the solar array does not exceed the maximum input voltage.
- Repair and clean as necessary.

# Installation & System Connections:

- Connections should be made according to Article 690 of the National Electrical Code (NFPA 70) or the standards in force at the installation location.
- Electrical connections may be made in any order; however the sequence below is recommended.

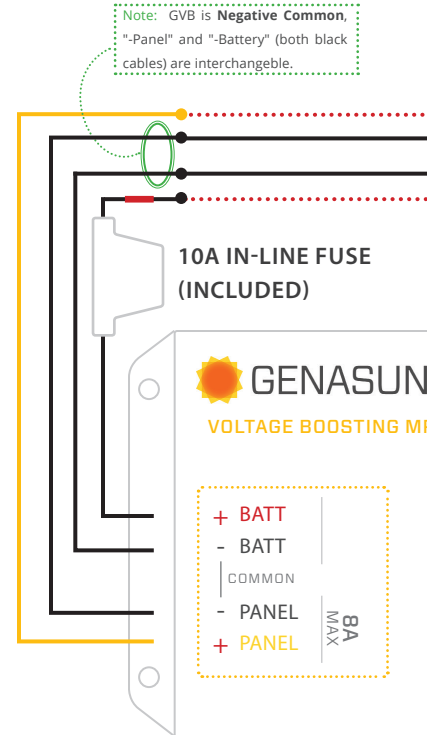
## 1 MOUNTING

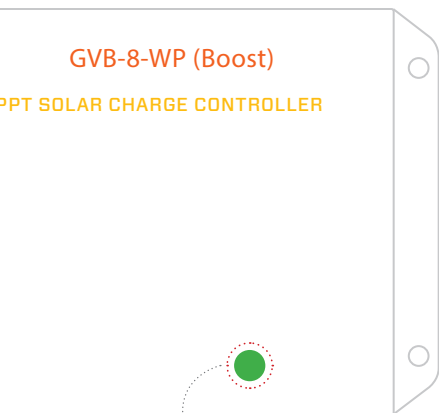
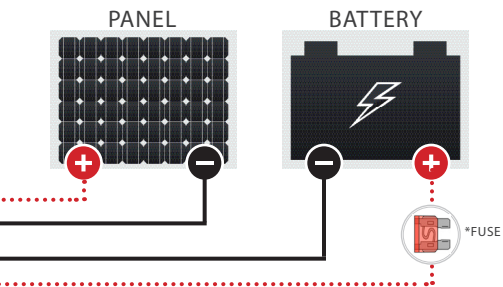
Mount the controller near your battery securely using the holes provided on the enclosure's flanges or with a means appropriate to the application.

- Mount near the battery (for lead-acid versions only, use within 0.3 m (1 ft) of batteries. See Caution, p.2).
- The GVB-8-WP can be mounted in any orientation on the floor or wall. We recommend a position in which all labels are clearly visible.
- Do not mount in direct sunlight or near a source of heat.
- Allow adequate airflow around the controller to achieve maximum output capability.



**Note\*:** The positive or negative battery cable must be protected by a fast-acting fuse or circuit breaker of 10A or less, rated for the maximum battery voltage and connected close to the battery terminal or power distribution block. This fuse will protect the wiring in the event of a short circuit or controller damage.





The GVB-WP has a **MULTICOLOR LED**. Learn about this indicator on the following page.

## 2 CONNECTING THE SOLAR PANEL

Connect the solar panel to the +PANEL and -PANEL terminals.

- In most applications, the panel should be connected only to the GVB-WP.
- The LED may blink red until a battery is connected.
- Do not use blocking diodes for single-panel installations. The GVB-WP prevents reverse-current flow.
- If multiple panels are being used in parallel, blocking diodes are recommended in series with each panel, unless the panel manufacturer recommends otherwise.
- Solar panel voltage rises in cold weather. Check that the solar panel open circuit voltage (Voc) will remain below the maximum input voltage of the GVB-WP at the coldest possible expected temperature.



**Note:** In the GVB-8-WP, the negative side of the battery is connected internally to the negative side of the solar panel.

## 3 CONNECTING THE BATTERY

Connect the battery to the +BATT and -BATT terminals.

- A small spark while connecting the battery is ok.
- Any loads should be connected directly to the battery. The GVB-WP does not provide protection against over-discharge.



**CAUTION, RISK OF FIRE OR EXPLOSION:** Do not make the final battery connection near lead-acid batteries that have recently been charging.

# Status Indication:

The GVB has a **MULTICOLOR** LED



## LED RUN/CHARGE INDICATION

Standby: The battery is connected properly and ready to charge when solar panel power is available.

2 SEC. BETWEEN BLINKS



Charging (low current, input current less than ~3.5A):

FAST & SHORT BLINKS



Charging (high current, input current more than ~3.5A):

LONGER, SLOWER BLINKS



Charging (current limit): charging at current limit.

The GVB is overloaded and limiting input current. Check that the solar panel rating is within the GVB's input specifications.

LONG, THEN SHORT BLINKS



Battery Charged: The battery is in the absorption or float charging stage.

SOLID GREEN



## LED ERROR INDICATION

Overheat: The controller's internal temperature is too high.

SETS OF 2 RED BLINKS



Overload: The GVB has been overloaded.

This could be caused by changing the solar panel connections while the controller is operating.

SETS OF 3 RED BLINKS



Battery voltage too high: Check that the correct GVB has been selected for the nominal system battery voltage. If the nominal battery voltage is correct, check the functioning of other chargers that may be connected to the system. This error can also be caused by a disconnected battery or blown fuse.

SETS OF 5 RED BLINKS



Internal Error: Contact your dealer for assistance.

