



**SOLECTRIA**  
**RENEWABLES**

**PVI 3000S**

**PVI 4000S**

**PVI 5000S**

**PVI 5300**

**INSTALLATION AND OPERATION MANUAL**

Revision A

**Residential/Commercial  
Grid-Tied Photovoltaic Inverter**

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All information subject to change without notice.

## **IMPORTANT REGISTRATION AND WARRANTY INFORMATION**

For warranty to become active, this inverter must be registered. To activate warranty and register inverter, please visit the link below.

[www.solren.com/registration](http://www.solren.com/registration)

# IMPORTANT SAFETY INSTRUCTIONS

In this manual “inverter” or “inverters” refers to the inverter models: PVI 3000S, PVI 4000S, PVI 5000S, and PVI 5300 unless one of the specific models is noted.

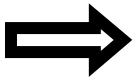
This manual contains important instructions that shall be followed during installation and maintenance of the PVI inverter.

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the inverter, the following safety symbols are used to indicate dangerous conditions and important safety instructions:

**WARNING:** This indicates a fact or feature very important for the safety of the user and/or which can cause serious hardware damage if not applied appropriately.



**Use extreme caution when performing this task.**



**NOTE:** This indicates a feature that is important either for optimal and efficient use or optimal system operation.



**EXAMPLE:** This indicates an example.



**GROUND SYMBOL**

## SAVE THESE INSTRUCTIONS

## IMPORTANT SAFETY INSTRUCTIONS

- All electrical installations shall be performed in accordance with the local, American and Canadian electrical codes.
- The inverter contains no user serviceable parts. Please contact Solectria Renewables or a Solectria Renewables authorized system installer for maintenance. See Appendix at the end of this manual for Solectria Renewables contact information.
- Before installing or using the inverter, please read all instructions and caution markings in this manual and on the inverter as well as the PV modules.
- Connection of the inverter to the electric utility grid must be completed after receiving prior approval from the utility company and must only be performed by qualified personnel.
- Completely cover the surface of all PV arrays with an opaque material before wiring them. PV arrays produce electrical energy when exposed to light and could create a hazardous condition.

## PRESCRIPTIONS DE SECURITE IMPORTANTES

- Tous les travaux d'installation électrique doivent être exécutés en conformité aux normes électriques locales ainsi qu'à la norme nationale américaine et canadienne.
- Le PVI 3000S, PVI 4000S, PVI 5000S, et PVI 5300 ne contient aucune pièce requérant un entretien effectué par l'utilisateur. Pour toute maintenance, veuillez consulter Solectria Renewables ou un installateur agréé par Solectria Renewables (les coordonnées de Solectria Renewables et des installateurs agréés sont indiquées sur le site web de Solectria Renewables: [www.solren.com](http://www.solren.com)).
- Avant d'installer ou d'utiliser le PVI 3000S, PVI 4000S, PVI 5000S, et PVI 5300, veuillez lire toutes instructions et toutes les mises en garde présentes dans ce manuel, sur le SGI et sur les modules PV.
- Le raccordement du PVI 3000S, PVI 4000S, PVI 5000S, et PVI 5300 au réseau électrique ne doit être effectuée qu'après avoir obtenu une entente d'interconnexion auprès de la compagnie locale de distribution électrique et uniquement par du personnel autorisé et qualifié.
- La surface de tous les capteurs PV doivent être recouverte entièrement d'un matériel opaque.
- (noir) avant de procéder au câblage. Les capteurs PV exposés a la lumière produisent du courant électrique susceptible de créer une situation de risque.

## CONSERVEZ CES INSTRUCTIONS

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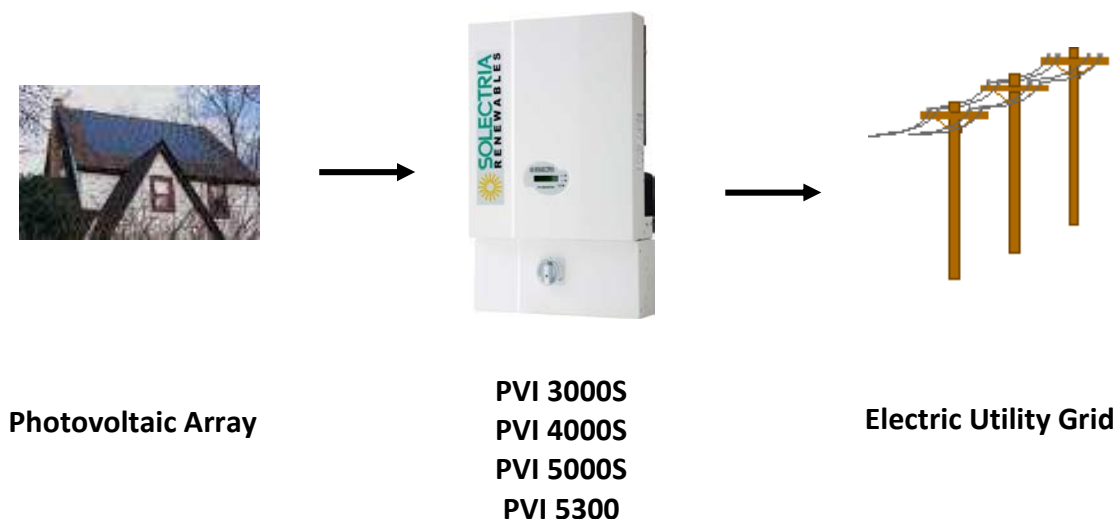
## 1.0 Introduction

The PVI 3000S, PVI 4000S, PVI 5000S and PVI 5300 are residential/commercial single phase, grid-tied PV inverters designed to be inter-connected to the electric utility grid. With this manual the PVI 3000S, PVI 4000S, PVI 5000S, and PVI 5300 can be installed and operated safely. This installation guide is used as reference for commissioning and as a guideline on how to use the inverter most effectively.

Feeding power onto the grid involves conversion of the DC-voltage from the PV-array to grid compatible AC-voltage by “inverting” DC to AC. This unit feeds power into a standard 240 VAC split phase electrical system or two legs (phase to phase) of a 208 VAC, 3-phase commercial, industrial or institutional facility’s electrical system that is connected to the electric utility grid. The inverters are not capable of feeding currents back into the PV array from the AC source, which include, short circuit(s) or fault(s) in the PV array or string(s).

If the PV system and inverter are providing the same amount of electrical power that the facility is using then no power is taken from or fed onto the utility grid. If the facility is using more power than the PV system is providing, then the utility grid provides the balance of power. If the facility is using less power than the PV system is generating, then the excess is fed into the utility grid.

Be sure to look into local regulations regarding net metering/inter-connection in your local area. Note that some utilities need to change their revenue kWh meter for proper net metering measurement or incentives/billing.



**Figure 1.1 – Grid-Tied Inverter Application**

## The string PV concept

The use of string PV concept significantly reduces the cabling costs on a photovoltaic system. The use of strings of several PV modules in series and multiple parallel strings of PV modules has proven advantageous by delivering a high operating voltage to the inverter. This advantage results in a higher system efficiency. Careful optimization of the overall system cost and efficiency lead to the choice of a 600V DC maximum system voltage for the power levels of the PVI 3000S, PVI 4000S, PVI 5000S and PVI 5300 for use with 1kW to 7kW PV arrays per inverter.

### Data acquisition, display and communication

The integrated data acquisition, display and communication capability of the PVI 3000S - PVI 5300 allows comprehensive tracking of data for understanding of system performance. All error messages and operating conditions of the PVI 3000S - PVI 5300 as well as the PV system are shown on the display. Information is not available when the inverter is off at night.

These functions allow complete and continuous monitoring of the photovoltaic system. Read-out of data over the integrated interface and its display is only possible when the Inverter is in operation.

An optional full-featured, “inverter-direct” data acquisition and data logging gateway and web-based service is available from Solectria Renewables LLC, called Solrenview (<http://www.solrenview.com>). You have the option to purchase the gateway, which plugs into the inverter and to the facility’s internet service.

### Technical structure of the PVI 3000S, PVI 4000S, PVI 5000S, and PVI 5300

A high frequency switching bridge circuit operating in connection with a high frequency transformer provides galvanic isolation of the photovoltaic system from the building’s AC power and electrical utility grid. The PV voltage and current are optimized in such a way that fluctuations which are caused by differing sunlight strengths and PV module temperatures can still end up producing the maximum possible power. Internal regulation of the PVI 3000S - PVI 5300 is achieved using microcontrollers, which control the function of MPP (Maximum Power Point) tracking.

The input PV voltage window is designed to cover a range of 200 to 550 VDC from the PV array (600VDC maximum open circuit voltage). This means that modules from most manufacturers can be used.

The inverter has very little standby power consumption and night-time losses (0.5 W). Even when running, the control circuit power use of the inverter is reduced to a minimum, which helps give the inverter high operational efficiency.



The housing and heat sink for the PVI 3000S - PVI 5300 is manufactured using an aluminium extrusion with an anti-corrosion finish. The housing is NEMA 3R compliant to be resistant to rain and snowfall. The heat sink and fan are designed in such a way that operation of the inverter is possible at ambient temperatures of -13° F (-25° C) to +131° F (+55° C) at full rated power.

The heat sink serves to conduct away heat generated from energy losses in the power electronics. Internal temperature regulation provides protection against excessively high temperatures inside the PVI 3000S - PVI 5300. The maximum power processed from the PV array is automatically reduced to limit excessive inverter temperature.

The PVI 3000S - PVI 5300 will only operate in parallel with the utility grid. AC grid monitoring is done by microcontrollers configured to meet the requirements of UL1741/IEEE1547. The inverter shuts down immediately if the grid goes down, or if the grid gives surges, sags, changes frequency or otherwise shows signs of instability. If this happens, the inverter will check the grid and reconnect to the grid 5 minutes after the grid is back to normal. The display then shows: "Monitoring". Disconnecting from the grid is important to protect the line workers who may be working to restore the grid as well as electricians working at a site with PV systems.

Power grid faults that will cause the PVI 3000S - PVI 5300 to isolate itself from the power grid:

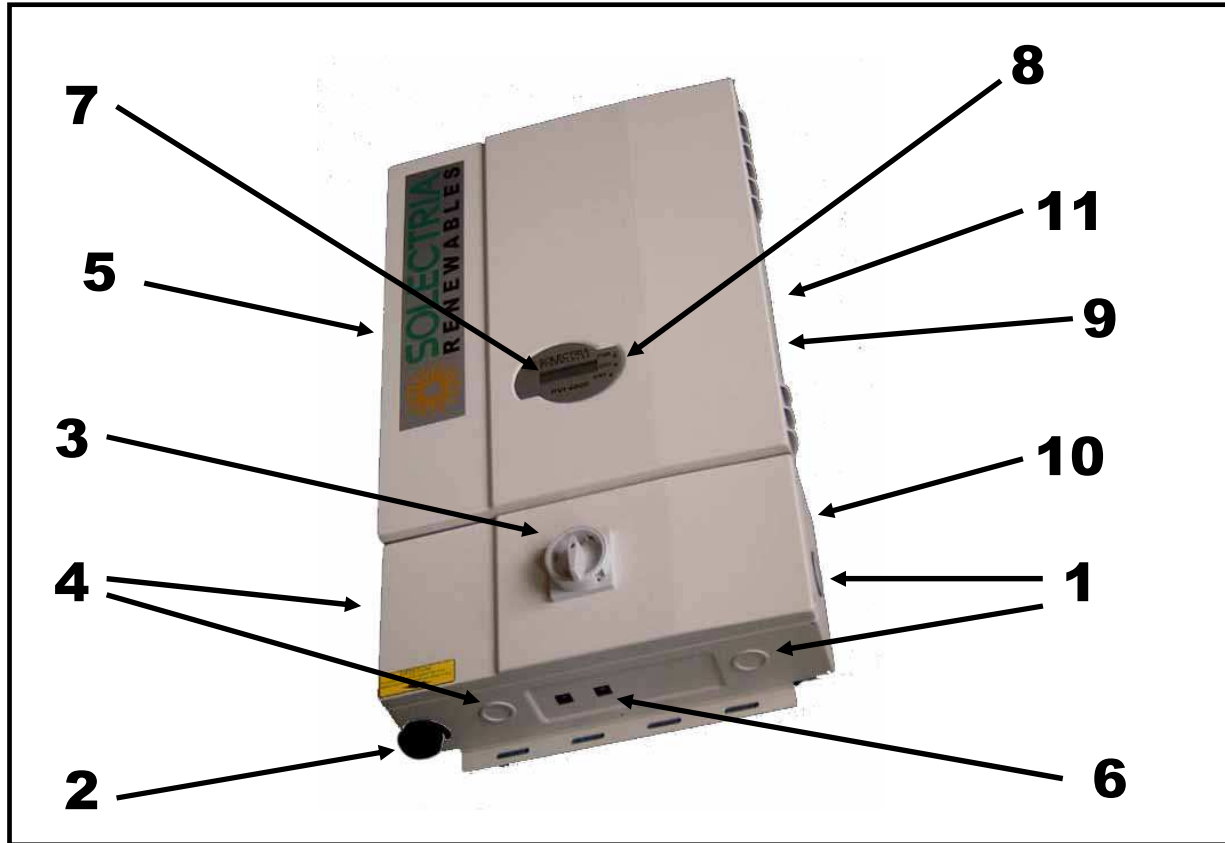
- AC grid voltage

The grid voltage must not go outside the range of -12%/+10% of the nominal 240 or 208V AC grid voltage. The inverter will isolate itself from the power grid if these limits are exceeded. The PVI 3000S - PVI 5300 is factory set to automatically detect and sync to 240 or 208VAC when connected to the neutral. If it is desired to connect to 208 or 240VAC without a neutral connection, then the inverter must be set at the factory or adjusted by a qualified installer. A qualified installer can reconfigure the grid voltage setting in the field using jumper adjustments inside the inverter.

- AC grid frequency

The inverter will operate when grid frequency is within a range of -0.7Hz, +0.5Hz of the nominal 60Hz grid frequency. The inverter will isolate itself from the power grid if these permitted limits are exceeded.

Other important safety features are galvanic isolation of the utility grid and PV array, as well as ground fault detection and interrupt (GFDI) of the PV array. The PV array negative is grounded inside the inverter (and must not be grounded at any other point).

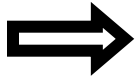


**Fig. 1.2 Features of the PVI 3000S/4000S/5000S/5300**

- (1) AC knockouts (bottom, side, and back)
- (2) PV array ground fault interrupt (GFDI) fuse
- (3) DC/AC disconnect
- (4) DC knockouts (bottom, side, and back)
- (5) Fan assembly (on back at bottom of heatsink, used on PVI 4000S/5000S/5300 only)
- (6) RS-485 interfaces
- (7) LCD display
- (8) LED indicators for basic operating status
- (9) Inverter Serial Number
- (10) Detachable wiring box
- (11) Quick-mount wall plate (behind unit)

## 2.0 Site Preparation and Inverter Placement

The inverter is comprised of a rainproof NEMA 3R industrial enclosure containing electrical and electronic components.



**NOTE:** If the inverter is mounted outside, during the installation process and in case of rain, do not open the inverter.

### Criteria for device mounting:

- Because the inverter is in a NEMA 3R enclosure, the inverter can be mounted outdoors.
- The longest inverter life can be achieved by mounting it in a clean, dry and cool location. It is recommended to keep the unit out of direct rain or snow. Protection by a roof overhang or covering is recommended if outdoor mounting is necessary.
- For optimal electrical system efficiency, use the shortest possible AC and DC cables and use the maximum allowable cable size.
- Avoid installation in close proximity to people or animals, as there is an audible high-frequency switching noise.
- Install the inverter in an accessible location following local codes. Note that code requirements for clearances and proximity to other equipment and building walls apply.
- For optimal inverter life and performance, do not mount the inverter in direct sunlight, especially in hot climates. If the unit must be mounted in direct sunlight, a silver or white metal sun-shield is highly recommended. It is further recommended that the inverter be mounted on the north or east side of buildings or on the northern side of a ground mounted PV array. Following these guidelines help prevent the unit from limiting the power produced due to an excessively high inverter temperature.



**CAUTION:** Please follow these guidelines:

- The inverters weigh up to 60 lbs (27.2 kg) depending on inverter model. Be sure to use a mounting method that will safely hold this weight. Refer to Table 9.3.1 for specific weights for each inverter model.
- The ambient temperature must be between  $-13^{\circ}\text{F}$  and  $+131^{\circ}\text{F}$  ( $-25^{\circ}\text{C}$  and  $+55^{\circ}\text{C}$ ) for full power, and continuous operation. The inverter will automatically reduce power or may shut down to protect itself if ambient air temperature at the intake rises above  $131^{\circ}\text{F}$  ( $55^{\circ}\text{C}$ ).
- The National Electrical Code (NEC) requires that the inverter be connected to a dedicated circuit and no other outlets or device may be connected to this circuit. See NEC Article 690. The NEC also imposes limitations on the size of the inverter and the manner in which it is connected to the utility grid. See NEC Article 690 for guidance within the US.
- The cooling air enters at the bottom of the heat sink and exhausts at the top of the unit. See Figure 2.1.3 for recommended clearances for cooling air and space around the inverter.
- If you are installing the inverter in a utility vault or electrical closet, the air circulation must be sufficient for heat dissipation – provide external ventilation, to maintain an ambient condition of less than  $131^{\circ}\text{F}$  ( $55^{\circ}\text{C}$ ). The ambient temperature should be kept as low as possible.
- Use Figures 2.1.1, 2.1.2, and 2.1.3 for dimensional diagrams. Use Figure 2.1.3 for clearance distances and mounting of the inverter.
- The mounting bracket should be fastened to a concrete or a masonry wall using appropriate anchors.



**WARNING:** Some parts of the heat sink can reach temperatures over  $160^{\circ}\text{F}$  ( $70^{\circ}\text{C}$ ). Keep flammable, explosive materials or trash at an appropriate distance from the inverter!



**WARNING:** Do not expose the inverter to corrosive liquids and/or gasses.

## 2.1 Inverter Positioning and Mounting

Correct mounting position for the inverter is vertical with back of inverter mounted to a wall.

