

MANUAL
Model: PT 12/24-30
 Solar Converters Inc.

1.0 Specification

Note: This unit is a dual voltage unit, both 12 and 24 V input and output, with a mixed 24 V input 12 V output option.

Connection: Power: max. AWG # 4 Eurostyle Terminal Strip
 Signal: max. AWG # 14 Eurostyle Terminal Strip

Maximum power point tracking to optimize output power.

Charge Technique: Dual float. Unit charges to float voltage + .3V, then drops to float voltage when charge current drops under 10%.

No User load overvoltage, regulates output voltage to "float" voltage even with no battery connected.

Temperature range: -40C to +60C

Open frame construction - panel mounted for standard NEMA boxes. NEMA boxes for unit available from Solar Converters Inc.

Efficiency: >94% over 20% charging load,

No need for external blocking diode,

Battery fused

Transient protected - input and output

1.1 Set up as a 12 V unit, no jumpers in place

Input Voltage: 0 - 50 DC volts PV Array, approx. 16 V nominal operating
 Current: 0 - 30 DC amps nominal,

Output Voltage: 10 - 15 V DC, factory set 14.1V
 Current: 30 amps continuous, (provided sufficient solar power),

Integral LVD: off at 11.0 V +/- .1, on at 11.5V

HVA: on when output goes above at 15 V, off when output goes under 14 V
 Also drives remote HVA terminals

LVA : On when output under 11.5 V, off when output above 11.6 V
 Also Drives remote LVA terminals

1.2 Set up as a 24 V unit: Both PV and BAT jumpers in place

Input Voltage: 0 - 50 DC volts PV Array, approx. 32 V nominal operating
 Current: 0 - 24 DC amps nominal,

Output Voltage: 20 - 30 V DC, factory set 28.21V

Current: 30 amps continuous, (provided sufficient solar power),

Integral LVD: off at 22.0 V +/- .1, on at 23V

HVA: On when output goes above at 30 V, off when output goes under 28 V
Also drives remote HVA terminals

LVA: On when output under 23 V, off when output above 23.2 V
Also Drives Remote LVA terminals

1.3 Set up as a 24 input, 12 V output unit, PV jumper in place only

Input Voltage: 0 - 50 DC volts PV Array, approx. 32 V nominal operating
Current: 0 - 15 DC amps nominal,

Output Voltage: 10 - 15 V DC, factory set 14.1V
Current: 30 amps continuous, (provided sufficient solar power),

Integral LVD: off at 11.0 V +/- .1, on at 11.5V

HVA: on when output goes above at 15 V, off when output goes under 14 V
Also drives remote HVA terminals

LVA : On when output under 11.5 V, off when output above 11.6 V
Also drives remote LVA terminals

2.0 Power Connections

Warning: Before connecting power cable to this unit, evaluate the PV and battery voltage and set the units voltage select jumpers accordingly. See signal connections for proper wiring of voltage select termination.

Warning: This unit operates from multiple **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. #10 AWG) connect the ground post (the back plate) of unit to appropriate system ground as required by the appropriate electrical code. Note this ground is not internally connected to any of the units terminals.

2.2 Input Power Connection

Input voltage: 0 - 50 V DC CHECK VOLTAGE SETUP OF INPUT VOLTAGE
Input current: 24 A DC max. nominal

Using a wire of sufficient amperage for the input power (min. #14 AWG) connect the positive of the solar panel (through the strain relief clamp) to the PV + terminal of the solar regulator. Connect the negative of the solar panel to the PV - terminal of the solar regulator.

2.3 Load Connection

Output voltage: 11 - 30 V DC CHECK VOLTAGE SETUP OF OUTPUT VOLTAGE
Output current: 0 - 30 amps nominal for specified regulation,
(total load = load current + battery current)

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

2.4 Battery Connection

Output voltage: 11- 30 V DC CHECK VOLTAGE SETUP OF OUTPUT VOLTAGE

Output current: 0 - 30 amps nominal,
(total load = load current + battery current)

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. BE SAFE. Make sure all strands are inside their respective terminals. The battery must be fused. Qualified personnel only to connect and operate this unit.

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

3.0 Signal Connection

3.1 Remote Shutdown

The load may be remotely disconnected by shorting the RS pins together with a suitable switch device. This can be done by devices like float switches or electronic timers for load control.

Electrical ratings:

12 V dc, .1 A dc

3.2 Temperature Compensation

This regulator is designed to use the voltage of a temperature sensitive zener (National Semiconductor # LM335Z or equiv.) attached at the battery location (hence battery temperature). This unit is available from Solar Converters Inc. as Model No. TC-2.

