GENASUN

GV-5 Manual

Solar Charge Controllers with Maximum Power Point Tracking

For models:

GV-5-Pb-12V:	12V Lead-Acid/AGM/Gel/Sealed/Flooded
GV-5-Pb-CV:	12V Custom Multi-Stage Lead-Acid/AGM/Gel/Sealed/Flooded
GV-5-Li-10.7V (-SP):	9V (3s) Lithium Iron Phosphate
GV-5-Li-12.5V:	11.1V (3s) Lithium Cobalt/Polymer
GV-5-Li-14.2V:	12V (4s) Lithium Iron Phosphate
GV-5-Li-16.7V:	14.8V (4s) Lithium Cobalt/Polymer
GV-5-Li-CV(**.*V):	Custom CC/CV or Multi-Stage Lithium Variation

5A / 65W (see specs p.7 for the max. power of Li-ion versions.)

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GENASUN GV-5 (ALL MODELS) MANUAL, REVISION 2.0 | 01.2018

IMPORTANT SAFETY INSTRUCTIONS | SAVE THESE INSTRUCTIONS

Safety Instructions:

This manual contains important instructions for the GV-5-Pb and GV-5-Li solar charge controllers that shall be followed during installation and maintenance. Various models of the GV-5 are available to charge different battery types as follows:

- **GV-5-Pb-12V:** 12V Lead-Acid/AGM/Gel/Sealed/Flooded
- **GV-5-Pb-CV:** 12V Custom Multi-Stage Lead-Acid/AGM/Gel/Sealed/Flooded
- **GV-5-Li-10.7V (-SP):** 9V (3s) Lithium Iron Phosphate
- **GV-5-Li-12.5V:** 11.1V (3s) Lithium Cobalt/Polymer
- **GV-5-Li-14.2V:** 12V (4s) Lithium Iron Phosphate
- **GV-5-Li-16.7V:** 14.8V (4s) Lithium Cobalt/Polymer
- **GV-5-Li-CV(**.*V):** Custom CC/CV or Multi-Stage Lithium Variation

Consult your battery charging specifications to ensure that the GV-5 is compatible with your chosen batteries.

The GV-5 does not include a fuse. Overcurrent protection suitable for the application must be provided by the user.

WARNING: EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED. DO NOT DISCONNECT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS FREE OF IGNITABLE 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 GV-5-Pb (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. Use only 12V lead-acid batteries with GV-5-Pb-12V and GV-5-Pb-CV.

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 GV-5 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 12-30 AWG (3.0 mm^2 max) 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.

Recommended terminal block tightening torque: 3-5 in-lbs, 0.35-0.55 Nm.

Inspection & Maintenance

No user-serviceable parts inside.

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:

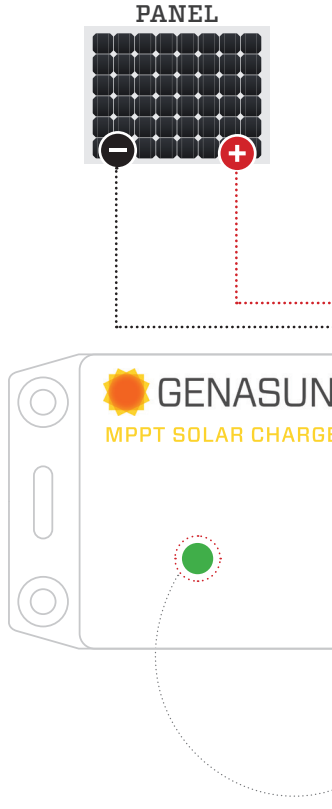
- Connections should be made according to Article 690 of the National Electrical Code (NFPA 70) or the standards in force at the installation location.
- Electrical connections may be made in any order; however the sequence below is recommended.

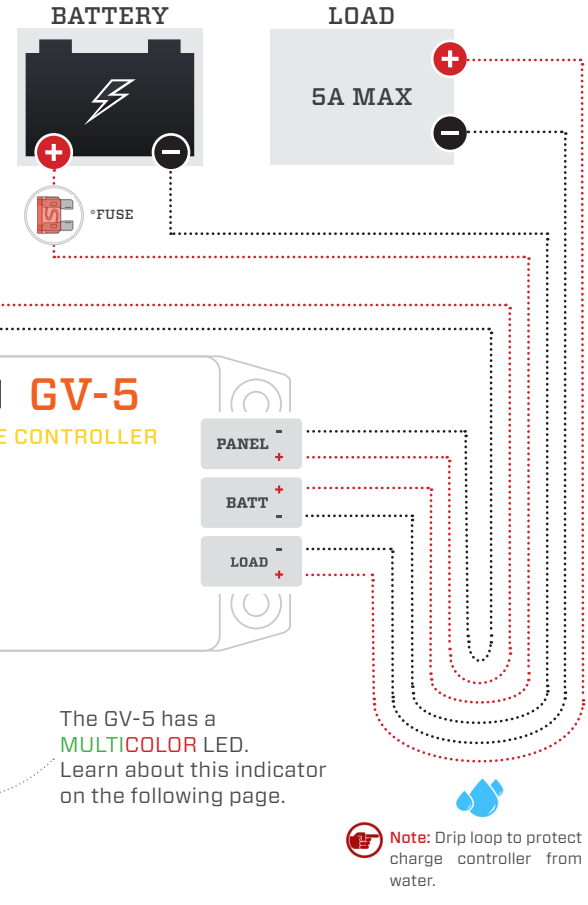
1 MOUNTING

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 GV-5 can be mounted in any orientation on the floor or wall. We recommend a position in which all labels are clearly visible.
- Do not expose to water.
- Do not mount in direct sunlight or near a source of heat.
- Allow adequate airflow around the controller to achieve maximum output capability.
- For outdoor use, the controller must be housed in an enclosure providing protection at least equivalent to NEMA Type 3.