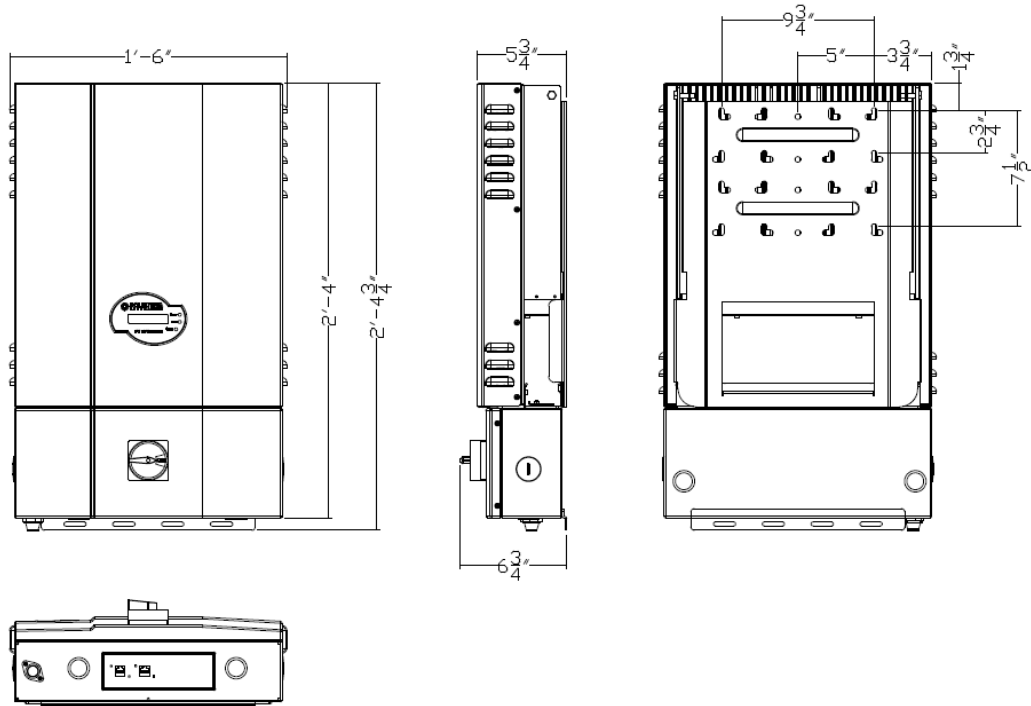


Figure 2.1.1 – PVI 3000S-4000S Dimensional Diagram

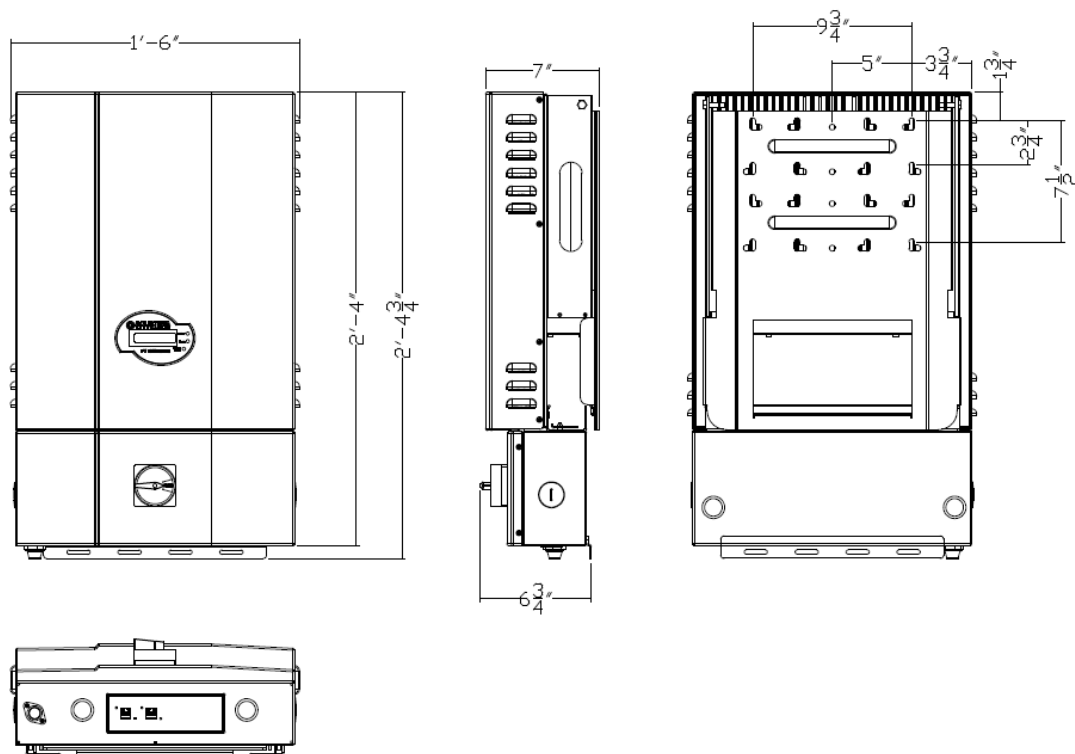


Figure 2.1.2 – PVI 5000S-5300 Dimensional Diagram

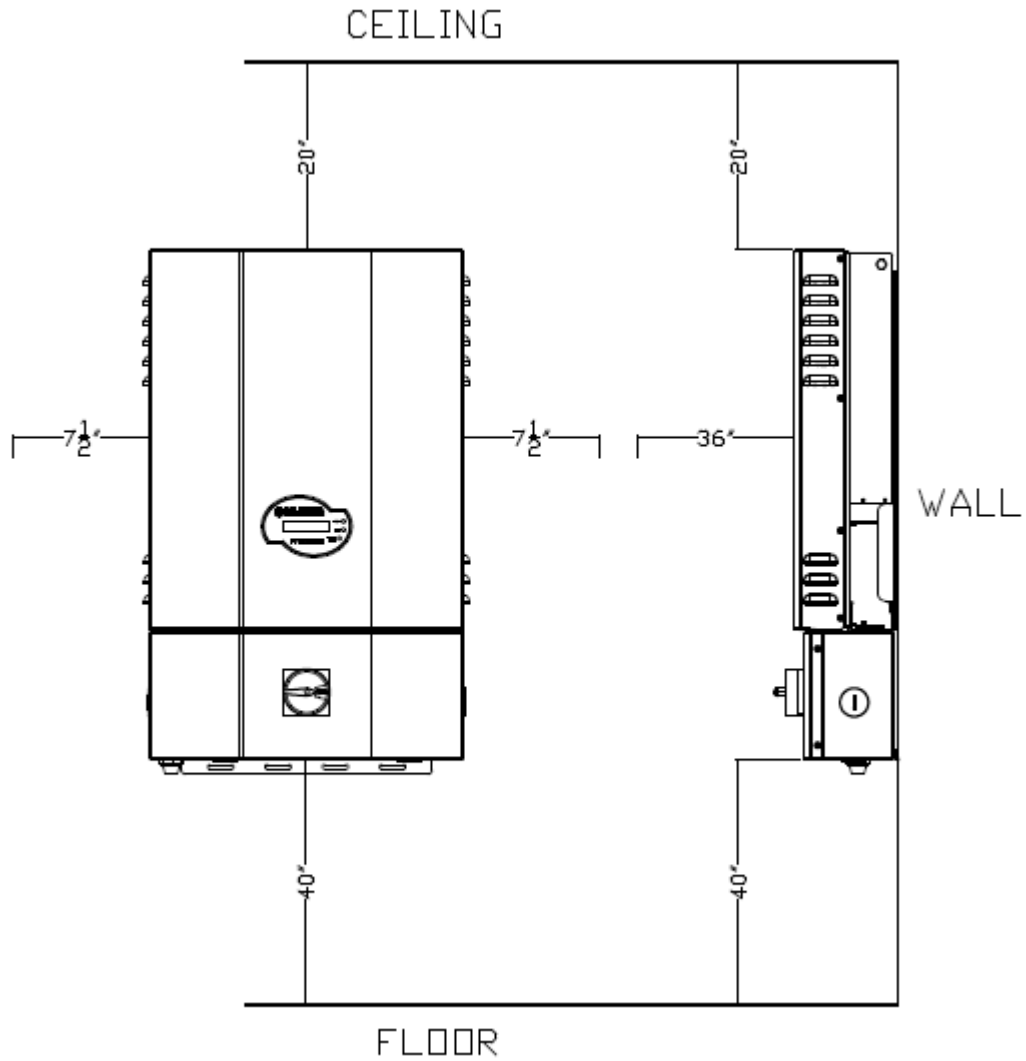
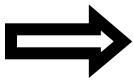


Figure 2.1.3 – Inverter clearances



**WARNING:** Severe injury or death could occur if the inverter mounting fails and the unit tips over or falls on a person.



**NOTE:** The weight of the inverter will exert an added load to the wall where mounted. Be sure to verify proper load capacity of mounting surface.

## 3.0 Installation



**WARNING:** Before installing the inverter, read all instructions and caution markings in this manual and on the inverter as well as on the photovoltaic modules.



**WARNING:** Electrical installation shall be performed in accordance with all local electrical codes and the National Electrical Code (NEC), Canadian Electrical Code for Canada (CEC).



**WARNING:** Connecting the inverter to the electric utility grid must only be completed after receiving prior approval from the utility company and installation performed only by qualified personnel/licensed electrician(s).

### 3.1 Checking for Shipping Damage

The inverter is thoroughly checked and tested before it is shipped. Even though it is packaged in a rugged cardboard box, the inverter can be damaged during shipping by poor handling, trucking or transfer station activity.

Please inspect the inverter thoroughly after it is delivered. If any damage is seen please immediately notify the shipping company to make a claim. If there is any question about potential shipping damage, contact Solectria Renewables, LLC. Photos of the damage may be helpful in documenting potential shipping damage.

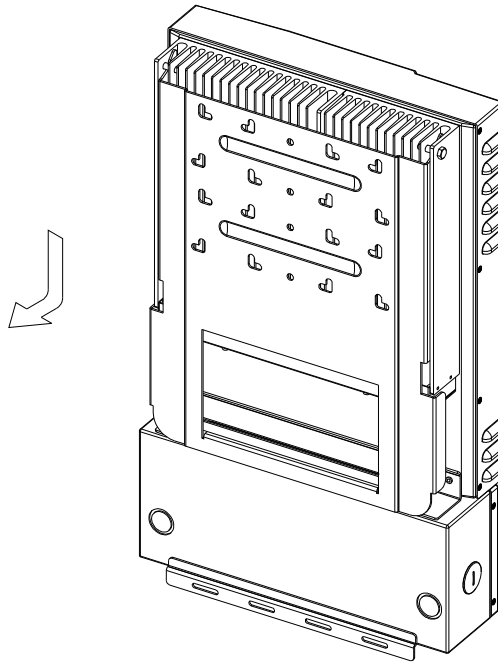
- Do not accept the unit if it is visibly damaged or if you note visible damage when signing shipping company receipt.
- Note damage on shipping papers with the truck driver! Report damage immediately to the shipping company.
- Do not remove the unit from packaging if damage is evident.
- If it is determined that the unit must be returned, an RMA number must be obtained from Solectria Renewables prior to shipping the unit back.

### 3.2 Removing Inverter from Cardboard Box and Moving Inverter Into Place



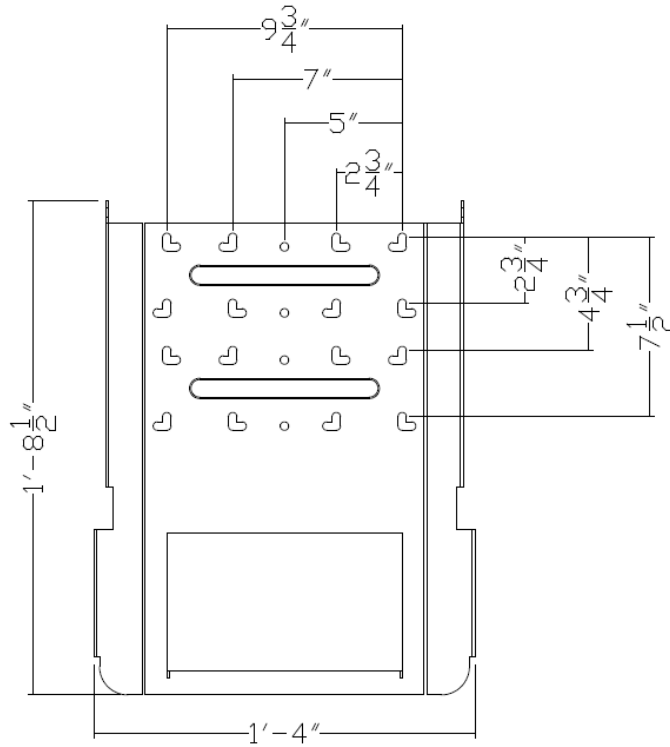
**WARNING:** The inverter may tip over if improperly moved, potentially causing damage to equipment, personal injury or death.

After taking the inverter out of the cardboard box, you will find the mounting bracket in the bag behind the heatsink. First, the mounting bracket needs to be picked up from the inverter, as shown in Figure 3.2.1.



**Figure 3.2.1 – Remove mounting bracket from Inverter**

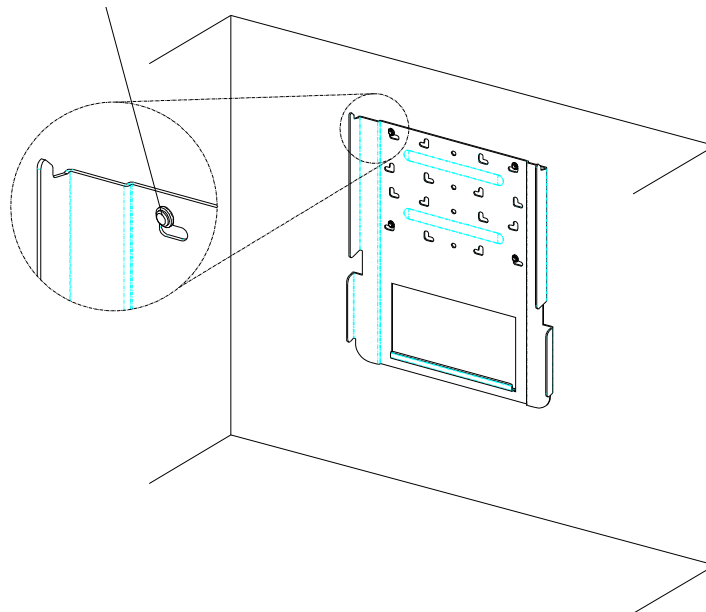




**Figure 3.2.2 – The Mounting Bracket with dimensions**

Use the mounting bracket as a template to mark the locations on the wall where holes should be drilled. After drilling the holes, the mounting bracket should be fastened to the wall with screws or screw-anchors.

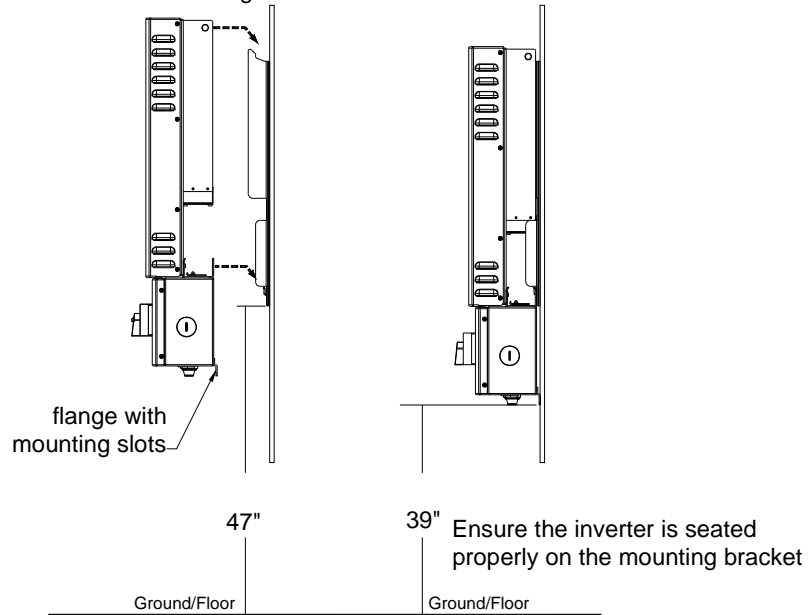
1/4" diameter mounting screw recommended or 3/16"-1/4" anchor bolt



**Figure 3.2.3 – Fastening the Mounting Bracket**

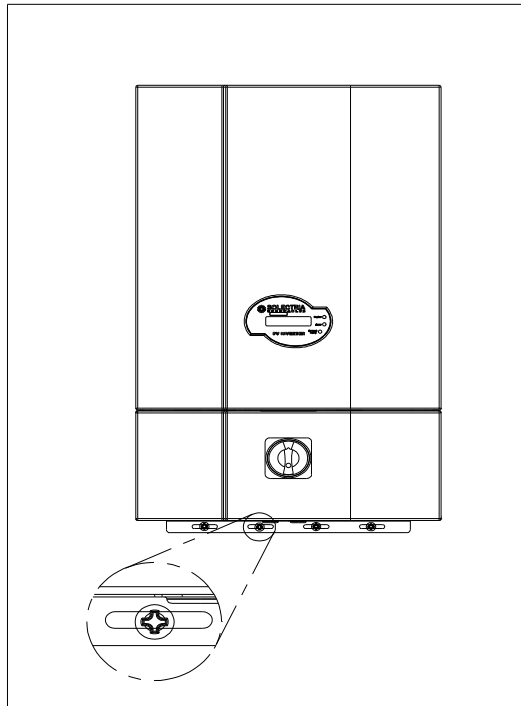
Once the mounting bracket is fastened to the wall, then the inverter and the wiring box can be hooked onto the mounting bracket and slipped down into place. Make sure the lower lip on the bracket hooks into the window on the back of the inverter as shown in Figure 3.2.4.

Slide the mounting hooks on the inverter over the hooks on the mounting bracket.



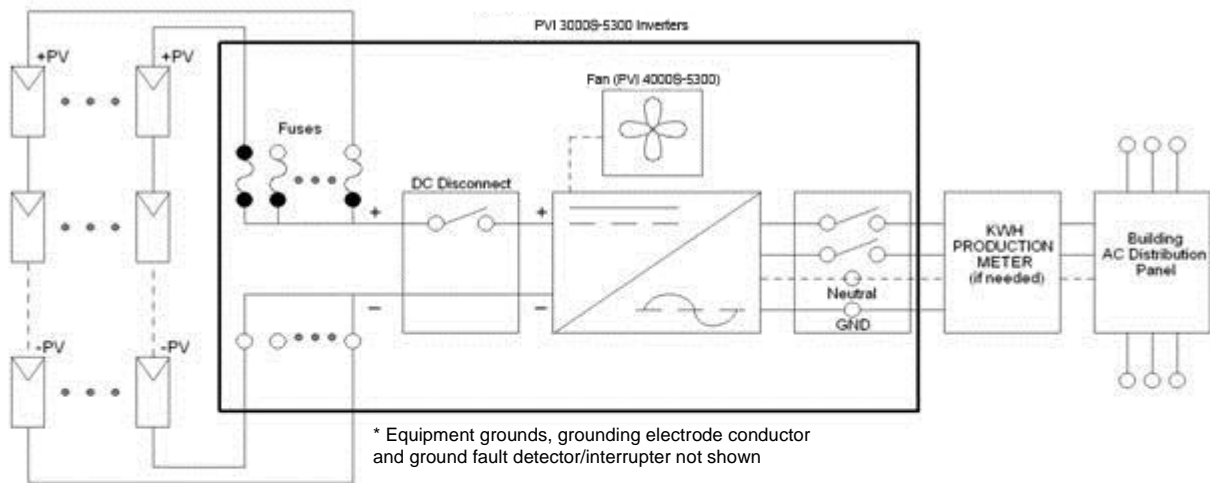
**Figure 3.2.4 – Mounting Inverter onto the Mounting Bracket**

After the inverter is hooked properly on the bracket, secure it with screws at the bottom flange as shown in Figure 3.2.5.



**Figure 3.2.5 – Fasten the Inverter with the screws at the bottom flange**

## 4.0 DC Connections from the PV Array and AC Connections to the Electrical Utility Grid



**Figure 4.0.1 Simplified Electrical Connection Diagram**



**WARNING:** All electrical installations shall be performed in accordance with all local and national electric codes.



**WARNING:** The negative DC photovoltaic connection is grounded within the inverter through the ground fault detection and interrupt circuit (GFDI). The PV negative should not be grounded at any other point in the system. The PV positive must never be grounded at any time. (Note that this is reversed for systems using the positive grounded option.)

### **AC and DC (PV) Connections:**

The PVI 3000S-5300 inverters are equipped with covered holes and knockouts to fit conduit fittings that are NEC code-compliant for use with several sizes of rigid and flexible metallic or non-metallic conduit. All conduit and wiring installation is done in the wiring box. This design allows installation and wiring of the inverter to be done without opening the main inverter enclosure which should not be opened during installation. AC & DC terminals allow for #10 to #6 AWG copper conductors.

**Lightning and Surge Protection:**

The inverter is designed with certain protections against surges in voltage including certification to UL1741/IEEE1547 /CSA22.2#107.1 / FCC Part 15B (including ANSI/IEEE 62.41/62.42 as required in the NY SIR), however added protection and solid grounding provisions are important for best protection against utility surges and surges created by indirect lightning strikes.

The installation of a Type 1, UL Listed Lightning Arrestor is recommended on both the DC and AC sides of inverter. Solectria Renewables, LLC and various distributors stock these arresters. They can be installed on the outside of the wiring box or other locations in the system and wired using the manufacturer's directions. This device gives important added protection from indirect lightning strikes and resulting surges that provide protection beyond the inverter's UL1741 requirements. It is suggested to drive a ground rod specifically for the PV array. It is recommended to install air terminals as part of the Lightning Protection System. These added protections are especially important for areas prone to thunder storms and possible nearby lightning strikes. Although these added precautions will not guarantee that there will be no damage from lightning, they can help prevent or limit potential damage.

**Grounding Electro Conductor:**

As with all PV systems, a Grounding Electro Conductor must be installed per NEC 690.47 (and 250.166). This conductor should be sized according to these NEC requirements. This conductor should be terminated on the labeled ground point located at the bottom of the wiring box where the DC and AC equipment ground conductors also are terminated.



**WARNING:** The main inverter enclosure should not be opened unless setting for positive grounding or setting voltage configuration jumpers.

**AC Voltage:**

The PVI 3000S-5300 are grid connected devices, suitable for both 240V AC and 208V AC grid-connected use. For example, connection to 2 phase legs of a 208V AC, 3-phase service (where acceptable by code). **No unit (PVI 3000S, 4000S, 5000S, or 5300) can be used with just a 120V AC connection.** The units are factory pre-set for auto-detect 240VAC and 208VAC when connected with a neutral. They can also be configured for connection to either 240 or 208 VAC without a neutral at the factory or by a qualified installer.

**Multiple Units:**

Multiple PVI 3000S-5300 units can be used at the same location/facility assuming all codes are followed including NEC, local building codes and area utility guidelines. If multiple units are used, each inverter should have its own dedicated circuit breaker, and a PV string must only be wired to one inverter (although multiple PV strings can be used on each inverter up to unit ratings and power levels).

### **AC Circuit Breakers:**

A dedicated AC circuit breaker in the home or building circuit panel is required for the PV inverter. Every PVI requires a 208/240V AC rated 2–pole circuit breaker. The following is a table showing the appropriate circuit breaker for the PVI 3000S, 4000S, 5000S, and 5300 (based on number of Amps).

PV Inverter Model	PVI 3000S	PVI 4000S	PVI 5000S	PVI 5300
Circuit breaker used (Amp) for 240V and 208V	20A	25A	30A	30A

## **4.1 Connecting the Inverter Wiring**



**WARNING:** The wiring of the PV inverter’s AC and DC connections must only be done with the building AC circuit breaker off, locked out and the PV array disconnected or covered with an opaque material (or other method that establishes electrically safe working conditions).



**WARNING:** Follow PV module manufacturer’s installation directions. PV arrays produce electrical energy when exposed to light and could create a hazardous condition. Disconnect array conductors when wiring the inverter or cover the array with an opaque material prior to wiring.

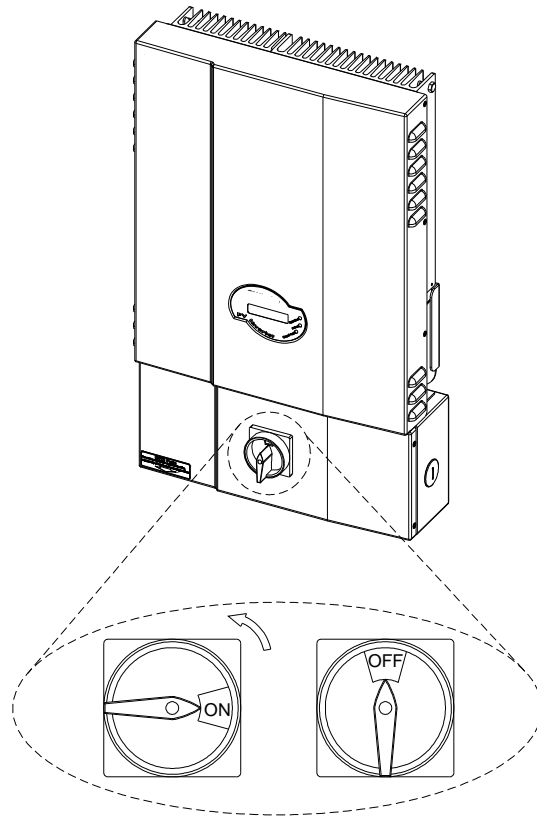


**WARNING:** Before connecting the connectors of the PV module to the DC inverter terminals, check the correct polarity and admissible PV module voltage between the (+) and the (-) wire connectors of the PV module. The PV module open circuit voltage must be below 600V DC ( $V_{pv} < 600V$  DC) under all temperature conditions per code.

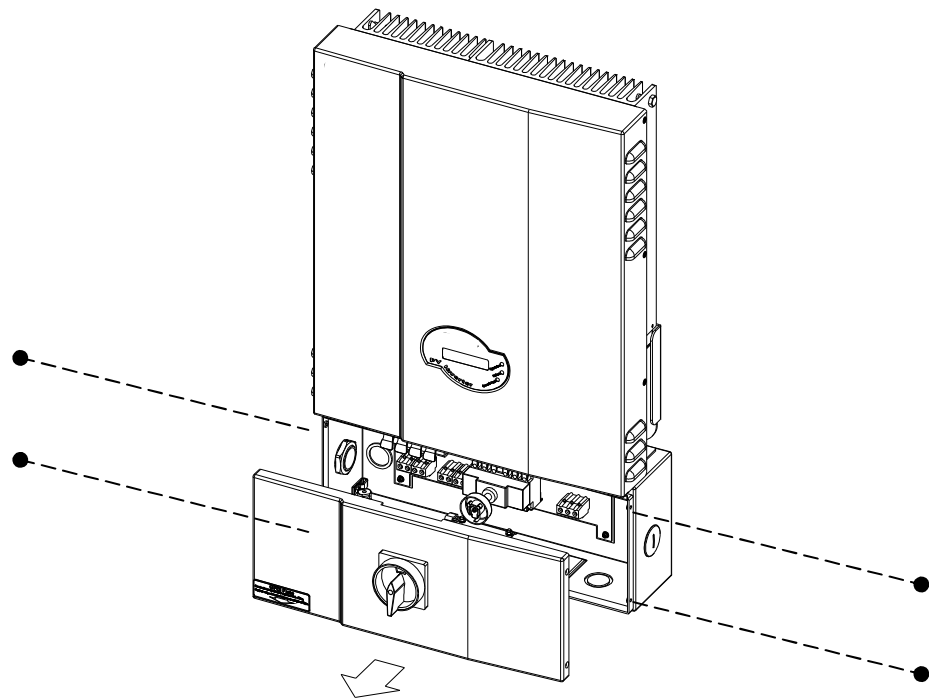


**WARNING:** Even when in the off position, the fused PV combiner and the DC terminals will remain live on the PV side.

The cover of the wiring box needs to be removed before wiring the inverter. First the DC/AC disconnect switch shall be turned to the OFF position as shown in the Figure 4.1.1. Remove the 4 screws, and then the cover of the wiring box shown in the Figure 4.1.2.

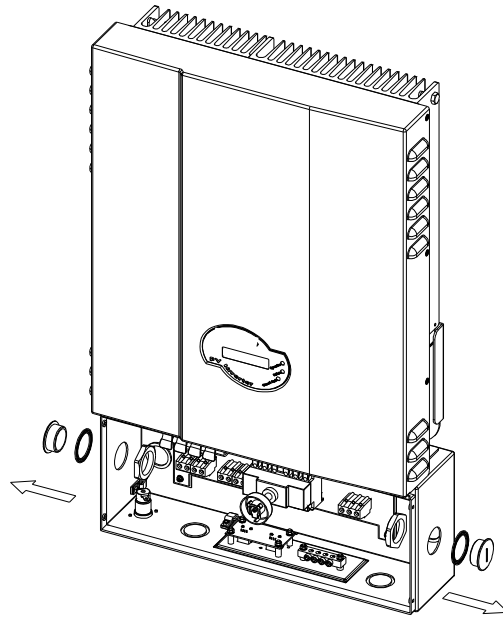


**Figure 4.1.1 – Turn the DC/AC Disconnect Switch off**



**Figure 4.1.2 – Remove the 4 Screws on the Wiring Box and Remove the Cover**

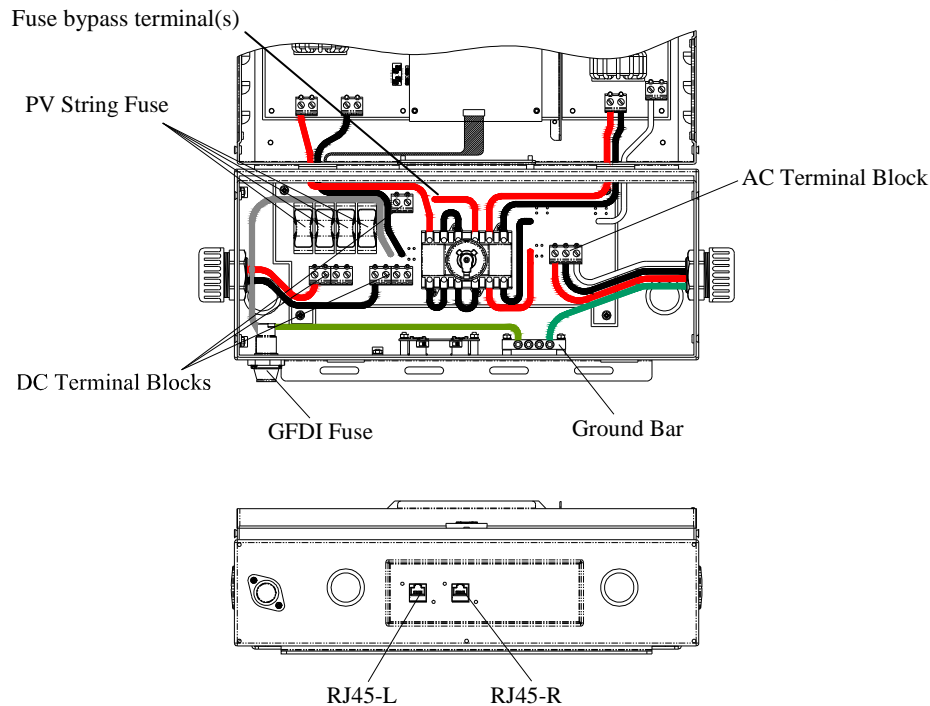
After the wiring box cover is removed, the conduit hole covers can be removed (or KOs in other locations punched out) as shown in the Figure 4.1.3, for the DC and AC conduits which will enter and exit these locations. Holes are pre-punched (and shipped with hole covers) for 1" conduit fittings on the left and right sides of the wiring box, these holes are centered at 2.5" from the wall mounting surface.  $\frac{3}{4}$ " and 1" concentric KOs are on the bottom of the AC and DC sides of the wiring box and these are located 2.63" from the wall mounting surface.  $\frac{3}{4}$ " and 1" concentric KOs are on the back of the AC and DC sides of the wiring box for routing wiring out the back of the box into the wall for a "hidden wiring" installation.



**Figure 4.1.3 – Punch Out the Knockouts where the Conduits will enter the Wiring Box.**

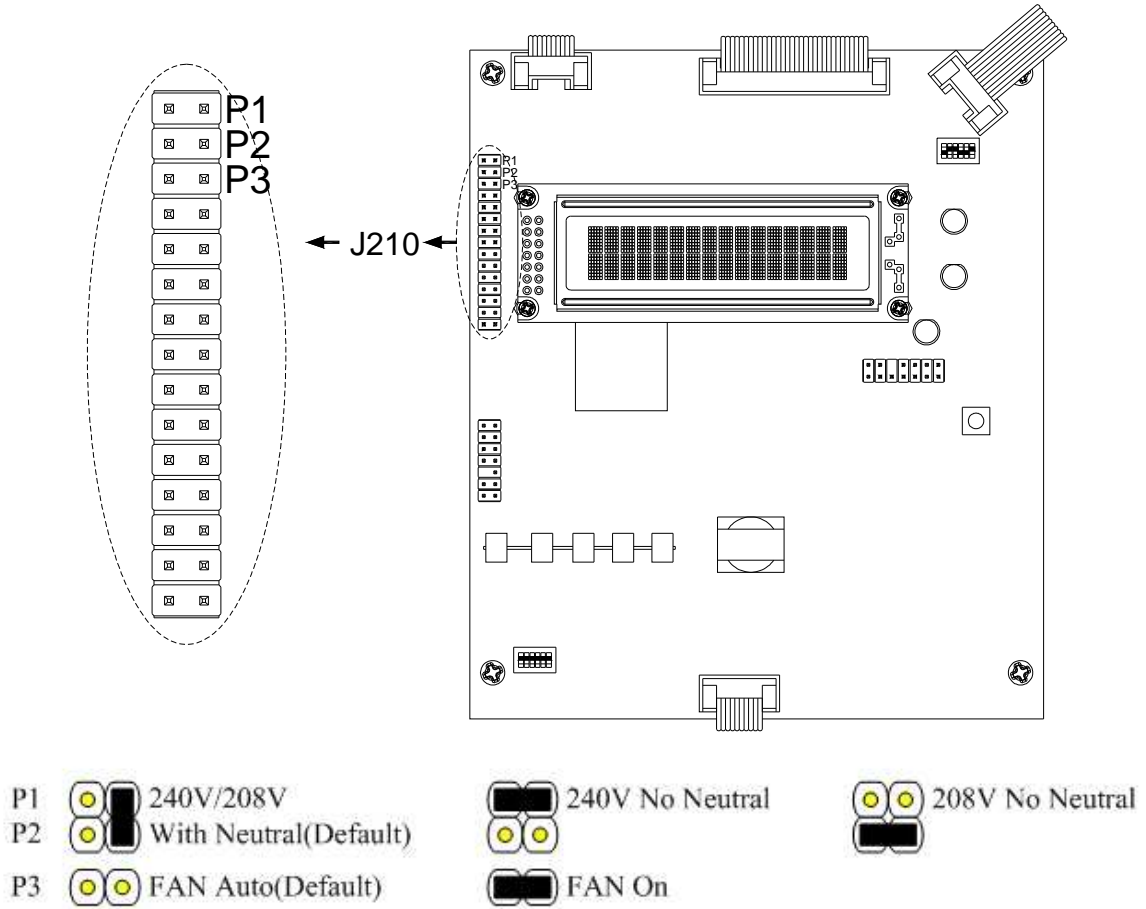
The following three sections describe the wiring for the AC, DC, and communication ports. The AC and DC wiring shall be done in the wiring box of the PVI 3000S/4000S/5000S/5300. There are a pair of DC terminal blocks, a DC fuse, a bypass terminal block, two (2) RJ-45 connectors, and one (1) AC terminal block in the wiring box as shown in the Figure 4.1.4. The DC terminal blocks are used to connect up to 4 PV strings that will parallel connected in the wiring box (3 strings for the PVI 3000S), or the fuse bypass terminal can be used if the fused combiner feature is not needed. The RJ-45 connectors are used for external communication to a remote computer or communication gateway. The AC terminal block is used to connect to the building/utility grid through a circuit breaker in the building distribution panel.





**Figure 4.1.4 - Wiring Box (Front and Bottom View).**

Before wiring the PVI 3000S-5300 inverter, the installer must determine the grid connection/utility configuration that the inverter will be connected to. The PVI 3000S-5300 inverter is default set for utility interconnection with a neutral connection. However, it may be reconfigured for a connection without a neutral. The utility configuration jumpers, J210, are located on the control board as shown in Figure 4.1.5 are used to set the PVI 3000S-5300 inverter to be connected to the commonly used utility configuration types shown in Figure 4.1.6. As shown in Figure 4.1.5, the P1 and P2 pins are used to configure the PVI 3000S-5300 inverter for the connection types of 208V and 240V AC outputs with or without neutral. When the inverter is set for the connection configurations with neutral, it can automatically distinguish the utility voltage and adjust the output AC voltage according to the grid voltage. When connecting the PVI 3000S-5300 inverter to the building / utility, the voltage **must** be compatible.



**Figure 4.1.5 – Building/Utility Configuration Jumpers**

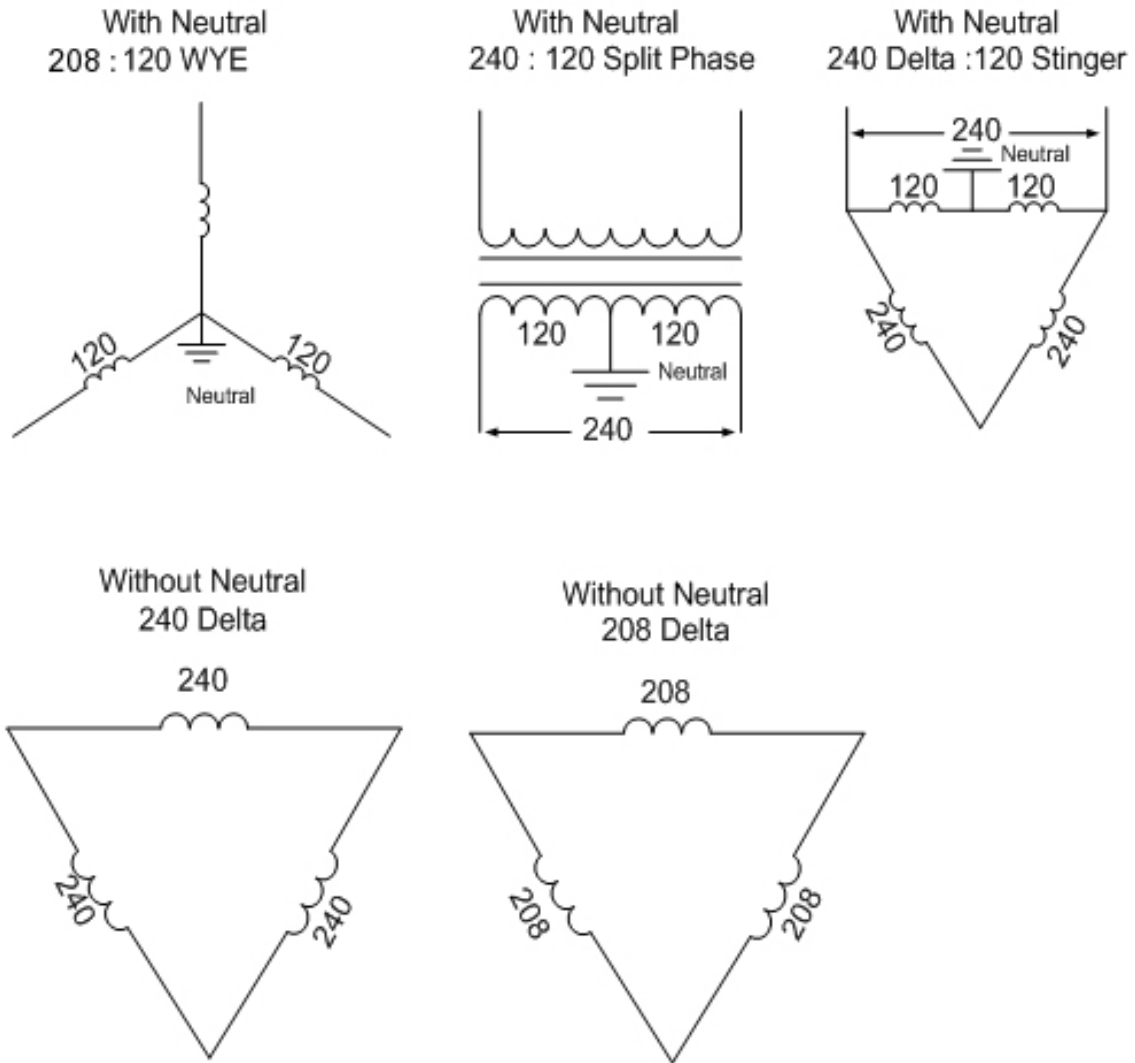


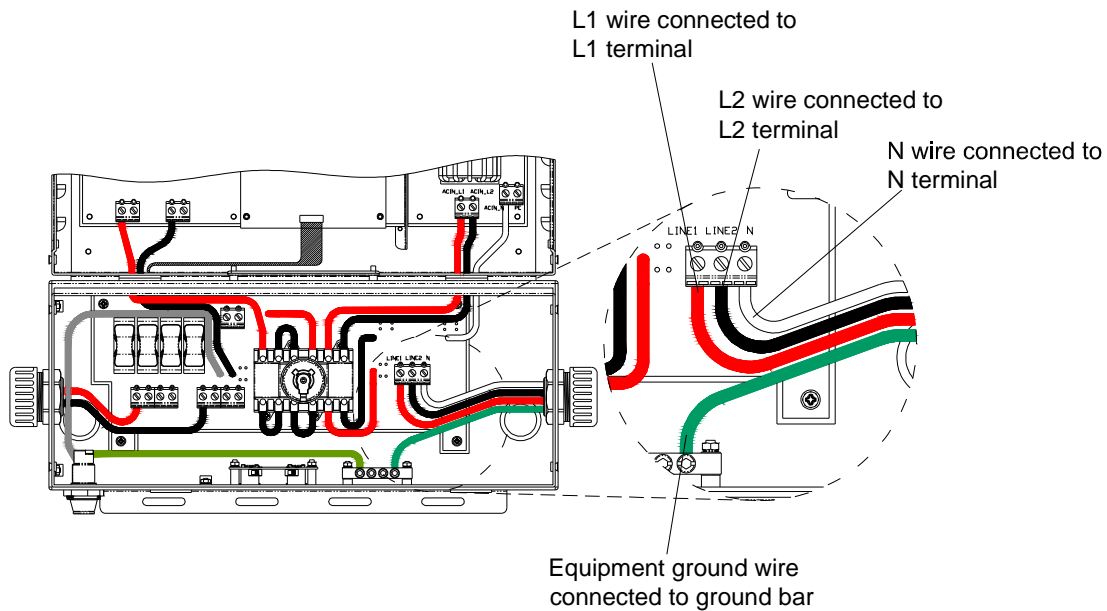
Figure 4.1.6 –Utility Configurations

## 4.2 AC Wiring



**WARNING:** Reconfirm that the circuit breaker to the grid/utility is switched OFF before connecting the power wires from the breaker to the inverter AC terminal block.

Use #10 AWG to #6 AWG, 90 °C (194 °F) copper wire for all AC wiring connections to the PVI 3000S-5300 inverters. You must choose the appropriate wire size based on local code requirements. Designed voltage drop recommended to be no greater than 1%. Larger conductors will be needed for longer wire runs.



**Figure 4.2.1 – AC Terminal Block for AC Wiring Connections**

- Connect the AC equipment GND wire to the screw of the ground bar labeled .
- Connect the white N wire to the terminal labeled N of the AC terminal block.
- Connect the L1 wire to the terminal labeled Line1 of the AC terminal block.
- Connect the L2 wire to the terminal labeled Line2 of the AC terminal block.
- Tighten the screws with a torque of 15.6 in-lb (1.7Nm)
- Reconfirm that all connections are correct as described above and all screws are properly tightened.



**WARNING:** Each connection to a PVI 3000S-5300 inverter must be installed with a dedicated circuit breaker. No other appliances may be connected to the circuit breaker.

### 4.3 DC Wiring



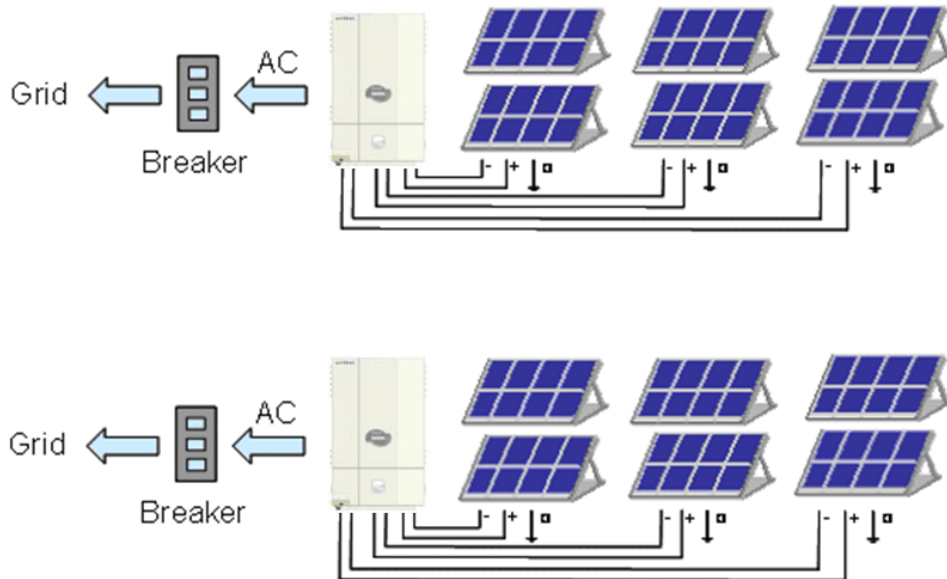
**WARNING:** Remove all PV string fuses before wiring DC connections! Do not reinstall fuses until you are ready to commission the inverter (See commissioning Section 5.0).



**WARNING:** Do not use fuses larger than 15A for the PV string fuses!

**Wiring inverters in parallel**


PVI 3000S-5300 inverters can be connected in parallel when more power is needed. In the parallel configuration, each inverter shall connect to its own PV array. Do not connect one PV array to more than one inverter. This will cause the inverter to function abnormally.



**Correct Configuration from DC Side**

**Figure 4.3.1 Parallel configuration of inverters is done on the AC side not the DC side.**

The wiring box of the PVI 3000S-5300 inverter is designed with a pair of DC terminal blocks which support up to four (4) independent PV strings to be fused and connected in parallel in the wiring box and then fed into the inverter (or 3 fused inputs in the case of the PVI 3000S). The PVI 3000S-5300 inverter is shipped with up to four (4) 15A, 600Vdc PV string fuses in the wiring box for the PV strings. The PVI 3000S is shipped with three (3) 15A, 600Vdc PV string fuses. However, the size of the PV string fuses shall be determined by the electrical ratings of the PV module and National Electrical Code (NEC) requirements. **IN NO CASE SHALL FUSES OF LARGER THAN 15A BE USED FOR THE PV STRING FUSES.** Please refer to Section 7.2 for the replacement of the PV string fuses. 15A fuses are shipped standard with every inverter. The fused combiner also is able to be bypassed using the provided bypass terminals (2 positions), which can also be used to connect the DC Lightning Arrestors.

There are two (2) terminals, labeled “Ungrounded (+)” and “Grounded (-)”, per PV string located in the wiring box used for the DC connections as shown in Figure 4.3.2. The DC equipment ground wire shall be connected to a screw on the ground bar labeled  in the wiring box of the PVI 3000S-5300 inverter. All the screws shall be tightened with a torque of 15.6 in-lb (1.7Nm)

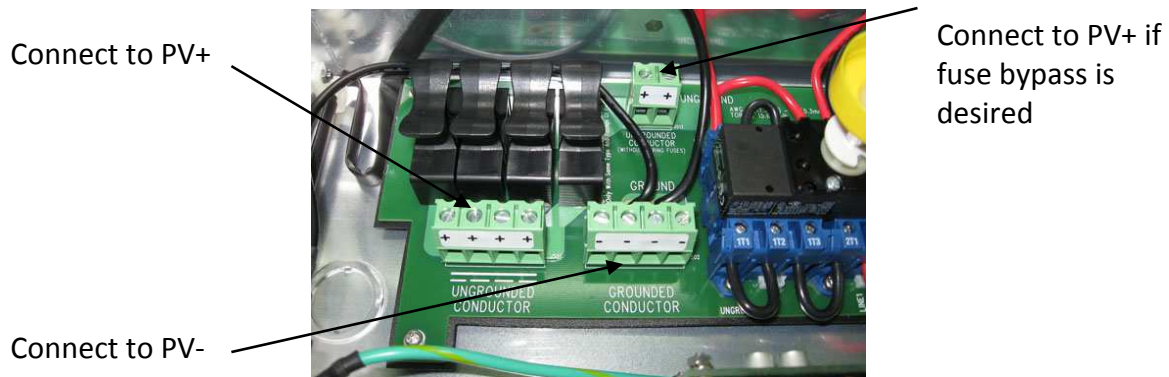


Figure 4.3.2 – DC Terminal Block for DC Wiring Connections

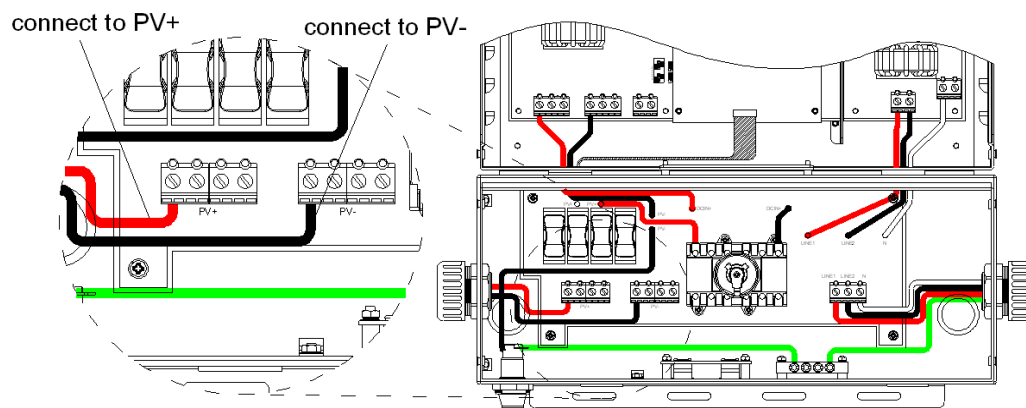



Figure 4.3.3 – PVI 4000S-5300 Supports Four (4) PV String Fuses



**WARNING:** Polarities of each DC input voltage from a PV string shall be connected correctly to the “+” (positive) and “-” (negative) terminals of a pair respectively. The DC voltage must be less than 600V in any condition.



**WARNING:** The inverter is listed for no backfeed current into the PV array. However, the ampacity of the PV strings must be calculated when determining proper PV combiner fuse value to prevent fire hazard.

- The positive (+) wire of the DC input shall be connected to the terminal labeled “Ungrounded (+)” and the negative (-) wire of the DC input shall be connected to the terminal labeled “Grounded (-)”, except when using positively grounded modules. In that case, see Appendix D at the end of this manual for further instruction.
- Wire nuts shall not be used to join any wires together or to make any connections anywhere in the PV system except where acceptable by code. Wire nuts are a frequent cause of unreliable connections, resistive connections, and ground faults and are not allowed in certain applications by NEC.
- Connect the equipment ground wire to the screw of the ground bar labeled .
- Tighten the screws with a torque of 15.6 in-lb (1.7Nm).



**WARNING:** Route the DC wires to the PVI 3000S-5300 inverters away from any possible hazards that could damage to the wires (such as sharp corners, edges or near covers where wires could be pinched or crushed).

### **Bypassing Fused Combiner**

If no (fused) combiner is required, as in the case of using a fused combiner other than the fused combiner inside the inverter, then the “Ungrounded (+)” bypass terminals (2) to the right of fuses can be used, as shown in Figure 4.3.2. Up to 2 PV circuits can be connected. The “Grounded (-)” connections are still to be connected to the “Grounded (-)” terminal block.

## **4.4 Connection of Communication Wiring**

The PVI 3000S-5300 inverter supports RS-485 which is used to communicate to the remote computer or communication gateway. As shown in Figure 4.4.1, there are two RJ-45 connectors, RJ45-R and RJ45-L that are located on the bottom of the wiring box. The pin numbers of the RJ-45 connectors and the corresponding signals are described in Figure 4.4.2 below. If the RS485 is used as the external communication interface and the inverter is the last device in the RS485 loop, then the termination switch shall be put to ON position (shown in Figure 4.4.3). The installer needs to open the front cover of the wiring box to switch the termination switch to ON position. The termination switch is default set to OFF position.

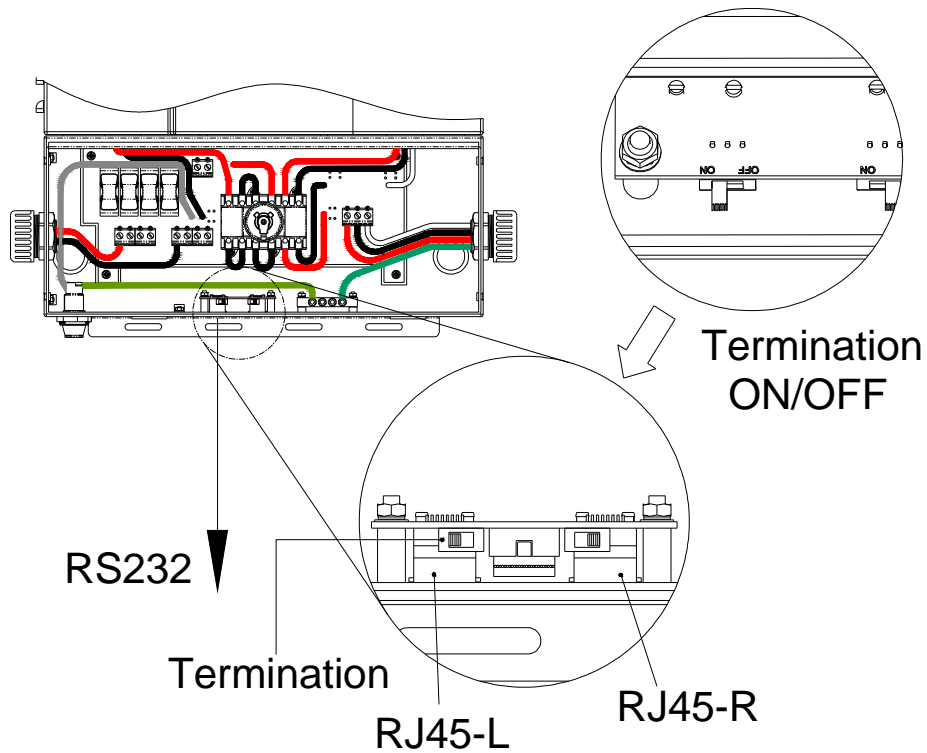


Figure 4.4.1 – Position of the Communications Ports and Termination Switches

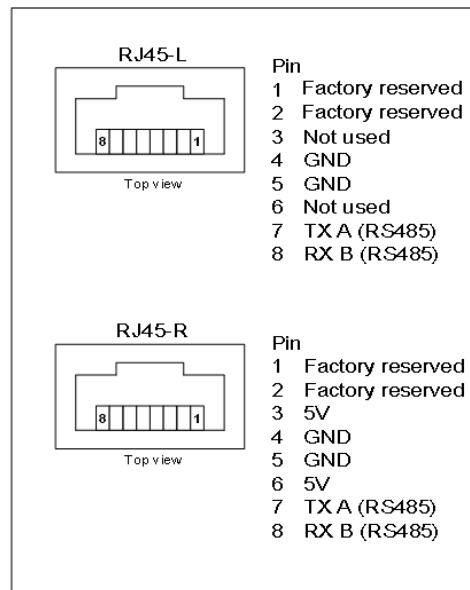
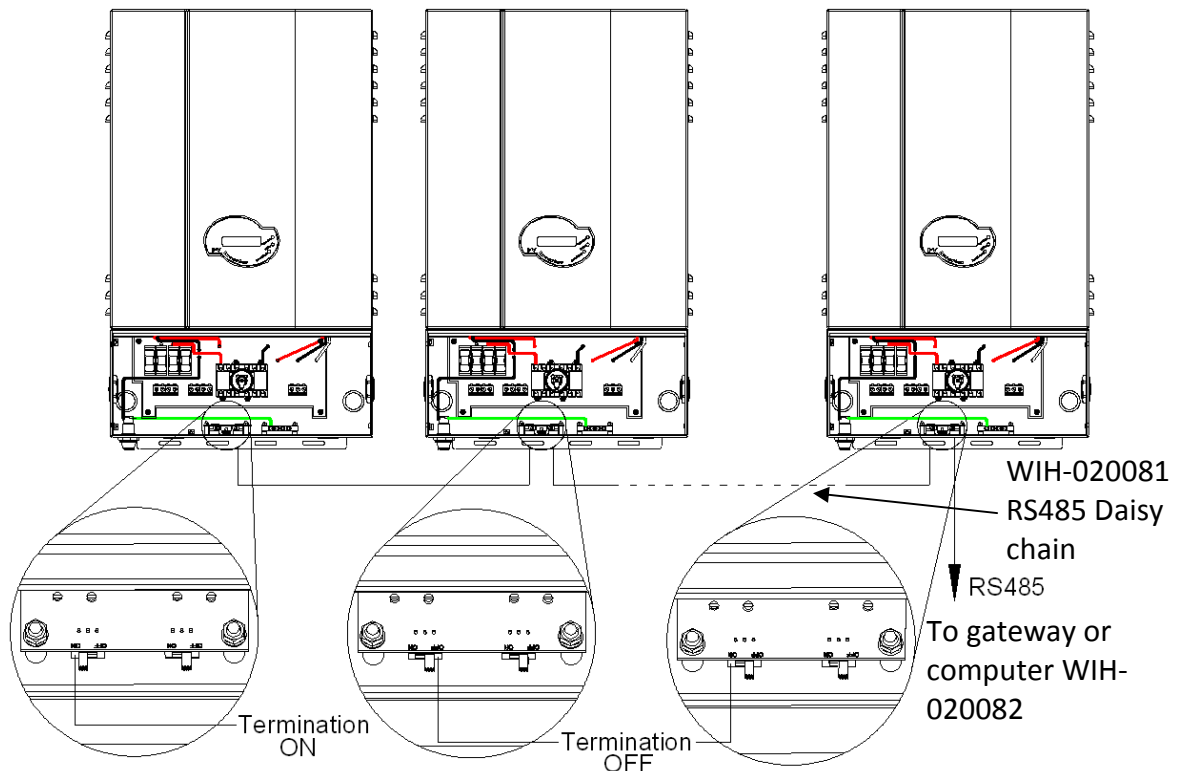


Figure 4.4.2 – RJ-45 Pinouts and Signals

If RS-485 interface is selected, both RJ-45 connectors will be used for the daisy-chained/cascaded RS-485 connections shown in the Figure 4.4.3.





**Figure 4.4.3 – RS-485 Connection**

Description	Part Number	Typical Use	Length
Cable, RS485 comm. PVI 3000S-5300	WIH-020082	RS485 cable for communication gateways	7 ft
Cable, RS485 daisy chain PVI 3000S-5300	WIH-020081	RS485 jumper cable, for 3000S-5300 inverter-to-inverter	30 in.

**Table 4.4.4 – Standard Cables available for RS232 and RS485 communication**

#### 4.5 Communication ID Adjustment

When using SolrenView data monitoring use an address between 1 and 16. SolrenView can automatically detect the ID# (see SolrenView manual). Each inverter requires a unique number when connected to a single communication DAS. The inverter terminator resistor should be turned off except for the inverter furthest away from the Solrenview gateway, i.e. the last inverter on the end of the line.

### 5.0 Commissioning the Inverter PV System

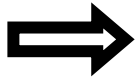
At this point the inverter should be mounted, all connections are made and you are ready to power it up.



**NOTE:** Make sure all tools, parts, etc. are removed from the vicinity of the inverter before turning on.



**WARNING:** Make a final check of all AC and DC wiring to the inverter and in the system before turning on.



**NOTE:** With the PV modules connected and inverter disconnects still off, perform a final check of the PV voltage and polarity once more using a digital volt meter and probing the positive (+) and negative (-) PV connections. Verify that voltage is less than 600V.

### 5.1 Turning on the Inverter

- Turn on the dedicated 2-pole circuit 240/208VAC circuit breaker on the home/building electrical panel
- Turn on the system AC disconnect (if the system is equipped with additional AC disconnect)
- Turn on the DC/AC disconnect on the inverter.
- Watch the LED indicators for initialization (all three LEDs on) and LCD messages.
- Watch for blinking green LED and LCD messages indicating 5 minute connect to grid time and following this time, the inverter will be on-line and beginning to feed power into the AC circuit, the inverter is operating normally
- Lastly, look for a steady green LED indicating the inverter has stabilized at Maximum Power Point

### 5.2 Operation

The control electronics will be active as soon as DC (PV) voltage reaches 200VDC. The inverter will go on-line with the utility/building grid when the DC voltage first exceeds 235VDC (strike voltage). Next, the inverter will load the array, bringing the DC voltage down from 235VDC to no less than 200VDC.

Once there is enough PV power at 200VDC to back feed, AC power switching will automatically feed power to the grid. (The inverter will always wait 5 minutes after being turned on and being within proper grid voltage range, before going into grid-feed mode).

Because the inverter goes completely off line at night or in dark conditions when no power can be produced, the standby losses are less than 0.5 Watt.

### 5.3 Turning off the Inverter

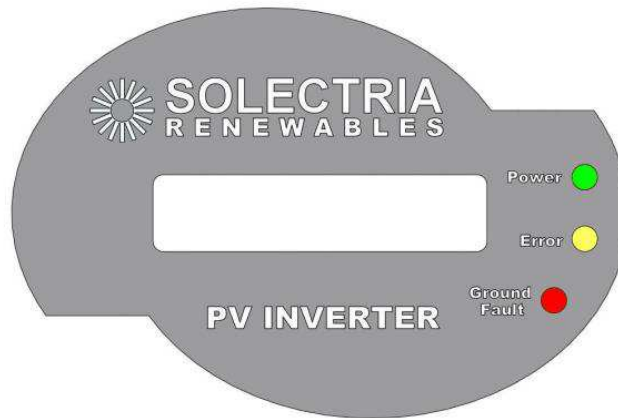
- Turn off the DC/AC disconnect on the inverter.
- Wait at least one minute for the capacitor bank to discharge.

## 6.0 LCD Display, LED Indicators, Errors and Messages

The inverter operates automatically without the need for user interaction. The inverters microcontroller runs through various checks before going online with the grid and feeding power

into the grid. The LCD display and LED indicators on the front of the inverter provide valuable inverter operating information.

## 6.1 LCD Display



**Figure 6.1.1 – LCD Display**

The green LED "Power" shows the current operating condition.

The yellow LED "Error" indicates whether there is an internal or external fault present and whether the AC grid back-feed has been interrupted.

The red LED "Ground Fault" shows if a ground fault is present.

Description of LED symbols used to indicate LED status in this manual

- LED ON
- LED OFF
- X Not relevant / Inconsequential
- ☀ LED ON 0.9 second/OFF 0.1 Second
- ⦿ LED ON 0.1 second/OFF 0.9 Second
- ◐ LED ON 0.25 second/OFF 0.25 Second

## 6.2 LED Indicators

LED indicators		Operating status	Description
Green Yellow Red	⊗ ⊗ ⊗	Initialization	The PVI 3000S-5300 is initializing.
Green Yellow Red	⊗ ● ●	System Check mode	The inverter is in System Check mode.
Green Yellow Red	⊗ ● ●	Monitor mode	The inverter is in Monitoring mode.
Green Yellow Red	○ ● ●	Grid/MPP mode	The inverter is feeding power back to the grid.
Green Yellow Red	⊗ × ●	Power limiting	Power limiting mode.
Green Yellow Red	× ⊗ ●	Warning	Warning is detected.
Green Yellow Red	⊗ ● ●	Low Insolation (solar irradiation)	The inverter is in low insolation (solar irradiation).
Green Yellow Red	● ○ ×	Fault mode	The inverter is in Fault mode.
Green Yellow Red	● × ○	Ground Fault	A DC ground fault was detected.
Green Yellow Red	○ ○ ×	Idle mode	The inverter is in idle mode.
Green Yellow Red	● ● ●	Night Time	There is no DC power coming from PV array. System is powered off.

### 6.3 LCD Display Messages

The PVI 3000S-5300 inverter is supplied ready to operate so there are no settings that need to be made by the user for fully automatic operation. The device comes standard with an LCD display on which various data can be read. All indicated data is only an indication and has tolerances of up to  $\pm 5\%$ .

The PVI 3000S-5300 inverter has a 16 x 2 LCD to show the operating status, input/output data, and error messages. As long as the DC input voltage is above the pre-set threshold value of 200V, the LCD continues to display the information following the process flow illustrated in the Figure 6.3.1.

The process flow may follow the **operating mode**, **fault mode**, or **idle mode**. The operating mode is when the system goes from power-on to **system check**, **monitoring**, and then **grid feeding mode** without any fault condition detected. The inverter should work following the operating mode and eventually feeds the power to the grid. During the system check and monitoring mode, if a fault condition that could be cleared automatically is detected, then the system will go into the fault mode that the system could return to the operating mode once the fault condition goes away. One obvious example is that an “island” condition is detected due to the grid going off and then back on later, the fault condition is cleared when the power returns. If a fault cannot clear on its own, then the system will enter the idle mode and will need a service person to clear the fault and reset the system.

The following figures explain how the display works in the **operating mode**.

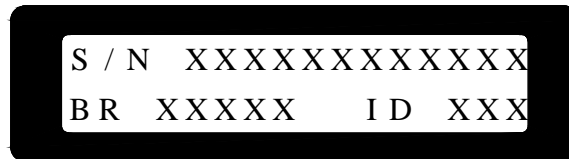
When the DC input voltage goes above the pre-set threshold value, the inverter is powered up and will show the company name and model name (PVI 4000S in this example) on the LCD as shown below.



After 3 seconds, software versions of two embedded CPU's, Sequential and Current controllers, will be displayed on the LCD. Afterward, the serial number (S/N), the baud rate (BR) / address (ID) for the communication port will be displayed.

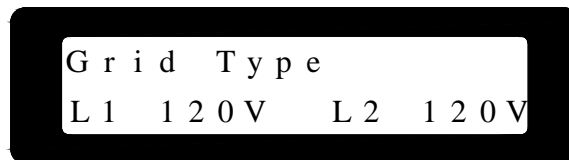


3 seconds ↓



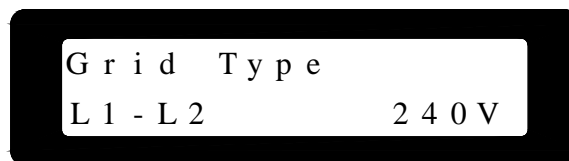
3 seconds ↓

Then three (3) seconds later, it displays the setting of the nominal grid voltage configuration. The grid type setting of 208/240 with neutral is used as the display example shown below. For the grid type setting, please refer to Section 4 Wiring the Inverter.



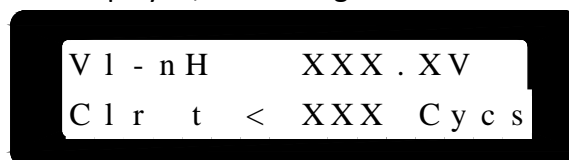
3 seconds ↓

If the grid type is set to 240 Vac without neutral, then the display will be looked as the figure shown below.

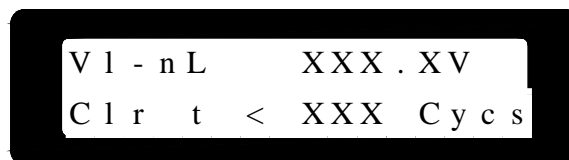


3 seconds ↓

Then three (3) seconds later, LCD will show the voltage setting for the inverter to drop the grid connection. The settings of the VI-nH and its clearing time will be displayed. The VI-nH setting is the phase-to-neutral (rms) high threshold voltage setting at which point the inverter disconnects its output from the AC power grid when abnormally high phase-to-neutral AC voltage is detected. After the setting of the VI-nH is displayed, the setting of the VI-nL will be displayed for 3 seconds.



3 seconds ↓



3 seconds ↓

Then three (3) seconds later, it displays the setting of the VacH which is the phase-to-phase (rms) high threshold voltage setting at which point the inverter disconnects itself from the grid when abnormally high phase-to-phase AC voltage is detected. Also, the setting of the clearing time which is the total duration of time to disconnect the output from the AC grid is displayed. The clearing time is the summation of the de-bounce time and the hardware delay time. This delay is necessary to avoid nuisance trips. After the settings of the VacH and its clearing time, the settings of the VacL and its clearing time will be displayed for three (3) seconds. The display VI-nH/VI-nL is only for 208/240 with neutral setting, VacH/VasL is only for 240 or 208 without neutral, they would not display at the same time.

```
V a c H      X X X . X V
C l r   t   < X X X   C y c s
```

3 seconds ↓

```
V a c L      X X X . X V
C l r   t   < X X X   C y c s
```

3 seconds ↓

Then the high and low threshold settings of the AC frequency and the clearing time will be shown for three (3) seconds. When the AC frequency reaches the high or low threshold setting, the inverter will disconnect its output from the AC grid.

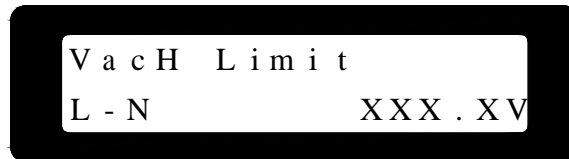
```
F a c H      X X . X X H z
C l r   t   < X X X   C y c s
```

3 seconds ↓

```
F a c L      X X . X X H z
C l r   t   < X X X   C y c s
```

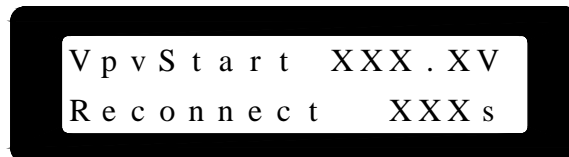
3 seconds ↓

Then the LCD will display the setting of the AC high voltage limit above which value, inverter will reduce the output power until the AC voltage drops within this setting. If the grid type is set to 208/240 with neutral, then the display will be looked as the figure shown below.



3 seconds ↓

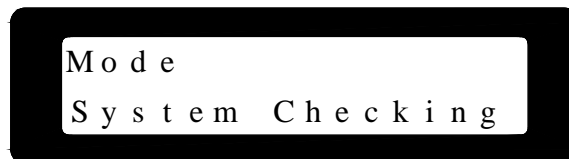
Then the setting of the re-connection time will be displayed. The re-connection time is the duration of delay time for the inverter to re-connect to the grid after the fault(s) is(are) cleared.



3 seconds ↓

Waiting Mode Display

After the basic information of the inverter is displayed, the system enters the **System Check mode** which is indicated on the LCD.



During the system checking, if the DC input voltage is not reaching the point of the PV start voltage setting, , then the following message will be shown on the LCD and the system will stay at this step.



During the system checking, if the grid is not connected to the inverter, then the inverter enters the fault mode and the following message will be shown on the LCD.



Once system check is done, the inverter goes into the **monitoring mode**. If all data needed for grid feeding is in the acceptable range, the system will keep monitoring this data for a period of time. The following information tells users that the system will go into the grid feeding mode in



XXX seconds and then show the measured data of the DC input voltages and the existing voltage and frequency on the grid side.

```

Mode   M o n i t o r i n
Next C o n n e c t   X X X s
    
```

3 seconds ↓

```

V p v           X X X V
    
```

3 seconds ↓

```

V a c           X X X . X V
F a c           X X . X H z
    
```

3 seconds ↓

During the monitoring mode, if DC input voltages fall under the PV start voltage setting, the system stays in this mode and shows the information as follows. The system will still keep measuring the parameters of both DC and AC and display on the LCD.

```

Mode   M o n i t o r i n g
Low    I n s o l a t i o n
    
```

3 seconds ↓

```

V p v           X X X V
    
```

3 seconds ↓



3 seconds ↓

After the system enters the **grid feeding mode**, it will show the following information in order and repeat this until the system goes to another operating mode.

The first screen shows the current operation mode.



3 seconds ↓

The next messages are the up-to-minute data of the DC input voltages and the AC output voltage. The first two messages are for the PV array and the other two messages are for the AC output power. Vpv is the incoming voltages from the PV array. Wpv is the incoming power of the PV array in Watts. Vac, Pac, Iac, and Fac are the voltage, power, current, and frequency that the inverter feeds to the grid.



3 seconds ↓



3 seconds ↓



3 seconds ↓

The next message shows the cumulated energy in kWh and period of time in hours for the inverter delivering the power to the grid since the inverter has been power on and operated for today.

```

E t o d a y   X X X . X   k W h
H t o d a y   X X . X   H r
    
```

3 seconds ↓

The next message shows the cumulated energy in kWh and period of time in hours for the inverter delivering the power to the grid up-to-date since the inverter has been installed and operated.

```

E a c   X X X X X X . X   k W h
H           X X X X X   H r
    
```

3 seconds ↓

There are five possible **de-rating displays** which will be shown if power de-rating is detected in grid feeding mode. Only one occasion that causes de-rating could be detected at a time. Therefore, only one of the following messages will be displayed if power de-rating occurs. When Temp message is presented, the power de-rating is caused by the over temperature. The Ipv message shows that the power de-rating is caused by restricting the DC input current to the maximum limit. The Iac and Pac messages illustrate the power de-rating is caused due to restriction of the maximum output AC current and power. The VacH message shows that the power de-rating is caused by the high AC voltage.

```

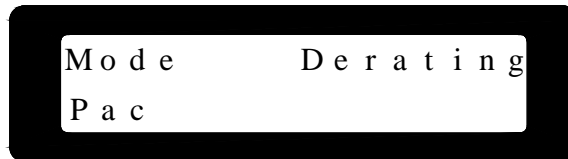
M o d e       D e r a t i n g
T e m p
    
```

```

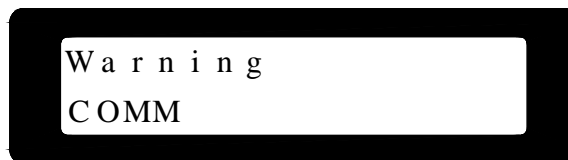
M o d e       D e r a t i n g
I p v
    
```

```

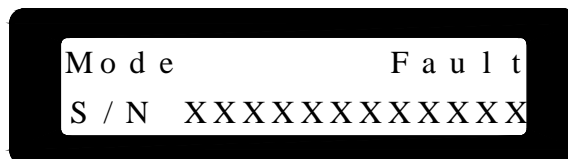
M o d e       D e r a t i n g
I a c
    
```



There are three possible **warning messages** that may be displayed with different failures. These messages occur in grid feeding mode. When EEPROM message is displayed, the system is unable to access the EEPROM. The COMM message means a failure of the communication function. The FAN BLOCK message shows that the fan has stopped running. These warnings could appear one after the other.



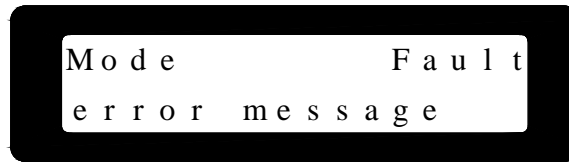
The messages for the **fault mode** are as follows. It shows the fault mode, serial number of the inverter, software versions of the sequential and current controllers and then the error messages which are listed in the Error Message Table 7.1.1.



3 seconds ↓



3 seconds ↓



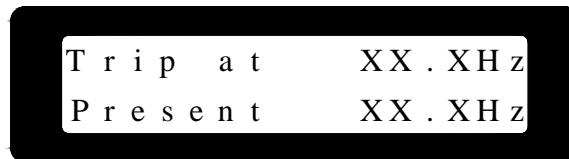
3 seconds ↓

There are several error messages that show the detailed conditions that cause the system to go into the fault mode, such as the messages shown below that show that the frequency of the AC grid is too high (H) or too low (L). After three (3) seconds, the message shows the present frequency and the frequency that caused the system to go into the fault mode.



X: H or L

3 seconds ↓



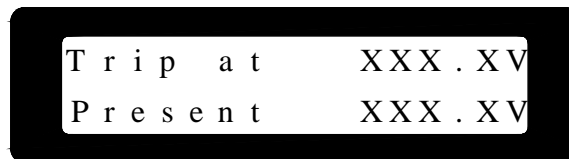
3 seconds ↓

The message below shows that the AC voltage is too high (H) or too low (L) and next it displays the present AC voltage on the grid and voltage causing the system to go into the fault mode.



X: H or L

3 seconds ↓



3 seconds ↓

The message below shows the PV DC voltage is too high....

```

Mode                F a u l t
V p v H
    
```

3 seconds ↓

```

T r i p   a t       X X X . X V
P r e s e n t       X X X . X V
    
```

3 seconds ↓

The following message presents that the AC line1 and/or line2 voltage (refer to the neutral) is/are too high (H) or too low (L)....

```

Mode                F a u l t
V a c L 1   X   V a c L 2   X
    
```

X: H or L

3 seconds ↓

The messages for the **idle mode** are as follows. It shows the operating mode, serial number of the inverter, software versions of the sequential and current controllers and then the error messages which are listed in the Error Message Table 7.1.1.

```

Mode                I d l e
S / N   XXXXXXXXXXXXXXXX
    
```

3 seconds ↓

```

S E Q   V e r s i o n   X . X X
C U R   V e r s i o n   X . X X
    
```

3 seconds ↓

```

Mode                I d l e
e r r o r   m e s s a g e
    
```

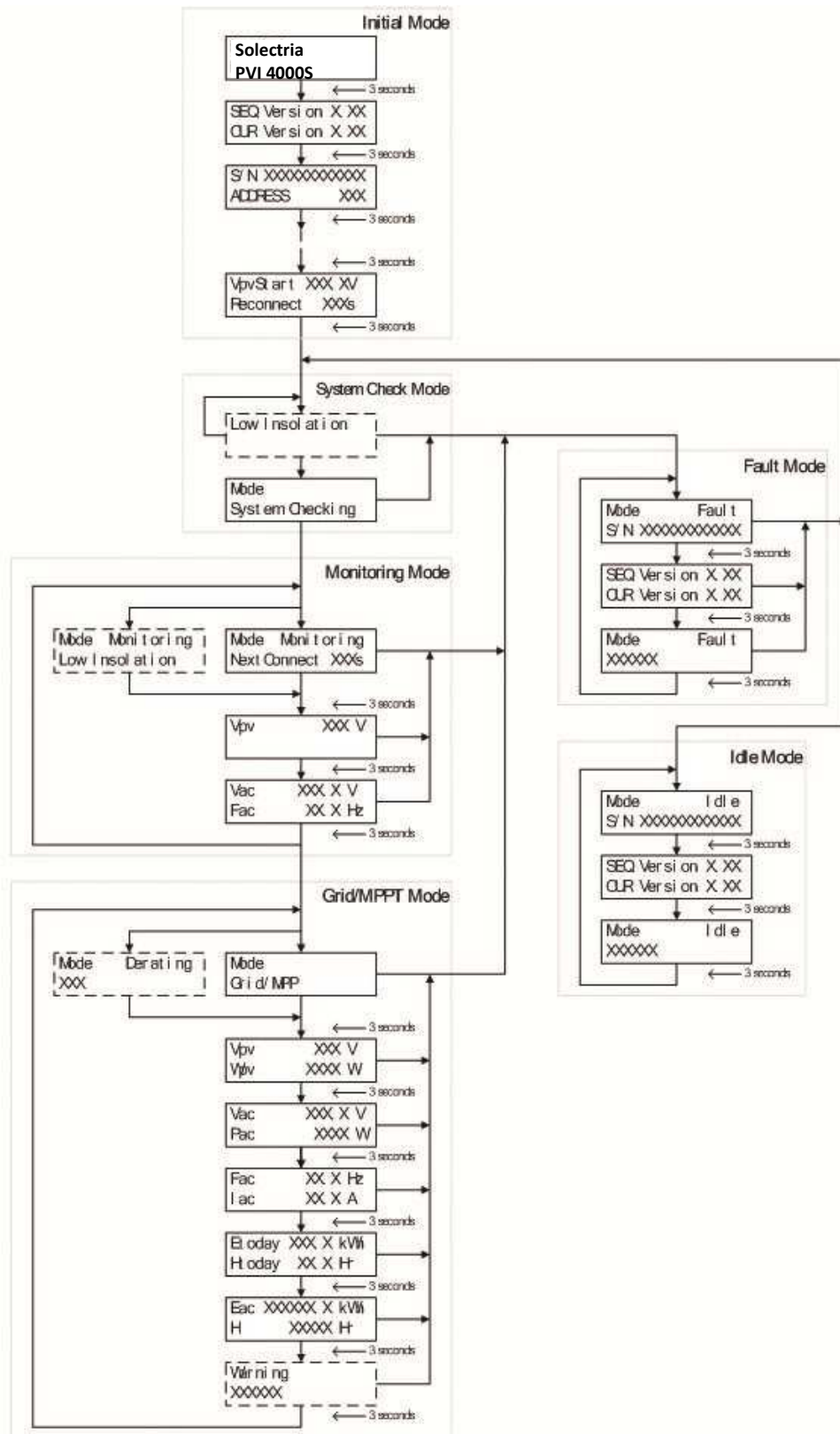


Figure 6.3.1 – LCD Display Flow Chart

## 7.0 Troubleshooting and Inverter Messages

### Identifying and resolving faults

The PVI 3000S-5300 is fitted with a self-diagnostic system, which can recognize a majority of possible faults and show these on the display. This allows the operator to rapidly identify possible problems in the solar inverter or system. Please refer to Table 7.1.1 for a thorough explanation of fault codes, modes, etc. These indicate both internal errors and external faults.

### Ground Fault

If a significant ground fault occurs in the PV array or wiring, the Ground Fault LED will light and the “fault” will be displayed. The GFDI fuse (located on the wiring/connector panel) may be blown. If it is, determine and repair ground fault and replace fuse with Bussmann KLKD1 (1 Amp, 600VDC).



**WARNING:** In the event of a ground fault, DO NOT TOUCH any equipment (including, but not limited to: the inverter, the PV array disconnects, the PV array combiners, the PV panels, the PV racking system). Immediately contact the installer or another qualified person to locate and repair the source of the ground fault. Be aware that normally grounded conductors and equipment may be energized and may pose a significant shock and / or fire hazard.

### Weak Sunlight Condition

Operation in weak sunlight, (for example early in the morning, when overcast, or when snow is covering most or all of the PV array) can cause the inverter to go through a cycle of trying to start and restart several times. This can occur if the array reached 235V (strike voltage) but there is nearly no power available. If in doubt, wait for stronger sun.

## 7.1 Inverter Messages

### Explanations of Error Messages

In the event of a fault, the inverter will stop feeding the AC voltage to the building/utility and display the error message on the LCD. Qualified service personnel shall do the analysis, measurement, and debug the system if needed according to the error message in order to resume normal operation. It is recommended to analyze the fault condition(s) by referring to the table below and then remove the fault condition(s) in order to return the inverter to normal and continue to feed AC voltage to the utility steadily. Please contact Solectria Renewables if the same error message is persistent.



Error Message	Description	Possible Solutions
<b>GridNA</b>	No AC voltage is detected.	Verify AC voltage disconnect on Verify AC circuit breaker is on/operational Verify and measure AC voltage present in Inverter disconnect Contact installing company or Solectria Renewables
<b>Drift Fac</b>	Islanding is detected.	Verify AC voltage present and correct in Inverter disconnect Contact installing company or Solectria Renewables
<b>VacH</b>	The AC voltage of utility is above the upper limit.	Verify setting for S201 is correct for the grid voltage applied Measure the AC voltage and compare to the voltage on the inverter display Contact Solectria Renewables for assistance if the range needs to be adjusted
<b>VacL</b>	The AC voltage of mains utility is below the lower limit.	Verify setting for S201 is correct for the grid voltage applied Measure the AC voltage and compare to the voltage on the inverter display Contact Solectria Renewables for assistance if the range needs to be adjusted
<b>FacH</b>	The frequency of AC voltage of the utility is above the upper limit.	Measure the frequency and compare to the frequency on the display Contact Solectria Renewables for assistance if the range needs to be adjusted
<b>FacL</b>	The frequency of AC voltage of the utility is below the lower limit.	Measure the frequency and compare to the frequency on the display Contact Solectria Renewables for assistance if the range needs to be adjusted
<b>VpvH</b>	The DC voltage of PV array is above the upper limit.	Turn off the inverter Measure the VDC at the Inverter disconnect if over 599VDC the

		<p>solar array needs to be inspected                  Contact installing company                  Do not turn on the inverter until the condition is repaired</p>
<b>Imax_AC</b>	Over current on the AC side.	<p>The inverter will continue to operate at a lower current                  If message occurs frequently contact the installing company</p>
<b>InvTempMax</b>	The internal temperature of the inverter exceeded the safe operating limit.	<p>If the inverter is located in direct sunlight it may need to be shaded                  The VDC input may be too high causing increased temperature, reduce VDC input. Contact installing company or Solectria Renewables</p>
<b>Relay Open Relay Close</b>	Relay test failed.	Contact installing company or Solectria Renewables
<b>VacL1 H</b>	The voltage between L1 and neutral is over the upper limit.	<p>Verify setting for S201 is correct for the grid voltage applied                  Measure the AC voltage and compare to the voltage on the inverter display                  Contact Solectria Renewables for assistance if the range needs to be adjusted</p>
<b>VacL1 L</b>	The voltage between L1 and neutral is under the lower limit.	<p>Verify setting for S201 is correct for the grid voltage applied                  Measure the AC voltage and compare to the voltage on the inverter display                  Contact Solectria Renewables for assistance if the range needs to be adjusted</p>
<b>VacL2 H</b>	The voltage between L2 and neutral is over the upper limit.	<p>Verify setting for S201 is correct for the grid voltage applied                  Measure the AC voltage and compare to the voltage on the inverter display                  Contact Solectria Renewables for assistance if the range needs to be adjusted</p>
<b>VacL2 L</b>	The voltage between L2 and neutral is under the lower limit.	Verify setting for S201 is correct for the grid voltage applied

		<p>Measure the AC voltage and compare to the voltage on the inverter display</p> <p>Contact Solectria Renewables for assistance if the range needs to be adjusted</p>
<b>MOV Fault, AC</b>	High voltage protection function failed on the AC side.	<p>Verify MOV appearance is OK</p> <p>Measure MOV using diode function of DMM if shorted</p> <p>contact Solectria Renewables</p>
<b>MOV Fault, DC</b>	High voltage protection function failed on the DC side.	<p>Verify MOV appearance is OK</p> <p>Measure MOV using diode function of DMM if shorted</p> <p>contact Solectria Renewables</p>
<b>GFDI</b>	The GFDI Fuse is open or blown.	<p>DO NOT TOUCH any equipment (including, but not limited to: the inverter, the PV array disconnects, the PV array combiners, the PV panels, the PV racking system). Immediately contact the installer or another qualified person to locate and repair the source of the ground fault.</p>
<b>DCInjectCurH</b>	Too much DC current injected into the AC grid is detected.	<p>Turn off the inverter and restart.</p> <p>If the error re-occurs Contact installing company or Solectria Renewables</p>
<b>Vdcbush</b>	Internal DC bus voltage is above the upper limit.	<p>Turn off the inverter and restart.</p> <p>If the error re-occurs Contact installing company or Solectria Renewables</p>
<b>Internal COMM</b>	<p>Internal communication failed.</p> <p>Internal watchdog function triggered.</p>	<p>Turn off the inverter and restart.</p> <p>If the error re-occurs Contact installing company or Solectria Renewables</p>
<b>Watchdog</b>	Internal watchdog function triggered.	<p>Turn off the inverter and restart.</p> <p>If the error re-occurs Contact installing company or Solectria Renewables</p>
<b>Offset</b>	The DC injection current monitoring function failed.	<p>Turn off the inverter and restart.</p> <p>If the error re-occurs Contact installing company or Solectria Renewables</p>

<b>Temp. Sensor</b>	Offset check for grid monitoring failed.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>RAM Test</b>	The internal temperature sensor failed.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>EEPROM Test</b>	Memory failed	Turn off the inverter and restart. If the error re-occurs
<b>System Error</b>	EEPROM test failed.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>Version Error</b>	The system failed.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>CPU Delta Fac CPU Delta Vac CPU Delta</b>	The firmware version is not correct. Internal measurement comparison error or defective hardware	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>GFDI CPU Delta Idc</b>		Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>IpvH</b>	Over current on the DC side	Use a suitable meter for measuring the current from the array. Verify the current is within the limits for the inverter. Contact the installing company to check the array
<b>Driver Fault</b>	Driver circuit or power device failed	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>CalDataError</b>	Calibration data is out of range	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>CalDataLoss</b>	Calibration data is lost.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables

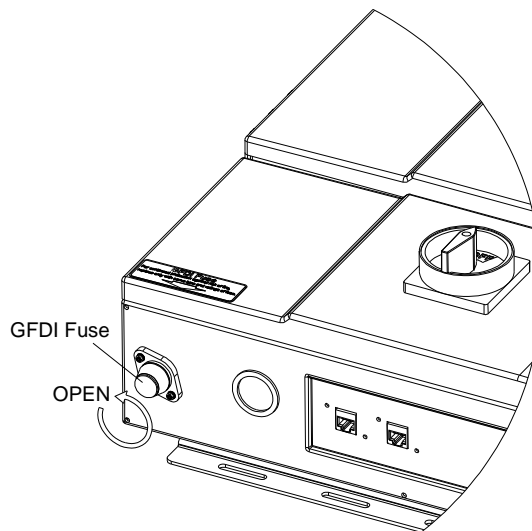
<b>Ibuck Over</b>	Internal converter over current	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables
<b>Converter Error</b>	DC/DC hardware failed.	Turn off the inverter and restart. If the error re-occurs Contact installing company or Solectria Renewables

**Table 7.1.1 – LCD Error messages**

## 7.2 Maintenance

### Replacing the GFDI Fuse

Remove the cap of the GFDI fuse holder to open and then replace the GFDI fuse with the same type and rating (600VDC, 1A). Before replacement of the fuse, you must switch off the DC/AC disconnect switch and AC breaker and wait for at least 5 minutes for system to discharge.



