

# **YASKAWA**

## **SOLECTRIA SOLAR**

### **SGI 500XTM**

### **SGI 750XTM**

#### **INSTALLATION AND OPERATION MANUAL**

Revision D

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## **IMPORTANT REGISTRATION AND WARRANTY INFORMATION**

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

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

# IMPORTANT SAFETY INSTRUCTIONS

In this manual, “inverter” or “inverters” refers to the inverter models: SGI 500XTM or SGI 750XTM unless one of the specific models is noted.

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

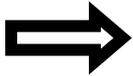
To reduce the risk of electrical shock, and to ensure the safe installation and operation of the inverter, the following safety symbols are used to indicate dangerous conditions and important safety instructions:



**WARNING:** This symbol, along with the word “**WARNING**”, indicates a fact or feature important for the safety of the user and/or which can cause serious hardware damage if not applied appropriately.



**CAUTION:** This symbol, along with the word “**CAUTION**”, indicates an area where extreme caution must be used.



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



**EXAMPLE:** This indicates an example.

**SAVE THESE INSTRUCTIONS**

### **IMPORTANT SAFETY INSTRUCTIONS**

- All electrical installations shall be performed in accordance with all applicable local, electrical codes.
- The inverter contains no user-serviceable parts. Please contact Solectria Renewables or a Solectria Renewables authorized system installer for maintenance. See Appendix F for Solectria Renewables contact and assistance information.
- Before installing or using the inverter, please read all instructions and caution markings in this manual as well as those on the inverter and PV modules.
- Connection of the inverter to the electric utility grid must be completed after receiving 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.
- The inverter enclosure and disconnects must be locked (requiring a tool or key for access) for protection against risk of injury to personnel. The enclosure includes a lockable handle and comes with a key. Keep the key in a safe location in case access to the cabinet is needed. A replacement key can be purchased from Solectria Renewables.

### **SAVE THESE INSTRUCTIONS**

#### **PRESCRIPTIONS DE SECURITE IMPORTANTES**

- Tous les travaux d'installation électrique doivent être exécutés en conformité aux normes électriques locales.
- L'onduleur 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. Reportez-vous à l'annexe F pour des informations de contact et les installateurs autorisés.
- Avant d'installer ou d'utiliser l'onduleur, veuillez lire toutes les instructions et toutes les mises en garde présentes dans ce manuel, sur l'onduleur et sur les modules PV.
- Le raccordement de l'onduleur au réseau électrique ne doit être effectuée qu'après avoir obtenu une entente d'interconnexion 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 à la lumière produisent du courant électrique suffisant pour de créer une situation de risque.
- Le boîtier de l'onduleur et déconnexions doit être verrouillé (nécessitant un outil ou d'une clé d'accès) pour la protection contre les risques de blessures aux personnes. Le boîtier comprend une poignée verrouillable et est livré avec une clé. Gardez la clé dans un endroit sûr en cas l'accès au boîtier est nécessaire. Une clé de remplacement peut être achetée de Solectria Renewables.

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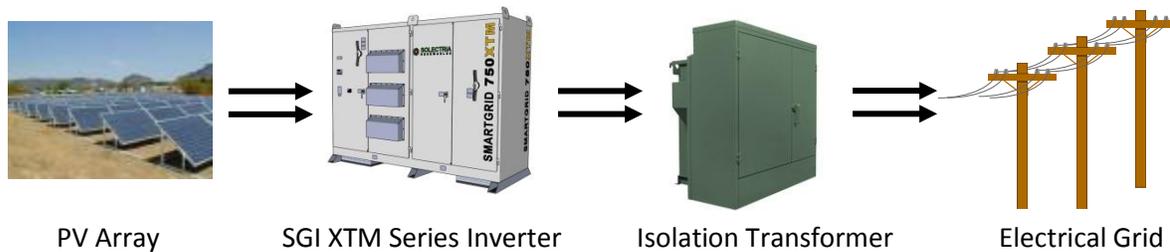
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# 1 Introduction

Thank you for purchasing a Solectria Renewables inverter. By following this manual the inverter can be installed and operated safely.

The SGI XTM series of inverters are utility scale, three-phase, grid-tied PV inverters designed to be interconnected to the electric utility grid with an external step-up isolation transformer. They are 1000VDC class inverters, and are available in 500kW and 750kW power levels.



**Figure 1.1 – SGI XTM Inverter Application**

Several options are available for the SGI XTM series of inverters, including fused or breaker DC subcombiners, in a variety of combinations and current ratings; SolZone™ subcombiner DC current monitoring; residual current monitoring for advanced detection of DC ground faults; an integrated AC disconnect; an integrated AC breaker with or without shunt trip; intake air filtration; a stainless steel enclosure; SolrenView™ inverter direct monitoring; SolrenView revenue grade monitoring; and SolrenView AIR cellular connections for monitoring options.

The inverter is comprised of an industrial enclosure containing electrical and electronic components. Standard equipment includes an integrated DC disconnect with a handle that is accessible from the outside of the enclosure. Optional equipment adds an integrated AC disconnect or an integrated AC breaker with a handle that is accessible from the outside of the enclosure. The figures that follow highlight the features of the SGI XTM series of inverters.

In this document, the UI refers to the User Interface. This is comprised of a series of push buttons and an LCD on the front side of the inverter. The SolrenView DAS refers to the Data Acquisition System. This is the communication gateway for the inverter which communicates to the SolrenView web-based monitoring system and external data monitoring systems.

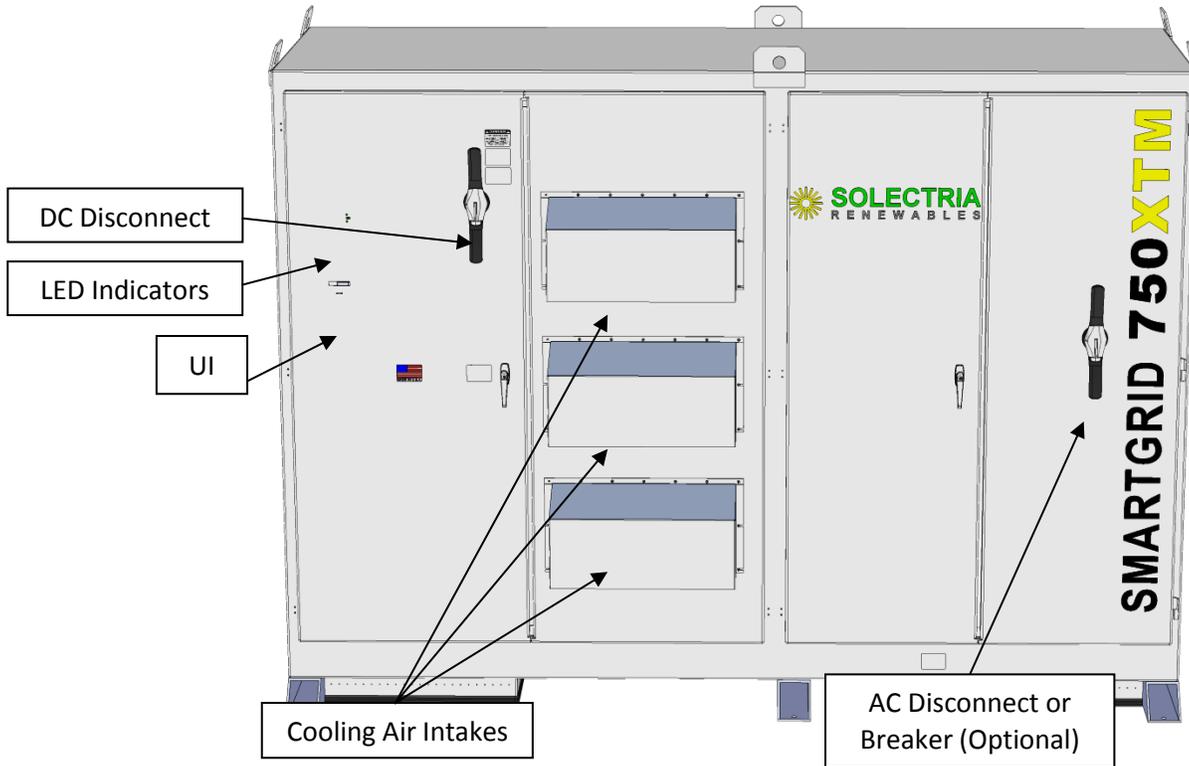


Figure 1.2 – The SGI XTM Series of Inverters (Front)

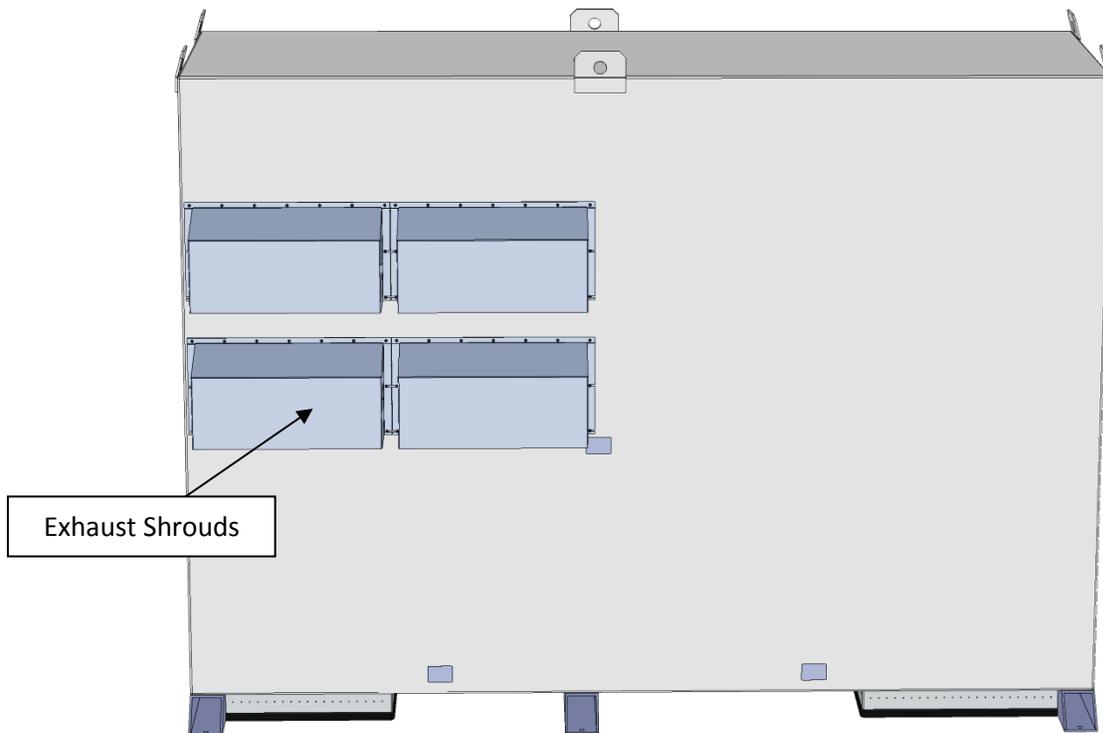
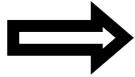
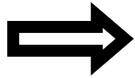


Figure 1.3 – The SGI XTM Series of Inverters (Rear)

## 2 Site Preparation and Inverter Placement



**NOTE:** If the inverter is mounted outside, ensure that the enclosure doors remain closed during the installation process in case of rain or snow. Leaving doors open during installation will void the warranty.



**NOTE:** It is recommended to store the inverter indoors before installation. If the inverter is to be stored outdoors before being installed and commissioned, care must be taken to avoid condensation inside the unit. Removing the protective shipping wrap and placing a small space heater inside the unit can help minimize the amount of condensation that can occur during onsite outdoor storage.

### 2.1 General Conditions for Inverter Installation

The inverter is a robust, ruggedized piece of industrial electrical equipment, however, certain criteria must be observed when planning for the installation of the inverter, as detailed below.

- The inverter can be mounted outdoors.
- The maximum life for the inverter can be achieved by mounting the unit in a clean, dry, and cool location.
- Install the inverter in an accessible location following local electrical codes for enclosure and disconnect door clearances with appropriate proximity to other equipment.
- Avoid installation in close proximity to people or animals, as there is an audible high-frequency switching noise.
- The ambient temperature must be at least  $-30^{\circ}\text{C}$  but less than  $50^{\circ}\text{C}$  for full power, continuous operation. The inverter will automatically reduce power or may shut down to protect itself if the ambient air temperature rises above  $50^{\circ}\text{C}$ .
- Although the inverter is designed to function at full power continuously in ambient temperatures up to  $50^{\circ}\text{C}$ , 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, the installation of a metal sun-shield is recommended. It is recommended that the inverter is mounted on the north side of buildings or on the north side of a ground mount PV array.

### 2.2 Ventilation Requirements

If the inverter will be installed in a utility vault or electrical closet, air circulation must be provided for sufficient heat dissipation. Adequate ventilation must be provided to maintain an ambient condition of less than  $50^{\circ}\text{C}$ . The ambient temperature should be kept as low as possible at all times for optimal inverter performance and life. The table below outlines the estimated heat loss of the SGI XTM series of inverters at full output power operation.

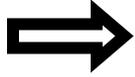
Model	Heat Loss at Full Power
SGI 500XTM	35,000 BTU/h
SGI 750XTM	52,500 BTU/h

**Table 2.1 – Heat Loss at Full Power**

## 2.3 Inverter Placement and Basic Dimensions



**WARNING:** Do not install the inverter on or over combustible surfaces or materials.



**NOTE:** The weight of the inverter will exert an additional load on the floor, roof, or pad where mounted. Verify proper load capacity of mounting surface with a qualified engineer. See Table 3.1 for inverter weights.

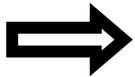
The correct mounting position for the inverter is vertical with the mounting feet on the floor. The clearances detailed below must be met when planning for the location of the inverter.

- A minimum distance of 18 inches must be clear *behind* the inverter for cooling air exhaust and service access. A clearance distance of 36 inches behind the inverter is highly recommended to aid in access for maintenance and service personnel.
- A minimum distance of 12 inches must be clear *above* the inverter for ventilation.
- A minimum distance of 6 inches must be clear to the *sides* of the inverter for ventilation.



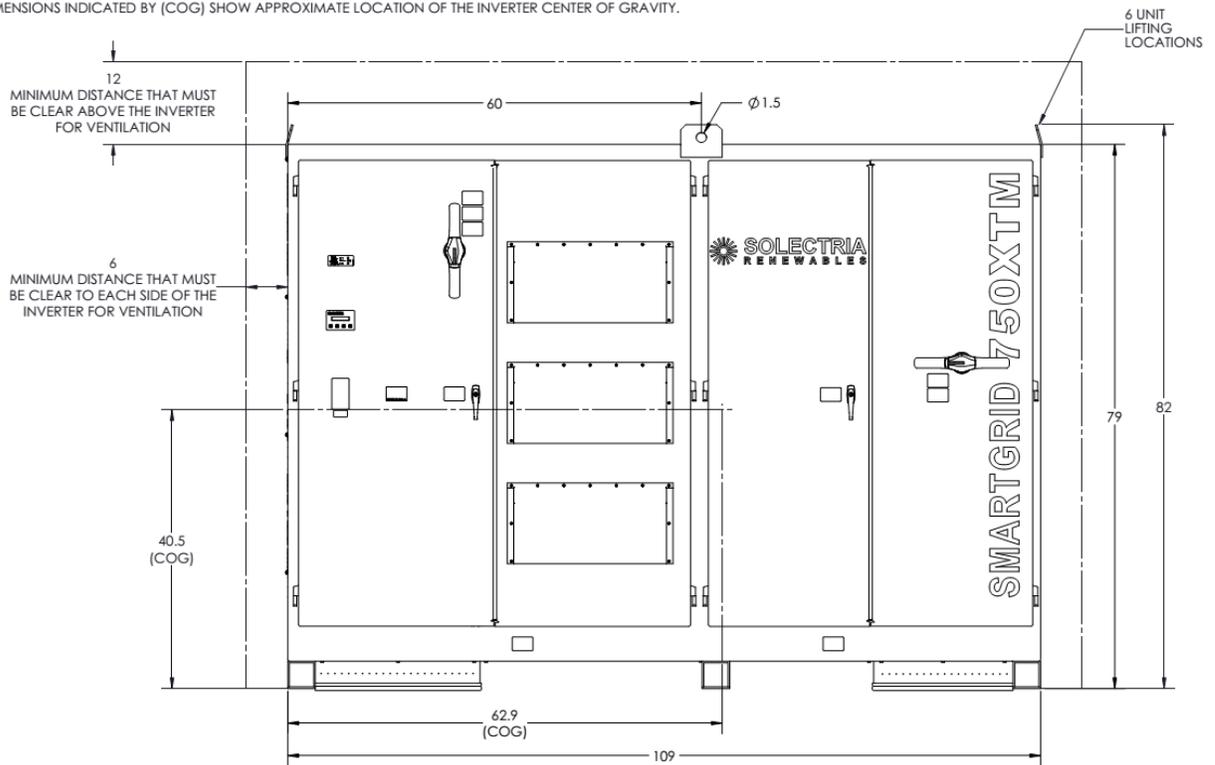
**WARNING:** Do not install inverters in a manner such that one inverter's exhaust air could be taken in by another inverter's intake. This may result in overheating of the inverter.

The two figures that follow show the basic inverter dimensions and mounting locations.

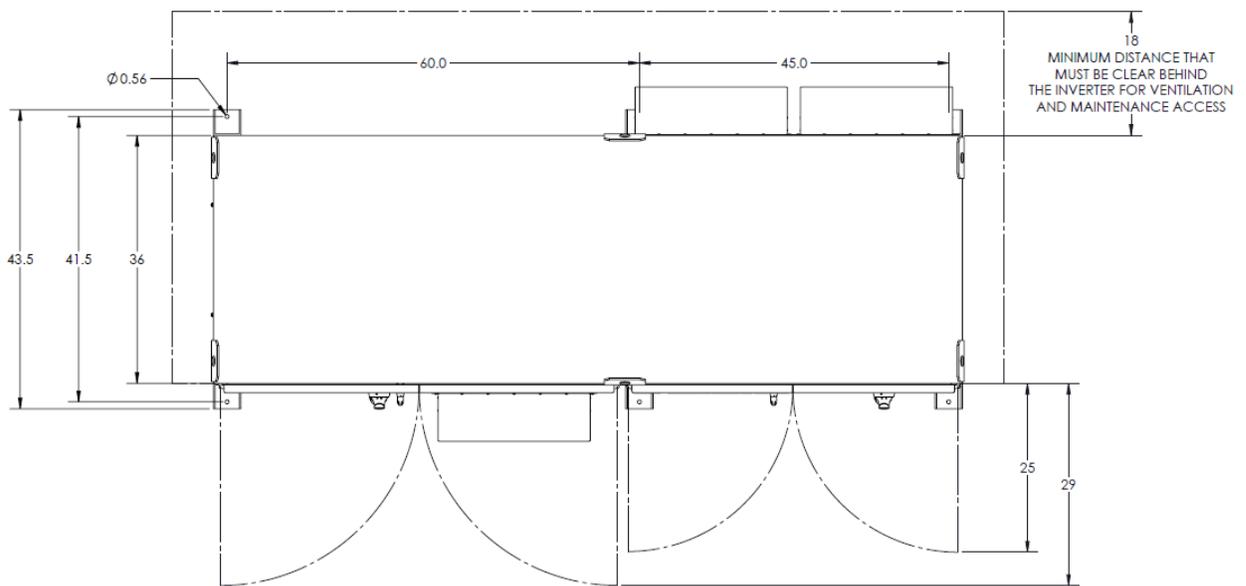


**NOTE:** For more detailed drawings and additional views and dimensions, please refer to *Customer Interface Drawing, SGI 500XTM-750XTM* (DOCR-070352). Drawings are available in both .pdf and .dwg formats.

**NOTES:**  
 1. DIMENSIONS INDICATED BY (COG) SHOW APPROXIMATE LOCATION OF THE INVERTER CENTER OF GRAVITY.



**Figure 2.1 – SGI XTM Series Dimensions (Front View)**



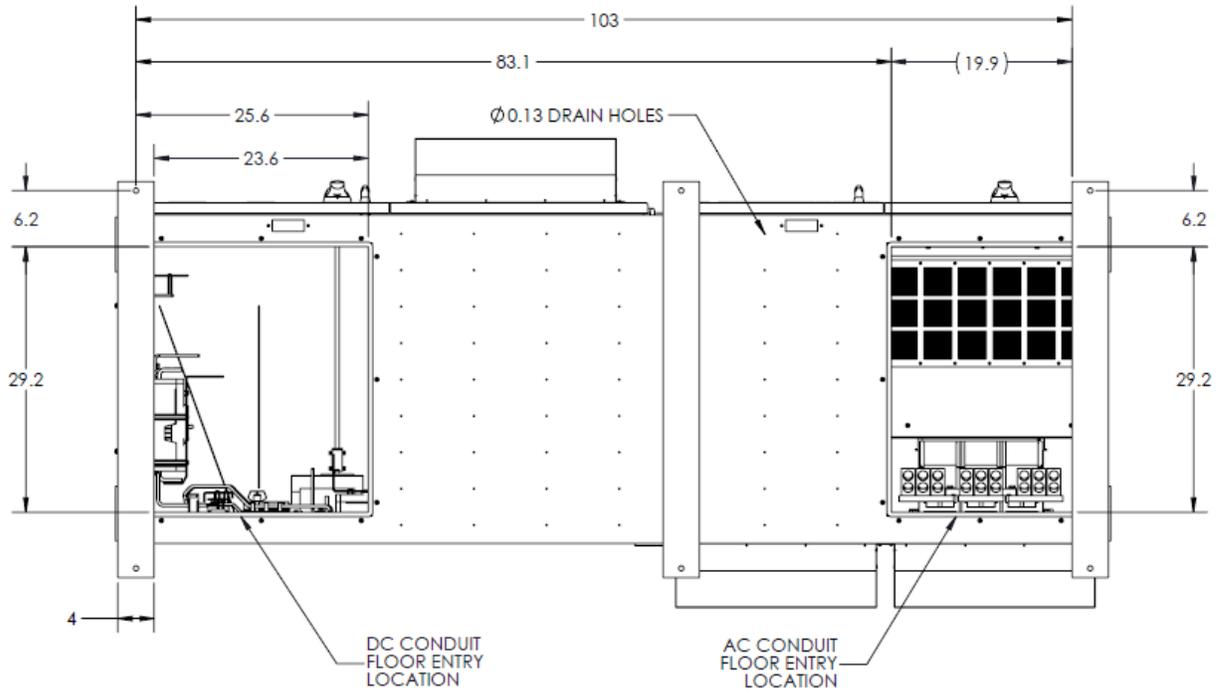
**Figure 2.2 – SGI XTM Series Dimensions (Top View)**



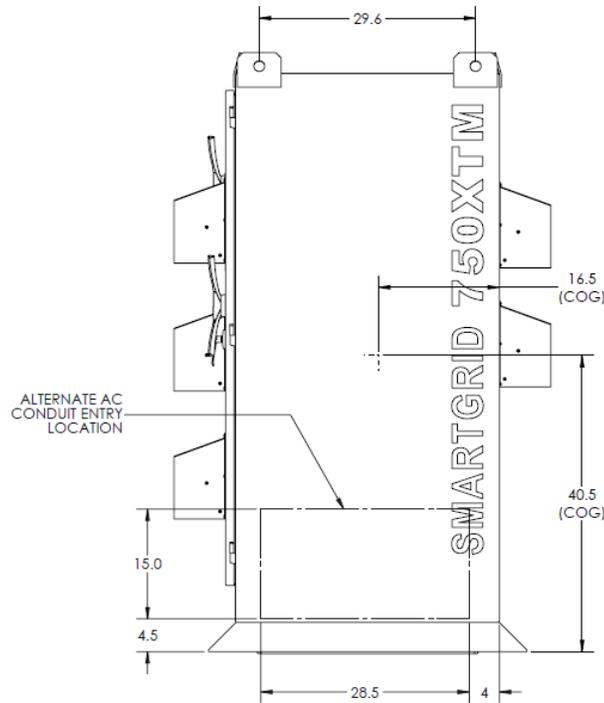
**NOTE:** For additional width of fan shroud, see Figure 8.4.

### 2.4 DC and AC Conductor Entry Locations

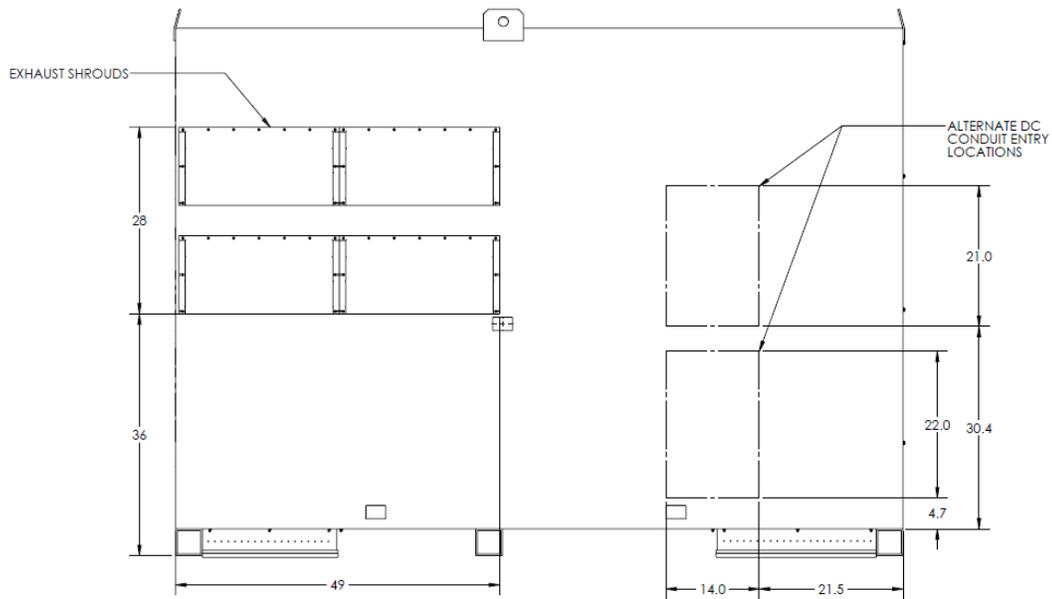
DC and AC conductors must enter through the provided conduit cutouts in the bottom of the inverter enclosure as detailed in the figure below. DC conductor terminations are located in the left side of the inverter. AC conductor terminations are located in the right side of the inverter. Alternate conduit entries for AC and DC conductors are available and are detailed in the figures that follow.