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.





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 GV-5.
- Never connect the panel negative to the battery negative, as your batteries may be damaged.

Note: In the GV-5, the positive side of the battery is connected internally to the positive side of the solar panel.

- Do not use blocking diodes for single-panel installations. The GV-5 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 GV-5 at the coldest possible

3 CONNECTING THE BATTERY

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

- A small spark while connecting the battery is ok.

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

4 CONNECTING THE LOAD

Connect the load(s) to the +LOAD and –LOAD terminals.

- The load draw should not exceed 5A continuous.
- Larger loads should be connected directly to the battery. The GV-5 will not be able to provide protection against over-discharge (Low Voltage Disconnect) in this case.

Status Indication:

The GV-5 has a MULTICOLOR LED

LED RUN/CHARGE INDICATION

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

8-10 SEC. BETWEEN GREEN BLINKS

Charging (low current, less than 0.3A):

4-5 SEC. BETWEEN GREEN BLINKS

Charging (between 0.3A - 3A):

FAST GREEN BLINKS

Charging (high current, more than 3A):

LONGER, SLOWER GREEN BLINKS

Charging (current limit): charging at current limit. The GV-5 is overloaded and limiting charging current.

LONG, THEN SHORT GREEN BLINKS

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

SOLID GREEN LED

LED ERROR INDICATION

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

SETS OF 2 RED BLINKS.

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

SETS OF 3 RED BLINKS.

Battery voltage too low: The controller cannot begin MPPT charging due to low battery voltage. If the nominal battery voltage is correct (12V), wait for the GV-5's trickle function to bring the battery voltage up, or charge the battery by some other means.

SETS OF 4 RED BLINKS

Battery voltage too high: If the nominal battery voltage is correct, check the functioning of the BMS (lithium systems) and any other chargers that may be connected to the system.

SETS OF 5 RED BLINKS.

Panel voltage too high: Only 12V nominal solar panels may be used with this controller.

SETS OF 6 RED BLINKS.

Internal Error: Contact your dealer for assistance.

2 LONG BLINKS, FOLLOWED BY ANY NUMBER OF SHORT BLINKS.

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 GV-5 battery terminal screws;
- Check the GV-5 terminal area for evidence of water or mechanical damage.

The GV-5 will not operate without a battery. If the system appears to be overcharging or the GV-5 will not begin charging, ensure that the solar panel is wired only to the GV-5, and in particular that the solar panel negative terminal is not connected to ground (battery negative). For more in-depth system troubleshooting, please visit the support area of our website: www.genasun.com/support/

Specifications:

	GV-5-Pb-12V	GV-5-Li-**.*V	
Maximum Recommended Panel Power:	65W	GV-5-Li-10.7V	50W
		GV-5-Li-10.7V-SP	20W
		GV-5-Li-12.5V	55W
		GV5-Li-14.2V	65W
		GV5-Li-16.7V	75W
Rated Battery (Output) Current:	5A	5A (-SP model: 2A)	
Nominal Battery Voltage:	12V	N/A	
Maximum Input Voltage:	27V	27V	
Recommended Max Panel Voc at STC:	22V	22V	
Minimum Battery Voltage for Normal Operation:	7.2V	7.2V	
Trickle Charge to Recover Dead (OV) Battery:	Yes	Yes	
Maximum Input Short Circuit Current*:	5A	5A (-SP model: 2A)	
Continuous Rated Load Current:	5A	5A	
Maximum Input Current**:	9A	9A	
Electrical Efficiency:	96% - 99.85% typical	94% - 99.85% typical	
Operating Consumption:	0.150mA (150uA)		
Night Consumption:	0.125mA (125uA)		

*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.

Specifications (cont.):

	GV-5-Pb-12V	GV-5-Li-**.*V	
Charge Profile:	Multi-Stage with Temperature Compensation	CC-CV	
Absorption Voltage:	14.2V	-	
Absorption Time:	2 hours	-	
Float Voltage (Pb models) or CV Voltage (Li models):	13.8V	GV-5-Li-10.7V (-SP)	10.7V
		GV-5-Li-12.5V	12.5V
		GV5-Li-14.2V	14.2V
		GV5-Li-16.7V	16.7V
Load (LVD) Disconnect/Reconnect Voltage:	11.4/12.5 V	GV-5-Li-10.7V (-SP)	8.2/9.0 V
		GV-5-Li-12.5V	9.3/10.5 V
		GV5-Li-14.2V	11.0/12.0 V
		GV5-Li-16.7V	12.4/14.0 V
Battery Temperature Compensation:	-28mV/°C	-	
Operating Temperature:	-40°C – 85°C		
Maximum Full Power Ambient:	50°C		
Tracking Efficiency:	99+% typical		
MPPT Tracking Speed:	15Hz		
Environmental Protection:	IP40, Conformal Coating, Nickel-Plated Brass & Stainless Hardware		
Connection:	6-position terminal block for 12-30AWG wire		
Weight:	2.8 oz., 80 g		
Dimensions:	4.3 x 2.2 x 0.9", 11 x 5.6 x 2.5 cm		
Warranty:	10 years		

Certifications: