



High Sierra Electronics

Model 5301 Solar Panel Instruction Manual 60-5301-03(B)

1.0 INTRODUCTION

1.1 General Description

The 5301, 100 milliampere Solar Panel is used for maintaining battery charge at sites that have moderate power requirements such as weather stations or remote flood warning sites. The panel comes complete with a mounting bracket and voltage regulator to prevent overcharging.

CAUTION: Photovoltaic modules do not have to be connected to a load to generate electricity. When installing this system, be certain to cover the front of the panel with an opaque covering until all electrical connections are made.

1.2 Receiving Inspection and Unpacking

The 5301 Solar Panel is a fragile unit. Exercise care during unpacking and installation. If any portion of the solar panel appears to be damaged, notify the carrier immediately and request an inspection. You must notify the carrier within fifteen (15) days of shipment. If a claim is not made within that time period, then the carrier will not acknowledge any claim for the lost or damaged goods.

1.3 Parts

- 1 Model 5301 100mA Solar Module with 20 foot, 18 gauge Power Cable
- 1 Solar Panel Instruction Manual 60-5301-03 (B)
- 1 Solar Panel Assembly Diagram 61-5301-03
- 1 Solar Panel Test Wire Diagram 06-5301-03
- 1 Solar Panel Kit 10-5301-03
 - 1 HSE Model 5310 ProTech Solar Panel Voltage Regulator
 - 12ft. 2-Wire 18 Gauge Power Cable with 3- pin MS Female Connector
 - 2 U bolts for 1-1/2" OD mast with mounting plate and four 1/4 -20 hex nuts with flat and lock washers
 - 3 UV Resistant 8 inch Cable Ties
 - 3 4 inch cable ties
 - 2 6-32 x 1/2 inch machine screws, lock washers and hex nuts
 - 1 3/16" cable clamp
 - 1 06-12091-03 Wire Diagram

1.4 Tools Needed

- Ladder
- 7/16" End Wrench
- 5/16" End Wrench
- 1/8" Allen Wrench
- 1/8" flat blade screwdriver
- #2 Phillips head screwdriver
- Multimeter with voltage and current scales appropriate for solar panel to be tested.
- Key to top section, or tools to remove top section from standpipe.
- Optional: Model 5507 Solar Panel Test Kit

2.0 *INSTALLATION*

Before installing the solar panel it is recommended that the unit be tested to verify that it is operating correctly (see section 5). The Model 5301 Solar Panel can be mounted vertically on the Antenna Mast for most user applications. If the system power is adequate in winter, it will be satisfactory during the rest of the year. Should it be necessary to tilt the solar panel, contact High Sierra Electronics for the appropriate hardware to mount the panel.

High Sierra Electronics' recommends that this unit be mounted on the antenna mast just below the antenna.

1. Determine due south and make a small mark on the antenna mast indicating the southern face of the mast. Remove the mast from the standpipe.
2. Mount the solar panel to the mast with the U-bolts provided (Figure 1). The panel should be oriented so that the power cable exits at the bottom of the mounting bracket. For most applications the solar panel may be mounted vertically on the pole.
3. Loop the cable up the mast and feed the cable through the opening at the top of the mast and push the cable through the length of the mast.
4. Wire tie the Power Cable to the mast both above and below the solar panel with the eight inch ultra violet resistant cable ties provided.
5. If the mast has been removed from the standpipe, reattach the mast to the standpipe. Be sure that the solar panel is facing South before securing the mast. If the solar panel is mounted with a tilt, be certain that it does not overhang the top section orifice.
6. Feed the power cable into the standpipe through the cable entry opening. Connect the power cable to the 'input' terminals of the 5310 Voltage Regulator. Connect the power cable section with the 3-pin female MS connector to the 'Output' terminals on the 5310 Voltage Regulator.

NOTE: Be certain to observe the correct polarity when connecting the power cable, Red to (+), Black to (-).