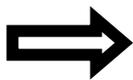
**Figure 2.3 – Conduit Entry Locations (Bottom View)**



**Figure 2.4 – Alternate AC Conduit Entry Location (Right Side View)**



**Figure 2.5 – Alternate DC Conduit Entry Location (Rear View)**

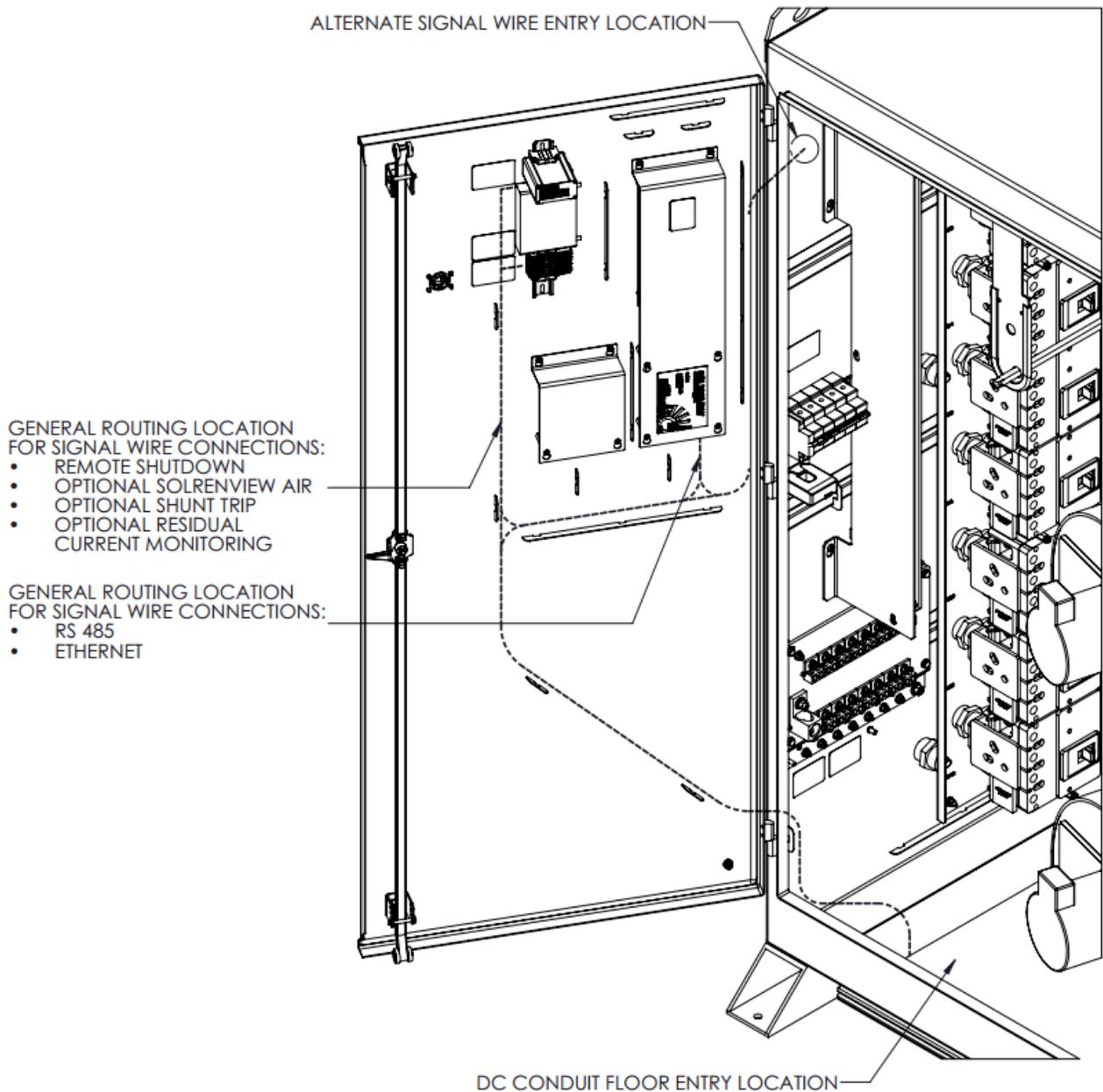


**NOTE:** The alternate DC conduit entry locations are to be used only if the following integral subcombiner options are selected:

1. Any number of fuse inputs.
2. Six or less breaker inputs.

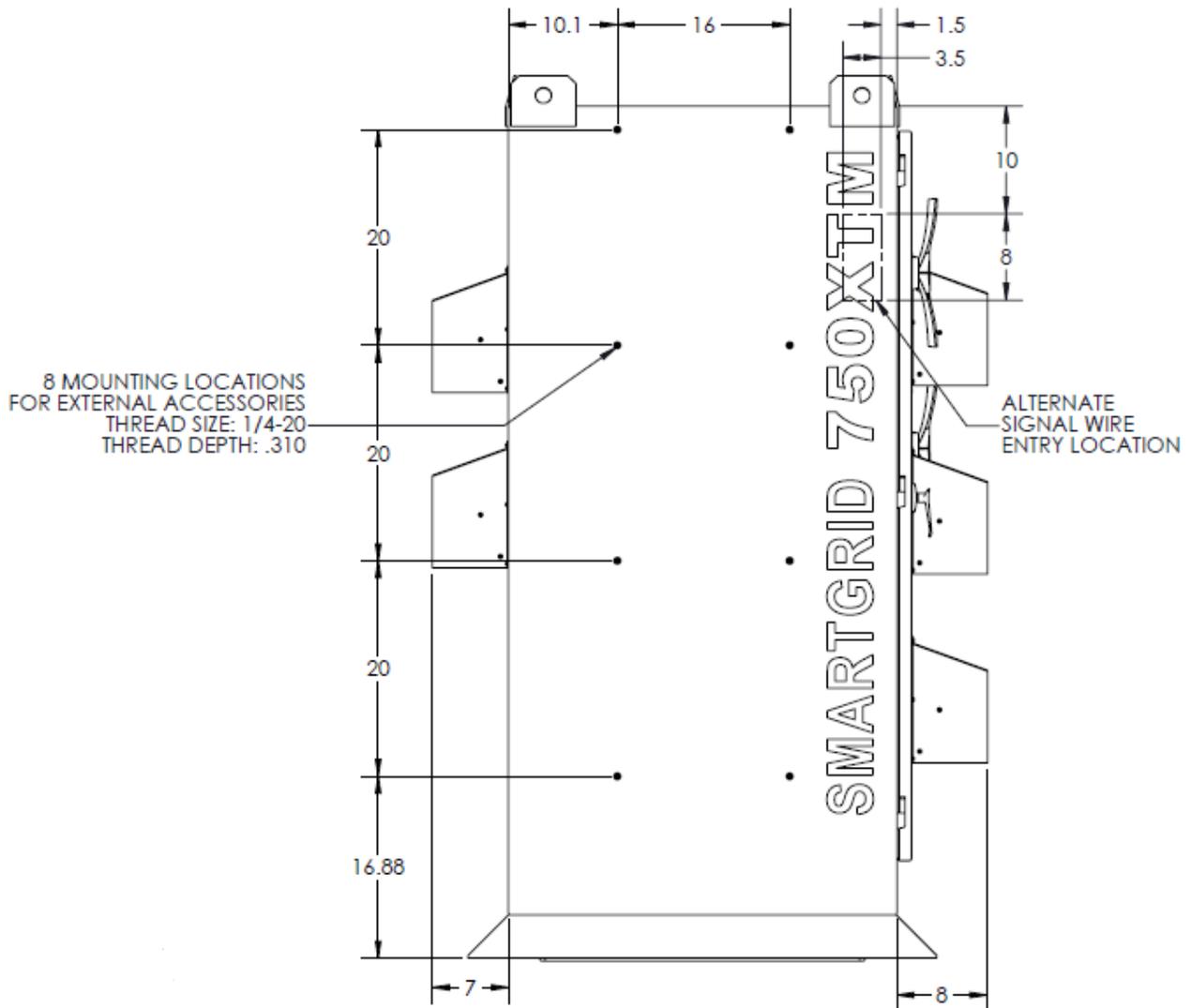
## 2.5 Mounting External Equipment and Signal Conductor Entry Locations

Signal conductors must enter the enclosure through their own conduits via the DC conduit cutout in the bottom of the inverter enclosure as detailed in the previous section. Signal conductor terminations are located on the inside of the leftmost door, in the left side of the inverter as shown below.



**Figure 2.6 – Signal Conductor Entry Location**

Eight threaded mounting locations, detailed below, are provided on the left side of the enclosure and can be used to mount external accessories such as monitoring and data acquisition systems, metering equipment, weather stations, etc. Use stainless steel hardware to mount equipment to these locations. An alternate conduit entry for signal conductors, detailed below, is available on the left side of the enclosure when these mounting locations are utilized.



**Figure 2.7 – External Equipment Mounting Details and Alternate Signal Conductor Entry Location (Left Side View)**

## 3 Installation

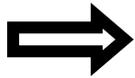


**WARNING:** Before installing the inverter, read all instructions and cautionary markings in this manual and on the inverter as well as on the photovoltaic modules.

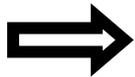
### 3.1 Checking for Shipping Damage

The inverter is thoroughly checked and rigorously tested before it is shipped. Even though it is bolted onto a rugged, oversized pallet for delivery, the inverter can be damaged during shipping by poor handling, trucking or transfer station activity.

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



**NOTE:** Document damage on shipping papers with the delivery driver. Immediately report any damage to the shipping company.



**NOTE:** Do not remove packaging from the unit or remove unit from the pallet if damage is evident.

### 3.2 Removing AC Customer Wire Cover Panels

If the optional integrated AC disconnect switch or the optional integrated AC breaker is ordered, the inverter will come equipped with an AC customer wire cover, as shown. This cover is composed of several panels, resides inside the right side of the inverter enclosure, and separates the user from the AC connections. It is intended to allow some limited servicing of the inverter when the integrated disconnect or breaker is in the OFF position.

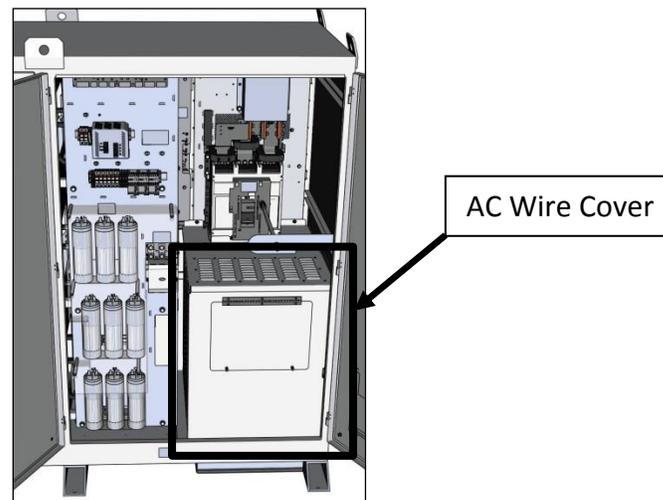
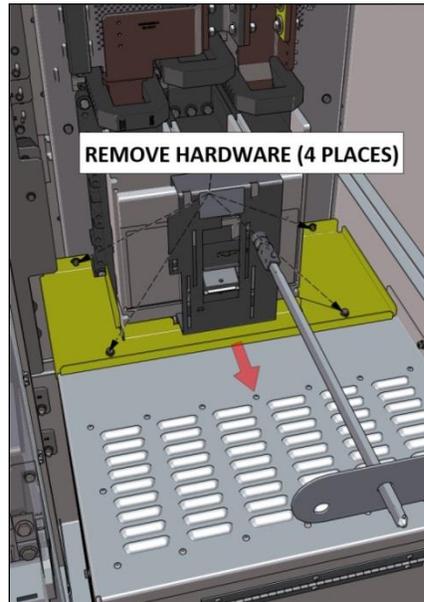


Figure 3.1 – AC Customer Wire Cover

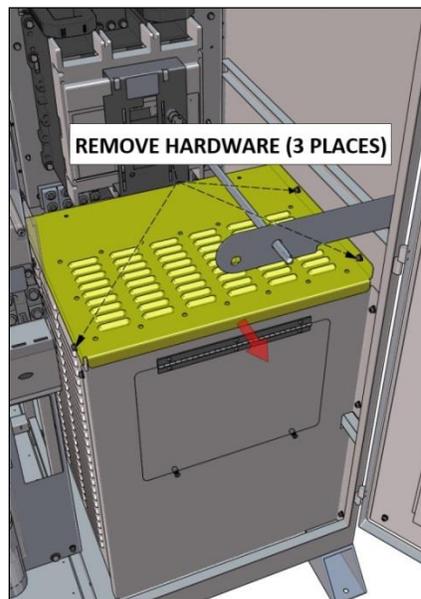
If the customer wire cover is present upon delivery of the inverter, it must be removed prior to removing the chase entry collars and removing the inverter from the shipping pallet in preparation for moving the inverter into place.

1. Begin by removing the hardware on the top rear panel and sliding the panel out of the inverter as shown below. Save the hardware and the panel for later reinstallation.



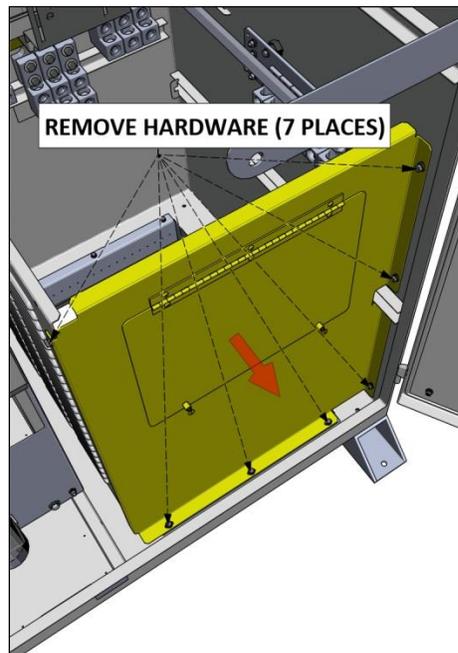
**Figure 3.2 – Removing AC Wire Cover, Top Rear Panel**

2. Remove the hardware on the top front panel and remove the panel from the inverter as shown below. Save the hardware and the panel for later reinstallation.



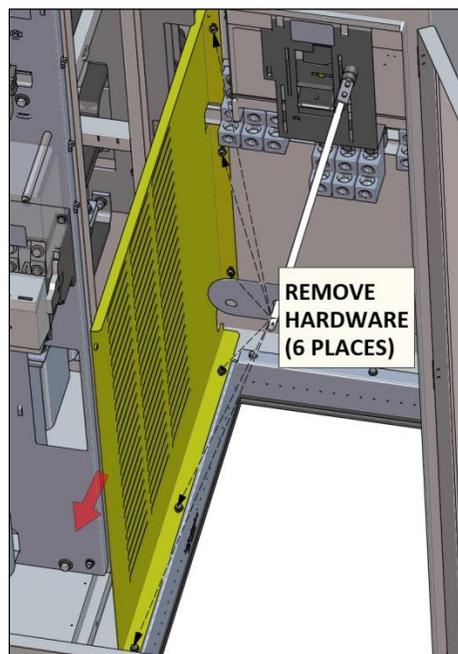
**Figure 3.3 – Removing AC Wire Cover, Top Front Panel**

3. Remove the hardware on the front panel and remove the panel from the inverter as shown below. Save the hardware and the panel for later reinstallation.



**Figure 3.4 – Removing AC Wire Cover, Front Panel**

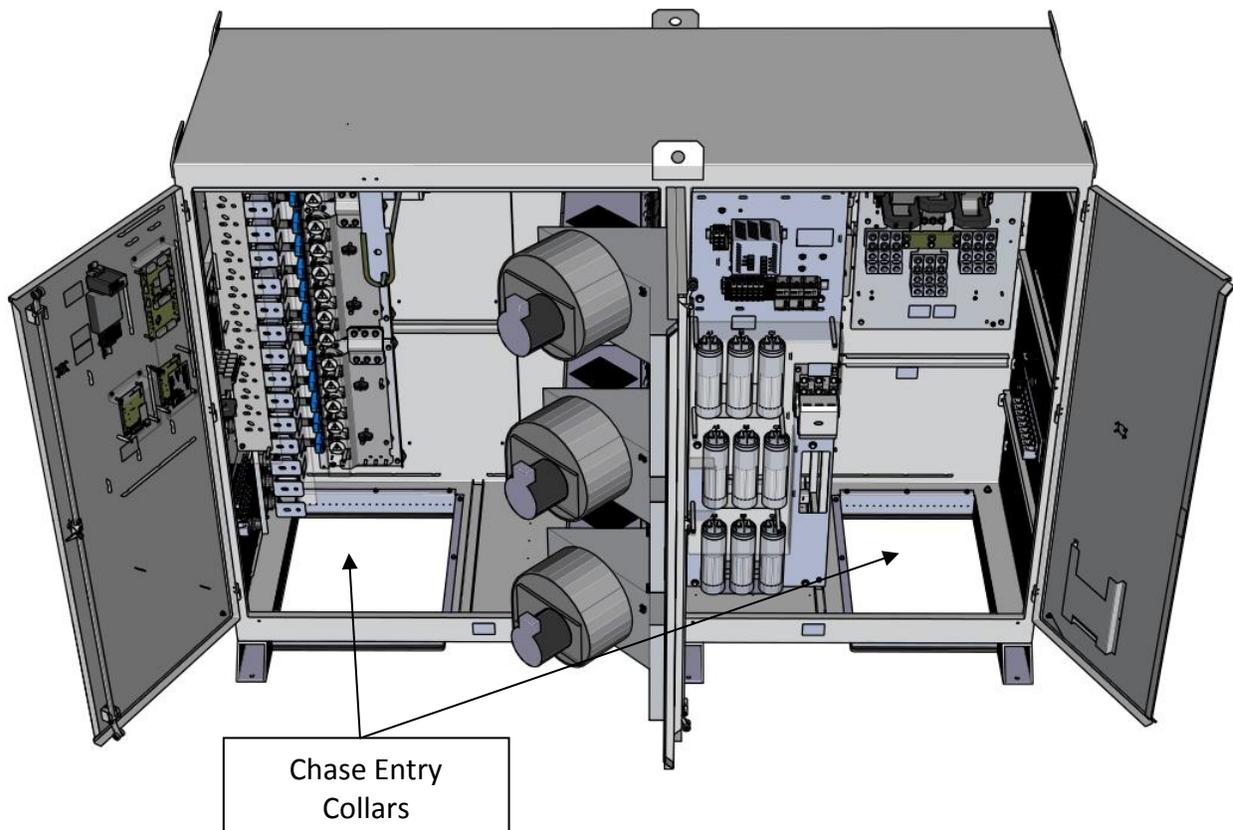
4. Finally, remove the hardware on the left panel and remove the panel from the inverter as shown below. Save the hardware and the panel for later reinstallation.



**Figure 3.5 – Removing AC Wire Cover, Left Panel**

### 3.3 Removing Chase Entry Collars

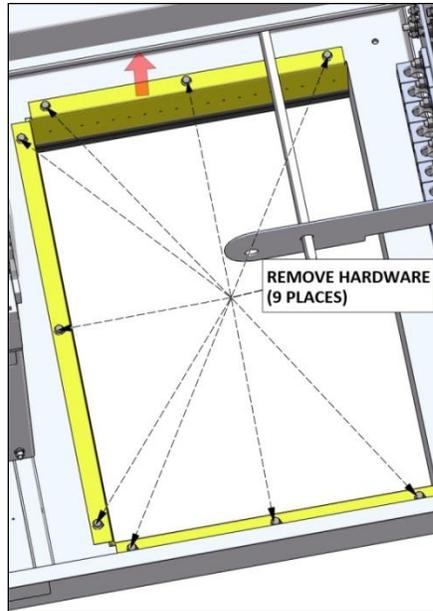
The inverter is equipped with two chase entry collars, one each for the DC and AC conduit entries as shown in the figure below. These collars seal the 4in gap between the bottom of the inverter enclosure and the inverter mounting surface.



**Figure 3.6 – AC and DC Chase Entry Collars**

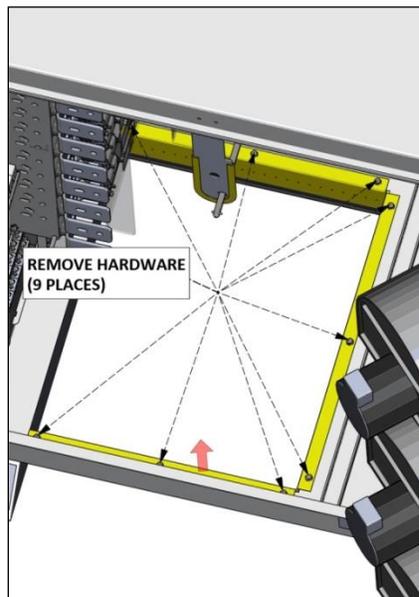
The collars must be temporarily uninstalled from the inverter prior to removing the inverter from the shipping pallet in preparation for moving the inverter into place.

To remove the AC chase entry collar, remove the hardware holding the collar in place and remove the collar from the inverter as shown below. Save the hardware and the collar for later reinstallation.



**Figure 3.7 – Removing AC Chase Entry Collar**

To remove the DC chase entry collar, remove the hardware holding the collar in place and remove the collar from the inverter as shown below. Save the hardware and the collar for later reinstallation.



**Figure 3.8 – Removing DC Chase Entry Collar**

### 3.4 Removing Inverter from Pallet and Moving Inverter into Place

The inverter is shipped on an oversized shipping pallet. It is recommended to keep the inverter secured to the pallet and moved as close as possible to the final mounting location prior to removing the inverter from the pallet.

Completely remove the hardware securing the inverter’s feet to the pallet before lifting the inverter off of the pallet.



**WARNING:** The AC and DC chase entry collars must be removed from the inverter prior to removing the inverter from the shipping pallet.

The center of gravity of the inverter is located approximately over the middle foot and slightly towards the rear of the unit as shown in Figures 2.1 and 2.4. The center of gravity may shift slightly based on the power level and options ordered.

The base weight of each inverter power level is shown in the table below. The inverter weight will increase with the addition of factory options.

Inverter Model	Base Weight, Not Including Options	Base Shipping Weight, Not Including Options
Sgi 500XTM	2870lbs	3080lbs
Sgi 750XTM	3360lbs	3570lbs

**Table 3.1 – Inverter Weights**

The inverter may be lifted from the bottom by a properly rated forklift or from the top lift tabs by a properly rated crane or other lifting device.



**WARNING:** Failure to remove the AC and DC chase entry collars prior to lifting the inverter may result in damage to the collars and/or the inverter.

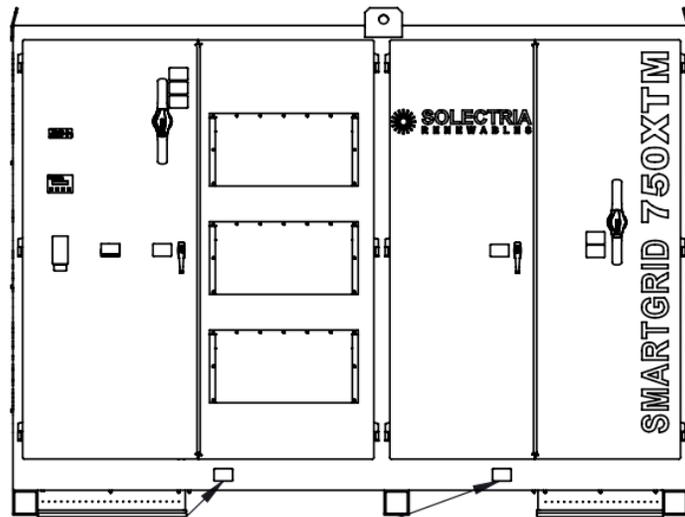


**WARNING:** The inverter may tip over if improperly moved or lifted, potentially causing damage to equipment, personal injury or death.



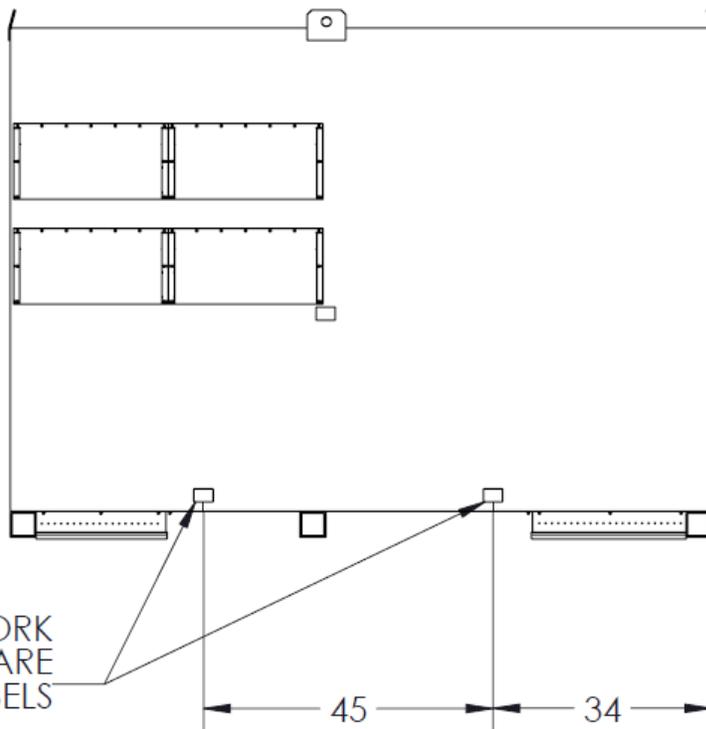
**WARNING:** Proper rigging and lifting methods must be used to lift the inverter. Only trained and qualified personnel should operate lifting equipment.

The recommended forklift locations are shown in the figures below.



RECOMMENDED FORK  
LIFT LOCATIONS ARE  
INDICATED BY LABELS

**Figure 3.9 – Forklift Lifting Positions (Front View)**



RECOMMENDED FORK  
LIFT LOCATIONS ARE  
INDICATED BY LABELS

**Figure 3.10 – Forklift Lifting Positions (Back View)**

If lifting the inverter from the top, lift using vertical rigging connected to a properly rated lifting device. Vertical rigging must have a central rigging point at least 15 feet above the inverter's roof.



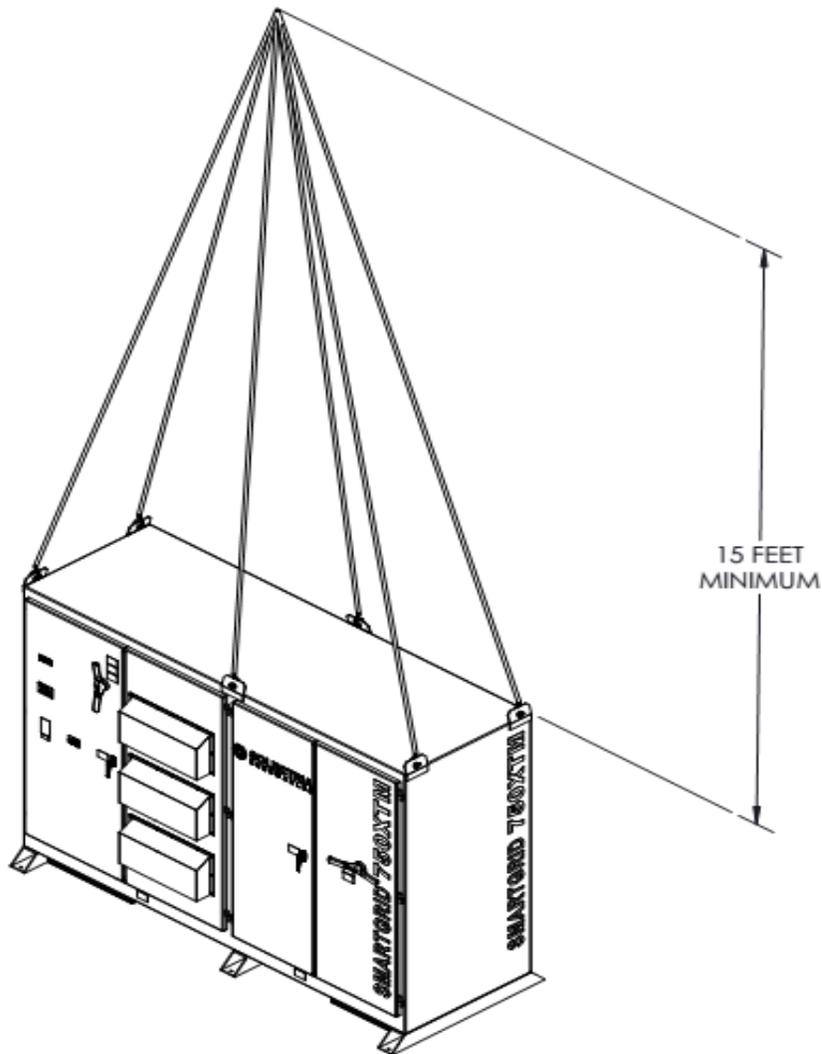
**WARNING:** Failure to follow these lifting guidelines may result in structural damage to the inverter and will void the warranty.



**WARNING:** Do not lift the unit with rigging that spans the lifting tabs front to back; this method will result in permanent damage to the inverter and will void the warranty.



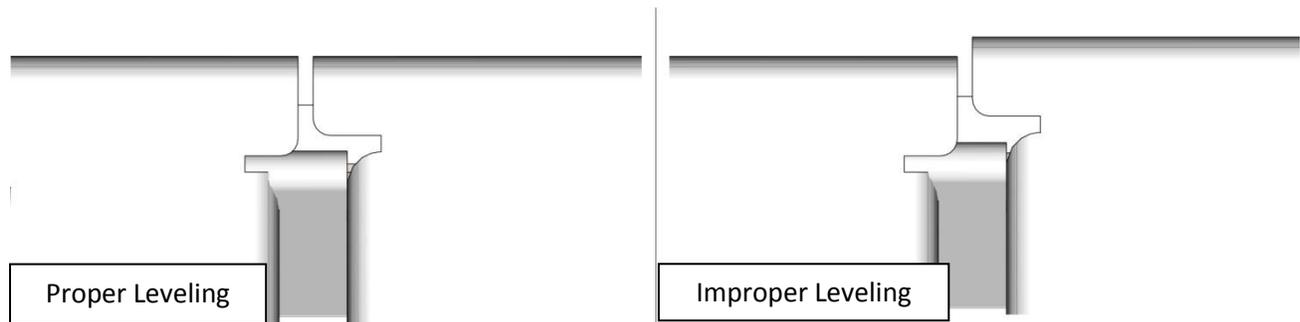
**WARNING:** All six lifting tabs must be used to lift the inverter. Never lift the inverter using only the four outer lifting tabs.



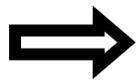
**Figure 3.11 – Recommended Single Point Lifting Method**

### 3.5 Leveling the Inverter

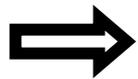
The inverter must be mounted on a flat and level plane in order for proper operation of the doors, DC disconnect shaft, and AC disconnect/breaker shaft (if equipped). To check if the inverter is properly leveled the top of each pair of doors should be aligned with one another and open smoothly without scraping the top of the enclosure. If the top edges are not aligned, the inverter must be leveled by placing aluminum shims under the appropriate mounting foot prior to securing the inverter.



**Figure 3.12 – Proper and Improper Door Leveling**



**NOTE:** Failure to properly level the inverter may cause damage to the enclosure, resulting in water infiltration or degradation of the enclosure and will void the warranty.



**NOTE:** Failure to properly level the inverter may cause damage to the operating mechanisms of the integrated DC disconnect or optional AC disconnect or AC breaker.

### 3.6 Mounting the Inverter

The inverter includes mounting feet with six holes for the use of 1/2in hardware. The holes are on a rectangular pattern, as shown in Figure 2.2. The inverter must be securely mounted to a rigid, structural surface. The use of hardware with corrosion resistance is recommended. The use of locking hardware is also recommended. Final hardware stack-up and torque should be determined by the qualified site engineer.



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

### 3.7 Installing Chase Entry Collars

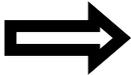
Once the inverter is properly mounted and prior to making electrical connections, the chase entry collars can be installed in the AC and DC sides of the inverter.



**WARNING:** Failure to install the AC and DC chase entry collars may result in water and animal intrusion into the inverter and will void the warranty.

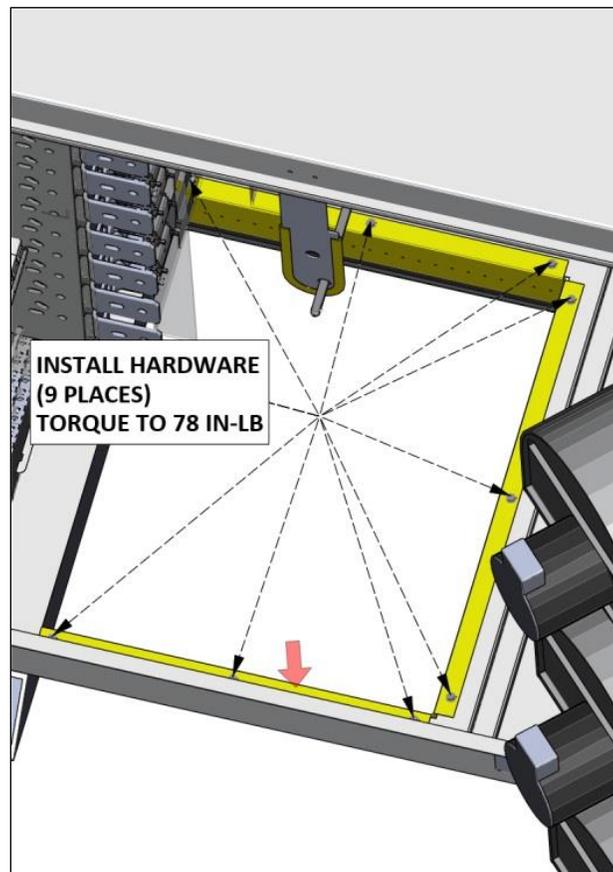


**WARNING:** It is highly recommended to install the chase entry collars prior to pulling conductors into the inverter. It is possible, although difficult, to install the collars after conductors are in place and terminated.



**NOTE:** The DC and AC chase entry collars are unique parts and are not interchangeable with one another.

To install the DC chase entry collar, begin by placing it into the DC conduit entry opening. The collar should be oriented with the rubber seal down and the open side to the left. Install a bolt, lock washer, and flat washer into the nine mounting locations and torque the hardware to 78in-lbs, as shown in the figure below.



**Figure 3.13 – Installing DC Chase Entry Collar**

To install the AC chase entry collar, begin by placing it into the AC conduit entry opening. The collar should be oriented with the rubber seal down and the open side to the right. Install a bolt, lock washer, and a flat washer into the three rear mounting locations and torque the hardware to 78 in-lbs, as shown in the figure below.

If the inverter did not come equipped with the AC customer wire cover described in Section 3.2, then install a bolt, lock washer, and flat washer into the six remaining mounting locations and torque the hardware to 78in-lbs, as shown in the figure below.

If the inverter came equipped with the AC customer wire cover described in Section 3.2, do not install any more hardware other than in the three rear mounting locations, as shown in the figure below. The remaining locations will be used to mount the AC customer wire cover, which is installed after installing the AC conductors, described in Section 6.

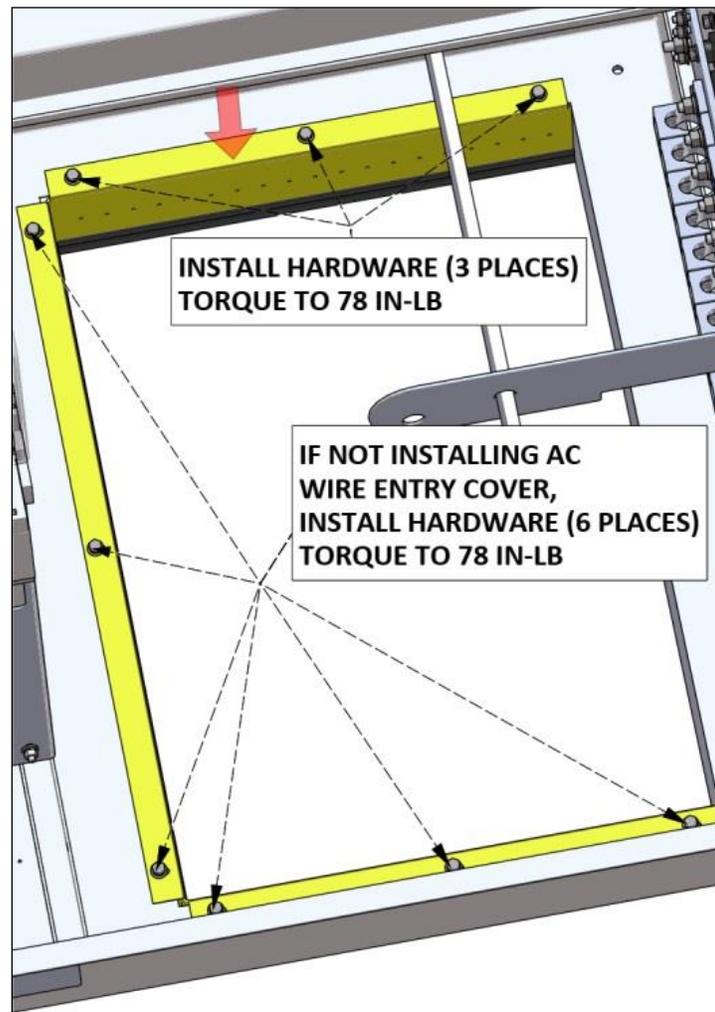
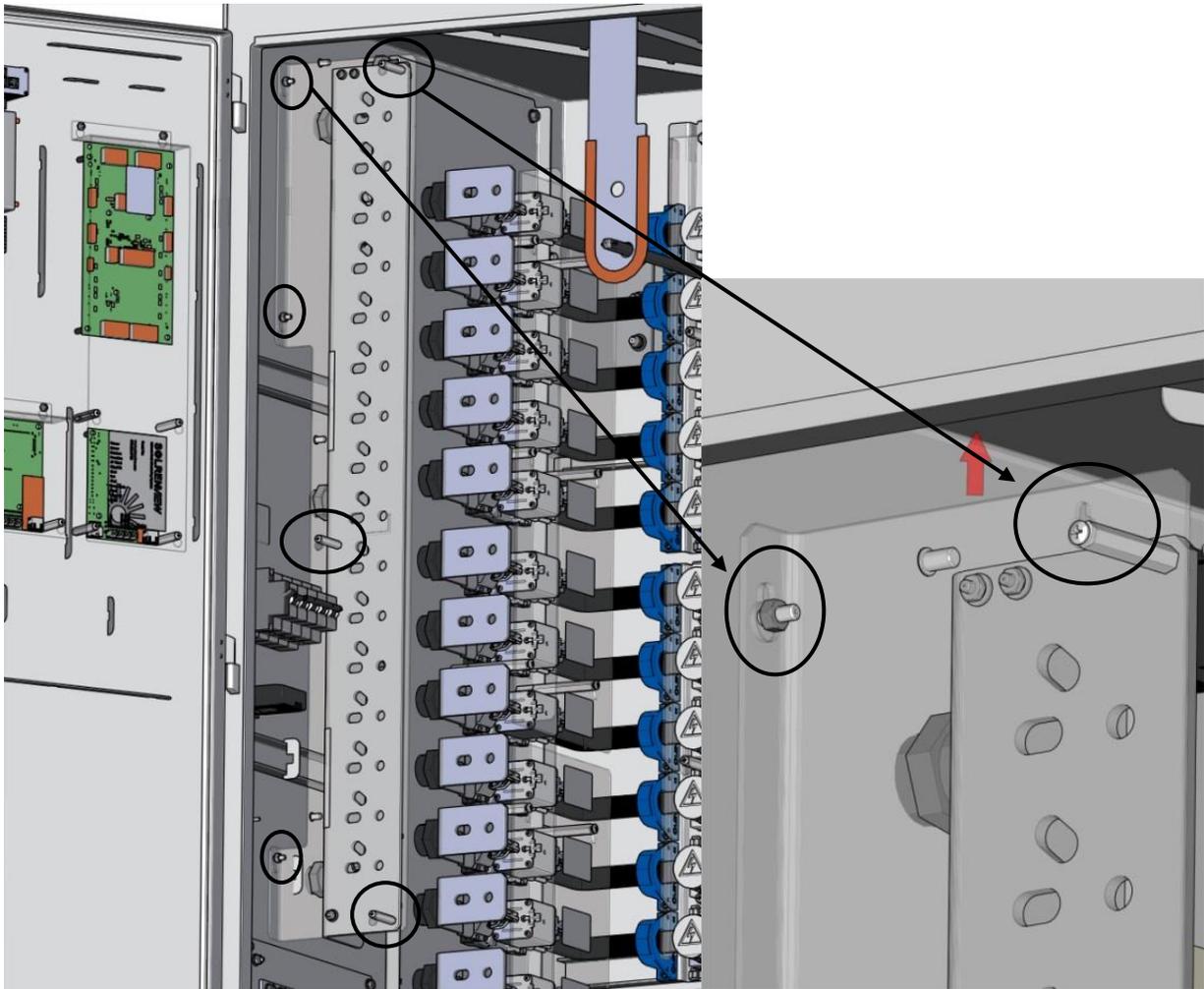


Figure 3.14 – Installing AC Chase Entry Collar

### 3.8 Plastic Shield Removal and Re-Installation

The negative and positive busbar covers protect the user from accidental contact with uninsulated conductors. If for any reason they need to be removed or re-installed, use the following steps:

1. Locate the clear plastic shields covering the negative and positive busbars.
2. Loosen hardware enough to lift the shield up and out of the unit.



**Figure 3.15 – Negative Shields and Hardware Locations**

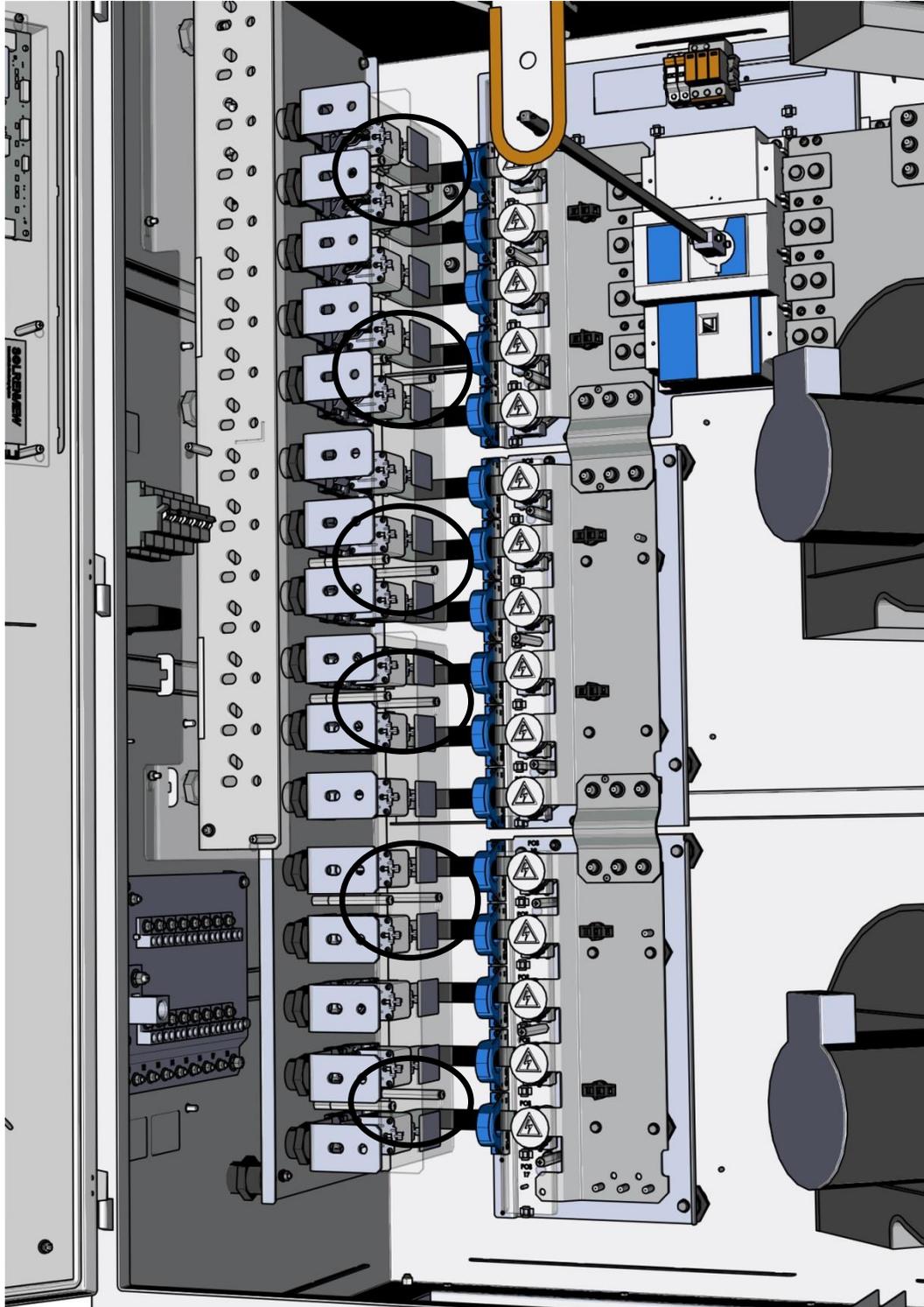
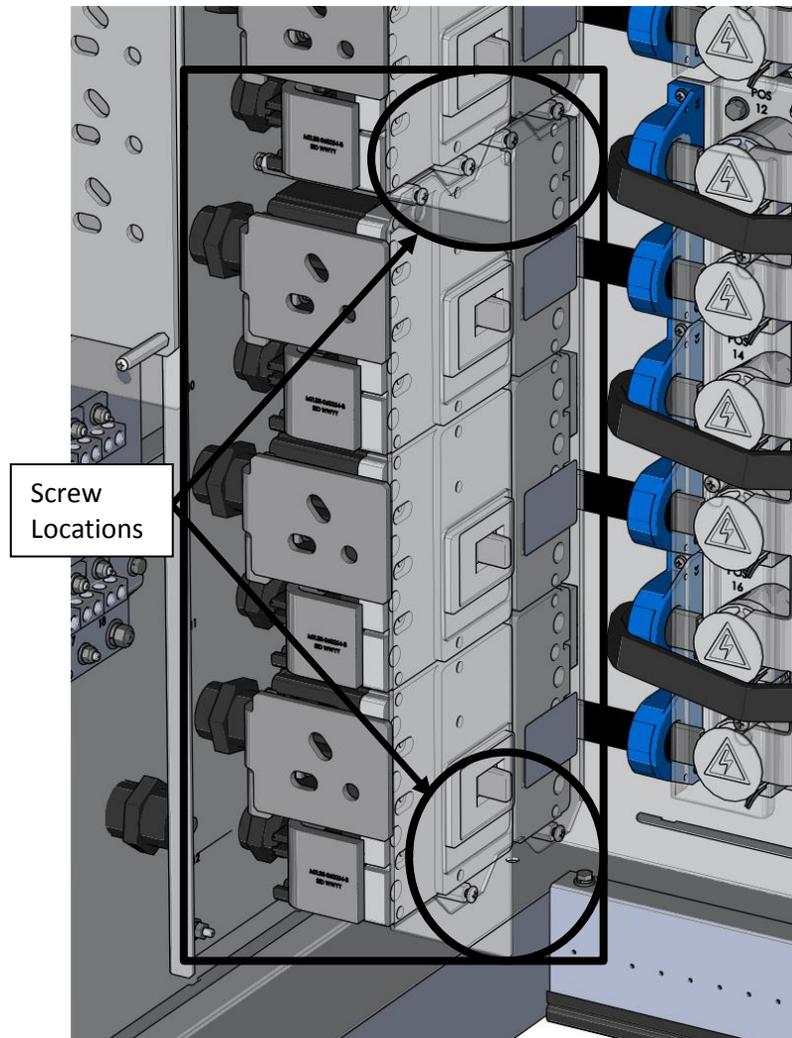


Figure 3.16 – Positive Fuse Shields and Screw Locations



**Figure 3.17 – Positive Breaker Shields and Screw Locations**

3. Once the wires are in place, re-insert the plastic shield.
4. Hand-tighten hardware once shield is back in place; *do not torque*.

## 4 Ground Connections



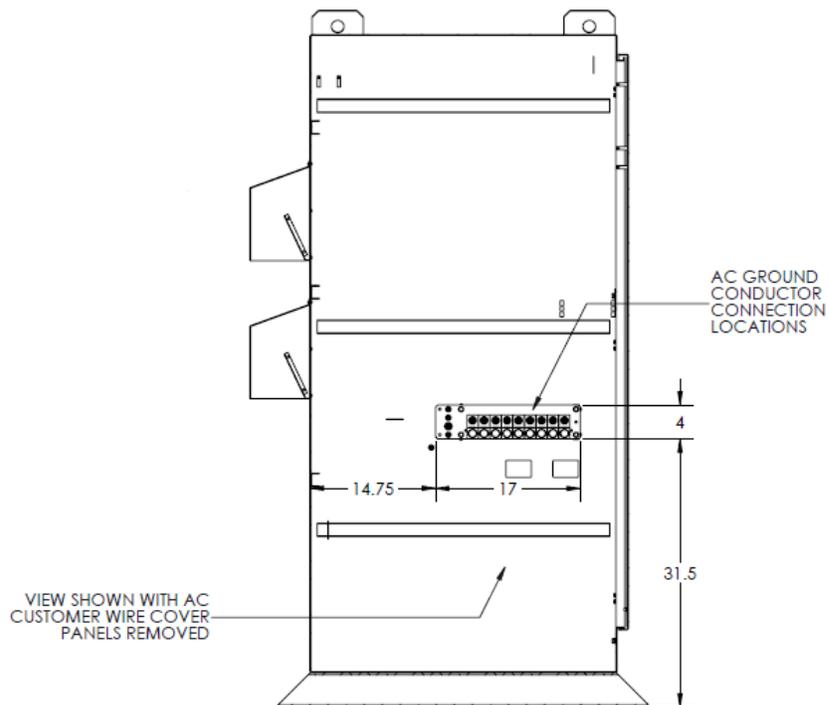
**WARNING:** All electrical installations shall be performed in accordance with all applicable local electrical codes.



**WARNING:** Establish a solid connection from the inverter to the system grounds before proceeding to connect any DC or AC power wires.

### 4.1 AC Ground Connections

The inverter comes with an AC ground plate populated with nine lugs for the connection of both AC Grounding Electrode Conductors (GECs) and AC Equipment Grounding Conductors (EGCs). The AC ground plate is bonded to the DC ground plate within the inverter, along with all of the internal inverter bonds. The AC ground plate is located on the right interior wall of the enclosure as shown below.

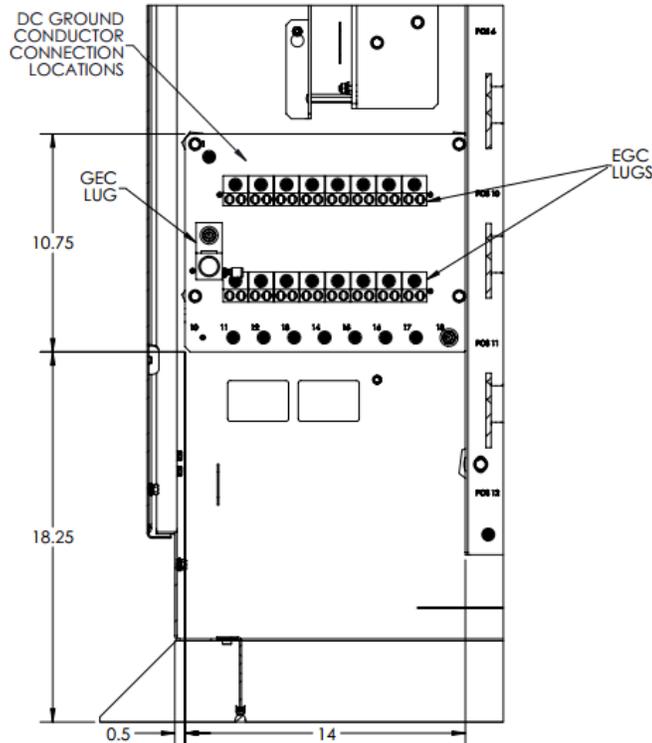


**Figure 4.1 – AC Ground Plate Location (Section View Showing Right Interior Wall)**

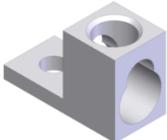
	Cu or Al Conductors Max. 9 x 1/0AWG–750kcmil 75°C connections, 550 in-lbs 1 wire per lug	<i>or</i>	Cu or Al Conductors Max. 18 x 1/0AWG–300kcmil 75°C connections, 550 in-lbs 2 wires per lug
	<b>Figure 4.2 – AC Ground Lugs</b>		

### 4.2 DC Ground Connections

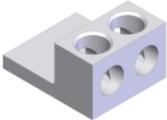
The inverter is also equipped with a DC ground plate populated with one lug for the connection of DC Grounding Electrode Conductors (GECs) and sixteen double lugs for the connection of DC Equipment Grounding Conductors (EGCs). The DC ground plate is bonded to the AC ground plate within the inverter, along with all of the internal inverter bonds. The DC ground plate is located on the left interior wall of the enclosure as shown below.



**Figure 4.3 – DC Ground Plate Location (Section View Showing Left Interior Wall)**

	<p>Cu or Al Conductors                  Max. 1 x 1/0AWG – 750kcmil                  75°C Connections, 550 in-lbs                  1 Wire per Lug</p>	<p>or</p> <p>Cu or Al Conductors                  Max. 2 x 1/0AWG – 300kcmil                  75°C Connections, 550 in-lbs                  2 Wires per Lug</p>
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**Figure 4.4 – DC Ground Lug for GECs**

	<p>Cu or Al Conductors                  Max. 32 x 14AWG – 1/0AWG                  75°C Connections, 50 in-lbs                  1 Wire per Lug Position</p>
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**Figure 4.5 – DC Ground Lugs for EGCs**

## 5 DC Connections



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



**WARNING:** Before terminating DC conductors at the inverter, ensure that the conductors are de-energized.



**WARNING:** Before connecting the DC conductors of the PV array to the subcombiner, verify the polarity of the conductors.

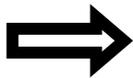


**WARNING:** Fuses in the inverter's ungrounded, fused subcombiner must only be replaced with the same type and rating fuses as originally equipped.

For the DC connections, the SGI XTM series of inverters must be ordered with either an integrated subcombiner populated with DC fuses or an integrated subcombiner populated with DC breakers. Many choices are available to meet a variety of design constraints. The SGI XTM series of inverters cannot be used without the internal subcombiner.

For the fused DC subcombiner option, four to sixteen positions are available, with current ratings of 100A, 110A, 125A, 160A, 175A, 200A, 250A, 300A, 315A, 350A, and 400A.

For the breaker DC subcombiner option, four to fifteen positions are available, with current ratings of 125A, 150A, 175A, 200A, 225A, 250A, 300A, and 350A.



**NOTE:** The XTM series of inverters is only offered in a negative ground configuration. Therefore, the positive conductors must land at either the fuse inputs or the breaker inputs, depending on the option ordered. The negative conductors will land on a busbar. No overcurrent protection devices are provided for the negative conductors, and none are required.

The negative connections are bonded to the ground system within the inverter through the ground fault detection and interrupt (GFDI) circuit. The negative connections must not be bonded to the ground system at any other point. The positive connections must never be bonded to the ground system at any time.



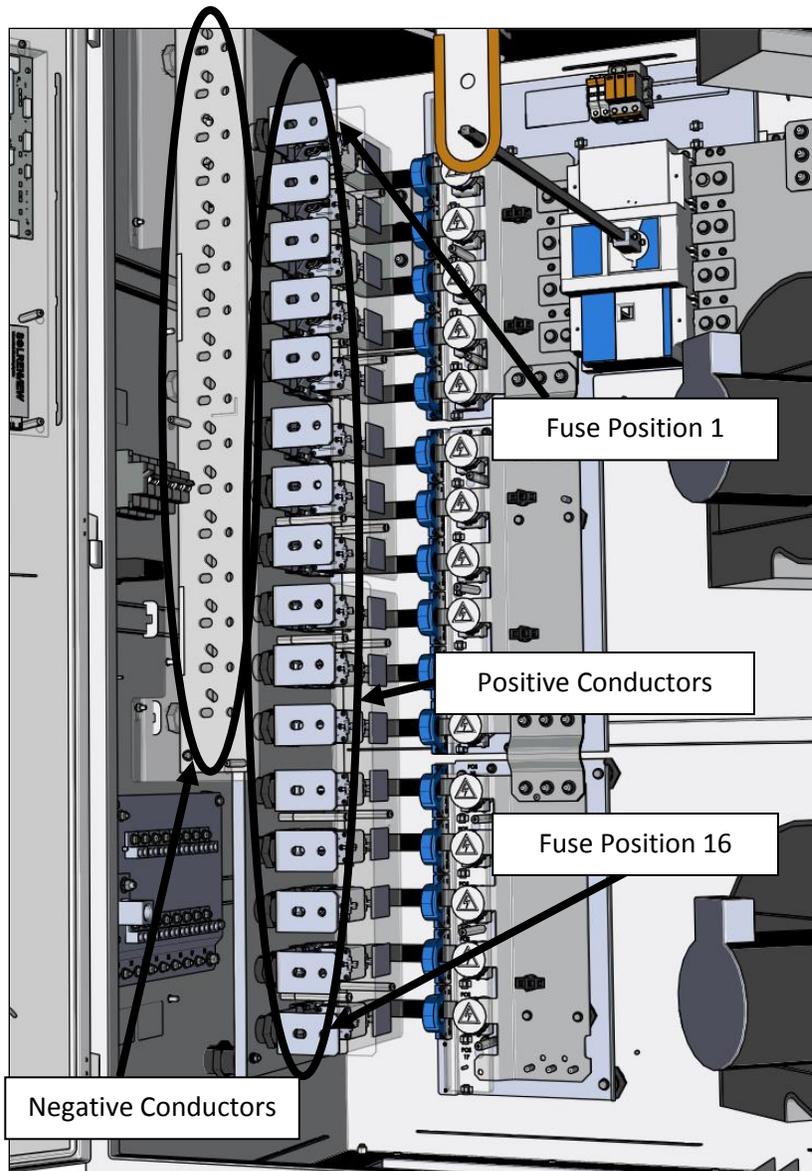
**WARNING:** The negative connections must not be bonded to the ground system at any point outside of the inverter. This bond is made in the GFDI circuit that is integral to the inverter.

### 5.1 Fused Subcombiner

For the fused subcombiner, four to sixteen positions are available. The positions are located inside the enclosure, on the left side. The positions will be populated from the top down, as shown in the figure below.



**NOTE:** Unless explicitly specified at the time of order, the positions will be populated top down with the highest amperage rated fuse to the lowest amperage rated fuse.



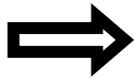
**Figure 5.1 – Fused Subcombiner, Positions and Connections**

### 5.2 Fused Subcombiner, Positive Connections (Ungrounded)

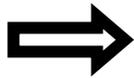
For the positive conductors, each fused input is supplied with a separate busbar that will accept up to two customer-supplied compression lugs. No lugs are provided with the subcombiner. The lugs must conform to the specifications given in the table below.

Lug Type	Hole Size	Hole Spacing	Plating	Max. Tongue Width, Horizontal Mounting
Two Hole	1/2in	1 3/8in – 1 3/4in	Tin Plated	2 1/2in

**Table 5.1 – Fused Subcombiner, Positive Connections, Lug Specifications**

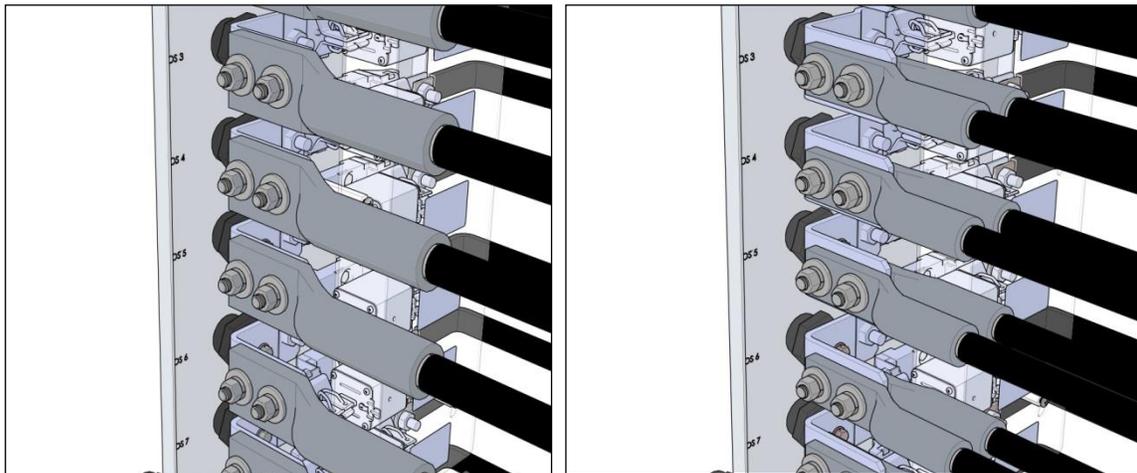


**NOTE:** Use Panduit series lugs LCD, LCC, LCC-W, LAB, or equivalent lugs from other manufacturers.



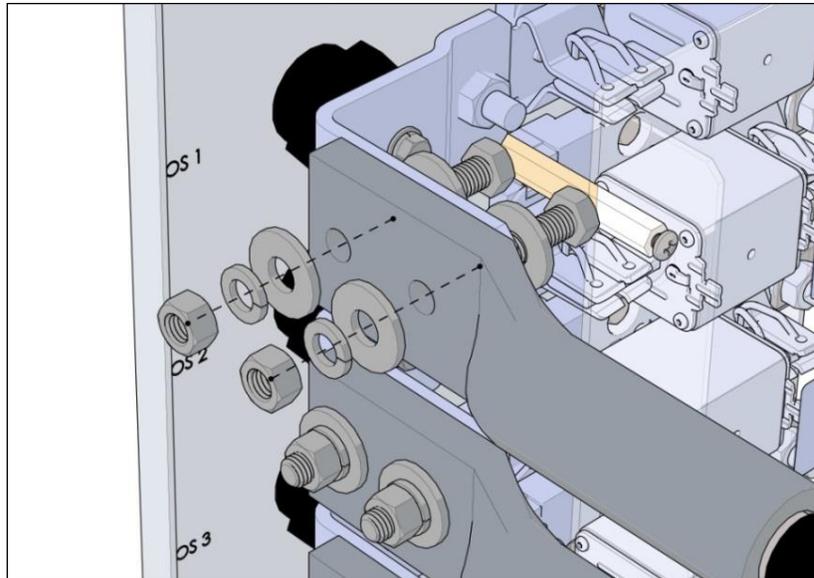
**NOTE:** Only use lugs with aluminum conductors that are explicitly listed for use with aluminum conductors.