**Figure 7.2.1 – Open Cap to Access the GFDI Fuse**

### Replacing the PV String Fuses

The inverter is shipped with four (4) 15A, 600Vdc PV string fuses for PV strings (or three for PVI 3000S). However, the size of the PV string fuse is determined by the electrical ratings of the PV module and by UL and National Electrical Code (NEC) requirements. The minimum size of the PV string fuse is calculated using the short circuit current rating (Isc) of the PV module. Please be sure to consult with the PV module manufacturer for appropriate PV string fuse rating. **IN NO CASE SHALL FUSES OF LARGER THAN 15A BE USED FOR THE PV STRING FUSES.**

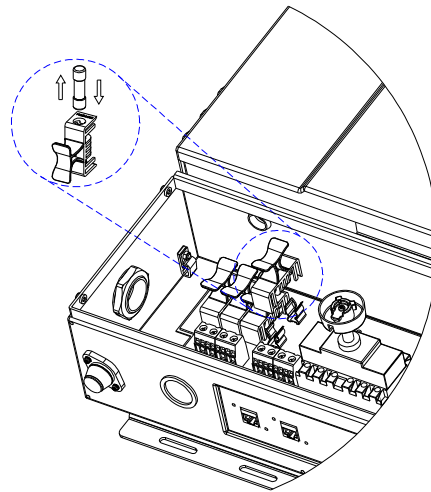


**WARNING:** EXTREME SHOCK AND FIRE HAZARD! FAILURE TO FOLLOW THE FOLLOWING PROCEDURE CAN RESULT IN SERIOUS SHOCK, FIRE DAMAGE AND WILL VOID INVERTER WARRANTY!



**WARNING:** PV arrays are always energized when exposed to light, therefore hazardous voltage is still present on the terminal blocks and the PV string fuse holders even when the DC/AC disconnect switch is switched OFF. Please cover the PV arrays with opaque (dark) materials during PV string fuse replacement.

- Remove wiring box cover
- Check DC voltages of all strings using a meter. Measured voltage should be open circuit voltage. If the measured voltage is at or close to 0.0V, then STOP and do not remove any fuses. Recheck your wiring to ensure there is not a dead short or a string with reversed polarity.
- Check DC current of all strings using DC clamp on meter. Measured currents should be at or very close to 0A. If there is a measured current reading, then STOP and do not remove any fuses. Recheck your wiring to ensure there is not a dead short or a string with reversed polarity.
- Once the voltages and currents are measured and confirmed to be correct, remove and replace the PV string fuses.



**Figure 7.2.2 – Replacement of the PV String Fuses**

### **Factory Service**

Please contact Solectria Renewables customer service for documentation to remove and replace inverter section without removing the wiring box.

## 8.0 Product Warranty & RMA Policy

### 8.1 Warranty Policy

The Solectria Renewables Warranty Policy is stated below.

#### **Solectria Renewables Warranty Coverage:**

Solectria Renewables Limited Warranties are provided by Solectria Renewables, LLC. ("Solectria Renewables") and cover defects in workmanship and materials. Solectria Renewables' price for the products is based on inclusion of these limited warranty provisions and disclaimers. In the event of a conflict between the terms of this Limited Warranty and any terms and conditions proposed by purchasers of Solectria Renewables' products, these Limited Warranty provisions shall govern the parties' obligations with respect to warranty coverage for defective products.

#### **Duration of a Solectria Renewables Warranty Period:**

For three-phase inverters (PVI 10kW and higher) and for the PVI 1800 and PVI 2500 inverters, the warranty period is 60 months from the date of purchase of the inverter by the end user or 64 months after the delivery date from Solectria Renewables to the distributor or the dealer / installer, whichever is shorter. If a warranty extension has been purchased, the term is defined as an extension beyond 60 months. For example, if a 5 year extension (to 10 years total) is purchased, the term becomes 120 months from date of purchase. For the PVI 3000 to PVI 7500 inverters, the warranty period is 120 months from the date of purchase by the end user or 124 months after the delivery date from Solectria Renewables to the distributor or the dealer / installer, whichever is shorter.

If Solectria Renewables repairs or replaces a product, its warranty continues for the remaining portion of the original Warranty Period or 90 days from the date of the repair/replacement shipment to the customer, whichever is greater.

Solectria Renewables' obligation to repair or replace a defective product under this warranty is contingent upon Solectria Renewables receiving full and timely payment for the warranted products and associated shipping charges. Solectria Renewables Warranty Coverage is voidable, at Solectria Renewables' sole option, if full payment for products and associated shipping charges are not received in full and in a timely manner by Solectria Renewables. Please contact Solectria Renewables Customer Service for further details on other products.

**What will Solectria Renewables do?**

Solectria Renewables will, at its sole option, repair or replace the defective product free of charge, provided that Solectria Renewables is notified of the product defect within the Warranty Period for the product, and provided that Solectria Renewables, through inspection, establishes the existence of such a defect and that it is covered by the Limited Warranty.

Solectria Renewables will, at its sole option, use new and / or reconditioned parts in performing warranty repair and/or replacements. Solectria Renewables reserves the right to use parts or products of original or improved design in the repair or replacement of the product. All replaced products and all parts removed from repaired products become the property of Solectria Renewables. Solectria Renewables will attempt to repair the unit within a reasonable time period. No provision will be made for reimbursement of lost energy production.

For three-phase inverters 10kW and higher:

Solectria Renewables covers parts, travel and labor necessary to repair the product and shipment of parts to and from the customer via a Solectria Renewables-selected non-expedited surface freight within the contiguous United States, Canada and Mexico. For Alaska, Hawaii and all other installation locations Solectria Renewables will supply necessary parts as needed for warranty repairs; however, travel is not included. Contact Solectria Renewables customer service for details on the freight policy for return shipments outside of the contiguous United States, Canada and Mexico.

For single-phase inverters 7.5kW and lower:

Solectria Renewables covers replacement inverters or parts necessary to repair the product and shipments of parts to and from the customer via a Solectria Renewables-selected non-expedited surface freight within the contiguous United States, Canada and Mexico. For Alaska, Hawaii and all other installation locations Solectria Renewables will cover the cost of return shipment of product one way from the customer. The warranty does not include customs fees, broker fees or other taxes that may be imposed by the government agency. Contact Solectria Renewables customer service for details on freight policy for return shipments outside of the contiguous United States, Canada and Mexico.

**Obtaining Service:**

If your product requires troubleshooting or warranty service, contact your distributor or dealer / installer. If you are unable to contact your distributor or dealer / installer, or the distributor or dealer / installer is unable to provide service, contact Solectria Renewables directly at the number listed on the website in the customer service section for your product.

Solectria Renewables may send personnel to a jobsite or contract with an area technician, installer or other authorized, trained service personnel to service / replace components.



Reimbursement for contracted services: Solectria Renewables will submit a purchase order to the designated service personnel before work is performed. This purchase order will cover time expected for the required service and most likely an allocation for travel time.

Direct returns may be performed according to the Solectria Renewables Return Material Authorization Policy.

In any warranty claim, dated proof of purchase must accompany the product and the product must not have been disassembled or modified without prior written authorization by Solectria Renewables.

Proof of purchase may be in any one of the following forms:

- The dated purchase receipt from the original purchase of the product at point of sale to the end user, or
- The dated distributor or dealer / installer invoice or purchase receipt showing original equipment manufacturer (OEM) status, or
- The dated invoice or purchase receipt showing the product exchanged under warranty.

Solectria Renewables provides technical assistance Monday-Friday, 8:30am-7pm EST and on- call technical support is provided outside normal business hours.

#### **What does the Solectria Renewables warranty not cover?**

Solectria Renewables Limited Warranties do not cover normal wear and tear of the product or costs related to the removal, installation, or troubleshooting of the customer's electrical systems. These warranties do not apply to and Solectria Renewables will not be responsible for any defect in or damage to:

- a) The product, if it has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment;
- b) The product, if it has been subjected to fire, water, generalized corrosion, biological infestations, acts of God or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Solectria Renewables product specifications including high input voltage from generators or lightning strikes;
- c) The product, if repairs have been made to it other than by Solectria Renewables or its authorized, trained service personnel;
- d) The product, if it is used as a component part of a product expressly warranted by another manufacturer;

- e) The product, if its original identification (trademark, serial number) markings have been defaced, altered, or removed;
- f) The product, if it has been damaged in shipping (unless approved in writing by Solectria Renewables);
- g) Any installation and operation beyond the scope covered by relevant safety regulations (UL1741, NFPA 70, etc.);
- h) Third party monitoring equipment.
- i) Failure to perform Preventative Maintenance may void the warranty.

#### **DISCLAIMER**

**SOLECTRIA RENEWABLES LIMITED WARRANTIES ARE THE SOLE AND EXCLUSIVE WARRANTY PROVIDED BY SOLECTRIA RENEWABLES IN CONNECTION WITH YOUR SOLECTRIA RENEWABLES PRODUCT AND ARE, WHERE PERMITTED BY LAW, IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, GUARANTEES, REPRESENTATIONS, OBLIGATIONS AND LIABILITIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE IN CONNECTION WITH THE PRODUCT, HOWEVER ARISING (WHETHER BY CONTRACT, TORT, NEGLIGENCE, PRINCIPLES OF MANUFACTURER'S LIABILITY, OPERATION OF LAW, CONDUCT, STATEMENT OR OTHERWISE), INCLUDING WITHOUT RESTRICTION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR CONDITION OR QUALITY OF THE PRODUCT, ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY OF DISTRIBUTOR OR DEALER/INSTALLER ABILITY, ALL OF WHICH ARE EXPRESSLY DISCLAIMED TO THE FULLEST EXTENT PERMITTED BY LAW.**

**ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY OF DISTRIBUTOR OR DEALER / INSTALLER ABILITY, TO THE EXTENT REQUIRED UNDER APPLICABLE LAW TO APPLY TO THE PRODUCT, SHALL BE LIMITED IN DURATION TO THE PERIOD STIPULATED UNDER THIS LIMITED WARRANTY, TO THE FULLEST EXTENT PERMITTED BY LAW.**

**IN NO EVENT WILL SOLECTRIA RENEWABLES, INCLUDING ITS SUPPLIERS, MANUFACTURERS, VENDORS, SUBCONTRACTORS, DISTRIBUTORS, DEALERS AND ANY OTHER AFFILIATES BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING WHETHER IN CONTRACT OR TORT INCLUDING WITHOUT RESTRICTION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, INCLUDING LOSS OF USE AND INTANGIBLE HARM OF ANY KIND, AND ANY PHYSICAL DAMAGE OR OTHER DAMAGE ARISING FROM OR AS A RESULT OF ANY USE, MISUSE OR ABUSE OF THE PRODUCT, OR THE INSTALLATION, INTEGRATION OR OPERATION OF THE PRODUCT, REGARDLESS OF WHETHER SUCH INSTALLATION, INTEGRATION OR OPERATION WAS PERFORMED PROPERLY OR IMPROPERLY.**

Solectria Renewables neither assumes nor authorizes any other person to assume for it any other liability in connection with the repair or replacement of the Product.

**Exclusions of the Policy:** Installation and Operation Manual

If your product is a consumer product, the applicable law may not permit exclusion of implied warranties. To the extent permitted by the applicable law such warranties are limited to the duration of this Limited Warranty. Some jurisdictions do not allow any limitations on the duration of an implied warranty, or exclusions on implied warranties, or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply to you. This Limited Warranty gives you specific legal rights. You may have other rights, which may vary from state to state or province to province.

**WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, UNLESS SPECIFICALLY AGREED TO BY IT IN WRITING, SOLECTRIA RENEWABLES**

- (a) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN MANUALS OR OTHER DOCUMENTATION PROVIDED BY IT IN CONNECTION WITH THE PRODUCT; AND**
- (b) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSSES, DAMAGES, COSTS OR EXPENSES, WHETHER SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION.**

**THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USERS' RISK.**

**WARNING: LIMITATIONS ON USE**

Please refer to your product user manual for limitations on uses of the product. Specifically, please note that Solectria Renewables' products are not intended for use in connection with life support systems and Solectria Renewables makes no warranty or representation in connection with any use of the product for such purposes.

**8.2 Return Material Authorization Policy**

Please review our Return Merchandise Authorization Policy below.

**Obtaining a required, Return Material Authorization:**

Before returning a product directly to Solectria Renewables you must obtain a Return Material Authorization (RMA) number and the correct factory "Ship To" address. Products must also be shipped prepaid. Product shipments will be refused and returned at your expense if they are unauthorized, returned without an RMA number clearly marked on the outside of the shipping box, if they are shipped collect, or if they are shipped to the wrong location.

**Information Solectria Renewables needs when you are obtaining service:**

- 1) The model names and serial number of your product

**Preparing the product for shipping:**

- 1) Package the unit safely, preferably using the original box and packing materials. Please ensure that your product is shipped fully insured in the original packaging or equivalent. This warranty will not apply where the product is damaged due to improper packaging.
- 2) Include the following:
  - a. The RMA number supplied by Solectria Renewables clearly marked on the outside of the box.
  - b. A return address to which the unit can be shipped. Post office boxes are not acceptable.
  - c. A contact telephone number where you can be reached during work hours.
  - d. A brief description of the problem.

Ship the unit prepaid to the address provided by your Solectria Renewables' customer service representative.

**Returning a product from outside of the USA or Canada:**

In addition to the above, you MUST include return freight funds and are fully responsible for all documents, duties, tariffs, and deposits.

Contact information:

Solectria Renewables LLC  
360 Merrimack Street, Building 9  
Lawrence, Massachusetts, 01843  
USA

Tel: 978.683.9700

Fax: 978.683.9702

Email: [service@solren.com](mailto:service@solren.com)

Website: [www.solren.com](http://www.solren.com)

## 9.0 Technical Data

Input (DC) from PV array:

- Maximum open circuit voltage of PV array is 600V DC



**WARNING:** NEC 690-7 must be followed to calculate the maximum number of PV modules allowed for a maximum inverter open circuit voltage (OCV) of 600V DC in extreme cold temperatures for the installation location.



The open circuit voltage of PV modules depends on the cell temperature and the solar irradiation. The highest open circuit voltage occurs when the PV modules are at the coldest temperature and in bright sun.

Because the PV modules also have a reduction in voltage at high cell temperatures, you must make sure the MPPT voltage of the strings will not drop below the minimum inverter DC input voltage in very hot temperature conditions.

Both the maximum open circuit voltage (OCV) when at cold extreme and minimum MPPT voltage when at hot extreme can be calculated for a PV module using its specification sheet. PV module string sizing can then be used to determine how many modules can be used in a string. Visit [www.solren.com/string sizing.html](http://www.solren.com/string sizing.html) to use Solectria’s interactive string sizing tool.

### 9.1 Input DC (PV) Specifications

	PVI 3000S	PVI 4000S	PVI 5000S	PVI 5300	Unit
Maximum open circuit voltage	600				VDC
Operating Voltage MPPT range	200 - 550				VDC
Strike Voltage	235				VDC
Maximum Input current	16	21	25	25	ADC
Maximum Short Circuit Current	24	24	30	30	ADC
Fused Inputs	3	4	4	4	
DC ground fault trip settings	1				ADC

**Table 9.1 – DC Input Specifications**

## 9.2 Output AC Specifications

The PVI 3000S-5300 is designed to feed power into a standard 60Hz, 240 or 208V AC utility service or 208V AC provided within a facility by a step down transformer (for example, from 480V AC service). As required by NEC, there must be a dedicated 2-pole circuit breaker for the PV inverter connection. This circuit breaker (and wiring) must have a rating of 20, 25 or 30A depending on the model. The inverter is designed to work with the range of AC voltage for a 240VAC or 208V service defined by UL1741/IEEE1547.

