

**MANUAL****Model: CP 12/24-15**

Solar Converters Inc. - Rev. E

**1.0 Introduction**

This unit is nominally used as a cathodic protection controller. It can also be used as a highly stable wide range DC to DC down converter with adjustable voltage, current and 1/2 cell sense.

**1.1 Specifications**

Input Voltage: 0 - 40 DC volts

Current: 0 - 15 DC amps nominal

Output Voltage: 1 - 30 V DC, factory set 15.0V

Current: 15 amps continuous

Output Current: 0 - 20 amps current limited

Factory set = 15 A

Connection: Power: max AWG # 10 Eurostyle terminal strip

Signal: max AWG # 14 Eurostyle terminal strip

Temperature range: -40C to +60C

Open frame construction - panel mounted for standard NEMA boxes

NEMA boxes for unit available from Solar Converters Inc.

Efficiency: &gt;96% over 20%, nominal output voltage of 12 V,

Battery fused

Transient protected - input and output

**2.0 Power Connections**

**Warning:** This unit operates from **Hazardous** energy sources. Ensure that all power sources are inactive before making any connections to this unit. Ensure proper procedures and the appropriate electrical codes are followed. To be serviced and operated only by qualified personnel.

**2.1 Ground**

Using wire of sufficient amperage (min #14 AWG) and a external tooth washer, connect the ground plate of unit to appropriate system ground as required by the appropriate electrical code. Note this ground is not internally connected to the power terminals, and is used as a reference for the surge protection and EMI control.

**2.2 Load Connection**

Output voltage: 2 - 24V DC

Output current: 0 - 20 amps

Using wire of sufficient amperage for the load connection (#14 AWG) or better connect the positive of the load (through a strain relief) to the positive load connection of the regulator terminal block. Similarly connect the negative of the load to the negative load connection of the regulator.

## 2.3 Battery Connection

Input voltage: 10 - 40 V DC

Input current: 0 - 15 amps nominal

**Warning:** Ensure the battery is disconnected and/or safe operating procedures are followed when making battery connections. Extreme care must be taken to ensure the battery is not shorted. Take all precautions. Make sure all strands are inside their respective terminals. Qualified personnel only to connect and operate this unit.

Using wire of sufficient amperage for the Battery connection (#14 AWG) or better connect the negative of the battery (through a strain relief) to the negative battery connection of the regulator terminal block. Similarly connect the positive of the battery to the positive battery connection of the regulator terminal block.

## 3.0 Signal Connection

### 3.1 1/2 Cell Sense

Warning: Ensure the battery is disconnected and/or safe operating procedures are followed when making battery connections. Extreme care must be taken to ensure the battery is not shorted.

Warning: The 1/2 cell sense leads should be connected to the point where the voltage needs to be regulated

Using wire of sufficient amperage (#24 AWG or better) connect the positive of the 1/2 cell sense through a strain relief (Cell +) to the positive anode of the 1/2 cell to be regulated and similarly connect the negative through a strain relief (Cell-) to the negative of the 1/2 cell voltage to be regulated.

The 1/2 cell regulator works by increasing voltage and current until the 1/2 cell voltage is attained as setup by the adjustment pot.

Note: Shielded twisted pair is the optimal wire if the point to be regulated is a "substantial" distance from the regulator.

### 3.2 On/Off

The unit may be remotely turned on and off by using the remote on off connector. Anything that shorts these pins the remote on/off pins together with an impedance of under 1M ohm will turn the unit off.

Using wire of sufficient amperage (#24 AWG or better) connect the positive of the on/off to the positive of the on/off switch (positive side if polarized) and similarly connect the negative of the on/off connection to the negative of the on/off switch.

## 4.0 Regulator Control Function

The unit has three control adjustments, voltage, current and 1/2 cell.

This unit will adjust itself between the three regulating modes as the load changes. It nominally operates in 1/2 cell voltage mode, and then will kick in voltage or current limiting respectively if the unit exceeds these set values.

### 4.1 Voltage

The "Voltage" setting sets the maximum regulation voltage of the regulator. With a meter on the output voltage, adjust the Voltage set adjustment to the desired output voltage. The default setting of this adjustment is 15.0 Volts.

If adjusting the pot has no adjustment on the output voltage, the output is being controlled by one of the other functions. A slight adjustment and return to initial position of the other adjustment pots will help determine which control loop, voltage, current or 1/2 cell sense is controlling the unit. **Note: Clockwise = more**

## 4.2 Current

The "Current" setting sets the regulation voltage of the regulator.

Place a heavy load on the unit. With a current meter on the output, adjust the Current set adjustment to the desired Current limit. The default setting of this adjustment is 15 amps.

