



Model 6958 DC-DC Converter

Rev 4

Owner's Manual

June 3, 2018

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I Introduction

Model 6958 is shipped in fully assembled form. The installer should locate a bag containing a quantity of (4) blade terminals intended for use with the I/O cabling to be used with the unit. After removal of the unit from its packaging it should be verified that it has suffered no damage in shipment. It is very important to follow the instructions of this manual to ensure proper connection and mounting.

Model 6958 is a high power 12 Volt to a maximum of 58.4 Volt DC-DC battery charger capable of delivering 20A to a lithium iron phosphate battery bank of 16 cells and nominal 51.2V rating. It is designed for mounting in vehicles of all types and is capable of enduring harsh vibration and shock.

II Installation

2.1 Mounting

Model 6958 has an overall length of 17.85 inches with mounting flanges included in this dimension. Hole mounting centers are 17.34 x 3.93 (inches)

2.2 Connections

Tools Required - 1 flat blade screw driver (1/4 in. wide)

Figure 1 shows the connection panel view of the 6958.

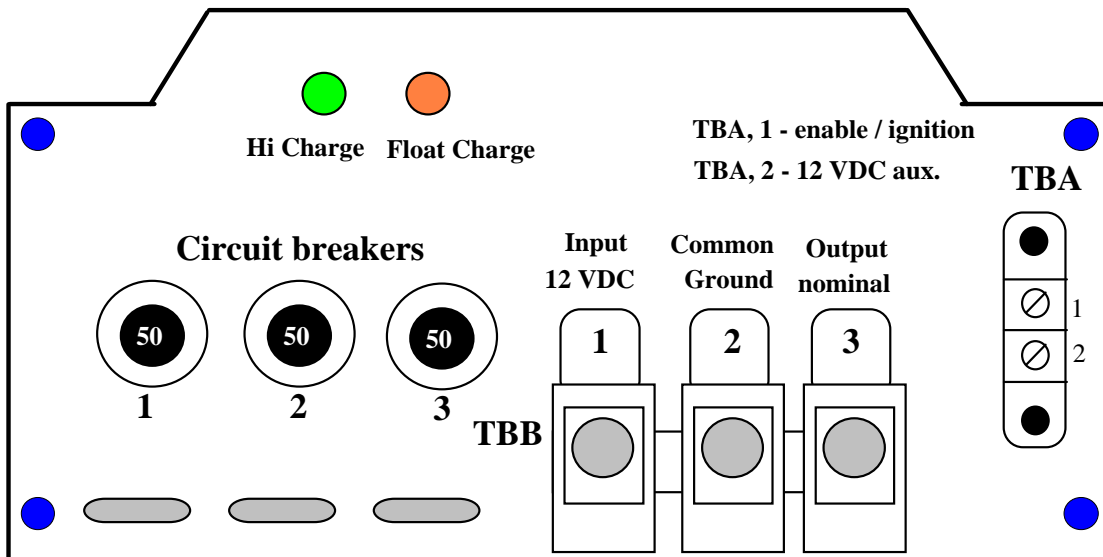


Figure 1

Prior to Main Input Power Connections:

The 6958 comes supplied with 4 blade terminals intended for crimping on to #2 AWG multi-stranded battery cable. It is important to utilize these terminals in order to realize reliable high current capacity connections between the terminal block and input/output cables.

Prior to hook up to the vehicle power source, the buttons on the three circuit breakers shown in Figure 1 should be pulled out into the OFF position. This position is indicated by the exposure of the white portion of the breaker button shaft. This ensures that there is no sparking from the source of power and also allows a reprieve in case there should be a hook up error. (This error would have to be detected prior to energizing the unit).

Once the breaker buttons are pulled, proceed to make connections as follows:

- A) Connect input +12V line to position #1 of TBB.
- B) Connect input GROUND to position #2 of TBB.
- C) Connect output (+51V nominal) line to position #3 of TBB.
- D) Connect output GROUND to position #2.

Prior to depressing the circuit breaker buttons, installer should:

- 1) Ensure that hook up in steps A through D are correct.
- 2) Select the method of converter activation.

Grounding Stud: The flat side of the unit is equipped with a ground stud which is connected to the 6958 housing. It may be connected to the battery ground of the vehicle at the user's option.

2.3 Methods of Converter Activation (with all circuit breakers on)

- A) Connect terminal #1 to terminal #2 on terminal block TBA. (The 6958 is shipped from the factory with a shorting jumper in place between those terminals.) This configuration allows for converter activation by turning the source power "ON". For this method the circuit breakers must be left in the ON position.
- B) Alternately the converter can be switched on from the vehicle's ignition system. Remove the jumper between terminals #1 and #2 on TBA. To energize the charger, connect terminal 1 to 12 V through the ignition switch or another switch that would enable terminal 1 to access 12 VDC. For this method the circuit breakers must be left in the ON position.
- C) Terminal #1 can be connected to terminal #2 through a remote ON/OFF switch or relay contacts thereby activating the charger. For this method the circuit breakers must be left in the ON position.

III Performance Characteristics and Indicator Light Functions

Once 6958 is properly connected, it is ready for activation. A microprocessor controls the 6958 performance and protection functions:

ON STATE FUNCTIONS

Output Voltage Cycles

- A) Upon initial turn on, the unit comes on with a charging voltage of 58.4 VDC limited to 24A. This state is discernible by the illumination of the green light (high charge indicator). If the battery bank (load) becomes fully charged with battery charging current being less than 1.5A, the unit will stop charging and remain in a state of sensing the output voltage. In this state the amber light turns ON and the green one turns OFF.
- B) Should the voltage float down to 51V, the 6958 will auto adjust its voltage to 58.4 VDC which is discernible by the amber light turning off and the green light (high charge indicator) turning on.
- C) As the battery bank charges up again, the 6958 monitors output current. When the current dips below 1A-2A, the charger turns off. This becomes discernible by the green light turning OFF as the amber light turns ON.
- D) Each time the charger is activated by the remote terminals or energized by the application of power, it goes into charge mode.

Current Limit and Overload

- A) In charge mode, the 6958 will supply up to a maximum of 22A at 58.4 VDC and will current limit should the load demand more than 24A.
- B) Should severe loading occur, bringing the output voltage below 36 VDC, the unit will shut off.
- C) Once the unit has endured such severe overloads (B), in order for it to resume normal functions the overload must be removed. Then the charger needs to be reset by power down and then power up by any of the means described in section 2.3. Ten minutes should be allowed prior to power up. In this period the cooling fan of the unit may bring internal temperatures down to tolerable limits.

Input Voltage Limits

- A) The nominal input operating voltage of the Model 6958 is 12VDC. The unit will accept a range between 10.8 VDC and 16 VDC. When input voltage is outside of this range, the unit shuts down and the amber light flashes continuously.
- B) After the unit shuts down due to the input voltage dipping below 10.8, it will turn back on once input voltage is restored back to at least 11.8V after a minimum time lapse of 5 seconds. This hysteresis and delay prevent ON/OFF input chatter.

OFF STATE

- A) When the unit is inactive both lights are off.

Table 1 shows the correspondence between indicator light states and the state of unit's operation:



GREEN	AMBER	STATE
		
OFF	ON	Charging Off
ON	OFF	Charge On
OFF	FLASHING	Low Input Voltage
OFF	OFF	Unit Off

Table 1

IV Battery Type Selection

Model 6958 is preprogrammed at the factory to be usable with batteries of 2 distinctive chemistries – 16 cell Lithium Iron Phosphate and 48V Lead Acid (AGM). The algorithm to charge Lithium Iron Phosphate or AGM is selectable by the position of a slide switch located on the blank panel of the unit.