7. Secure the 5310 Voltage Regulator to the mounting bracket at the top of the standpipe with the two 6-32 x 1/2 inch machine screws. (If the standpipe does not have a mounting plate, secure the 5310 Voltage Regulator to the bracket that secures the rope. Use the four inch nylon cable ties provided.) Be certain to use at least one of the cable ties as a strain relief for the power cable regardless of how the 5310 Voltage Regulator is attached.
8. Verify that the solar panel is working properly - See section 5.
9. Connect the 3-pin MS connector to the terminal marked '12 VDC IN' on the Model 3206 ALERT Transmitter.
10. Replace the Transmitter in the standpipe and replace the top section onto the standpipe.

NOTE: Be certain to check that the tipping bucket is level whenever the top section has been removed.

3.0 OPERATION

The 5301 Solar Panel provides reliable, virtually maintenance-free power to maintain the batteries used in High Sierra Electronics' equipment. The photovoltaic modules convert light energy to direct current (DC) electrical energy. The solar panel produces voltages in excess of the maximum requirements of the twelve volt battery and electronic circuitry of High Sierra Electronics equipment and must be used in conjunction with a voltage regulator such as the Model 5310. Other types of voltage regulators may be used, but some regulators cause power drain when no sun is present or if the solar panel is disconnected from the regulator.

4.0 MAINTENANCE

The 5301 should be carefully wiped clean and free of any debris every time the site is serviced and at least once per year. Dirt accumulated on the surface should be cleaned with a clean sponge or soft cloth using water and a mild detergent. Do not use a scrub brush. Confirm that the 5301 is facing in the correct direction and is at the proper angle. Check all cables and associated connectors for damage. Verify that the solar panel and regulator are working properly (See Section 5).

5.0 TESTING : Refer to Wire Diagram 61-5301-02

- Check all cables for damage.
- Check to be certain that the terminal connections at the voltage regulator are tight and that there is no corrosion evident. Clean as necessary.

To test the 5301 for proper operation, you will need a Multimeter for measuring current. It is best to test the panel through the length of the entire power cable including the 3-pin female MS connector. The High Sierra Electronics Model 5507 Solar Panel Test Kit has a test fixture that is a useful aid in testing the solar panel. If you do not have a test kit, refer to 61-5301-02 and follow these instructions:

1. The Solar Panel cable should not be connected to the equipment. Uncover the solar panel and place in full sun. Set the multimeter to read voltage and place the probes on the "input" terminals of the solar panel regulator. The open circuit voltage (battery not connected) should be around 17.5 volts (61-5301-02). Move the probes to the "output" side of the voltage regulator (61-5301-01). The open circuit voltage should be around 13.7 Volts.

NOTE: If the output voltage is in excess of 14.5 volts contact High Sierra Electronics for help.

2. Set the multimeter to the proper scale for the anticipated solar panel current. Connect the meter in series with the solar panel and a 12 volt battery, preferably one that is not at full charge. If you do not have a Solar Panel Test Kit it is best to disconnect the power lead from the "output" side of the voltage regulator [diag. 2 (C)] and connect the meter between the voltage regulator and the power cable. Plug the 3 pin female connector into the transmitter. The reading on the ammeter should be AT or ABOVE the panel rating after a few minutes in full sun. Note, the 5301 may read below the rated amperage if the battery being used has a good charge, and it may take five to fifteen minutes to show a full scale reading. If there is not a battery available with a partial discharge, check the short circuit current of the panel by disconnecting the panel from the regulator and connecting the ammeter leads between the signal wires. The current reading should be above the solar panel rating. With the voltage regulator connected to the solar panel and the ammeter leads connected to the output side of the voltage regulator, turn the panel over or cover it completely and check the ammeter reading to be certain that the 5301 does not draw current when there is no sun.
3. If the solar panel is performing as expected, remove the cable from the equipment and remove the meter from the circuit. Reconnect the solar panel cable to the Voltage regulator and reattach the cable to the equipment.