Warning: If temperature compensation is not used, a 3k precision resistor must be connected between the TC+ and TC- terminals (its default condition). Lack of this resistor will not harm the regulator, but will require re-adjustment of the output voltage.

If temperature compensation is being used, remove the 3k resistor across terminals TC+ and TC-. Using a wire of sufficient amperage (#24 AWG or better) connect the TC+ terminal to the anode (the red lead) of the temperature sensitive zener. Similarly connect the TC- terminal to the cathode (the black lead) of the temperature sensitive zener (LM335Z).

3.3 LVD

The LVD terminals are connected directly across the relay coil of the LVD relay to be used as a remote LVD sense. This is normally used in high voltage systems to run a higher power/voltage LVD relay beyond the capability of the on-board LVD relay

3.4 AUX Terminals

The unit produces a small signal relay drive to power a large relay for auxiliary switching in a higher power array. This scheme uses the units advance PWM charge control technique to "finish" the charge on a battery in a very large power system. The unit power the AUX terminals to connect the other array at float voltage less 3%, to charge the battery, then as the battery voltage moves above float less 3 %, it disconnects the other high power array, finishing the charging on the units MPPT PWM control.

Using wire of sufficient gauge, connect the relay coil to the AUX terminals. Do not install external flyback diode across relay as the unit has its own internal diode. The unit applies battery voltage to the external relay.

3.5 Voltage Select

The control Voltage of the unit is selected by shorting across the PV and BAT terminals for 24 V operation or leaving open for 12 V operation respectively.

Note: This unit is capable of charging a 12 V battery bank from 24 V panels while putting maximum power into the battery.

Using small signal wire Min. #28 AWG, short the respective PV or battery terminals for 24 Volt operation. Leave the terminals open for 12 V operation.

4.0 Regulator Control Function

LEDs in the status section signal the status of the unit at any time. The status is also remotely signalled by the remote functions of the same name.

4.1 On LED signals when the battery power is being applied to the load

4.2 1/3, 2/3 3/3 LED's give an indication of the battery state of charge

4.3 Chrg The unit is "MPPT" maximum current into the battery.

4.4 LVA The output voltage is low

4.5 HVA The output voltage was above the setpoint. This light will remain on until the voltage drops below the lower setpoint.

4.6 Float Setting

The "Float" voltage setting sets the regulation voltage of the regulator. The regulator will charge the battery at a voltage of the float voltage +.3 V while the battery current is above 10% charging current and the regulator will hold the battery at the float setting while the battery charge current is less than 10% of charging current.

With a meter on the output voltage, adjust the Float set adjustment to the desired output voltage. The default setting of this adjustment is 14.1 Volts.

Note on 24 V settings the above numbers are doubled. The default setting is 28.2 V

5.0 Meter

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

5.1 On

The button marked meter on turns the meter on for approx. 30 seconds. Holding the button down keeps the meter on indefinitely.

5.2 Meter Volt/amp

The meter is reading the battery voltage when the toggle switch is in the Volts position. The meter is reading the battery amperage (+ into battery, - out of battery) when the toggle switch is in the Amps position.

5.3 Load Current

The button marked "Load" turns off the unit such that the meter reads the battery discharge load current and voltage.

5.4 LVA

A LED signals Low Voltage Alarm when the battery voltage is below :

24 V Setting

LVA 22.8 volts
LVD operation (at 22.0 V).

12 V Setting

LVA 11.4 volts
LVD operation at 11.0 V.

5.5 HVA

A LED signals High Voltage Alarm signalling the battery is over 31 Volts (24 V setting) or 15.5 V (12 V setting). Investigate the cause of this mode as the unit is likely broken.

5.6 Meter Adjustments

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

NOTE: For this 30 amp unit, if a meter is added from the standard meter, it will read a value 1/2 true value. The meter current gain adjustment, adjustment "C" needs to be adjusted to account for this scale factor and to obtain a true reading.

The pots are available through holes in the meter metalwork:

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

Current:

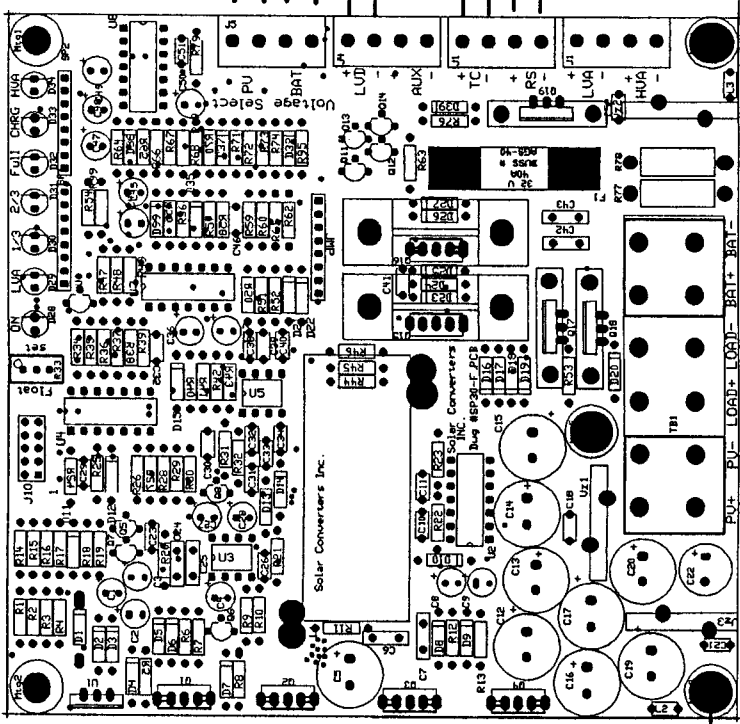
Set the volt/amp switch to read amps. With the meter on and the load button pushed, twiddle the Current Meter offset C to get a meter reading of 00.0

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

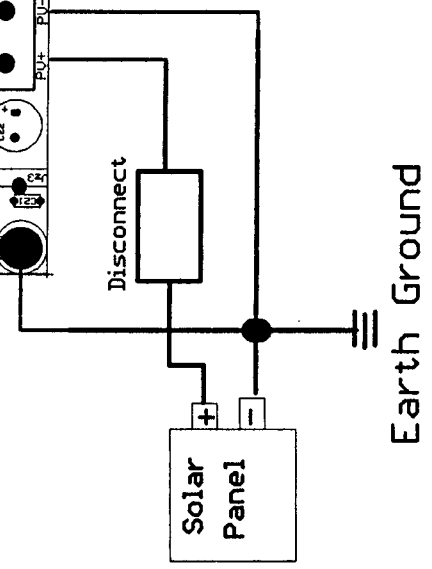
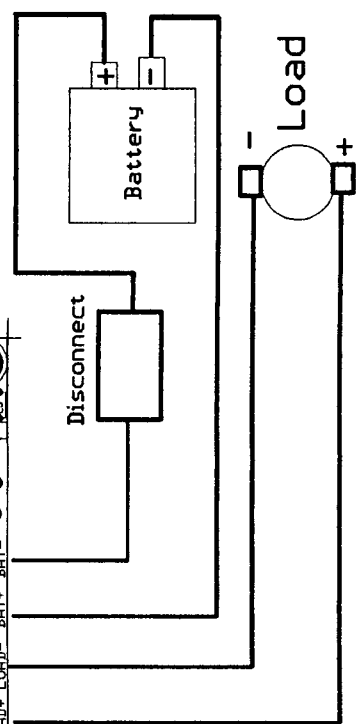
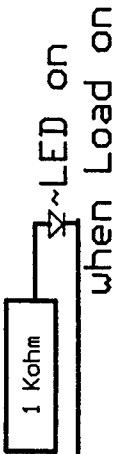
Voltage:

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

Meter connects here → Adjust float voltage →



Connect for 24 V panels
Connect for 24 battery



Note: Load may be taken directly off battery terminal

WARRANTY

The product is warranted to be free from defects in material and workmanship for a period of one year (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.

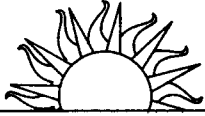
Solar Converters Inc. cannot guarantee the compatibility of its products with other components used in conjunction with Solar Converters Inc. products, including, but not limited to, solar modules, batteries, and system interconnects, and such loads as inverters, transmitters and other loads which produce "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.



SOLAR CONVERTERS INC.

C1 - 199 Victoria Rd. S., Guelph, ON N1E 6T9 Canada

PLEASE READ BEFORE INSTALLING

Caution:

Do not connect the case ground of this unit directly to the inverter case ground. Use a 6 foot minimum grounding lead length. This may be carefully coiled inside the unit's enclosure before connecting to the grounding post.

Why?

NEC (National Electrical Code) requires that the case be grounded for safety reasons. This unit has common-mode capacitors (Capacitors connected from battery - to case ground) to meet the requirements of the FCC (Federal Communication Commission). It is illegal to sell or install equipment in the US that does not meet FCC requirements.

Some inverters do not meet or have not been tested to these FCC requirements, but are sold anyway and produce a lot of electrical noise in the case grounding wires. Direct connection injects this noise into the unit's electronics and may disrupt its operation.