Units are shipped from the factory with switch position in the Lithium mode. Figure 2 shows a battery type selector switch available at the rear of the unit to allow the user to select the AGM profile.

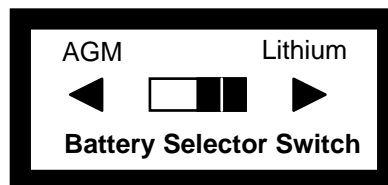


Figure #2

IV Internal Adjustment of Output Voltage

There should be no need for any adjustment provided the unit is used for its intended application. In the event that there is a need to alter the output voltage, use the following procedure:

Varying the adjustments of the Model 6958 requires the technician to have a stable DC power supply variable from at least 10 VDC to 15 VDC with a current capacity of at least 3A. This adjustment should be conducted with no load on the charger.

To access the adjustment turn the unit upside down and remove the base plate by unscrewing the 4 securing screws in its corners.

Orient the converter upside down and horizontally with the connection panel to the left as shown in figure #3.

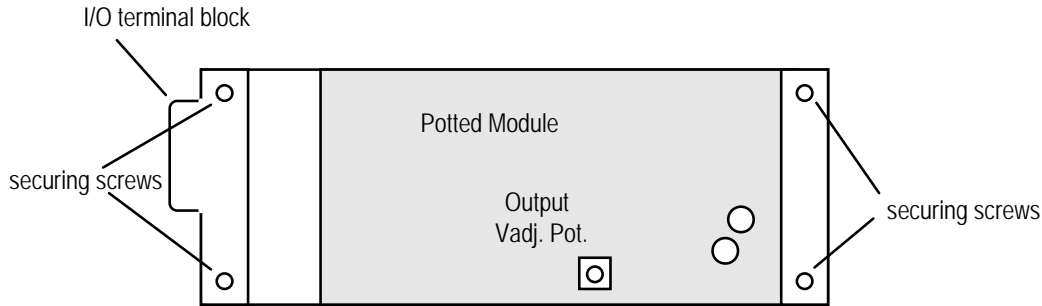


Figure #3

A potentiometer can be noticed. Pink sealant compound may need to be removed to gain access.

The potentiometer is used to adjust output voltage in a range of 47.5 - 56.3 VDC at no load float condition (amber light is ON). 6958 is factory adjusted in the Lithium Iron Phosphate setting to 51.2 VDC output at no load (float voltage). This corresponds to a high charge voltage of 58.4. If the float voltage is changed, the high charge voltage will automatically also be altered by the same amount.

4.1) Instrumentation Configuration for Voltage Adjustment

a) Hook up the unit under test as shown in Figure #4

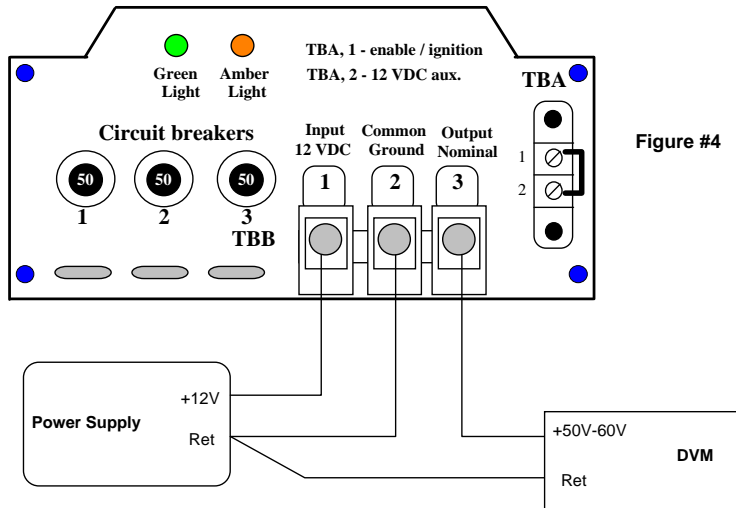


Figure #4

b) Make sure terminals 1 & 2 on TBA are jumpered and that the power supply is turned off. Set the DVM to the appropriate scale to read 60 VDC at the desired accuracy.

c) Energize power supply and adjust its output voltage to +12 VDC. Adjust potentiometer to the desired output (between 47.5 VDC and 56 VDC) as read on the DVM.

d) Turn off power supply.