For the positive conductors, the lugs can only be installed horizontally, as shown in the figure below.



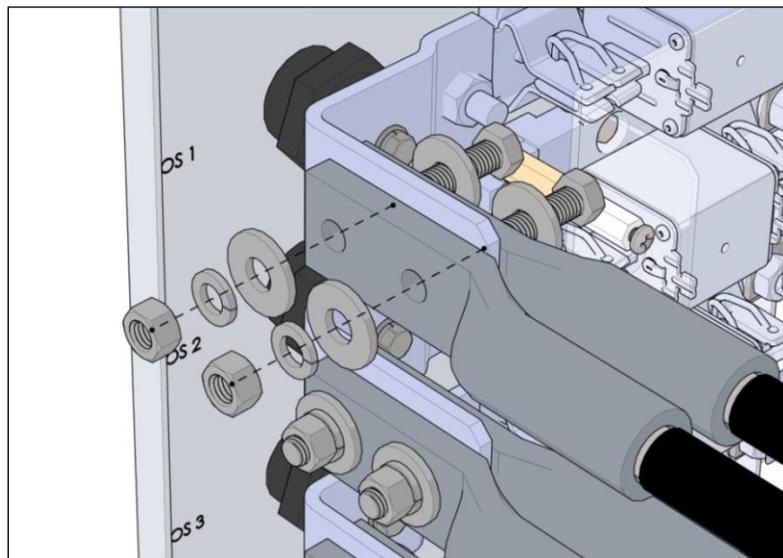
**Figure 5.2 – Fused Subcombiner, Positive Connections  
One and Two Lugs, Horizontal Mounting**

If using one lug, install it on the front side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



**Figure 5.3 – Fused Subcombiner, Positive Connections, One Lug, Hardware Stack-up**

If using two lugs for parallel conductors, install one lug on each side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > lug > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



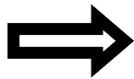
**Figure 5.4 – Fused Subcombiner, Positive Connections, Two Lugs, Hardware Stack-up**

### 5.3 Fused Subcombiner, Negative Connections (Grounded)

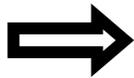
For the negative conductors, a large busbar is supplied that will accept up to two customer-supplied compression lugs per input. No lugs are provided with the subcombiner. The lugs must conform to the specifications given in the table below.

Lug Type	Hole Size	Hole Spacing	Plating	Max. Tongue Width, Horizontal Mounting	Max. Tongue Width, 45-Degree Mounting
Two Hole	1/2in	1 3/8in – 1 3/4in	Tin Plated	2 1/2in	2in

**Table 5.2 – Fused Subcombiner, Negative Connections, Lug Specifications**

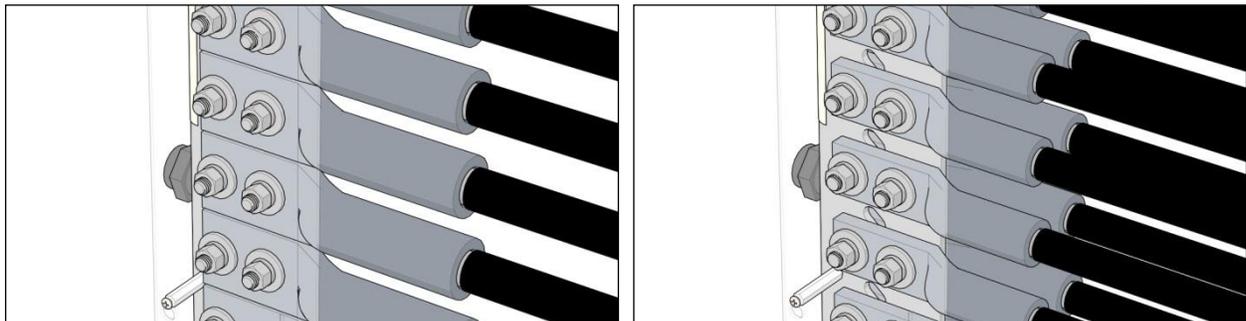


**NOTE:** Use Panduit series lugs LCD, LCC, LCC-W, LAB, or equivalent lugs from other manufacturers.

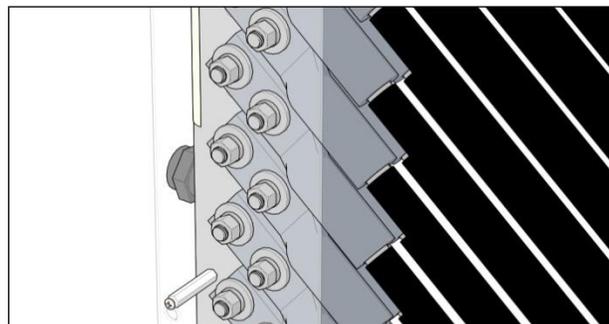


**NOTE:** Only use lugs with aluminum conductors that are explicitly listed for use with aluminum conductors.

For the negative conductors, the lugs can either be installed horizontally or at a 45-degree angle, allowing for easier routing of the conductors, as shown in the figures below.

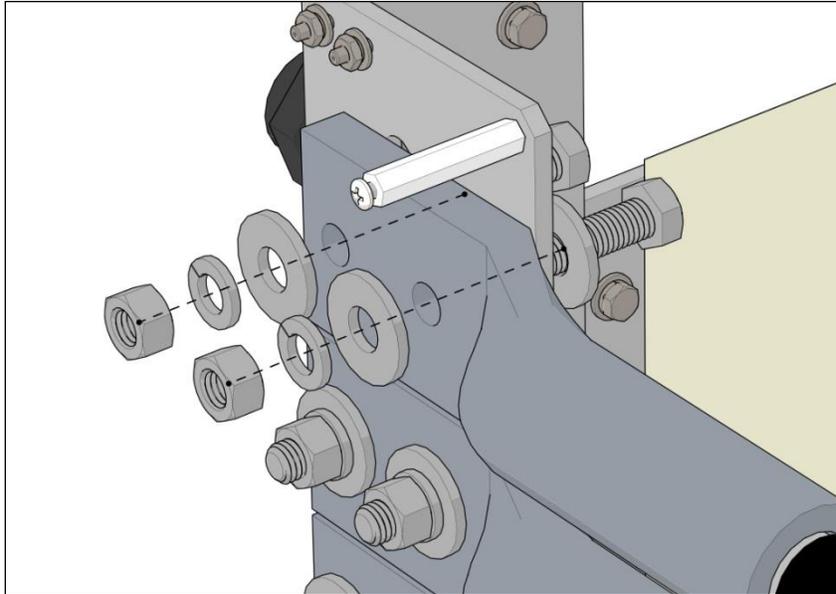


**Figure 5.5 – Fused Subcombiner, Negative Connections One and Two Lugs, Horizontal Mounting**



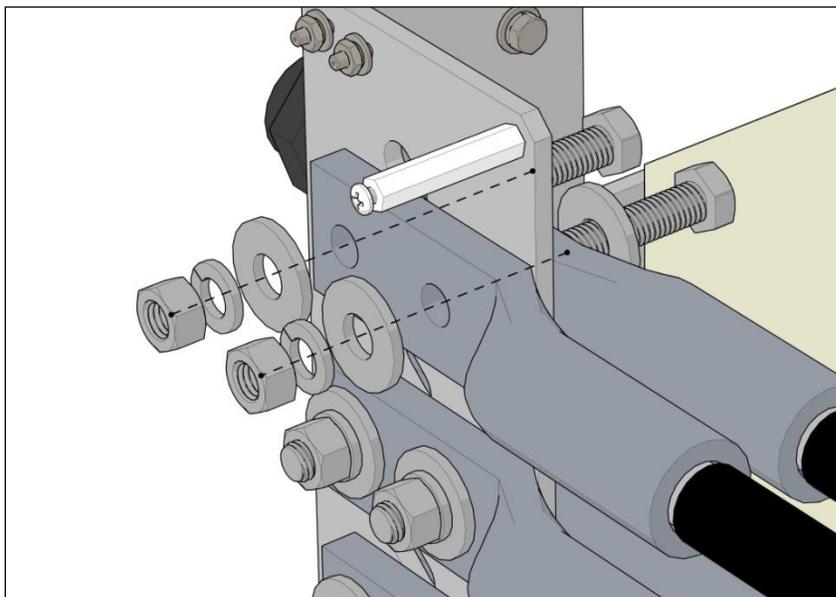
**Figure 5.6 – Fused Subcombiner, Negative Connections, Two Lugs, 45-Degree Mounting**

If using one lug, install it on the front side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



**Figure 5.7 – Fused Subcombiner, Negative Connections, One Lug, Hardware Stack-up**

If using two lugs for parallel conductors, install one lug on each side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > lug > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.

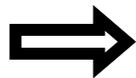


**Figure 5.8 – Fused Subcombiner, Negative Connections, Two Lugs, Hardware Stack-up**

### 5.4 Fused Subcombiner, Conductor Type and Sizing

Either copper or aluminum wire may be used for the positive and negative conductors, though due to terminal size restrictions, aluminum wire may not be an option for all cases. As with any aluminum wire, exercise best industry practices to ensure a reliable connection; thoroughly clean the conductor just prior to making the electrical connection and use an oxide inhibitor to prevent the formation of aluminum oxide.

Use minimum 90°C rated conductors to connect to the inverter’s subcombiner connections. The tables below show the minimum conductor sizes that must be used for each fuse size, as well as the maximum size conductors that each input will accept. Voltage drop, local electrical codes, and other considerations may dictate that larger wire sizes than the minimums shown must be used. Connections are rated for 75°C terminal temperatures.



**NOTE:** The positive and negative conductors for each input must be sized the same.

Fuse Current Rating	Fused Subcombiner			
	Single Conductor		Two Parallel Conductors	
	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
100A	3AWG – 1000kcmil	1AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
110A	2AWG – 1000kcmil	1/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
125A	2AWG – 1000kcmil	1/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
160A	2/0AWG – 1000kcmil	4/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
175A	2/0AWG – 1000kcmil	4/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
200A	3/0AWG – 1000kcmil	4/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
250A	250kcmil – 1000kcmil	350kcmil – 1000kcmil	1/0AWG – 600kcmil	2/0AWG – 600kcmil
300A	250kcmil – 1000kcmil	400kcmil – 1000kcmil	1/0AWG – 600kcmil	2/0AWG – 600kcmil
315A	350kcmil – 1000kcmil	500kcmil – 1000kcmil	2/0AWG – 600kcmil	3/0AWG – 600kcmil
350A	400kcmil – 1000kcmil	600kcmil – 1000kcmil	2/0AWG – 600kcmil	4/0AWG – 600kcmil
400A	500kcmil – 1000kcmil	700kcmil – 1000kcmil	3/0AWG – 600kcmil	4/0AWG – 600kcmil

**Table 5.3 – Conductor Ranges for Fused Subcombiner**

<i>Customer –Supplied Compression Lugs</i>	Cu or Al Conductors See Table Above for Minimum Conductor Sizes Max. 2 x 600kcmil per Subcombiner Position 75°C Connections, 550in-lbs 1-2 Wires per Subcombiner Position
--	---

**Table 5.4 – Fused Subcombiner Connections**

### 5.5 Breaker Subcombiner

For the breaker subcombiner, four to fifteen positions are available. The positions are located inside the enclosure, on both the left and back sides, depending on the number of positions ordered. The positions will be populated on the left side starting from the top through position six. Positions seven through nine will then be populated on the back side. Positions ten through twelve will then be populated on the left side, starting under position six. Positions thirteen through fifteen will then be populated on the back side, starting under position ten. See the figures below.



**NOTE:** Unless explicitly specified at the time of order, the positions will be populated with the highest ampacity breaker for the lowest position number to the lowest ampacity breaker with the highest position number.

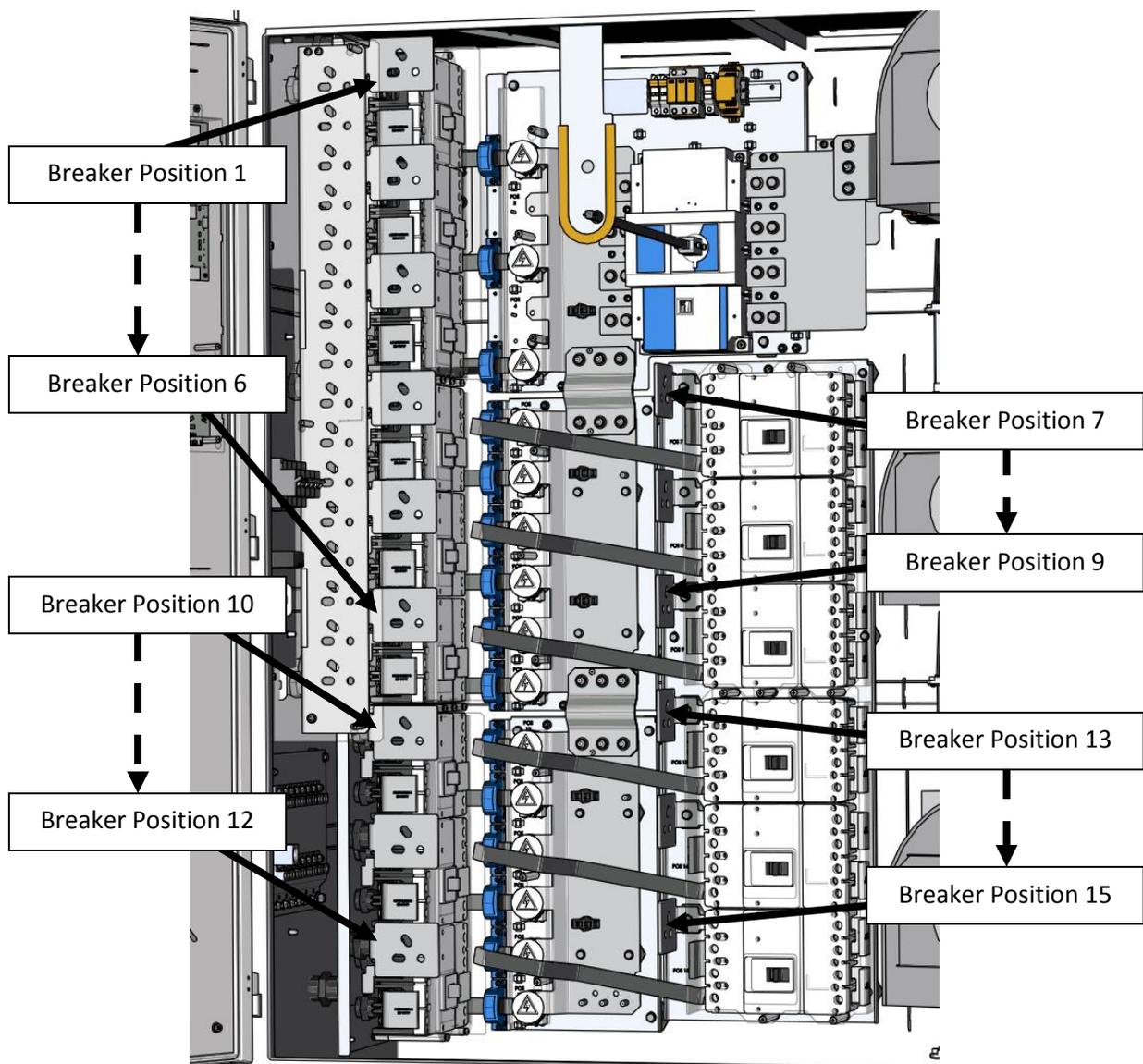


Figure 5.9 – Breaker Subcombiner, Positions

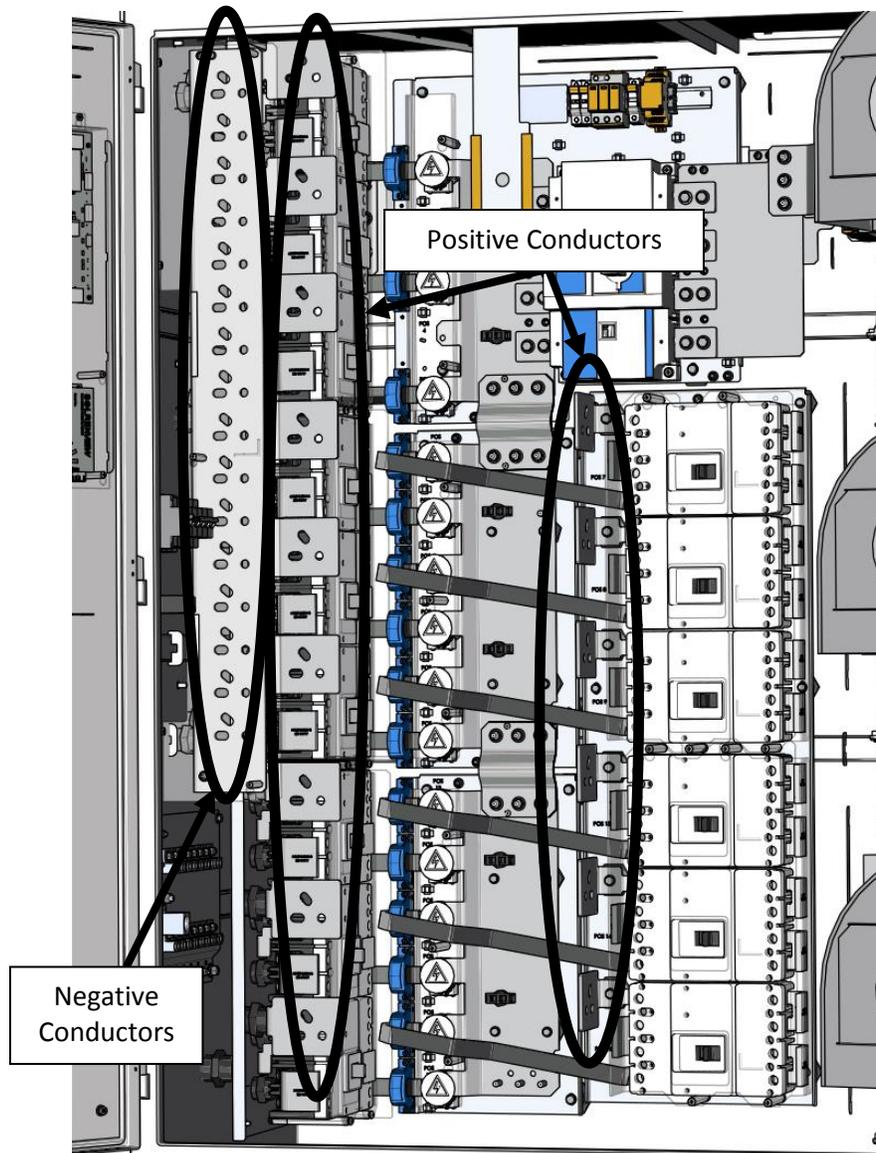


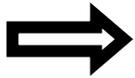
Figure 5.10 – Breaker Subcombiner, Connections

### 5.6 Breaker Subcombiner, Positive Connections (Ungrounded)

For the positive conductors, each breaker input is supplied with a separate busbar that will accept up to two customer-supplied compression lugs. No lugs are provided with the subcombiner. The lugs must conform to the specifications given in the table below.

Lug Type	Hole Size	Hole Spacing	Plating	Max. Tongue Width, Horizontal Mounting	Max. Tongue Width, 45-Degree Mounting
Two Hole	1/2in	1 3/8in – 1 3/4in	Tin Plated	2 1/2in	2 1/2in

Table 5.5 – Breaker Subcombiner, Positive Connections, Lug Specifications

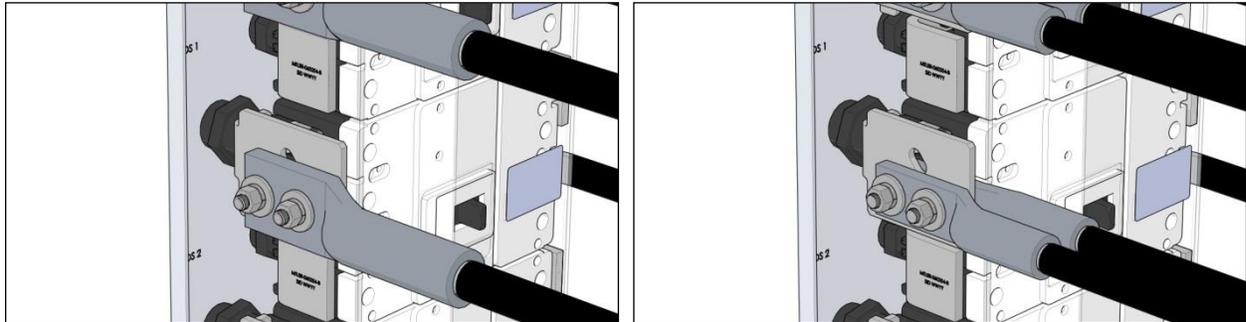


**NOTE:** Use Panduit series lugs LCD, LCC, LCC-W, LAB, or equivalent lugs from other manufacturers.

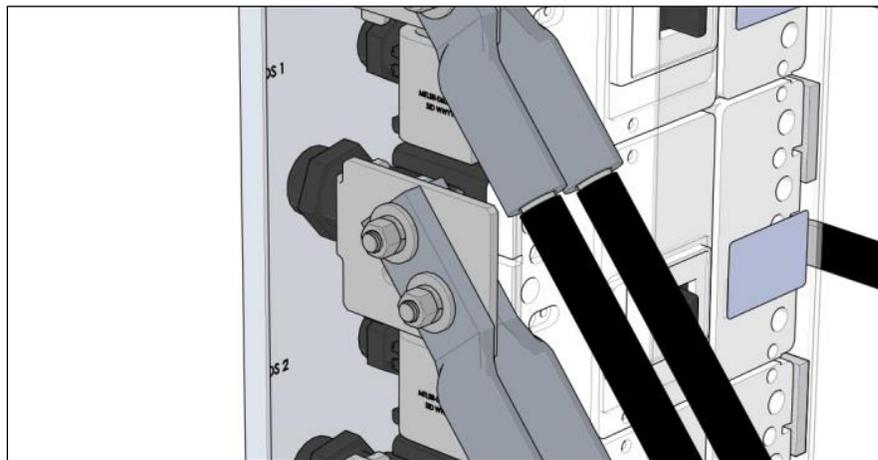


**NOTE:** Only use lugs with aluminum conductors that are explicitly listed for use with aluminum conductors.

For the positive conductors, the lugs can either be installed horizontally or at a 45-degree angle, allowing for easier routing of the conductors, as shown in the figures below.

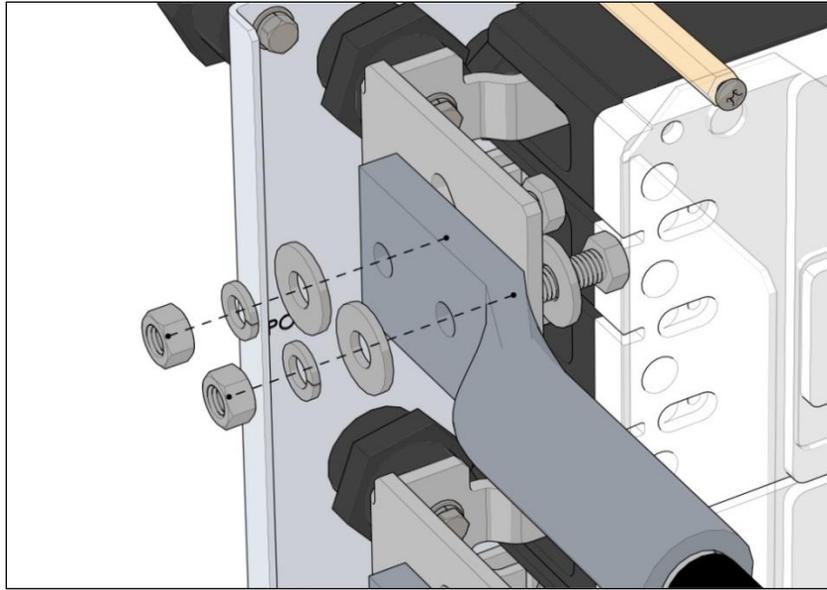


**Figure 5.11 – Breaker Subcombiner, Positive Connections  
One and Two Lugs, Horizontal Mounting**



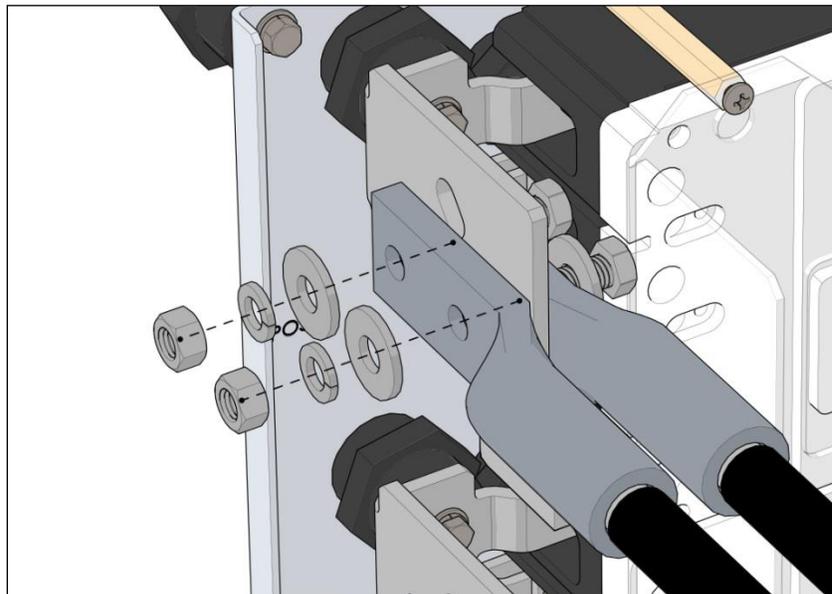
**Figure 5.12 – Breaker Subcombiner, Positive Connections,  
Two Lugs, 45-Degree Mounting**

If using one lug, install it on the front side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



**Figure 5.13 – Breaker Subcombiner, Positive Connections, One Lug, Hardware Stack-up**

If using two lugs for parallel conductors, install one lug on each side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > lug > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



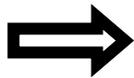
**Figure 5.14 – Breaker Subcombiner, Positive Connections, Two Lugs, Hardware Stack-up**

### 5.7 Breaker Subcombiner, Negative Connections (Grounded)

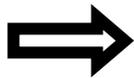
For the negative conductors, a large busbar is supplied that will accept up to two customer-supplied compression lugs per input. No lugs are provided with the subcombiner. The lugs must conform to the specifications given in the table below.

Lug Type	Hole Size	Hole Spacing	Plating	Max. Tongue Width, Horizontal Mounting	Max. Tongue Width, 45-Degree Mounting
Two Hole	1/2in	1 3/8in – 1 3/4in	Tin Plated	2 1/2in	2in

**Table 5.6 – Breaker Subcombiner, Negative Connections, Lug Specifications**

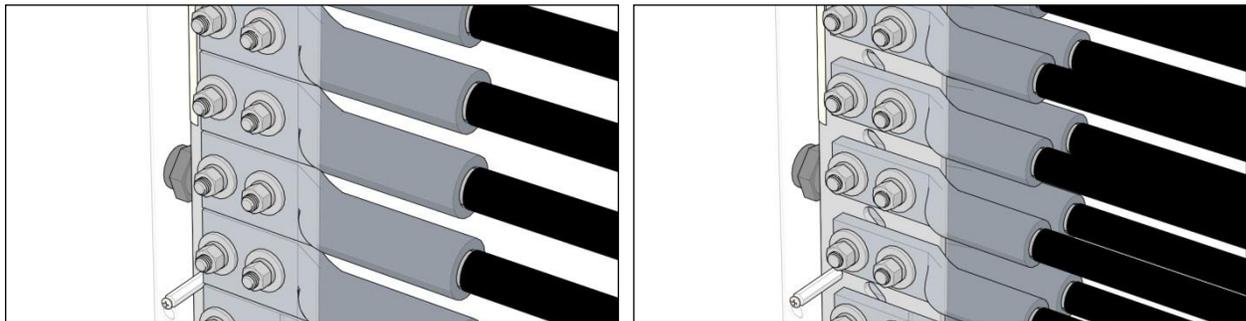


**NOTE:** Use Panduit series lugs LCD, LCC, LCC-W, LAB, or equivalent lugs from other manufacturers.

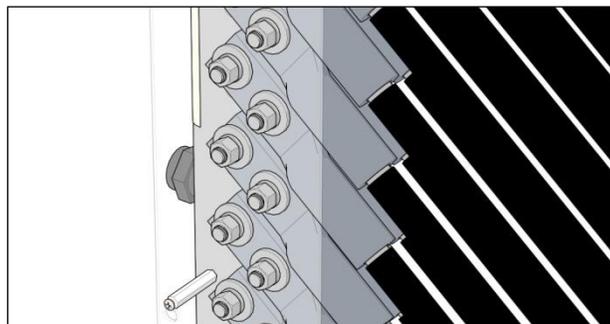


**NOTE:** Only use lugs with aluminum conductors that are explicitly listed for use with aluminum conductors.

For the negative conductors, the lugs can either be installed horizontally or at a 45-degree angle, allowing for easier routing of the conductors, as shown in the figures below.