If adjusting the pot has no adjustment on the output voltage, the output is being controlled by one of the other functions. A slight adjustment and return to initial position of the other adjustment pots will help determine which control loop, voltage, current or 1/2 cell sense is controlling the unit. **Note: Clockwise = more**

## 4.3 1/2 Cell Sense

The "1/2 Cell" voltage setting sets the regulation voltage of the regulator to the 1/2 cell sense made by a sense electrode and the structure being protected and putting the proper voltage where it is being used. The 1/2 cell terminology is 1/2 cell sense when applied to cathodic protection controllers.

When using 1/2 cell sense, it is recommended that the voltage setting be set first at no load to a value slightly above the desired voltage to ensure that the unit will not overvoltage the load in case of the 1/2 cell sense wires somehow become disconnected.

With a meter on the 1/2 cell sense input, adjust the 1/2 cell set adjustment to the desired 1/2 cell voltage output voltage. The default setting of this adjustment is 0.5 Volts with a copper sulphate probe assumed.

Note: It may be beneficial to adjust this voltage as pin 5 of op-amp U3 on the PCB **Note: Clockwise = more**

## 5.0 Meter

A meter option is available. This meter is a 3.5 digit LCD meter, which turns itself off to limit long term battery drain.

### 5.2 Meter Volt/Amp

The meter is reading the load voltage when the toggle switch is in the Volts position. The meter is reading the load when the toggle switch is in the Amps position

### 5.4 Meter Adjustments

The meter may be calibrated in the field should the need arise.

- A: Current meter gain
- B: Voltmeter gain
- C: Current Meter offset

Current:

Set the volt/amp switch to read amps. With the meter on and the off button pushed, twiddle the Current Meter offset C to get a meter reading of 00.0

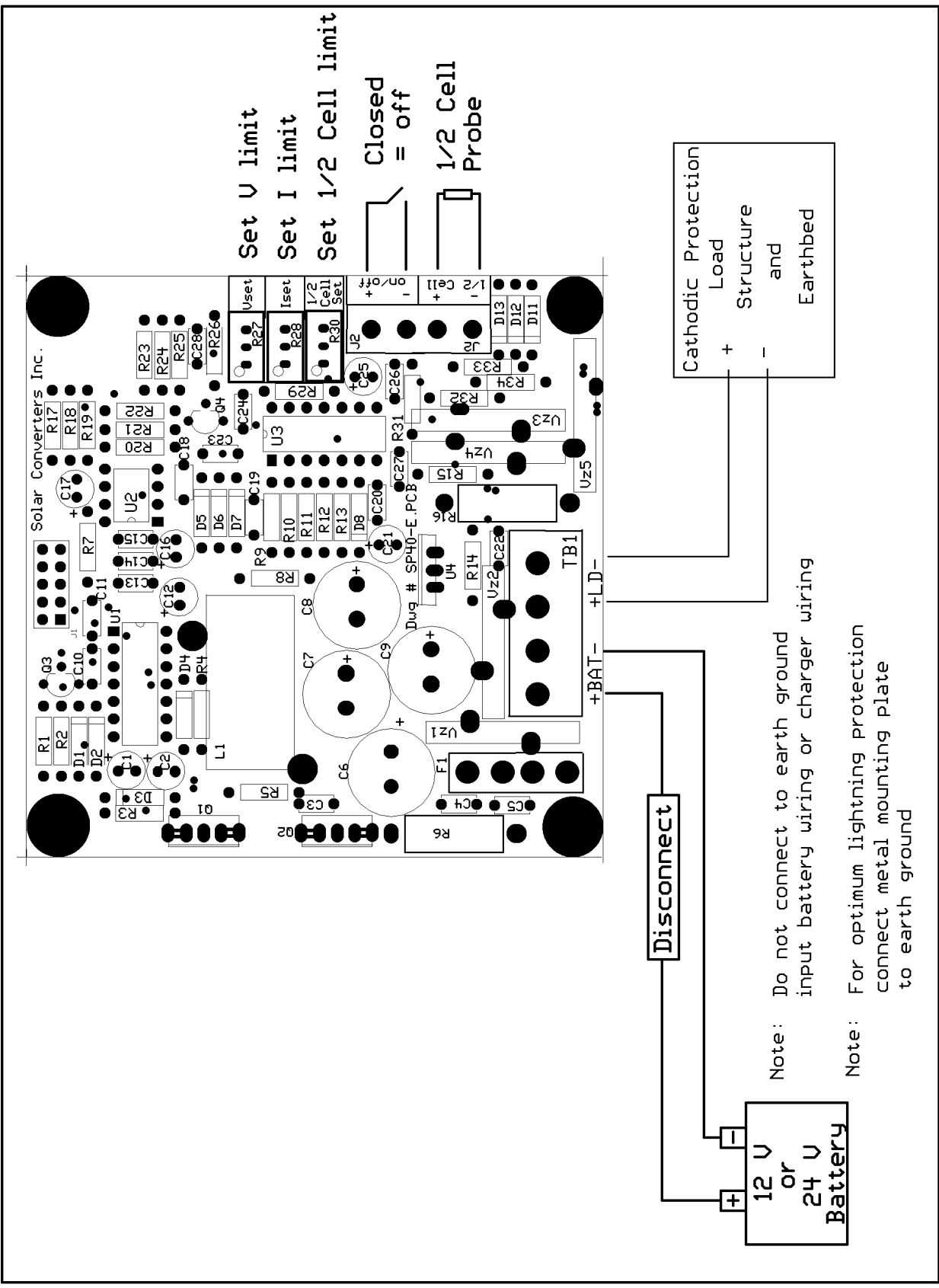
Next independently measure the current under load. Twiddle the adjustment pot A so the meter reads identical to the independent measurement.