2 LONG BLINKS, FOLLOWED BY ANY NUMBER

OF SHORT BLINKS



Battery voltage too low: The controller cannot begin charging due to low battery voltage. Charge the battery by some other means before use.

SETS OF 4 RED BLINKS



SOLID RED



OR OTHER LED INDICATIONS NOT LISTED

## Troubleshooting

If the LED Indicator will not light, or displays an indication not listed in this manual:

- Verify correct battery polarity;
- Check that there is a solid electrical connection to the battery;
- Check that battery voltage appears on the GVB-8 battery cables.

The GVB-8-WP will not operate without a battery. If the system appears to be overcharging or the GVB-8-WP will not begin charging, ensure that the solar panel is wired only to the GVB-8-WP.

If the GVB-8-WP does not appear to be charging, note that the GVB-8-WP waits up to one minute before trying to restart if it has shut down due to lack of power from the solar panel. If the LED indicator will not light with a battery connected, or blinks the over-battery-voltage error, or the controller does not charge, the fuse may be blown. The GVB-8-WP fuse is located in a black waterproof in-line fuse holder in the positive battery line. If the fuse is blown, replace it with a 10A fast-acting ATO or ATC fuse rated for the maximum battery voltage. Automotive-style fuses are typically rated to 32V, and are suitable for the GVB-8-Pb-12V-WP, GVB-8-Pb-24V-WP, GVB-8-Li-14.2V-WP, and GVB-8-Li-28.4V-WP. For the GVB-8-Pb-36V-WP, GVB-8-Pb-48V-WP, GVB-8-Li-41.7V-WP, GVB-8-Li-54.2V-WP, and GVB-8-Li-56.8V-WP, a fuse with a higher voltage rating is required. We recommend Littelfuse part number 142.6185.5102, rated 58V, or OPRIFUSE part number APR58-UL-10A (UL# is JFHR2-E504903), rated 58V. For more in-depth system troubleshooting, please visit the support area of our website: <https://sunforgellc.com/learning-center>.



### Note: The most common causes of blown fuses are:

- Connecting the GVB-8-WP to the battery backwards;
- Shorting the solar panel input while the GVB-8-WP is charging. In this case, there may be internal damage to the controller.

## Specifications:

### GVB-8-WP, All Models

Rated Panel (Input) Current:	8A*
Minimum Panel Voltage for Charging:	5V
Minimum Battery Voltage for Operation:	9.5V
Maximum Input Panel:	60V
Recommended Max Panel Voc at STC:	50V
Input Voltage Range:	0-60V
Maximum Input Short Circuit Current**:	8A*
Maximum Input Current***:	15A
Operating Temperature:	-40°C – 85°C
Maximum Full Power Ambient:	70°C
MPPT Tracking Speed:	15Hz
Environmental Protection:	IP68, Waterproof
Connection:	Flying Leads, 16 AWG tinned wire, pre-stripped
Certifications:	CE, FCC, RoHS

\*Panel ratings have increased since we designed the GVB. Although we don't believe in changing specifications without a corresponding engineering change, based on both our customers' experiences over the years as well as the headroom we designed into the GVB, we feel comfortable recommending the GVB for panels with Imp up to 9A. \*\*Panel Isc. Maximum input power and maximum input voltage requirements must also be respected. \*\*\*Maximum current that the controller could draw from an unlimited source. This specification is not intended for determining PV input.

# Specifications (cont.):

## GVB-8-WP, All Models

Weight:	10.3 oz., 290 g
Dimensions:	5.5 x 3.2 x 2.2", 14 x 8.1 x 5.5 cm
Warranty:	5 years

### GVB-8-Pb-12V-WP

### GVB-8-Pb-24V-WP

### GVB-8-Pb-36V-WP

### GVB-8-Pb-48V-WP

Charge Profile:	Multi-Stage with Temperature Compensation			
Nominal Battery Voltage:	12V	24V	36V	48V
Maximum Recommended Panel Vmp:	13V	26V	41V	43V
Maximum Recommended Panel Power (8A Panel w/~155mm cells):	105W	210W	325W	350W
Bulk Voltage:	14.4V	28.8V	43.2V	57.6V
Absorption Voltage:	14.2V	28.4V	42.6V	56.8V
Absorption Time:	2 Hours			
Float Voltage (Pb models) or CV Voltage (Li models):	13.8V	27.6V	41.4V	55.2V
Battery Temperature Compensation: (referred to 25°C)	-28mV/°C	-56mV/°C	-84mV/°C	-112mV/°C
Electrical Efficiency:	95% - 97% typical	96% - 98% typical	96% - 98% typical	96% - 99% typical
Night Consumption:	7mA	6mA	6mA	5mA

### GVB-8-Li-14.2V-WP

### GVB-8-Li-28.4V-WP

### GVB-8-Li-41.7V-WP

### GVB-8-Li-54.2V-WP

### GVB-8-Li-56.8V-WP

### GVB-8-Li-58.4V-WP

Battery type:	4S LiFePO4	8S LiFePO4	10S Li-ion	13S Li-ion	16S LiFePO4	14S Li-ion
Charge Profile:	CC/CV				CC/CV	
CV Voltage:	14.2V	28.4V	41.7V	54.2V	56.8V	58.4V
Battery Temperature Compensation:	Disabled					
Maximum Recommended Panel Vmp:	13V	26V	39V	43V	43V	43V
Maximum Recommended Panel Power:	105W	210W	325W	350W	350W	350W
Electrical Efficiency:	95% - 97% typical	96% - 98% typical	96% - 98% typical	96% - 99% typical	96% - 99% typical	96% - 99% typical
Night Consumption:	7mA	6mA	6mA	5mA	5mA	5mA