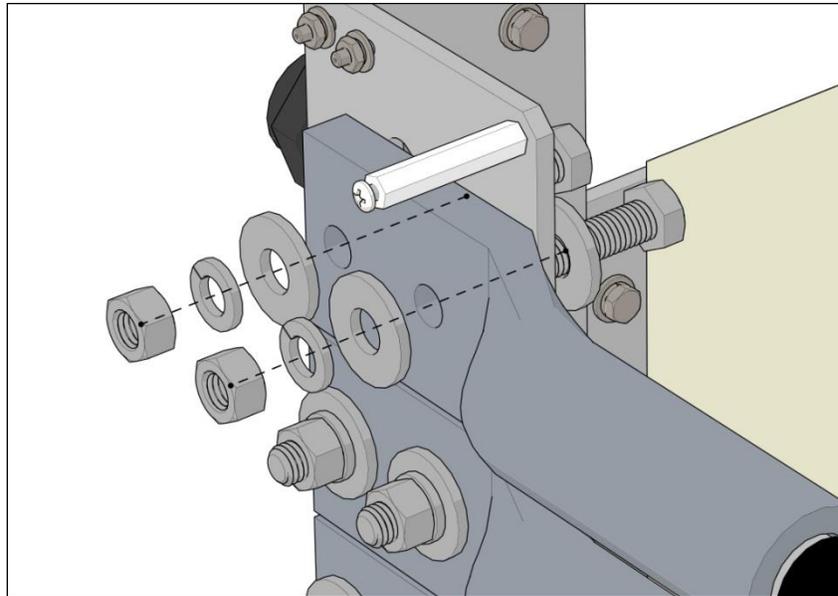


**Figure 5.15 – Breaker Subcombiner, Negative Connections One and Two Lugs, Horizontal Mounting**



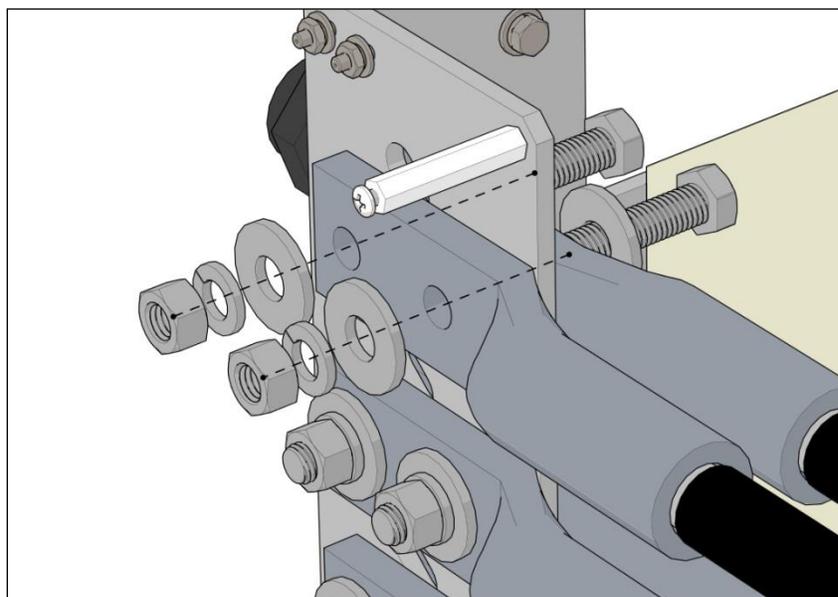
**Figure 5.16 – Breaker Subcombiner, Negative Connections, Two Lugs, 45-Degree Mounting**

If using one lug, install it on the front side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.



**Figure 5.17 – Breaker Subcombiner, Negative Connections, One Lug, Hardware Stack-up**

If using two lugs for parallel conductors, install one lug on each side of the busbar. Use 1/2in stainless steel hardware that consists of the following and in the following stack-up: bolt > flat washer > lug > busbar > lug > flat washer > lock washer > nut, as shown in the figure below. Torque the hardware to 550in-lbs.

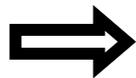


**Figure 5.18 – Breaker Subcombiner, Negative Connections, Two Lugs, Hardware Stack-up**

### 5.8 Breaker Subcombiner, Conductor Type and Sizing

Either copper or aluminum wire may be used for the positive and negative conductors, though due to terminal size restrictions, aluminum wire may not be an option for all cases. As with any aluminum wire exercise best industry practices to ensure a reliable connection; thoroughly clean the conductor just prior to making the electrical connection and use an oxide inhibitor to prevent the formation of aluminum oxide.

Use minimum 90°C rated conductors to connect to the inverter’s subcombiner connections. The tables below show the minimum conductor sizes that must be used for each breaker size, as well as the maximum size conductors that each input will accept. Voltage drop, local electrical codes, and other considerations may dictate that larger wire sizes than the minimums shown must be used. Connections are rated for 75°C terminal temperatures.



**NOTE:** The positive and negative conductors for each input must be sized the same.

Breaker Current Rating	Breaker Subcombiner			
	Single Conductor		Two Parallel Conductors	
	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
125A	1AWG – 1000kcmil	2/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
150A	1AWG – 1000kcmil	2/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
175A	2/0AWG – 1000kcmil	3/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
200A	3/0AWG – 1000kcmil	4/0AWG – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
225A	4/0AWG – 1000kcmil	250kcmil – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
250A	4/0AWG – 1000kcmil	300kcmil – 1000kcmil	1/0AWG – 600kcmil	1/0AWG – 600kcmil
300A	250kcmil – 1000kcmil	400kcmil – 1000kcmil	1/0AWG – 600kcmil	2/0AWG – 600kcmil
350A	350kcmil – 1000kcmil	500kcmil – 1000kcmil	2/0AWG – 600kcmil	3/0AWG – 600kcmil

**Table 5.7 – Conductor Ranges for Breaker Subcombiner**

<i>Customer –Supplied Compression Lugs</i>	Cu or Al Conductors See Table Above for Minimum Conductor Sizes Max. 2 x 600kcmil per Subcombiner Position 75°C Connections, 550in-lbs 1-2 Wires per Subcombiner Position
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**Table 5.8 – Breaker Subcombiner Connections**

## 6 AC Connections



**CAUTION:** All electrical installations shall be performed in accordance with all applicable local electrical codes.

The SGI XTM series of inverters must be connected to a dedicated step-up isolation transformer that allows for a floating ground connection between the inverter and the primary side of the transformer. Up to two inverters may be connected to a single transformer, provided that the transformer has separate primary windings for each inverter. The transformer must comply with the requirements found in the *SGI 500XTM and 750XTM Isolation Transformer Specification* (DOCR-070354); this document can be found online: <http://solectria.com/support/documentation> .



**CAUTION:** Failure to connect the inverter to a dedicated isolation transformer will result in damage to the inverter or service equipment and will void the warranty.

The inverter connects to the dedicated isolation transformer with three phase conductors and the appropriate AC ground conductors. No neutral conductor is required and under no circumstances should a neutral connection be made at any point between the inverter and the primary (inverter) side of the transformer.



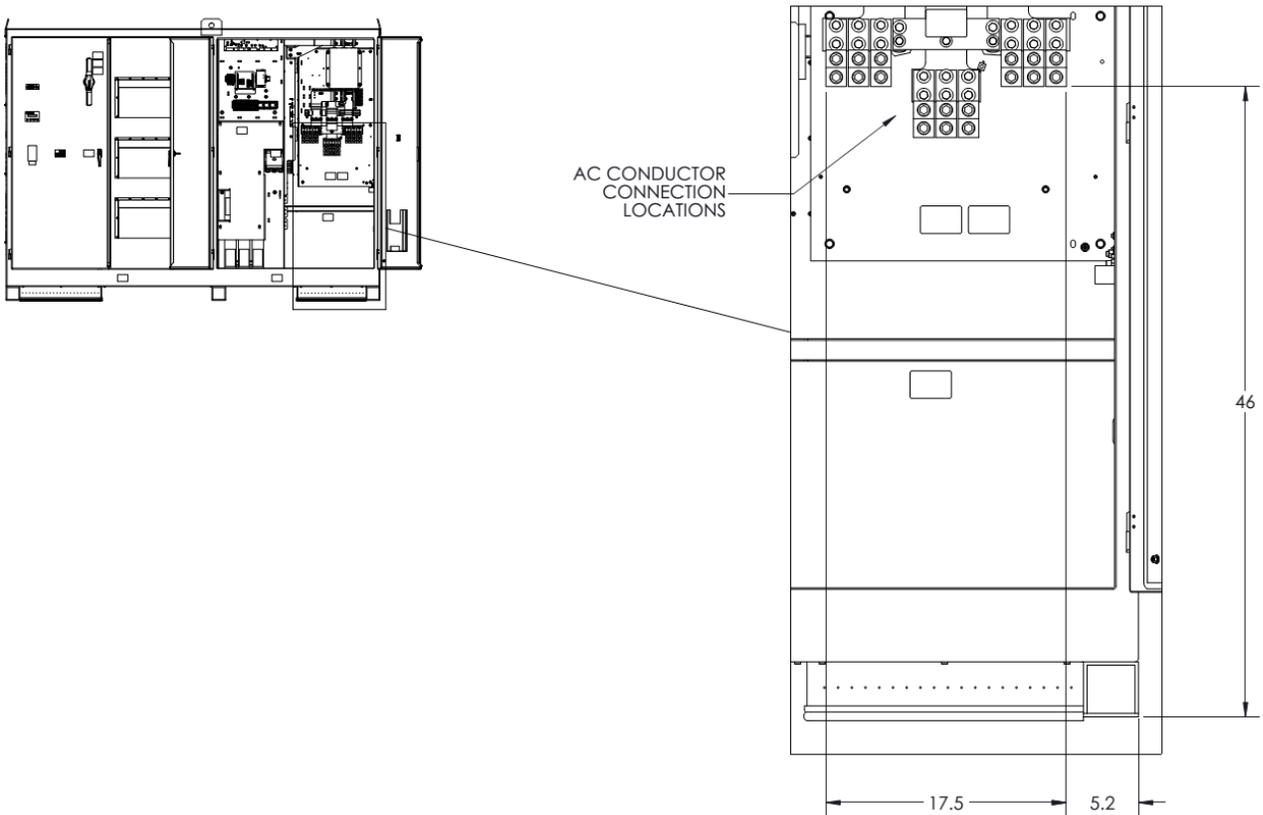
**CAUTION:** The three-phase output of the inverter must be fully isolated from the ground system at all times. The three phases shall not be bonded to ground or be provided an impedance path to ground with metering or monitoring equipment, potential transformers, grounding transformers, surge arrestors, neutral bonds at the transformer, etc. Failure to comply will result in catastrophic damage to the inverter and will void the warranty.

The impedance of the interconnection wiring at the connection point should be as low as possible to avoid an increase of the AC voltage to non-permissible values while the inverter outputs power to the grid. Minimizing wiring impedance will also result in higher overall system efficiency.

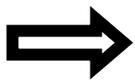
Either copper or aluminum conductors may be used, although due to terminal size restrictions, aluminum conductors may not be an option for all cases. As with any aluminum conductors, exercise best industry practices to ensure a reliable connection; thoroughly clean the conductor just prior to making the electrical connection and use an oxide inhibitor to prevent the formation of aluminum oxide.

### 6.1 AC Connections, Base Model

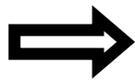
The base models of the SGI XTM series of inverters come with lugs at the AC output of the inverter suitable for landing the phase conductors. No AC disconnecting means or over current protection is included in the base model. The AC lugs for the base model are located inside the enclosure, on the rightmost side, as shown in the figure below.



**Figure 6.1 – AC Connection Locations, Base Model**



**NOTE:** An external disconnecting means must be provided for use with the base model to de-energize the inverter for servicing and maintenance.



**NOTE:** An external overcurrent protection device (OCPD) must be provided for use with the base model. The ampacity rating of the OCPD must conform to the ratings shown in the table below.

Inverter Model	Standard Rated OCPD	100% Rated OCPD
SGI 500XTM	1000A	800A
SGI 750XTM	1600A	1200A

**Table 6.1 – Inverter AC OCPD Requirements**

Use minimum 90°C rated conductors to connect to the inverter’s AC connections. The tables below show the minimum conductor sizes that must be used to connect to the inverter, as well as the

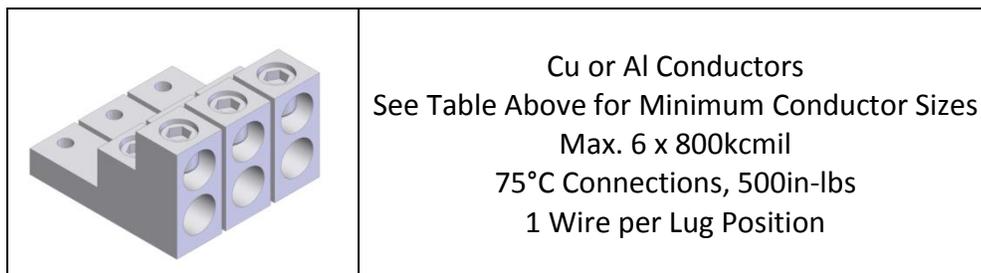
maximum size conductors that the inverter will accept. Voltage drop, local electrical codes, and other considerations may dictate that larger wire sizes than the minimums shown must be used. Connections are rated for 75°C terminal temperatures.

SGI 500XTM				
Standard Rated OCPD		100% Rated OCPD		
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
3	500kcmil – 800kcmil	600kcmil – 800kcmil	500kcmil – 800kcmil	600kcmil – 800kcmil
4	300kcmil – 800kcmil	400kcmil – 800kcmil	300kcmil – 800kcmil	400kcmil – 800kcmil
5	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil
6	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil

**Table 6.2 – Conductor Ranges for SGI 500XTM, Base Model Utilizing External OCPD**

SGI 750XTM				
Standard Rated OCPD		100% Rated OCPD		
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
3	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
4	600kcmil – 800kcmil	<i>Not Allowed</i>	600kcmil – 800kcmil	750kcmil – 800kcmil
5	400kcmil – 800kcmil	600kcmil – 800kcmil	350kcmil – 800kcmil	500kcmil – 800kcmil
6	300kcmil – 800kcmil	400kcmil – 800kcmil	300kcmil – 800kcmil	400kcmil – 800kcmil

**Table 6.3 – Conductor Ranges for SGI 750XTM, Base Model Utilizing External OCPD**

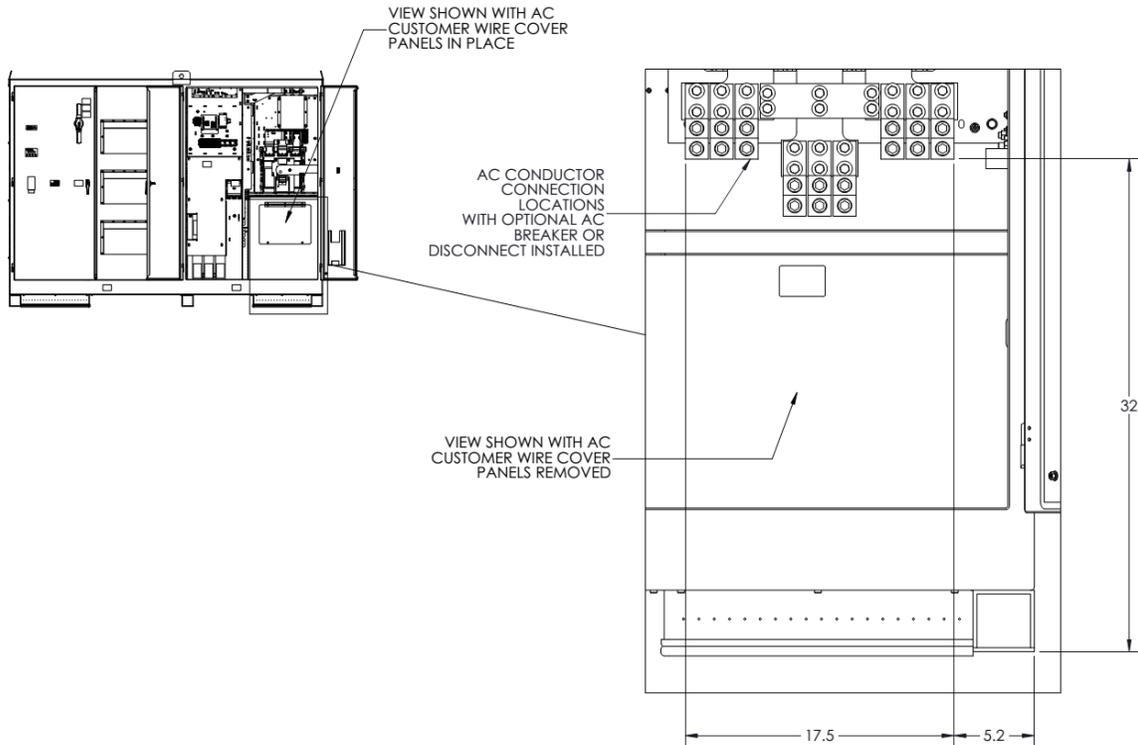


**Figure 6.2 – AC Phase Lugs, Base Model**

## 6.2 AC Connections, Integrated Disconnect Switch Option

An optional integrated AC disconnect is available for the SGI XTM series of inverters. The disconnect also contains a handle that is operable from outside the enclosure acting as a disconnecting means. The disconnect comes equipped with lugs suitable for landing the AC phase

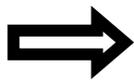
conductors. The AC lugs for the optional disconnect model are located inside the enclosure, on the rightmost side, as shown in the figure below. The table below provides the ratings for the integrated disconnect.



**Figure 6.3 – AC Connection Locations, Integrated Disconnect Option**

Inverter Model	Disconnect Ampere Rating	Disconnect Short-Circuit Current Rating
Sgi 500XTM	1600A	65kAIC
Sgi 750XTM	2000A	65kAIC

**Table 6.4 – Integrated Disconnect Ratings**



**NOTE:** An external overcurrent protection device (OCPD) must be provided for use with the integrated disconnect model. The ampacity rating of the OCPD must conform to the ratings shown in the table below.

Inverter Model	Standard Rated OCPD	100% Rated OCPD
Sgi 500XTM	1000A	800A
Sgi 750XTM	1600A	1200A

**Table 6.5 – Inverter AC OCPD Requirements**

Use minimum 90°C rated conductors to connect to the inverter’s AC connections. The tables below show the minimum conductor sizes that must be used to connect to the inverter, as well as the maximum size conductors that the inverter will accept. Voltage drop, local electrical codes, and

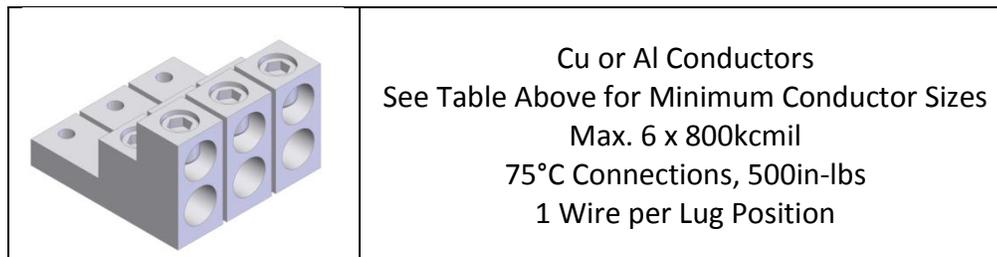
other considerations may dictate that larger wire sizes than the minimums shown must be used. Connections are rated for 75°C terminal temperatures.

SGI 500XTM				
Standard Rated OCPD			100% Rated OCPD	
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
3	500kcmil – 800kcmil	600kcmil – 800kcmil	500kcmil – 800kcmil	600kcmil – 800kcmil
4	300kcmil – 800kcmil	400kcmil – 800kcmil	300kcmil – 800kcmil	400kcmil – 800kcmil
5	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil
6	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil	300kcmil – 800kcmil

**Table 6.6 – Conductor Ranges for SGI 500XTM, Integrated Disconnect Model Utilizing External OCPD**

SGI 750XTM				
Standard Rated OCPD			100% Rated OCPD	
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
3	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>	<i>Not Allowed</i>
4	600kcmil – 800kcmil	<i>Not Allowed</i>	600kcmil – 800kcmil	750kcmil – 800kcmil
5	400kcmil – 800kcmil	600kcmil – 800kcmil	350kcmil – 800kcmil	500kcmil – 800kcmil
6	300kcmil – 800kcmil	400kcmil – 800kcmil	300kcmil – 800kcmil	400kcmil – 800kcmil

**Table 6.7 – Conductor Ranges for SGI 750XTM, Integrated Disconnect Model Utilizing External OCPD**

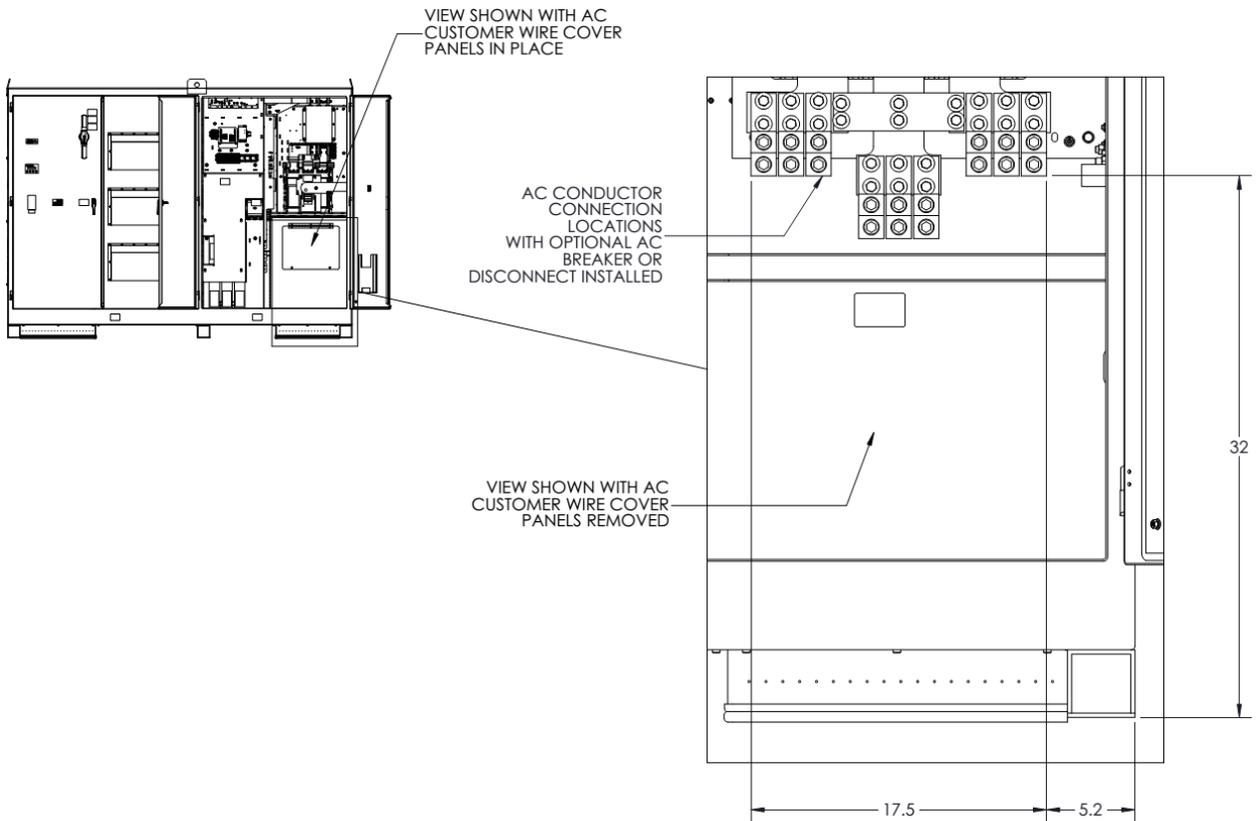


**Figure 6.4 – AC Phase Lugs, Integrated Disconnect Model**

### 6.3 AC Connections, Integrated Breaker Option

An optional integrated AC breaker is available for the SGI XTM series of inverters. The breaker also includes a handle that is operable from outside the enclosure to act as a disconnecting means. The breaker comes equipped with lugs suitable for landing the AC phase conductors. The AC lugs for

the optional breaker model are located inside the enclosure, on the rightmost side, as shown in the figure below. The table below provides the ratings for the integrated breaker.



**Figure 6.5 – AC Connection Locations, Integrated Breaker Option**

Inverter Model	Breaker Frame Size	Breaker Interrupting Capacity	Breaker Continuous Current / Long Delay Pickup Setting ( $I_r$ )	Breaker Long Delay Time ( $t_r$ )	Breaker Short Delay Pickup ( $I_{sd}$ )
Sgi 500XTM	1600A	65kAIC	1000A	24s	9000A
Sgi 750XTM	2000A	65kAIC	1600A	24s	14400A

**Table 6.8 – Integrated Breaker Ratings**

Use minimum 90°C rated conductors to connect to the inverter’s AC connections. The tables below show the minimum conductor sizes that must be used to connect to the inverter, as well as the maximum size conductors that the inverter will accept. Voltage drop, local electrical codes, and

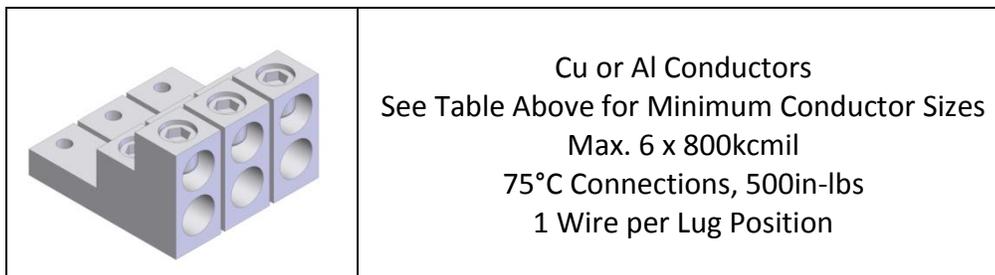
other considerations may dictate that larger wire sizes than the minimums shown must be used. Connections are rated for 75°C terminal temperatures.

SGI 500XTM		
Integrated Breaker		
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>
3	500kcmil – 800kcmil	600kcmil – 800kcmil
4	300kcmil – 800kcmil	400kcmil – 800kcmil
5	300kcmil – 800kcmil	300kcmil – 800kcmil
6	300kcmil – 800kcmil	300kcmil – 800kcmil

**Table 6.9 – Conductor Ranges for SGI 500XTM, Integrated Breaker Model**

SGI 750XTM		
Integrated Breaker		
Number of Parallel Conductors	Copper Conductors	Aluminum Conductors
1	<i>Not Allowed</i>	<i>Not Allowed</i>
2	<i>Not Allowed</i>	<i>Not Allowed</i>
3	<i>Not Allowed</i>	<i>Not Allowed</i>
4	600kcmil – 800kcmil	<i>Not Allowed</i>
5	400kcmil – 800kcmil	600kcmil – 800kcmil
6	300kcmil – 800kcmil	400kcmil – 800kcmil

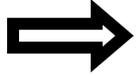
**Table 6.10 – Conductor Ranges for SGI 750XTM, Integrated Breaker Model**



**Figure 6.6 – AC Phase Lugs, Integrated Breaker Model**

## 6.4 Phase Rotation

Clockwise phase rotation is required for the inverter to operate. Connect Phase A conductors to the leftmost lugs, Phase B conductors to the middle lugs, and Phase C conductors to the rightmost lugs. Correct phase rotation is clockwise A-B-C as shown below.



**NOTE:** Improper phase rotation will not damage the inverter; however, the inverter will not operate until the phase rotation is corrected to a clockwise rotation.

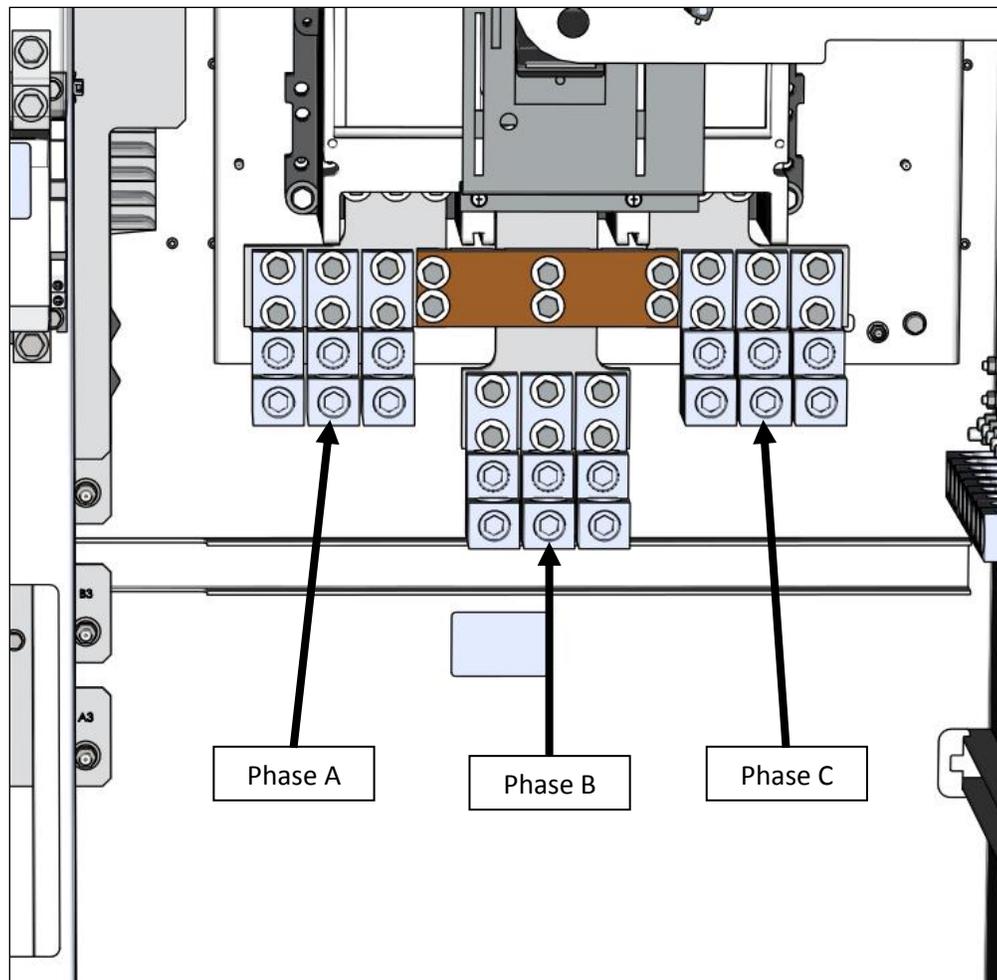


Figure 6.7 – AC Phase Rotation

## 6.5 Installing AC Customer Wire Cover Panels

Once the AC conductors have been installed, the AC customer wire cover panels can be reinstalled into the inverter.