If the 5301 Solar Panel does not perform to specification, assistance is always available by calling High Sierra Electronics Customer Service between 8:00am and 5:00pm Pacific Standard Time at (916) 273-2080; Fax (916) 273-2089. It should be noted that the majority of all failures are due to bad connections.

7.0 RETURNS

If you need to return the 5301 Solar Panel for any reason, call High Sierra Electronics at (916) 273-2080 between 8:00am and 4:00pm Pacific Standard Time. Ask for a Return Authorization Number (RA#) to be assigned to your unit.

Carefully pack the equipment so that it will not be damaged in shipment, and write the RA# on the outside of the box and on any paperwork enclosed with the unit. Please include a brief description of the problem and the conditions under which the unit failed.

8.0 WARRANTY

All High Sierra Electronics' manufactured products are warranted against defects in materials and workmanship for a period of three (3) years from date of shipment. If

equipment fails due to such defects, High Sierra Electronics will, at its option, repair or provide a replacement for the defective part or product. In no case will High Sierra Electronics be liable for more than the original purchase price.

Equipment supplied by High Sierra Electronics and manufactured by others carries the respective manufacturer's warranty. High Sierra Electronics assumes no warranty obligation, either express or implied, for equipment manufactured by other and supplied by High Sierra Electronics.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH IS EXPRESSLY DISCLAIMED.



High Sierra Electronics Inc.

*155 Spring Hill Dr. Suite 106
Grass Valley, CA 95945*

Phone: (530) 273-2080

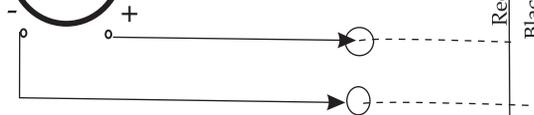
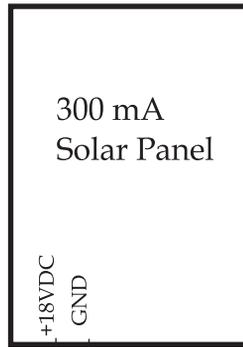
Fax: (530) 273-2089

Solar Panel Test Diagram

Test #1

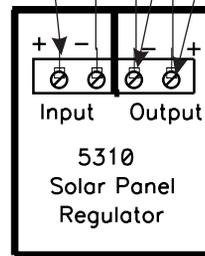
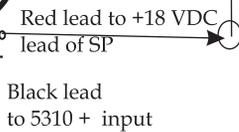
Disconnect Solar Panel leads from Model 5310 regulator for this test.
 Set meter to read direct current.
 Short Circuit current >290 mA

Set to read DC Voltage:
 Open circuit voltage: >18VDC



Test #2

Set meter to read direct current
 insert meter leads in current socket.
 On battery with low voltage: >250 .mA



Test #3

Set meter to read Voltage
 13.6-13.9 VDC



Red +12VDC
 Black: GND

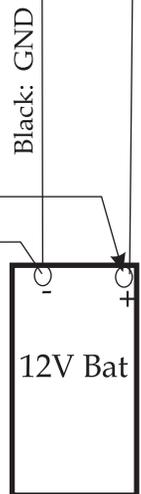


Test #4

Set meter to read direct current
 insert meter leads in current socket.
 (Check manual specifications for maximum current draw)



Black lead to 12VDC input
 Red lead to +12VDC
 Black: GND



Note: When testing solar panel and regulator, disconnect system from Rugid computer

All tests to be conducted in full sun

 High Sierra Electronics 155 Spring Hill Drive, Grass Valley CA 95945 Phone: (530) 273-2080 Fax: (530) 273-2089			
TITLE:			
MODEL NO.:	DRAWING NO.:	REV.:	APPROVED BY:
DATE:	DRAWN BY:		
FILE NAME:	SHEET:	DO NOT SCALE	