V Warranty and Repair

Should your investigations indicate that your new Model 6958 is defective or damaged and your unit is still under warranty, contact SEC America, LLC at 802-865-8388 and obtain return merchandise authorization for credit or exchange.

If the warranty period has expired or if the warranty has been violated due to operator error or misuse, call:

SEC America, Corp, Repair Department, at **802-865-8388** or fax SEC America, LLC at 802-865-8389 to receive authorization for shipment back to factory for analysis and possible repair.

Warranty

The Model 6958 has a 2 year warranty covering parts and labor. The warranty is found on page 7 of this owner's manual.

LIMITED WARRANTY

We warrant each instrument, sold by us, or our authorized agents, to be free from defects in material and workmanship and that it will perform within applicable specifications for a period of two years after original shipment. Our obligation under this guarantee is limited to repairing or replacing any instrument or any part thereof, except fuses and pilot lights, which shall within one year after delivery to the original purchaser, be returned to us with transportation charges prepaid, provided after our examination to be thus defective.

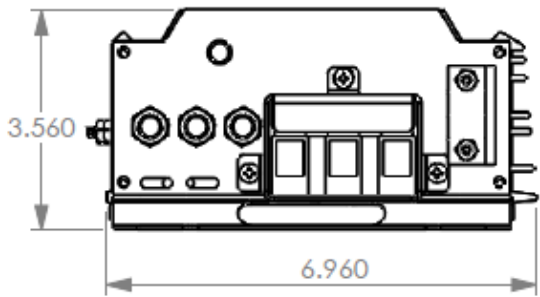
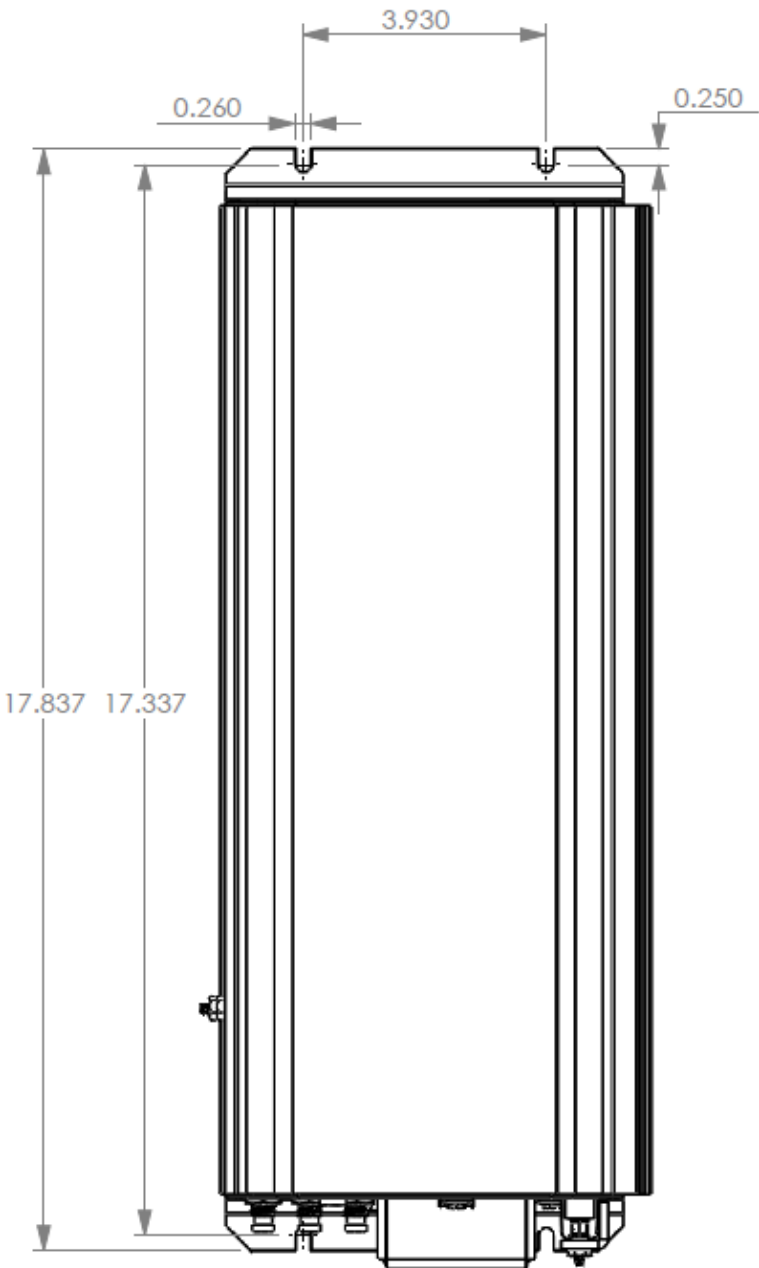
The above limited warranties take the place of all other warranties, expressed or implied, and correction of such defects by replacement or repair shall constitute a fulfillment of all obligations under the terms of the warranties. The warranties do not cover any unit that has been damaged either in transit or by misuse, accident or negligence. No warranty or representation by anyone other than this Company shall be binding on us.