Voltage:

Set the volt/amp switch to read voltage. Next independently measure the voltage. Adjust the adjustment pot B so the meter reads identical to the independent measurement.

\*\*\*\*\*

Model: CP 12/24-15



**WARRANTY**

The product is warranted to be free from defects in material and workmanship for a period of one (1) year from the date of purchase by a retail customer. The purchase date must be evidenced by a valid and original sales receipt. In lieu of sales receipt, factory will use code date on its label. Removal of the Solar Converters Inc. label or serial number will void the warranty.

Product liability, except where mandated by law, is limited to repair or replacement at the manufacturer's discretion. No specific claim of merchantability or use shall be assumed or implied beyond what is printed on the manufacturers printed literature. No liability shall exist from circumstances arising from the inability to use the product, or its inappropriateness for any specific purpose or actual use, or consequences thereof for any purpose. **It is the user's responsibility to determine the suitability of the product for any particular use.** Solar Converters Inc. shall not be liable for any damages or any kind including without limitation, special, incidental or consequential obligations and liabilities of Solar Converters Inc. and the remedies of Buyer set forth herein shall be Solar Converters Inc. sole and exclusive liability.

Failure to provide a safe and correct installation, safe operation, or care for the product will void the warranty. Personal safety, and compatibility with any other equipment is the ultimate responsibility of the end user. Any returned product that shows significant evidence of abuse may not be covered by this warranty. Installation must be preformed by a person with qualification to insure safe and effective operation and the installation thereof certifies that the installer has the technical qualifications to do so.

Solar Converters Inc. cannot guarantee the compatibility of its products with other components used in conjunction with Solar Converters Inc. products, including, but not limited to, solar modules, batteries, and system interconnects, and such loads as inverters, transmitters and other loads which produce "noise" or electromagnetic interference, in excess of the levels to which Solar Converters Inc. products are compatible. Solar Converters Inc. shall not assume responsibility for any damages to any system components used in conjunction with Solar Converters Inc. products nor for claims for personal injury or property damage resulting from the use of Solar Converters Inc. products or the improper operation thereof or consequential damages arising from the products or use of the products.

The warranties set forth herein are Solar Converters Inc. sole and exclusive warranties for or relating to the goods. Seller neither makes nor assumes any warranty or merchantability, any warranty fitness for any particular purpose, or any other warranty of any kind, express, implied or statutory. Solar Converters Inc. neither assumes nor authorizes any person or entity to assume for it any other liability or obligation in connection with the sale or use of the goods, and there are no oral agreements or warranties collateral to or affecting the sale of the goods.

**WARRANTY CLAIM PROCEDURE**

In the event of product failure, follow this warranty claim procedure.

1. Make sure the problem you are having is actually due to the suspected product and not some other part of the system. You may call technical support for advanced troubleshooting assistance.
2. If you determine that a Solar Converters Inc. product is actually defective, describe on paper, in detail the exact nature of the failure.
3. The product must be accompanied by proof of the date of purchase satisfactory to Solar Converters Inc.
4. Return the product and description to the business office address, along with your address and a daytime phone number. Purchasers must prepay all delivery costs or shipping charges as well as any other charges encountered, in shipping any defective Solar Converters Inc. product under this warranty policy. **No shipment will be accepted Freight Collect.**
5. Any return shipment from Solar Converters Inc. will be via Canada Post. Foreign shipments will ship best way. Special shipping arrangements are available at the customer's expense.