**WARNING:** Failure to install the AC customer wire cover panels may delay servicing of the inverter.

1. Begin by placing the left panel into place. The proper orientation is with the cutout to the rear and the flanges pointing to the right, as shown in the figure below.
2. Install a nut, a lock washer, and a flat washer onto the three mounting studs on the rear of the enclosure and torque the hardware to 58in-lbs, as shown in the figure below.
3. Install a bolt, a lock washer, and a flat washer into the three bottom mounting locations and torque the hardware to 78in-lbs, as shown in the figure below.

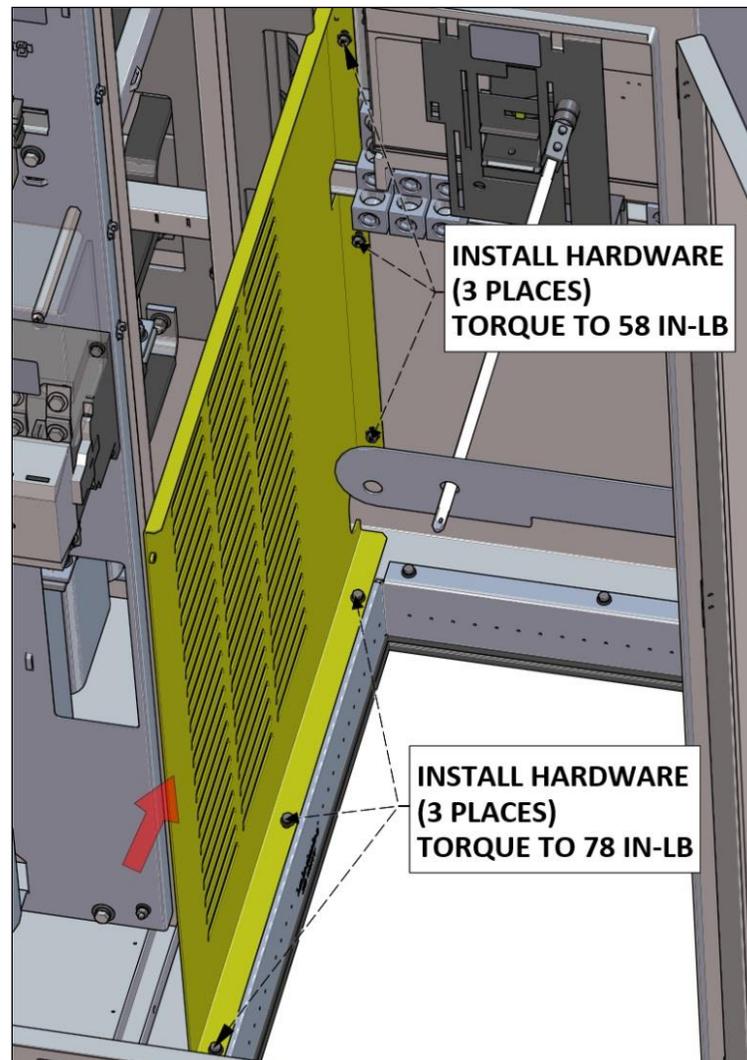
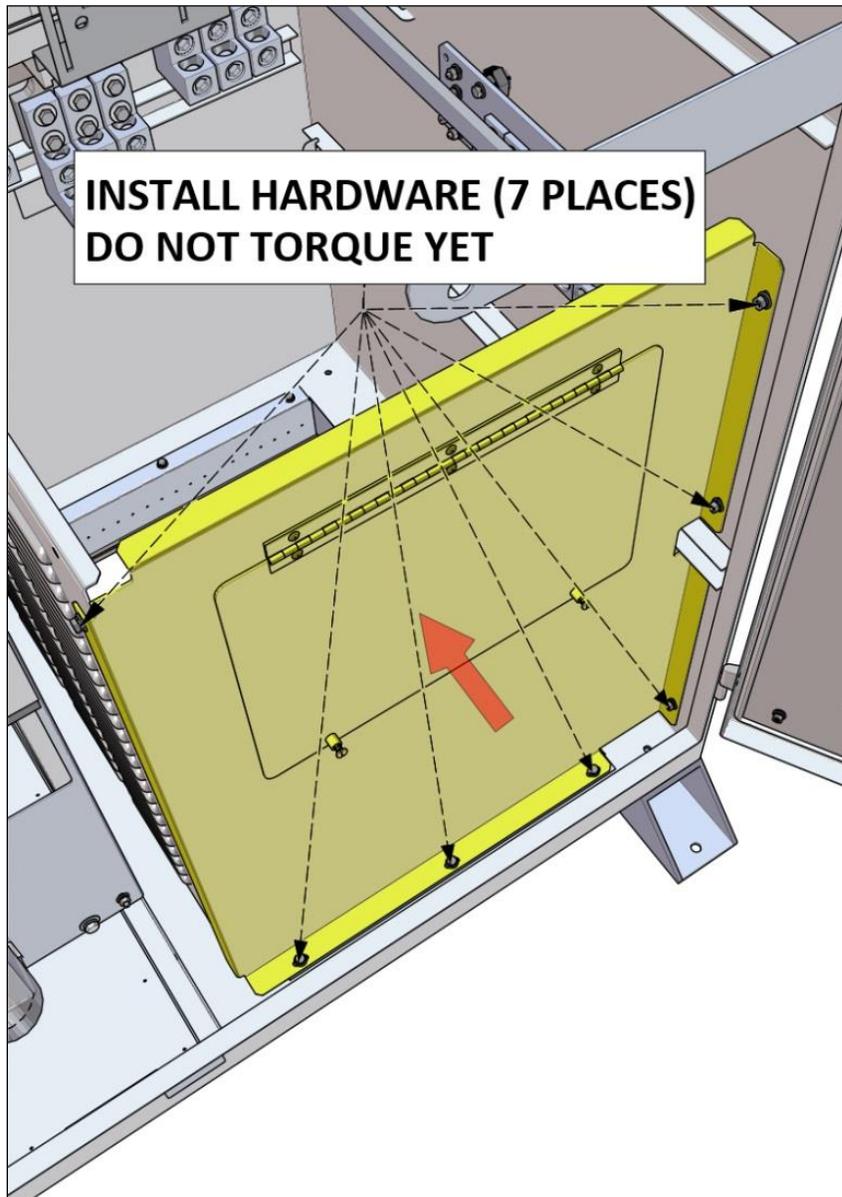


Figure 6.8 – Installing AC Wire Cover, Left Panel

4. Next, place the front panel into place. The proper orientation is with the door towards the top and the left flange covering the left panel, as shown in the figure below.
5. Loosely install a nut, lock washer and flat washer onto the three mounting studs on the right of the enclosure, as shown in the figure below.
6. Loosely install a bolt, lock washer and flat washer into the three bottom mounting locations and the one left side location, as shown in the figure below. Do not torque any of the hardware at this point.



**Figure 6.9 – Installing AC Wire Cover, Front Panel**

7. Next, place the top front panel into place. The proper orientation is with the louver vents towards the front, the left flange covering the left panel, and the front flange covering the front panel, as shown in the figure below.
8. Loosely install a nut, lock washer, and flat washer onto the two mounting studs on the right of the enclosure, as shown in the figure below.
9. Loosely install a bolt, lock washer, and flat washer into the one left side location, as shown in the figure below. Do not torque any of the hardware at this point.

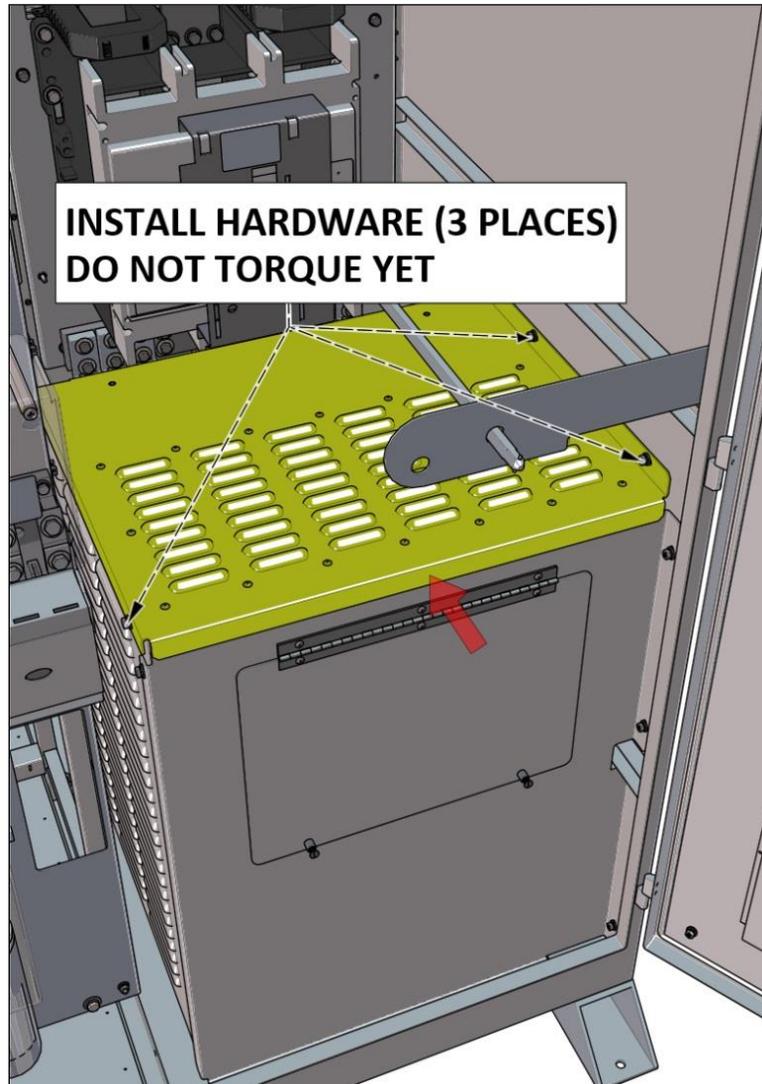


Figure 6.10 – Installing AC Wire Cover, Top Front Panel

10. Next, slide the top rear panel into place. The proper orientation is with the flanges facing up, as shown in the figure below.
11. Install a nut, lock washer, and flat washer onto the two mounting studs on the rear mounting panel already in the enclosure and torque the hardware to 58in-lbs, as shown in the figure below.
12. Maneuver the rest of the structure so that a bolt, lock washer, and flat washer can be installed into the two top locations and torque to 78in-lbs, as shown in the figure below.

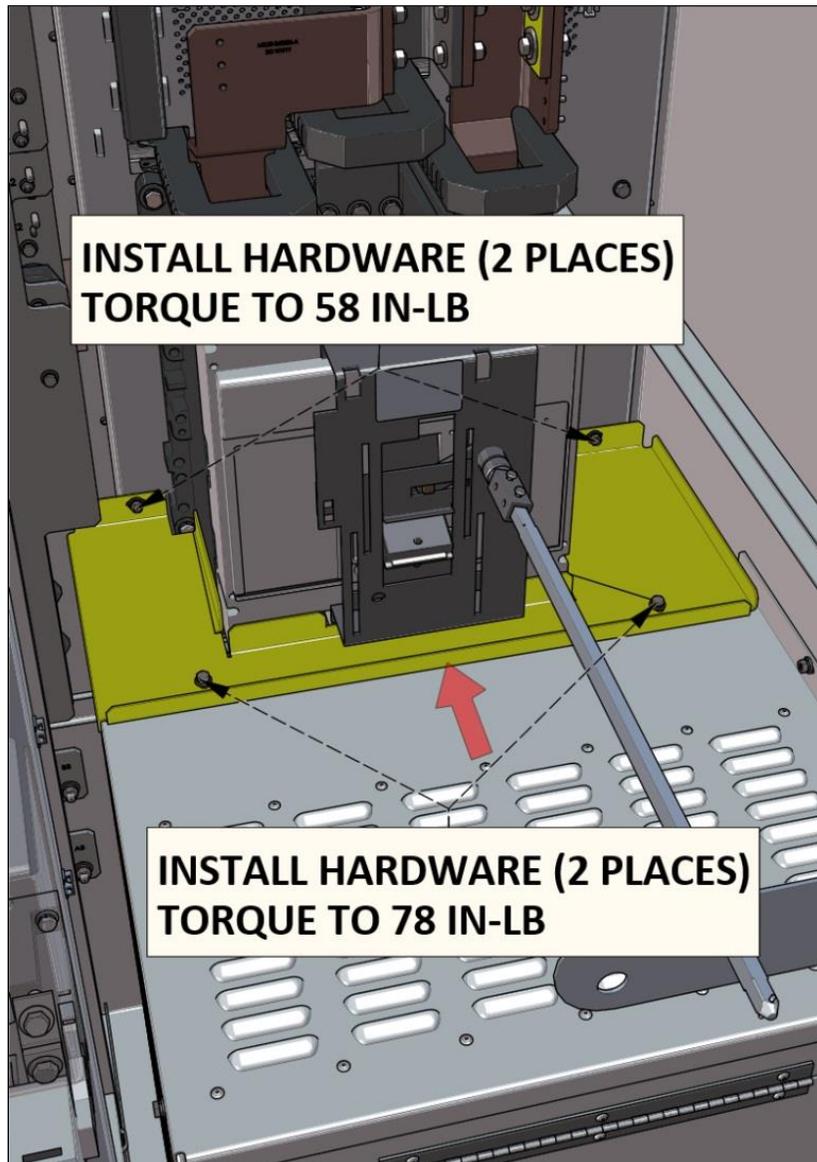


Figure 6.11 – Installing AC Wire Cover, Top Rear Panel

13. Finally, tighten and torque the remaining hardware; the hardware on the right side that consists of nuts should be torqued to 58in-lbs, as shown in the figure below. The hardware on the bottom and left sides that consists of bolts should be torqued to 78 in-lbs, as shown in the figure below.

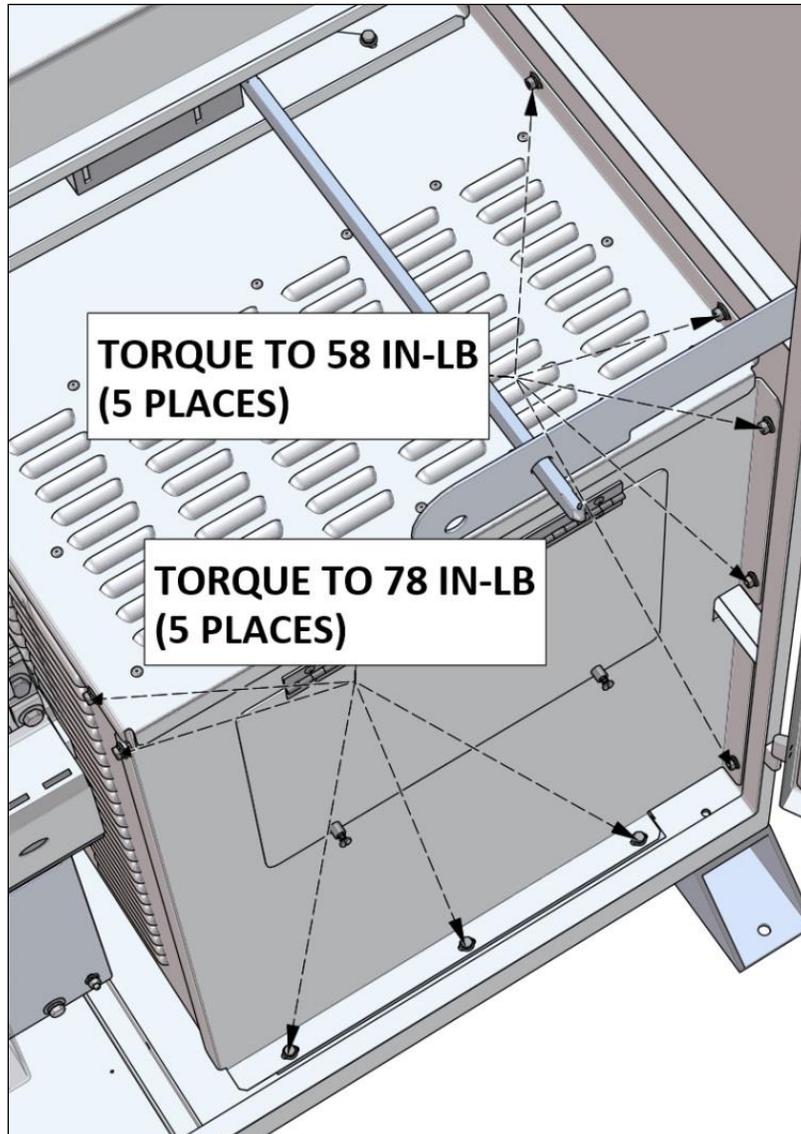


Figure 6.12 – Installing AC Wire Cover, Final Step

## 7 Signal Connections



**WARNING:** Before conducting any maintenance or service on the inverter, the disconnect switches must be set to the OFF position (locked out) and the absence of voltage must be verified by qualified personnel. Do not rely on UI functions to stop the inverter, as a reset might cause it to start unexpectedly.

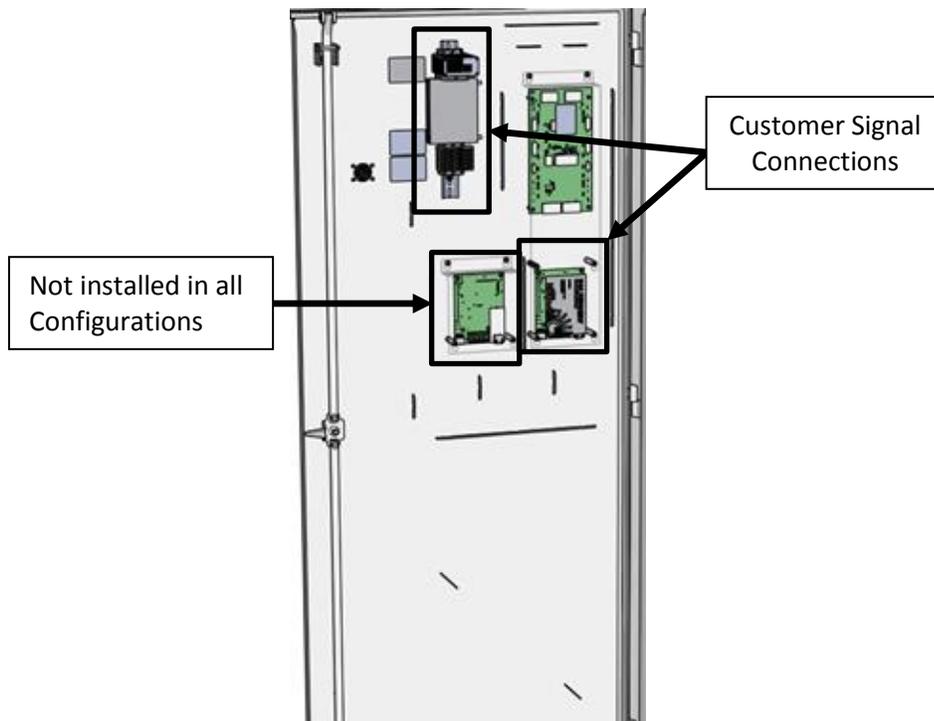


Figure 7.1 – Signal Connection Locations

### 7.1 Terminal Block Locations

Purpose	Terminal Block	Contact Point	Wire Gauge
Shunt Trip	12	Positive Conductor	14AWG
	13	Return Conductor	
Remote Shutdown	14	Positive Conductor	26 – 14AWG
	15	Return Conductor	
Optional Residual Current Monitor (RCM)	16	Test/Reset	26 – 14AWG
	17	Test/Reset	
	18	Alarm (Normally Closed)	
	19	Alarm (Common)	
	20	Alarm (Normally Open)	

Table 7.1 – Terminal Blocks

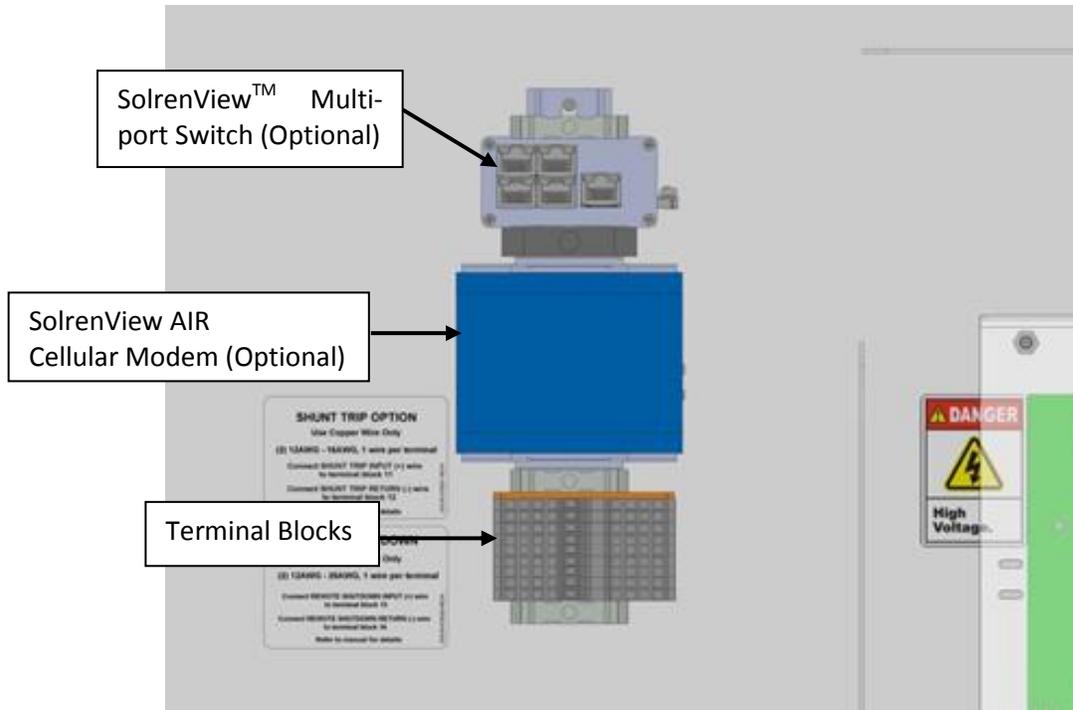


Figure 7.2 – Terminal Block Location

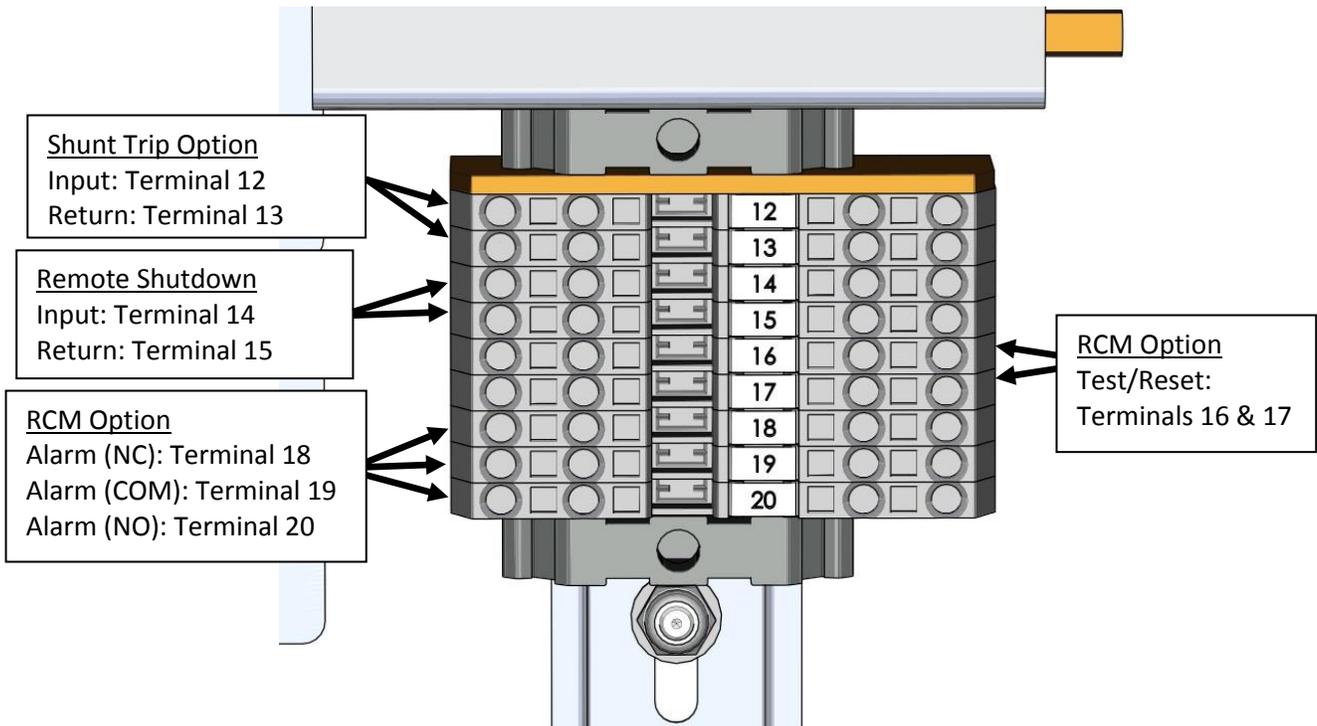
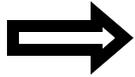


Figure 7.3 – Terminal Block Connections



**NOTE:** Terminals 16 through 20 are only present when the RCM option is installed.

## 7.2 AC Breaker Shunt Trip Connections



**NOTE:** The shunt trip only functions when the AC breaker with shunt trip option is purchased. However, the customer connections are always installed. If 24V is applied to the terminal blocks when the option is not installed, the inverter will stop producing power.

Inverters equipped with the shunt trip feature allow for a remote device to trip the AC breaker. An electrically activated solenoid will be factory installed prior to shipment. When the solenoid is energized the breaker will open. Once the breaker has been tripped, it must be manually reset. The handle must be rotated to the OFF position before it can be re-engaged.

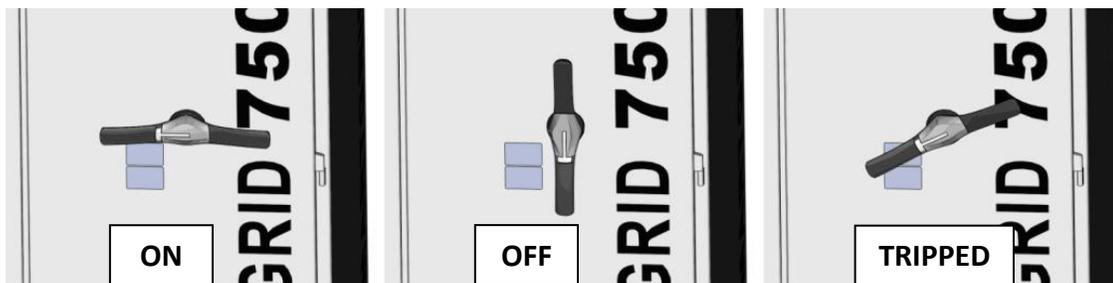
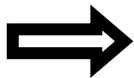


Figure 7.4 – AC Breaker Handle (Different Positions)

Wire the positive conductor to Terminal Block 12. Wire the return conductor to Terminal Block 13. The terminal blocks secure the conductors with cage clamps.

Nominal Supply Voltage	Minimum Operating Voltage	Maximum Operating Voltage	I with Duration of 0.250s	VA	Average Opening Time	Terminal Wire Size
24VDC	16.8VDC	26.4VDC	16.5A	396	62ms	14AWG

Table 7.2 – Shunt Trip Specifications



**NOTE:** Voltage rating of wire insulation should be 600V.



**NOTE:** A shunt trip event will be logged on SolrenView. Since the inverter will lose power at the time of the event, it may not be visible on SolrenView until the next time the inverter is energized.

## 7.3 Remote Shutdown Connections

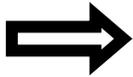
The SGI XTM series of inverters feature a remote shutdown input to allow for advanced remote command and control systems. The input required is an isolated 24VDC signal that is wired to the

terminal blocks on the door of the inverter. Once the signal is activated, the inverter will slowly ramp down power and then it will cease power output and disconnect the inverter from the PV array. The inverter will not reconnect until the signal is removed. The remote shutdown feature will not result in an instantaneous shutdown of the inverter.

Locate the set of terminal blocks on the inside left most door of the inverter. Wire the positive conductor to Terminal Block 14. Wire the return conductor to Terminal Block 15. The terminal block secures the conductors with cage clamps.