	PVI 3000S	PVI 4000S	PVI 5000S	PVI 5300	Unit
Continuous Power (240V)	3000	4000	5000	5300	W
Continuous Power (208V)	2800	3500	4400	4600	W
Operating AC Voltage range (240V)	211 – 264				VAC
Operating AC Voltage range (208V)	183 – 228				VAC
Default over/under voltage trip points and times	per IEEE Std 1547-2003, Table 1				
Operating frequency ( and frequency range)	60 (59.3 – 60.5)				Hz
Maximum Continuous Current	13.5	16.8	21.15	22.1	Arms
Output Current Protection	20	25	30	30	Arms
Maximum Backfeed Current to PV	0	0	0	0	Arms
Total Harmonic distortion (THD, @ full power)	< 3%				
Power Factor	Unity, >0.99				
Anti-islanding protection	per UL1741 / IEEE1547 / CSA22.2#107.1 / FCC Part 15 B				
CEC Efficiency (240V)	96.0%	96.0%	96.0%	96.0%	
CEC Efficiency (208V)	95.5%	95.5%	96.0%	95.5%	
Peak Efficiency (240V)	96.7%	96.7%	96.7%	96.4%	
Peak Efficiency (208V)	96.4%	96.5%	96.4%	96.2%	

**Table 9.2.1 – AC Output Specifications**

## 9.3 General Specifications

	PVI 3000S	PVI 4000S	PVI 5000S	PVI 5300	Unit
Enclosure	Rainproof, NEMA 3R				
Housing Material	Painted Aluminum				
Ambient Temperature Range	-13°F to +131°F (-25°C to +55°C)				°F/°C
Cooling	Convection	Convection and fan assist			
Weight	48.8 lbs	48.8 lbs	59.8 lbs	59.8 lbs	lbs
Dimensions (H x W x D)	28.75" x 18" x 6.75"		28.75" x 18" x 7"		in.
Wires Sizes	10 to 6 AWG input and output connections				AWG
Standards	UL1741/IEEE1547, IEEE1547.1, CSA22.2#107.1, ANSI62.41.2, FCC part 15 B				
Warranty	10 years standard				

**Table 9.3.1 – General Specifications**

### AC Output of PVI 3000S-5300

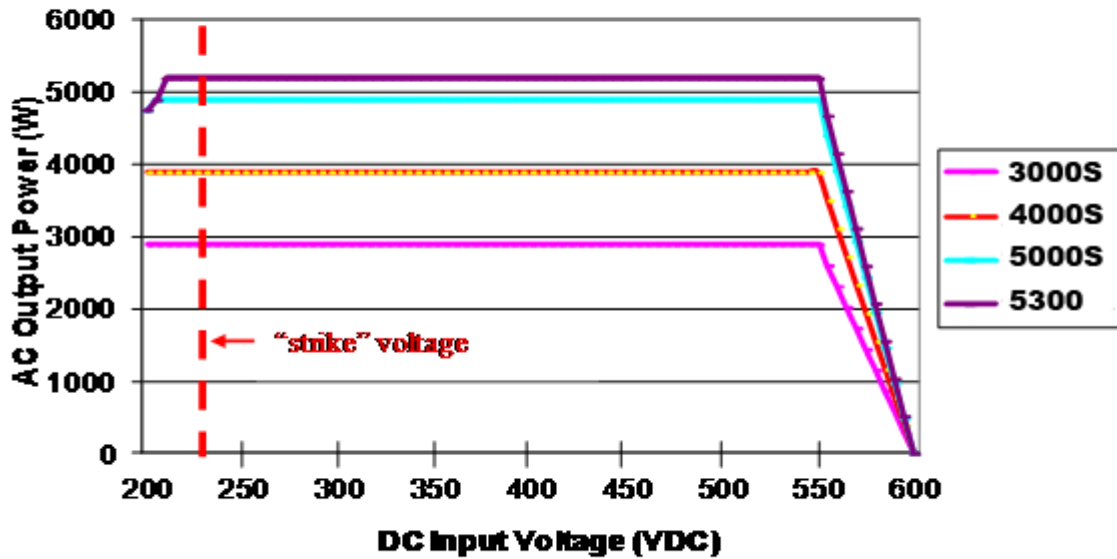


Figure 9.3.2 – DC Voltage and AC Output

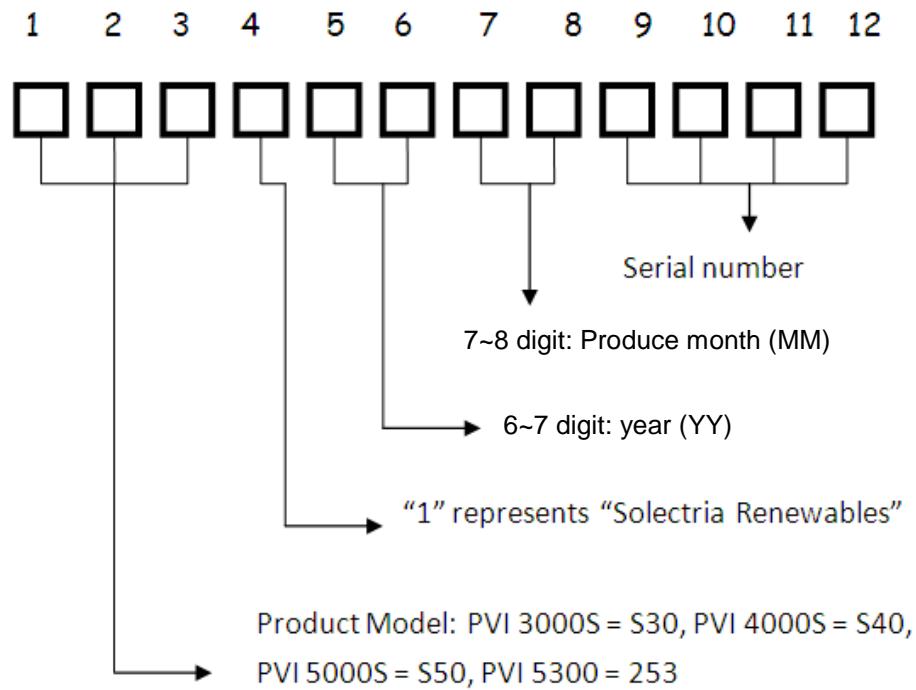


Table 9.3.3 – Serial Number Key

## 10.0 Appendices

### 10.1 Appendix A – PVI 3000S, PVI 4000S, PVI 5000S, PVI 5300 Data Sheet

[http://www.solren.com/downloads/PVI3000-7500\\_datasheet.pdf](http://www.solren.com/downloads/PVI3000-7500_datasheet.pdf)

### 10.2 Appendix B – String Sizing Tool

<http://www.solren.com/stringSizing.html>

### 10.3 Appendix C – Contact Information

Solectria Renewables LLC

360 Merrimack Street

Building 9, 2<sup>nd</sup> floor

Lawrence, Massachusetts 01843

USA

Tel: 978.683.9700

Fax: 978.683.9702

Sales/ general info: [inverters@solren.com](mailto:inverters@solren.com)

Customer Support: [service@solren.com](mailto:service@solren.com)

Website: [www.solren.com](http://www.solren.com)

### 10.4 Appendix D – Authorized Distributors

See website for complete and updated listing: [www.solren.com](http://www.solren.com)

### 10.5 Appendix E – Positive Grounding Option

See section 4.3 Connection of the DC wiring in the Wiring section for standard wiring for negatively grounded systems and refer to it while connecting for positively grounded systems using this appendix including use of all the warnings and cautions.

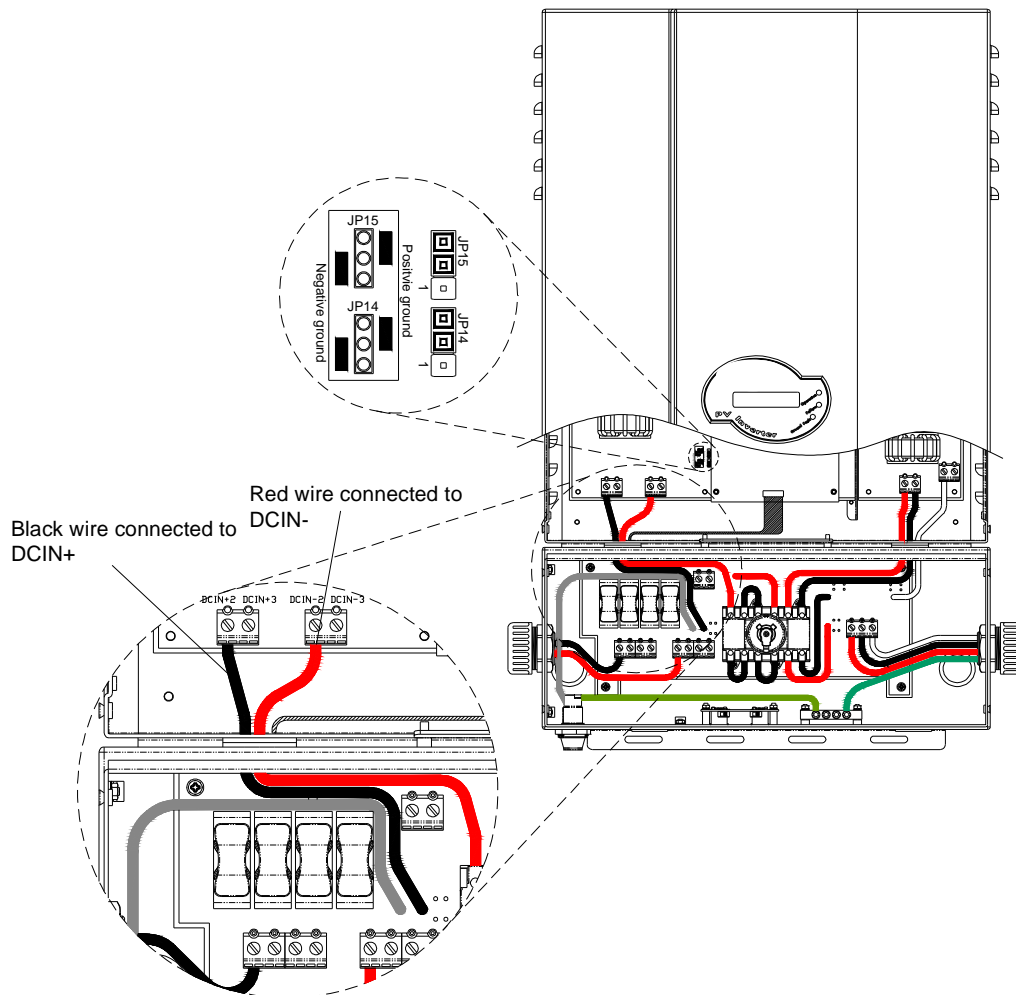


**WARNING:** For positively grounded systems, polarities of each DC input from a PV string shall be correctly connected to the “Grounded Conductor” (positive) and “Ungrounded Conductor” (negative) terminals respectively. The DC voltage must be less than 600V in any condition.

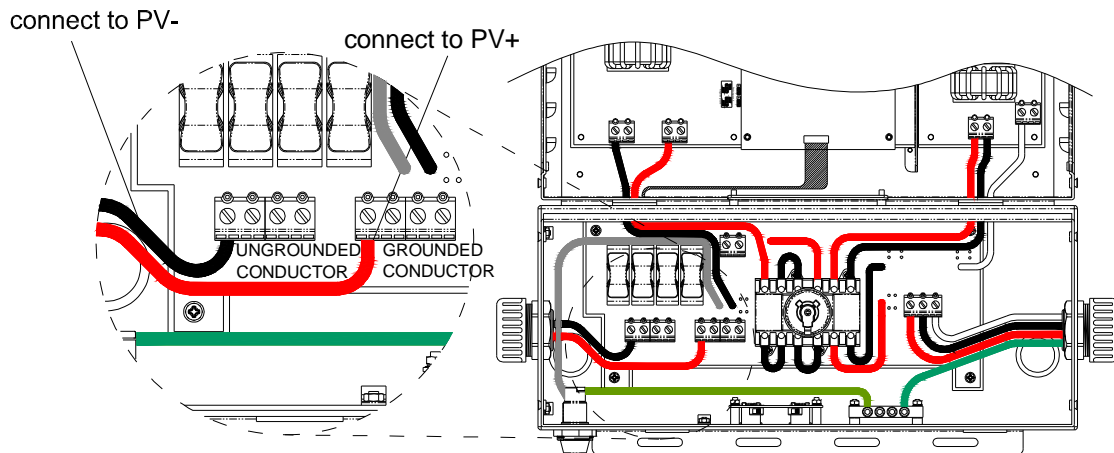
The PVI 3000S-5300 inverter supports positively grounded arrays. To configure the inverter for positive grounded arrays, the integrated disconnect must break the ungrounded, negative conductor. If any inverter is ordered as negatively grounded, it can be “converted” to positively grounded following these instructions:



- Ensure that the inverter is off and de-energized from both AC and DC sides.
- Open the wiring box and inverter cover.
- As shown in Figure 10.5.1, the JP14 and JP15 jumpers need to be placed at the higher positions to set to positive grounding.
- The red DC wire, that connects the inverter board to the wiring box, needs to be connected to “Grounded” DCIN- terminal on the Inverter board.
- The black wire, that connects the inverter to the wiring box, needs to be connected to “Ungrounded” DCIN+ terminal on the Inverter board.
- Disconnect the black DC wires (from PV array) connected to “GROUNDED CONDUCTOR” terminal block.
- Disconnect the red DC wires (from PV array) connected to “UNGROUNDED CONDUCTOR” terminal block.
  - If using the bypass terminals, disconnect the wires from the associated terminal block.
- Connect the black DC wires (from PV array) to the “UNGROUNDED CONDUCTOR” terminal.
  - If using the bypass terminals, connect the black DC wires to this set of terminals.
- Connect the red DC wires (from PV array) to the “GROUNDED CONDUCTOR” terminal.
- Add permanent weatherproof labels over the Ungrounded (+) and Grounded (-) labels below the green terminal blocks. The left terminal block must be labeled “Ungrounded (-)” and the right terminal block must be labeled “Grounded (+)”. Optional: add “Warning, Positively Grounded Unit” label to outside of unit at bottom right corner of wiring box. (a label kit is available from Solectria if requested).
- Tighten the set screws to a torque of 1.7Nm (15.6 in-lb.)



**Figure 10.5.1 – Positive Ground Setting and DC Wire Connections**

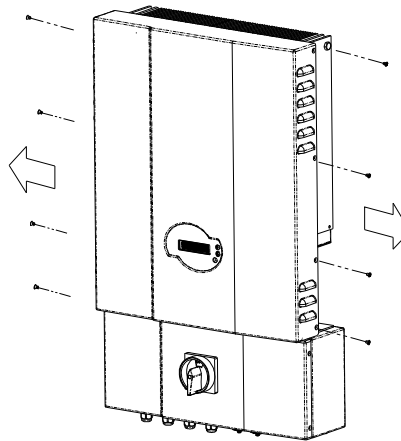


**Figure 10.5.2 – DC Wiring to Terminal Blocks for Positive Ground**

## 10.6 Appendix F – Weatherproof Shield for Wind-Driven Snow and Rain

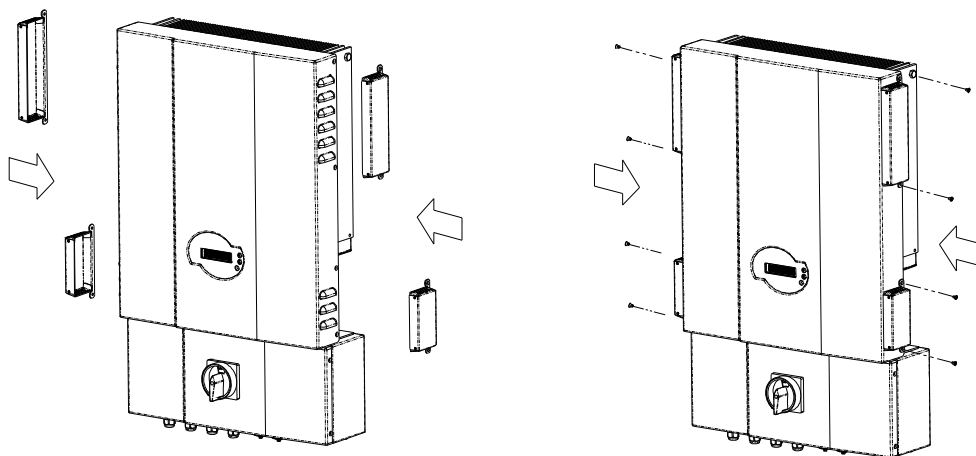
The weather proof shield is to be installed on inverters when the chance of rain, snow or severe weather may occur. Examples of installations needing the shields are units installed on trackers or units installed outdoors, fully exposed to elements and in climates where severe weather can occur.

- Remove the (8) eight screws used to fasten the inverter cover. It is not necessary to remove the inverter cover.
- Open the wiring box and inverter cover.



**Figure 10.6.1 – Remove the Screws of the Inverter Cover**

- Install the shields on the sides of the inverter and cover the air vents. The larger shield is used for the upper vent and the small shield is for the lower.



**Figure 10.6.2 – Secure the Shields on the Sides of the Inverter**

### 10.6 Appendix G – PVI 3000S-5300 PV Inverter Fault Report Form

<b>Basic information</b>	
Model (i.e. "PVI 3000S")	
Serial number	
Purchased from	
Purchased date	_____Y/_____M/_____D
<b>Installation information</b>	
Type of installation	<input type="checkbox"/> Residential <input type="checkbox"/> Commercial
Installation date	_____Y/_____M/_____D
First operation date	_____Y/_____M/_____D
AC wire size and length	_____ AWG wire size      feet length of wire
DC wire size and length	_____ AWG wire size      feet length of wire
PV panel mount	<input type="checkbox"/> Roof <input type="checkbox"/> Pole <input type="checkbox"/> Ground
Solar tracker	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>PV strings</b>	
Output power	
Normal voltage range	Vdc
Peak open circuit voltage	Vdc
Normal current rating	Adc
maximum current rating	Adc
Number of panels	
Number of series/parallel	_____S/_____P
PV panel brand & model	
<b>Fault/error information (please write down exact words that appear on the LCD)</b>	
Fault message 1 on LCD	
Fault message 2 on LCD	
Fault message 3 on LCD	
Fault message 4 on LCD	
Fault message 5 on LCD	
Fault message 6 on LCD	
Description of problem	-Does this failure happen regularly or intermittently? -Can you reproduce the failure? -How much energy has been produced thus far? (kWh)

Form filled out by \_\_\_\_\_

Date \_\_\_\_\_

### 10.7 Appendix H – UL1741 / IEEE 1547 / CSA22.2#107.1 Listing Letter



# Listing Verification

The following Company/product(s) is listed for use with the below ETL Listed Mark(s).

Date Issued  
February 21, 2012

Product  
PV Inverter

Issued To  
Solectria Renewables LLC

Standard(s)  
Inverters, Converters, Controllers &  
Interconnection System Equipment for  
Use With Distributed Energy Resources  
(UL-1741) & General Use Power  
Supplies (CAN/CSA-C22.2 No. 107.1)

Model(s)  
PVI 3000, PVI 3000-P, PVI 3000S,  
PVI 3000S-P, PVI 4000, PVI 4000-P,  
PVI 4000S, PVI 4000S-P, PVI 5000,  
PVI 5000-P, PVI 5000S, PVI 5000S-P,  
PVI 5300, PVI 5300-P



Joanne Nutting  
Senior Directory Coordinator



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