To return a unit send only to the following address:

**SEC America, Corp
78 Ethan Allen Drive
S. Burlington, VT 05403**

**PLEASE RETAIN YOUR ORIGINAL BILL OF SALE. IT MUST
BE SUBMITTED WHEN MAKING ANY WARRANTY CLAIM**

VI Mechanical Drawing



VII Electrical Specifications:

Output Voltage:	58.4V Charge Nominal (16 cell LiFePO4)
Output Voltage Adjust Range	47.5 VDC to 56.0 VDC (float)
Continuous Max Load Amps:	22 ADC @ 40C ambient (Input 12.5 VDC) 18 ADC @ 60C ambient
Maximum Power Dissipation:	110 Watts @ Full Load (20A, 58.4 VDC out)
Maximum Input Current:	130 A (12 VDC in)
Overload Protection:	Electronically current limited (primary protection) Thermal Circuit Breakers at the Input (secondary protection)
Cooling:	Convection and Forced Air Thermostat Controlled Fan
Output Ripple Voltage:	10 mV RMS (20C to 75C) 50 mV RMS (-30C)
Input Voltage Range:	10.8 VDC to 15 VDC
Input Output Isolation:	Input and Output returns are Common (non isolated)

Low Voltage Cutout Circuit:

Low Voltage cutout point:	10.8 VDC
Low Voltage cutout Hysteresis:	1.0 VDC; Unit turns on at 11.8 VDC

Activation Circuits:

- 1) The unit may be activated through the command terminal #1 of terminal block TBA which when connected to +12 VDC of the vehicle will turn the charger ON..
- 2) The charger may be turned on by energizing the primary power source.

Ambient Operating Temperature:	-30C to + 60C
Maximum Humidity:	100% non condensing
Maximum Elevation:	15000 ft. above sea level

Mechanical Specifications:

Dimensions:	See Drawing on Page 8
Shipping Weight:	16 lb.
Construction:	Aluminum housing with painted steel end panels and base
Mounting Method:	#12 Hardware via front and rear mounting flanges
Mounting Centers:	17.34 x 3.93 (inches)
Hook Up:	3 Position Splicer Terminal Blocks