Default Maximum Shutdown Ramp Time	Nominal Input Voltage	Minimum Activation Input Voltage	Maximum Input Voltage	Minimum Current Capability	Terminal Wire Size
4s	24VDC	21.6VDC	26.4VDC	100mADC	26 – 14AWG

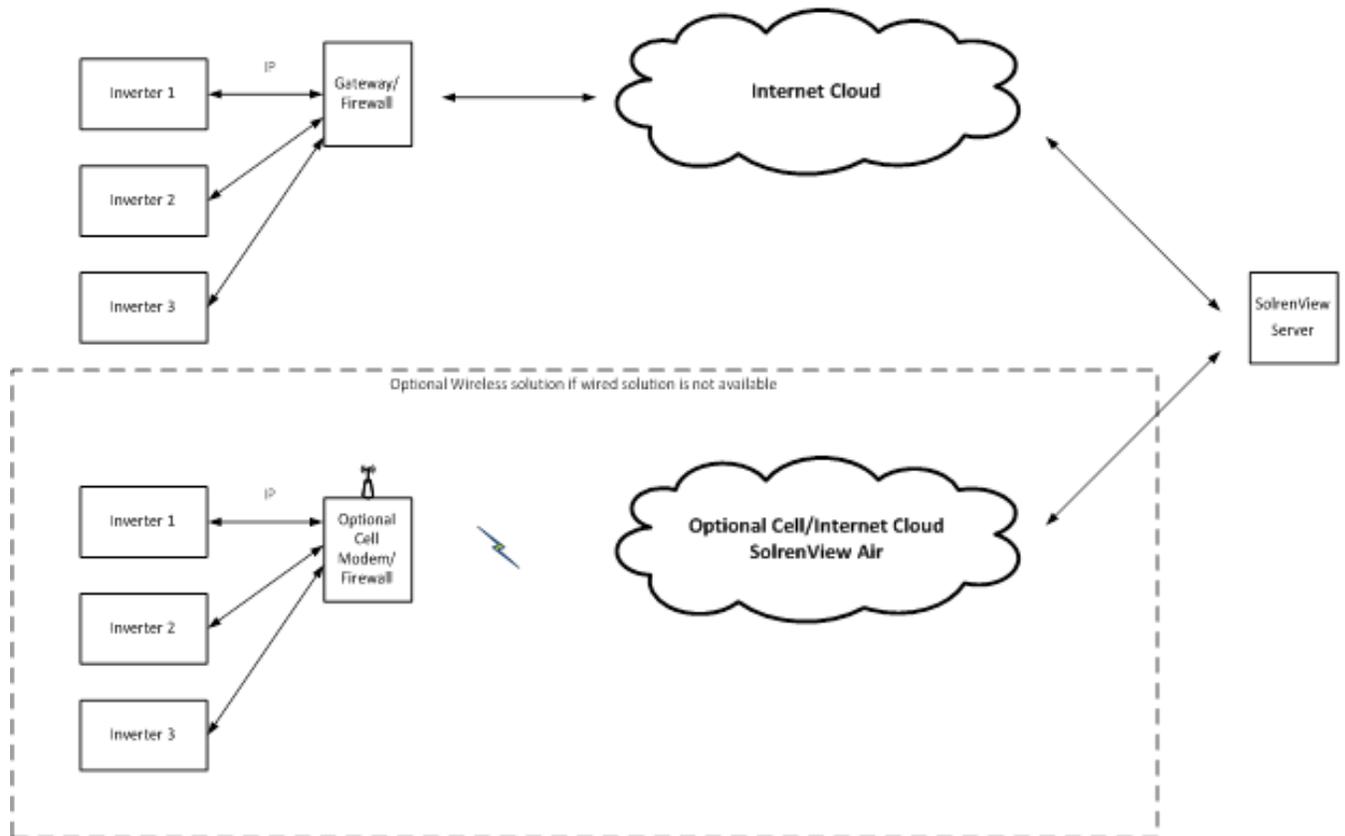
**Table 7.3 – Remote Shutdown Specifications**



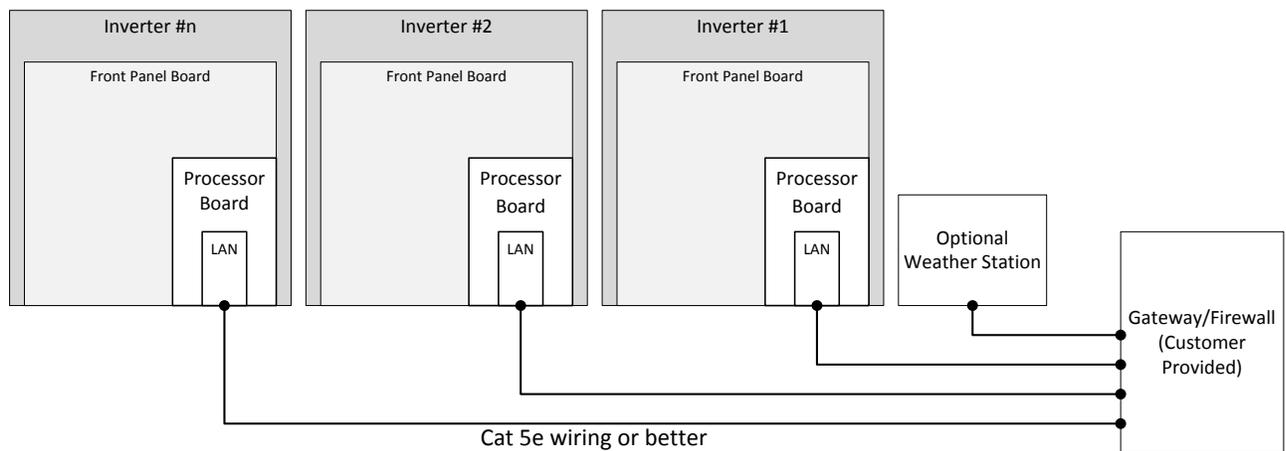
**NOTE:** Voltage rating of wire insulation should be 600V.

#### 7.4 SolrenView Ethernet Connection

Before SolrenView web-based monitoring can function, the inverter must be connected to the Internet. Customers ordering the SolrenView AIR have network connectivity turned on in the factory; no additional steps are required.



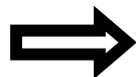
**Figure 7.5 – Block Diagram of the SolrenView Data Acquisition Infrastructure**



**Figure 7.6 – Typical SolrenView Data Acquisition Configuration**



**NOTE:** The SolrenView Data Acquisition gateway should be provided by the customer.



**NOTE:** See Sections 10.20 through 10.25 for information on how to configure the SolrenView connection.

### 7.4.1 SolrenView DAS Ethernet Connection

The DAS is located on the back side of the left most door (can be seen below, on right). The board to the left is only included for inverters with SolZone™ installed and the number of inputs is 9 or more. For SolZone with 8 or less inputs, only the SolrenView DAS is included.

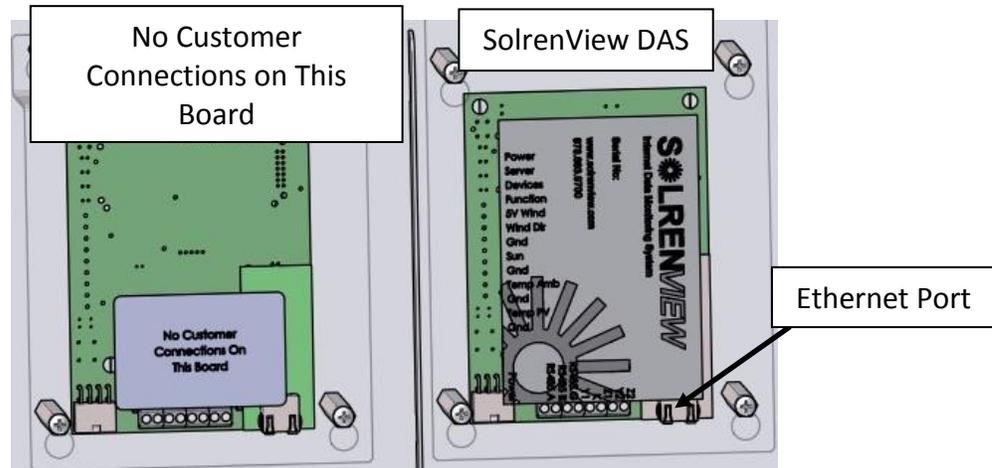
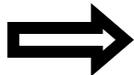


Figure 7.7 – Ethernet Connection to the Back of the SolrenView DAS

1. Remove the plastic protective cover (right side only).
2. Install networking cable into Ethernet port (shown above).



**NOTE:** The green link and yellow activity LEDs only light when the SolrenView DAS is powered.

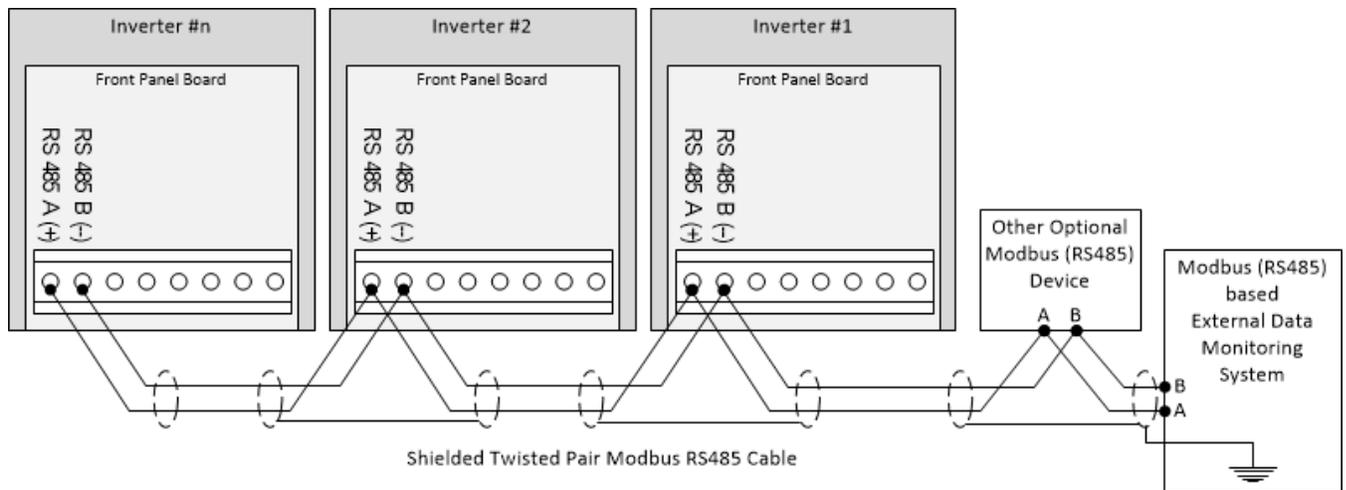
3. Re-install the protective cover. Hand-tighten screws once shield is back in place; *do not torque*.

Use Cat5e or Cat6 networking cable between the SolrenView DAS and the router/switch/firewall. If molded cables cannot be used, suggest using a network cable tester to ensure cable and crimp quality.

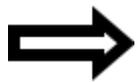
### 7.5 RS-485 Connections

To ensure good and reliable communications between the external data monitoring system and the SolrenView DAS, it is important to follow these guidelines when wiring the RS-485 connections:

1. Shielded, twisted pair cable must be used.
2. All devices on the RS-485 must be daisy chained.

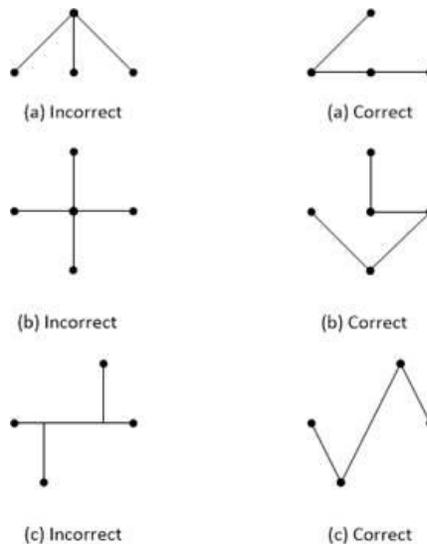


**Figure 7.8 – Typical External Data Monitoring System Modbus Connections**



**NOTE:** When wiring in a daisy chain two wires must be landed in the same wire terminal for each device in the chain, excluding the devices at the end of the chain.

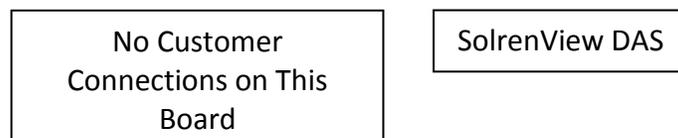
When connecting multiple devices, avoid the incorrect “Branch” (a), “Star” (b) and “T” (c) connection schemes (on the left) as they will cause unwanted signal reflections that can disrupt the communication signals. Instead use connection schemes shown as correct (on the right).



**Figure 7.9 – Correct and Incorrect Ways to Daisy Chain Inverters**

### 7.5.1 SolrenView DAS RS-485 Connections

The DAS is located on the back side of the left most door (can be seen below, on right). The board to the left is only included for inverters with SolZone installed and the number of inputs is 9 or more. For SolZone with 8 or less inputs, only the SolrenView DAS is included.





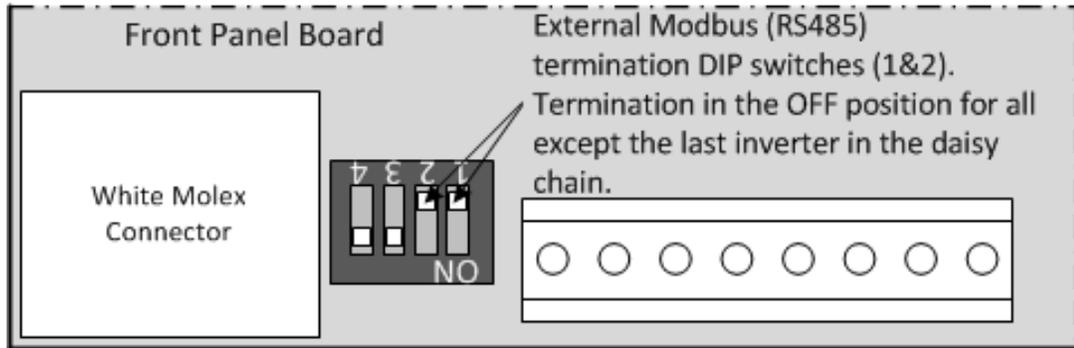


Figure 7.11a – External Modbus (RS-485) Termination Switches 1 and 2 in the OFF Position

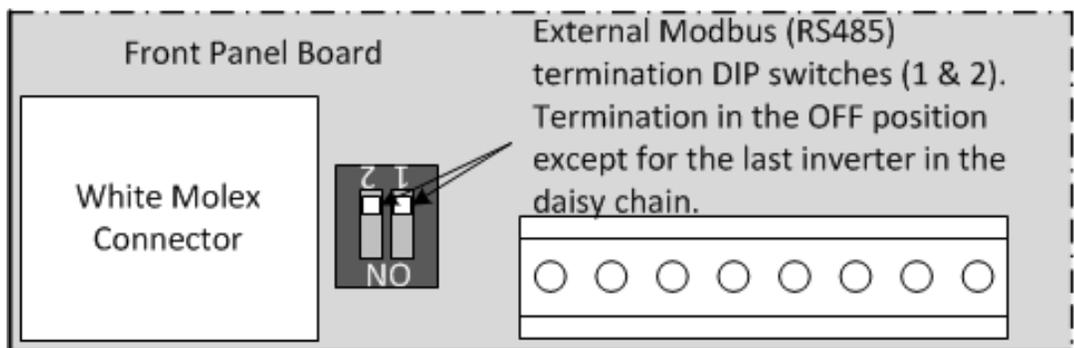
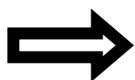
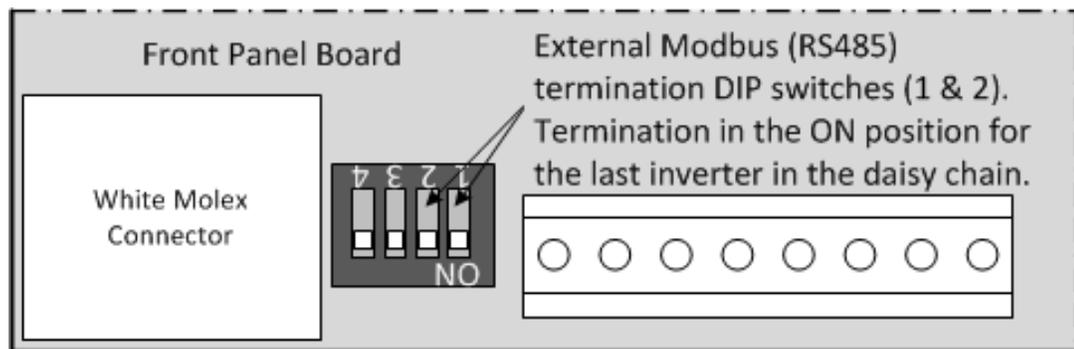


Figure 7.11b – External Modbus (RS-485) Termination Switches 1 and 2 in the OFF Position  
Rev 4 or newer boards.

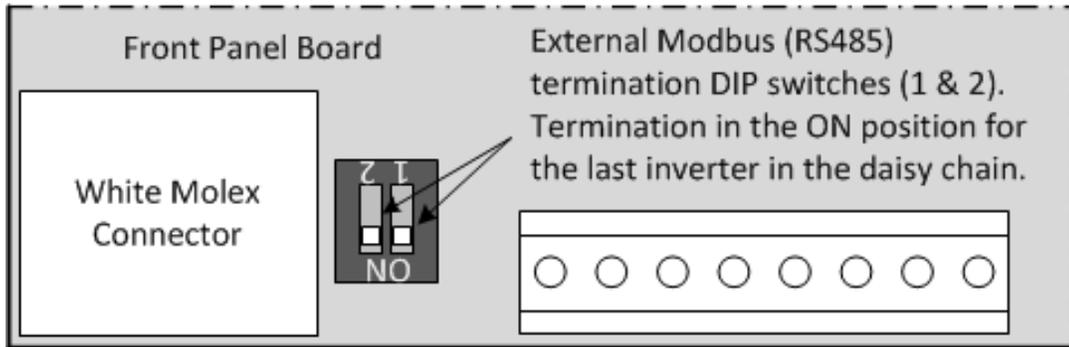
If the inverter happens to be the last device in the Modbus (RS-485) daisy chain (where the bus physically ends) the external bus termination has to be turned ON (e.g., Inverter #n in Figure 7.8 above). That is done by pushing DIP switches 1 and 2 towards the edge of the board. Switches 1 and 2 are the two DIP switches that are further away from the white Molex connector, as shown in Figure 7.12.



**NOTE:** It is important that any other device, inverter or other, does not have any termination turned ON, thereby loading down the Modbus (RS-485) bus unless it is the first device on the bus (e.g., the External Data Monitoring System).



**Figure 7.12a– External Modbus (RS-485) Termination Switches 1 and 2 in the ON Position**



**Figure 7.12b– External Modbus (RS-485) Termination Switches 1 and 2 in the ON Position. Rev 4 or newer boards.**

Switches 3 and 4 (closest to the white Molex connector) should be in the ON position towards the edge of the board.

Note: Switches 3 and 4 have been removed from Rev 4 and newer boards and are no longer applicable on rev 4 and newer boards.

See Section 10.29 for information on how to prepare the XTM inverter for Modbus (RS-485) communications.

## 8 Inverter Features and Options

### 8.1 DC Ground Fault Detection and Interruption

The DC grounded connections are internally bonded to the ground system through the DC Ground Fault Detection and Interruption (GFDI) circuit. When a single ground fault on an ungrounded circuit exceeding the pickup value is present in the PV array or in the DC wiring to the inverter, the internal DC GFDI breaker will trip and a ground fault will be signaled by means of a set of yellow LEDs and a message on the UI.



**WARNING:** The DC grounded connections must not be bonded to the ground system at any point outside of the inverter. This bond is made in the GFDI circuit that is integral to the inverter.



**WARNING:** In the event of a DC ground fault indication, normally grounded conductors and equipment may be energized and may pose a significant shock and/or fire hazard. DO NOT TOUCH any equipment including, but not limited to: the inverter, the PV array disconnects, the PV array combiners, the PV panels or the PV racking system. The source of the ground fault must be located and eliminated by qualified personnel before proceeding.

The GFDI breaker is located inside the inverter, on the left side, as shown in the figure below.

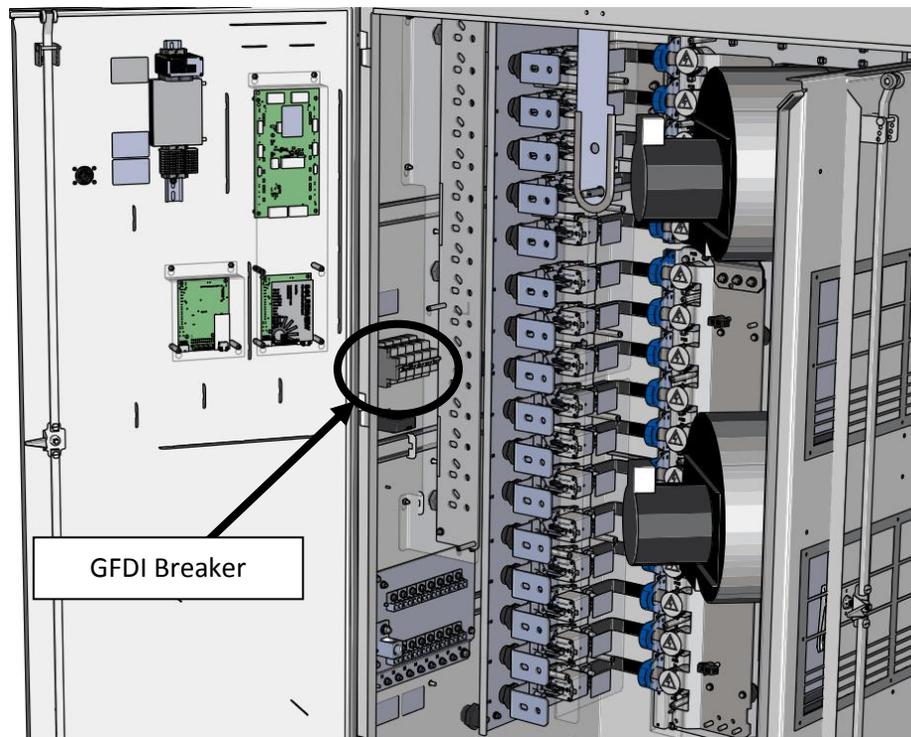


Figure 8.1 – Location of GFDI Breaker

Once the ground fault has been found and eliminated, the GFDI breaker can be re-engaged. To re-engage the breaker, push the tie bar on the breaker all the way down, and then firmly engage it by pushing the tie bar up, as shown in the figure below.



**CAUTION:** Even when the inverter's DC disconnect is in the OFF position, the ungrounded DC conductors leading up to the DC disconnect will remain live as long as the PV modules are in daylight. The inverter side of the DC disconnect will remain live as long as AC voltage is available to the inverter.



**CAUTION:** In the event of a ground fault, normally grounded conductors and equipment may be energized and may pose a significant shock and/or fire hazard.



**WARNING:** Only operate the GFDI breaker in the middle of the tie bar. Operating the GFDI breaker by one end of the tie bar could cause damage to the GFDI breaker.

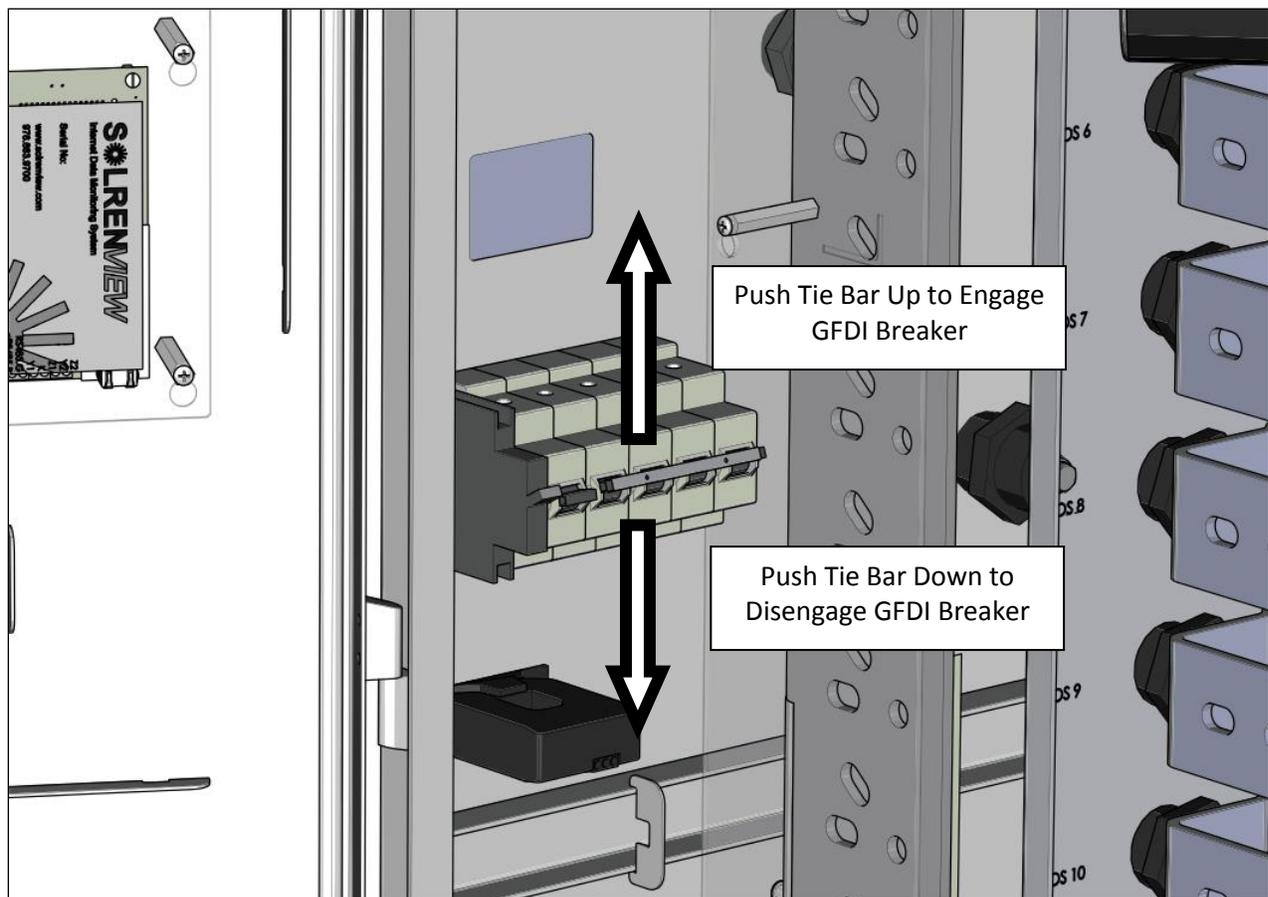


Figure 8.2 – GFDI Breaker Operating Positions

## 8.2 AC Ground Fault Detection

The SGI XTM series of inverters are not equipped with AC ground fault protection. Refer to local electrical codes for requirements related to AC ground fault protection for interconnected devices.

## 8.3 DC Input Voltage Check

The inverter is equipped with a circuit to test for the correct polarity and the presence of a minimum voltage on the DC inputs prior to startup. The inverter performs this check on inputs 1 and 2, which are the topmost inputs in either the fuse DC subcombiner or the breaker DC subcombiner.

In order to pass the polarity check, both inputs 1 and 2 must be wired correctly so that the positive conductor is wired to the fuse or breaker input and the negative conductor is wired to the large busbar. This represents a negative ground configuration, and is the only configuration supported by the SGI XTM series of inverters. If either of the inputs fails this check, the inverter will not start until the condition is resolved.



**NOTE:** Positive ground configurations are not supported by the SGI XTM series of inverters.

For the minimum voltage check, either input 1 or 2 must measure at least 540VDC. If both inputs are below this threshold, the inverter will not start until the condition is resolved.

## 8.4 Lightning and Surge Protection

The SGI XTM series is equipped with an IEC 60364-7-712 rated Surge Protective Device (SPD) connected to the DC input. Each SPD contains three inserts. Should one of these inserts expire, a red indicator flag will signal the insert requiring replacement. Contact Solectria Renewables Customer Support for further evaluation. The inverter will continue to output power even if the SPD inserts are expired.

## 8.5 Stainless Steel Enclosure (Optional)

The stainless steel option is best for installation in harsh or marine environments. It houses the power stage system components in a 316-grade stainless steel enclosure for increased corrosion protection. In addition, all aluminum parts on the outside of the enclosure have a black anodized finish.

### 8.6 Intake Air Filter (Optional)

The intake air filter option is comprised of upgraded air intake housings that each accepts a 20in x 20in filter. Three different filters are available with the option. For the lightest-duty filtering environments and the longest time between cleanings, an economy aluminum mesh filter is available. For medium-duty filtering environments and moderate time between cleanings, an electrostatic MERV 6 filter is available with a peak arrestance of 82%. For the heaviest-duty filtering environments and the shortest time between cleanings, a premium electrostatic filter is available with a MERV 8 rating and a peak arrestance of 94%.



Figure 8.3 – SGI 750XTM with Optional Air Filters

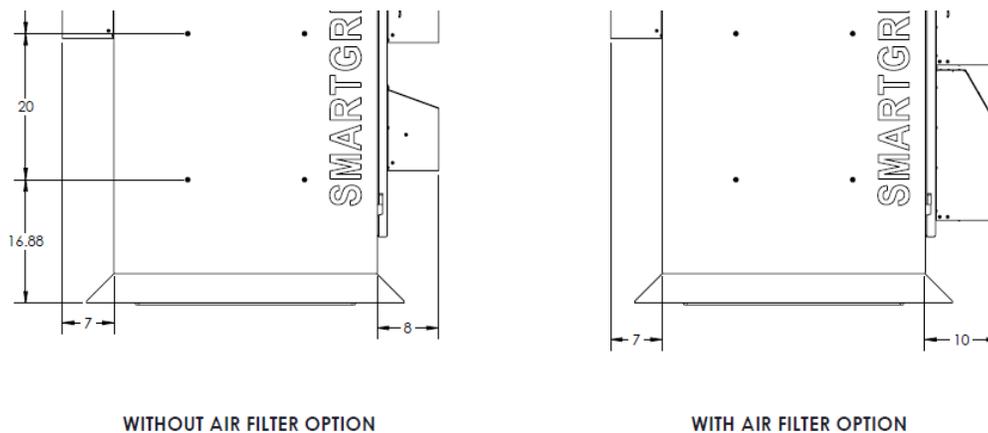


Figure 8.4 – Dimensions With and Without Air Filter Option

It is recommended to inspect and clean the filters monthly for the first year of operation and adjust the maintenance schedule as necessary (see Section 12.7 for cleaning instructions).



**NOTE:** Failure to clean the filters on a timely basis will result in reduced airflow to the inverter, possibly resulting in the inverter going into a protective mode with reduced power output.

## 8.7 Residual Current Monitor (Optional)

The Residual Current Monitor (RCM) option is comprised of a digital ground fault monitor and relay integrated into the inverter. This system does not take the place of the inverter's ground fault detection and interruption system, but acts as a supplementary system to provide greater advanced warning into issues developing in the modules and array wiring.

A special current transducer is installed around both the DC positive and negative busbars at a point within the inverter after the internal subcombiner. It measures the difference between the currents in the positive and negative busbars and sends that differential measurement to the monitor. If the differential measurement is greater than the preset trip level within the monitor, the monitor will trigger an alarm and switch its relay. This alarm is sent to the inverter via the internal wiring as well as to a set of terminal blocks on the door of the inverter. The terminal blocks allow for a customer connection that can be used to monitor the state of the RCM. See Section 7.1 for terminal block connection information.

When the RCM triggers an alarm, the inverter can be set to react in several ways. It can be set to an alarm-only mode where the inverter sets an internal alarm but does not stop exporting power; a mode where the inverter will fault and stop exporting power; or it can be disabled.

## 8.8 AC Power and Current Limiting

The standard inverter configuration operates as a current limited device. The AC output current limit is set to equate to nameplate power at nominal AC voltage. The current limit is not modified up or down to maintain rated power level as AC voltages change from nominal. If the grid AC voltage is below nominal the inverter will not provide full power. If the grid AC voltage is above nominal the inverter is capable of outputting more than its nameplate power rating.

Power limiting is an AC voltage-driven inverter function that occurs when the AC voltage is higher than nominal. As AC voltage increases the current limit decreases to maintain nameplate power. If AC voltage is below nominal the AC current limit does not change.

Either of these functions can be configured (see Section 10.13 for instructions). See Figure 14.3 for an explanation of both functions' behaviors.

## 8.9 Temporary Current Limiting

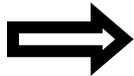
This function is used to temporarily override the standard system configuration. Adjustment is made in the form of a percentage and is set independently of the permanent limits via Modbus or through the UI. Refer to Section 10.12 for instructions on setting this function. As soon as the new current limit is set, the inverter will ramp to the new value.



**NOTE:** This limit will be reset if the system power is power cycled for any reason or if the system experiences certain fault conditions. The limit does not get reset if the inverter is stopped using the UI.

## 8.10 Power Factor Control Function

The power factor control function can be used to regulate AC voltage fluctuations at the PV inverter output caused by the changes in power generation. For this reason, many utility companies use this feature to mitigate cloud induced AC voltage transients. Typical power factor control range for voltage control will be between -0.95 and -0.98.



**NOTE:** The max power factor control range is from -0.8 to +0.8.

A positive power factor will produce reactive power supplied to the distribution network and can be used to increase the feeder voltage when the feeder experiences low voltage caused by heavy loading or fault. More commonly, a negative power factor will absorb reactive power from the distribution network and can be used to decrease the feeder voltage when it experiences high voltage due to light loading or high power generation.

The power factor is the ratio of real power to apparent power. The inverter's apparent power is limited to its kVA rating in order to protect the inverter components. Because of this, the inverter can generate its rated kW only when the power factor is unity (1.0). When the power factor command is other than unity, the inverter will automatically curtail the output generation level in order for the apparent power not to exceed its kVA rating and meet the required power factor setting.

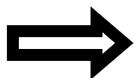


**EXAMPLE:** When the power factor command is 0.95 for the SGI 750XTM unit, reactive power is generated to meet the power factor command in proportion to the real power generation and therefore the real power generation cannot exceed  $750\text{kW} \times 0.95 = 712.5\text{kW}$  open through the available DC power may be more than 750kW.

For instructions on setting the power factor, see Section 10.14.



**NOTE:** The power factor control will not influence the protective functions of the inverter. The power factor will, however, work with the power curtailment function. In which case, the maximum generated real power is limited by the power curtailment function setting.



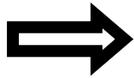
**NOTE:** The power factor setting relates to the power factor at the output of the inverter and may not represent the power factor on the utility. The power factor should be independently verified to ensure it is meeting the intended level.

## 8.11 Revenue Grade Meter (Optional)

The SolrenView Revenue Grade Meter is a factory-integrated, Revenue Grade metering device that measures power and energy production at the AC output of the inverter and can be monitored through SolrenView monitoring services.

### 8.12 Auxiliary Power Outlet (Optional)

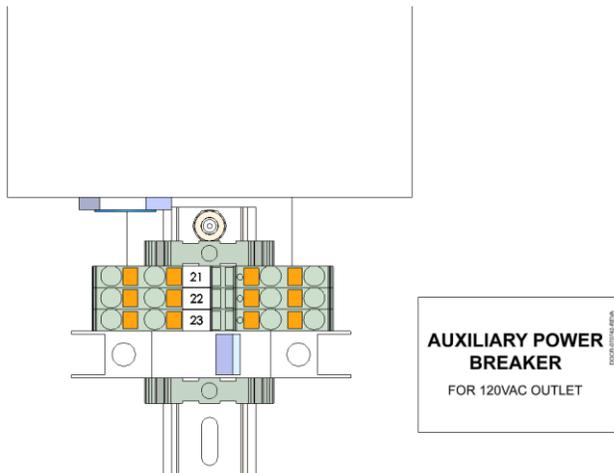
When this option is ordered, a 120VAC outlet is installed on the bottom left wall inside the inverter. The outlet is rated for 20A. This outlet can be used to power permanent fixtures, such as a weather station, through a conduit into the inverter or more temporary solutions, such as charging a power tool while onsite, through the test portal located on the floor of the inverter. The maximum power draw available through this outlet is 1800W. A 20A breaker is located below the transformer should the power drawn exceed 1800W.



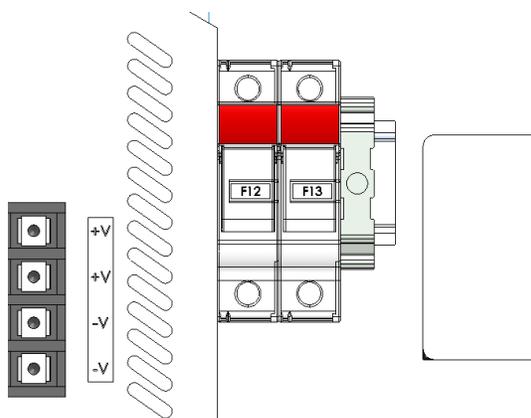
**Note:** The DC disconnect must be in the off position to open the cabinet doors to access the outlet.



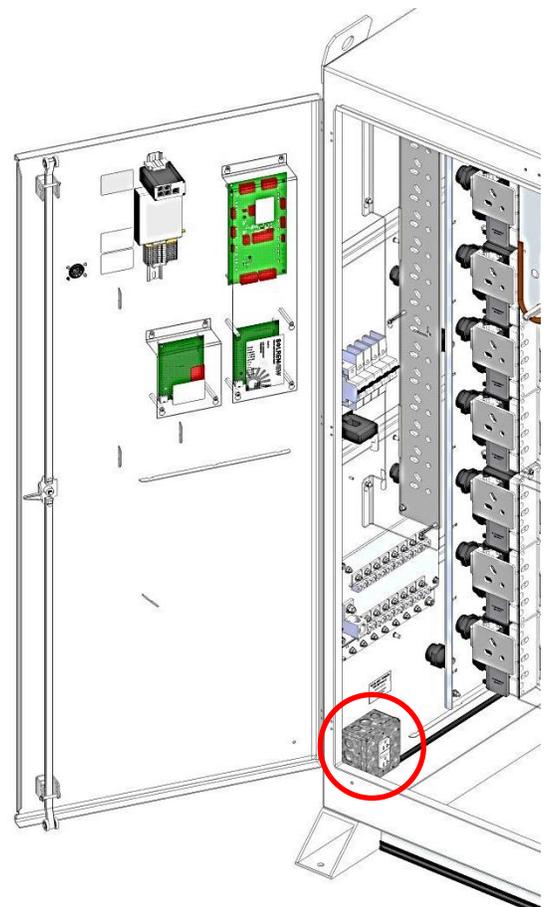
**Note:** Selecting this option could negatively affect the overall CEC efficiency of the inverter. The option may draw up to 1940W from the 380VAC service. The idle loss of this option is approximately 45W (while this option is not in use, the customer may remove the two 8A fuses shown below to avoid energy loss).



**Figure 8.5 – Location of 20A Breaker (On Inside Right Cabinet Wall)**

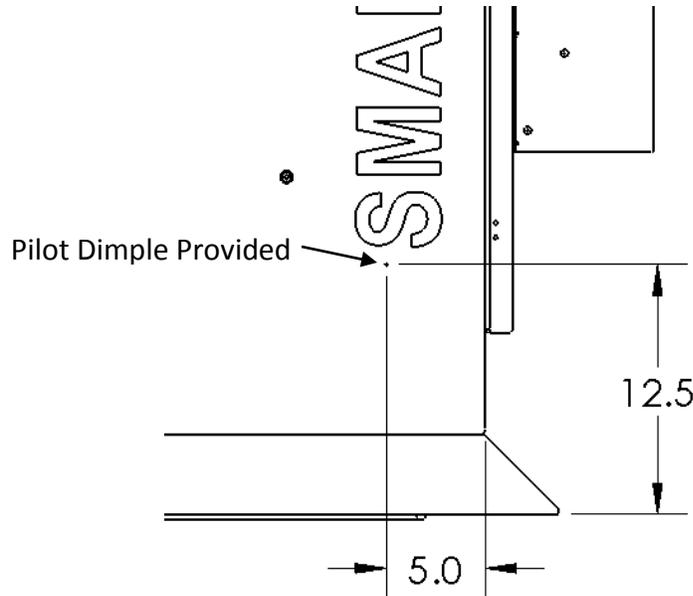


**Figure 8.6 – Location of 8A Fuses from 380VAC Bus (On AC Front Panel in Right Side of Cabinet)**



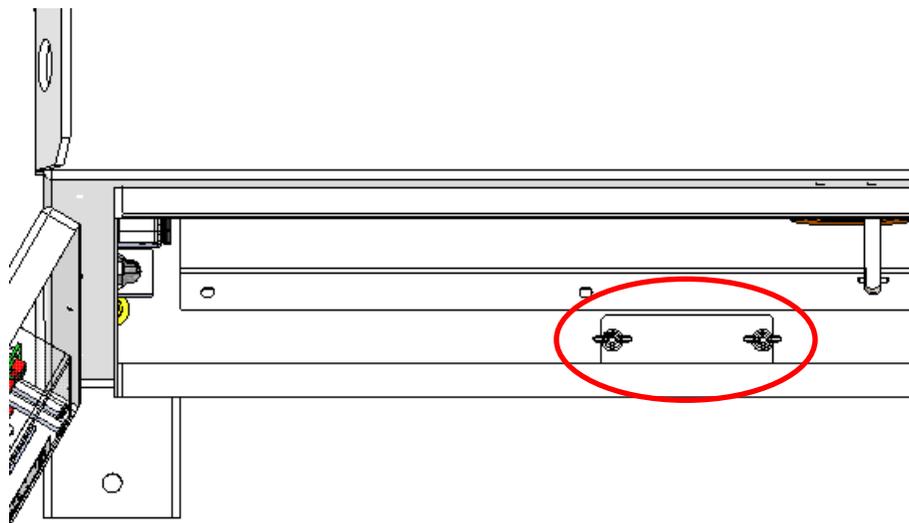
**Figure 8.7 – Auxiliary Outlet in XTM Inverter**

The following figures show the area for conduit entry for permanent fixtures and the portal that would be used for temporary usage. The maximum conduit size for the use of auxiliary outlet is 1-inch trade size. A listed, water-tight (Type 4) fitting must be used.



**Figure 8.8 – Conduit Entry Location on Left Wall for Auxiliary Power Outlet**

To access this portal for temporary usage, unscrew the two wing nuts and remove the plate. When finished using the outlet, replace the plate back over the portal and secure with the wing nuts.



**Figure 8.9 – Portal on Inverter Floor for Temporary Connections**

## 9 SolrenView™ Options and Features

The SGI XTM series of inverters provides a Modbus (RS-485) interface that can be utilized to connect external data monitoring systems to the inverter. The external data monitoring systems can access inverter data such as AC voltage, DC voltage, power, and energy production. This is included with every unit.

### 9.1 Inverter Direct Monitoring (Optional)

SolrenView optional web-based monitoring provides PV system owners with a highly accurate, real time monitoring solution to maximize the efficiency and profitability of their solar assets. The complete SolrenView DAS for the SGI XTM inverter features inverter direct monitoring, revenue grade monitoring, agency reporting, SolZone™ sub-array current monitoring, XML feed, kiosk view and weather station monitoring. Alarms and alert messages can be sent via email or text for quick response to abnormal conditions.

The DAS connects to the internet using an Ethernet broadband connection through the site supplied connection to a router. For sites with multiple inverters each inverter requires an Ethernet connection.

### 9.2 SolrenView AIR Monitoring (Optional)

SolrenView AIR allows customers to take advantage of SolrenView web-based monitoring features when standard internet access is not readily available or in environments where network security is critical. The SolrenView DAS provides data to the fully-integrated cellular modem over the 3G cellular network. Remote solar fields, banks, government, schools, and agricultural locations are a few examples where a cellular link is preferred.

If you have purchased the 3G cellular SolrenView AIR monitoring option, all of the hardware will be installed in the inverter and configured at the factory. The inverter will begin to report to the SolrenView server as soon as the inverter is commissioned with AC and DC power and a cellular signal is present. No additional installation or configuration steps or external power supplies are necessary. SolrenView AIR 3G cellular service is provided by Verizon Wireless and is available in their network coverage areas. It is recommended to verify if service is available in the intended location before purchasing this option.

### 9.3 SolrenView AIR Multi-port (Optional)

Inverters Equipped with the SolrenView AIR multi-port option include an Ethernet switch integrated into the inverter. One port is pre-wired to the SolrenView AIR Modem and a second port is pre-wired to the SolrenView DAS in the inverter. This leaves available ports for any other SolrenView device, such as an inverter data acquisition device or weather station. The multi-port option is only for use with SolrenView monitoring devices. The customer is responsible for connecting devices to the Ethernet switch.

#### **9.4 SolrenView SolZone™ (Optional)**

SolZone sub-array monitoring provides customers an extra level of granularity to view zone-by-zone production performance. SolZone compares DC currents of individual PV array zones against each other, allowing for the detection of underperforming strings via a web browser. It also detects partial shading so that customers may evaluate how to improve their PV array output. SolZone is also compatible with many external data monitoring systems.

This option includes up to 16 factory installed Current Transformers (CTs) on the inverter's DC inputs. The number of CTs will match the number of inputs on the DC combiner. The CTs measure the DC current from each of the array zones included in the DC combiner. The SolrenView DAS will collect the data from each of the CTs and will provide the data for SolrenView web-based monitoring or for 3<sup>rd</sup> party monitoring via Modbus. Each CT is rated to measure up to 300ADC.

#### **9.5 SolrenView Revenue Grade Monitoring (Optional)**

The SolrenView Revenue Grade Monitoring option keeps track of lifetime energy produced by a customer's PV system. The Revenue Grade Monitoring option can be purchased by itself or in addition to Inverter Direct Monitoring. In addition to the monitoring service, the Revenue Grade Meter option must also be purchased.

#### **9.6 Agency Reporting (Optional)**

Solectria Renewables may also report the revenue grade totals to certain agencies for net metering reimbursement; this is an additional option if a customer chooses.

## 10 Inverter Control and Communications

Every Solectria Renewables commercial and utility-scale inverter includes a SolrenView™ DAS integrated into the inverter door. This device performs multiple functions including control, monitoring, data logging, and communications between the inverter and the outside world.

A user can configure, monitor, and control the inverter using the UI mounted on the front door. The UI consists of the display, with four buttons and three sets of LED indicators for power, ground fault, and error indication.

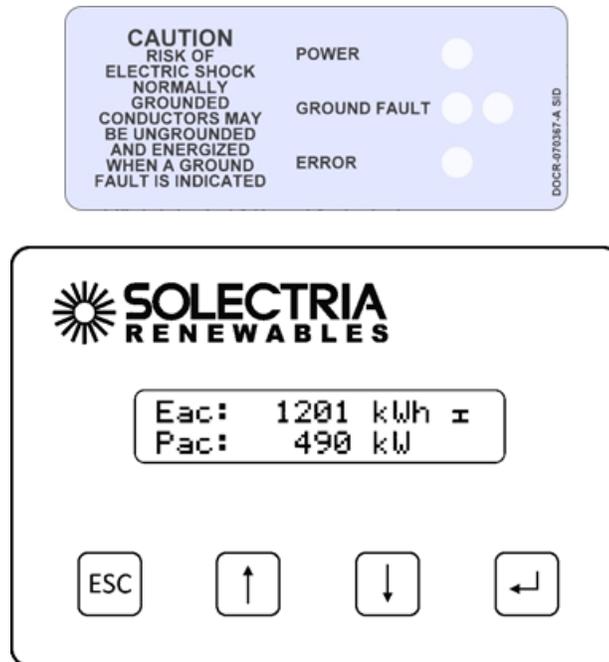
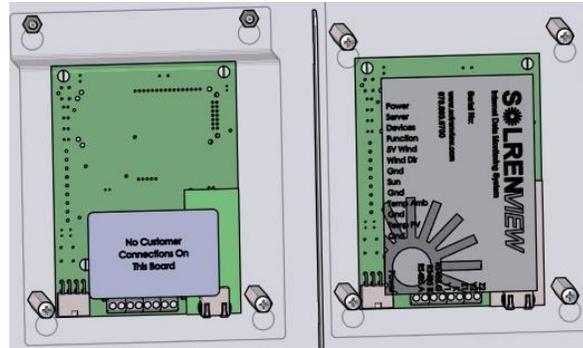


Figure 10.1 – SolrenView UI (Front)

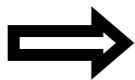
The SolrenView DAS, located on the back side of the UI (which can only be physically accessed when the inverter door is open), provides connectivity to the data monitoring system.



**WARNING:** SolrenView DAS connections must be made by qualified personnel only. To reduce the risk of electric shock, you should never attempt to open the inverter, DC, or AC enclosure doors, or perform any service or troubleshooting without prior training. Before attempting to service or troubleshoot the inverter, please read the entire manual.



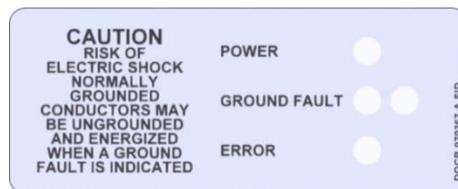
**Figure 10.2 – SolrenView DAS: Data Monitoring Connectivity (Right);  
Optional SolZone™ Board for Zones 9 to 16 (Left)**



**NOTE:** When the SolZone option is purchased and the DC combiner has more than 8 inputs, a second board will be installed to monitor the additional DC currents. The second board does not have any connections for the customer.

### 10.1 LED Indicators

The LED indicators mounted on the inverter enclosure just above the UI give the installer and user a quick look at inverter status and if it is operating normally.



**Figure 10.1 – LED Indicators**

#### Power – Green:

Solid green means the unit is outputting power and running normally. Flashing green is an indicator of other states and does not include abnormal operation.

#### Ground Fault – Yellow:

Indicates that a ground fault in the PV array has been detected and it must be located and repaired before the inverter will function again. Two LEDs are included for redundancy. If one of the LEDs fails, a second LED will still illuminate (see Section 8.1).



**WARNING:** If the Yellow Ground Fault indicator is lit then normally grounded conductors may be ungrounded and energized. Do not touch the inverter as there is a risk of electrical shock.

#### Error – Red:

The inverter is not providing power due to an error or fault. The Red LED also turns on if the inverter is shut down using the keypad.

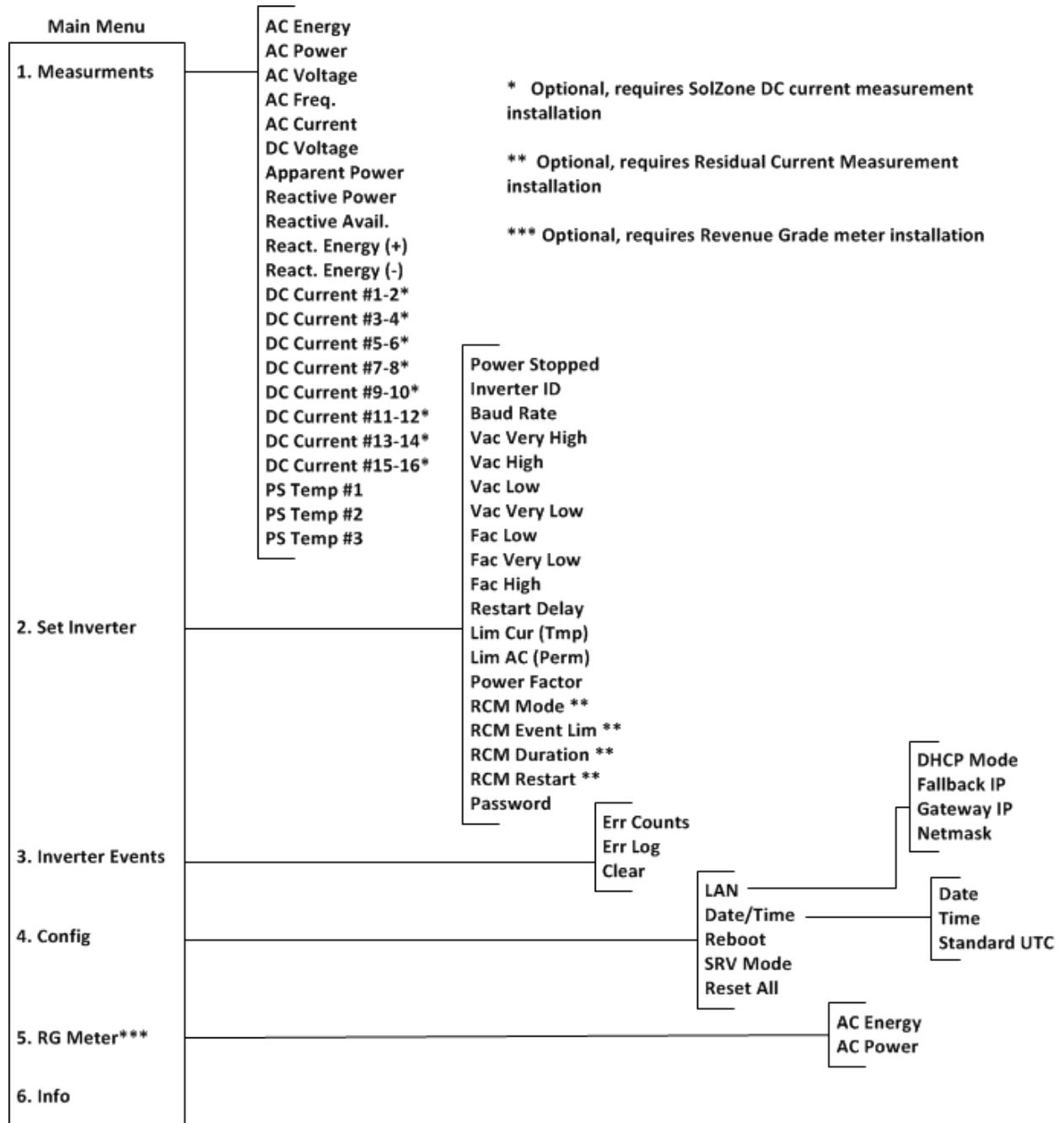
## 10.2 Button Descriptions

The UI is controlled by four buttons that are integrated into the inverter door. These buttons are operated by momentarily pushing the center of the button.

The buttons perform the following functions:

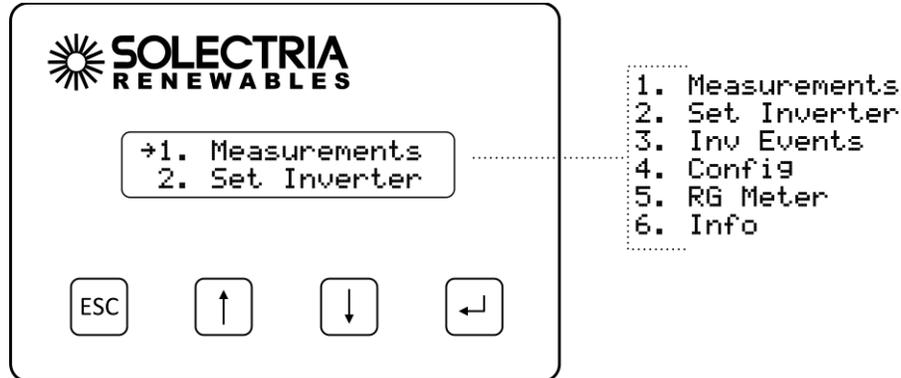
<b>ESCAPE</b>		To move up a level from the current menu. To cancel changing a data value. Hold for two seconds to STOP or START the inverter.
<b>UP</b>		To scroll up within the individual menu items. To increase a data value.
<b>DOWN</b>		To scroll down within the individual menu items. To decrease a data value.
<b>ENTER</b>		To enter into the selected menu. To begin to edit a data value. To accept a data value.

### 10.3 User Interface Menu Structure

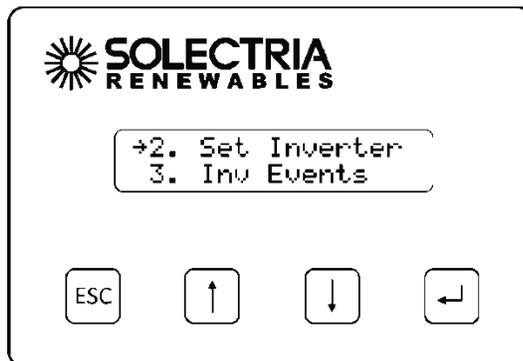


### 10.4 Navigating the Menu Structure

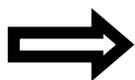
The **Main Menu** allows the user to configure, monitor, and control inverter functions. The selected menu option is shown with an arrow on the left. Please note that the display only shows two menu options at a time and will scroll to show the other options.



Press the **DOWN** or **UP** button to change the selected menu option, as indicated by the arrow. Note that the Revenue Grade Meter is optional and the “RG Meter” menu option appears only when one has been installed.



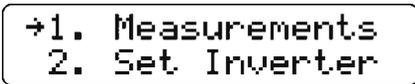
Press the **ENTER** button to activate the selected function or submenu.



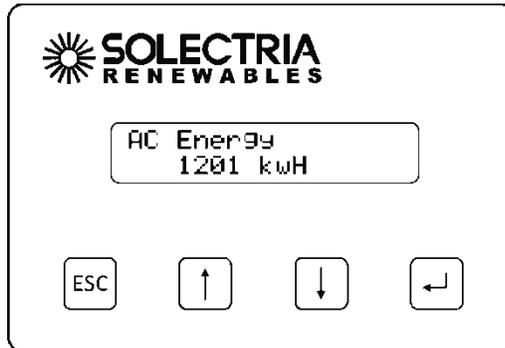
**NOTE:** All menus wrap around. Pressing the **UP** button when at the top of a menu will select the bottom-most menu option. Pressing the **DOWN** button when at the bottom of a menu will select the top-most menu option.

### 10.5 Displaying Inverter Measurements

From the **Main Menu**, select the **Measurements** function and then press the **ENTER** button.

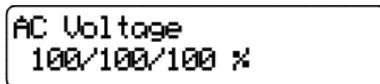


The display will show the AC Energy readout:



Press the **DOWN** or **UP** buttons to display different measurement values. Press the **ESCAPE** button to return to the **Main Menu**.

### 10.6 Typical AC Voltage Measurement



The AC Voltage reading is displayed for the 3 phases as a % value of the inverter specified nominal output voltage (380 VAC). They are listed in “A-B, B-C, C-A” order.

### 10.7 Available Measurements

The DC current measurements are only available if the SolZone option is installed. The following table summarizes the measurements available:

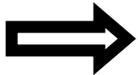
Measurement	Description
-------------	-------------

AC Energy	<i>Cumulative AC Energy (kWh)</i>
AC Power	<i>AC Power output (W)</i>
AC Voltage	<i>AC Voltage, Three-phase (% of Nominal Output Voltage)</i>
AC Freq.	<i>AC Frequency (Hz)</i>
AC Current	<i>AC Current, Three-phase average (A)</i>
DC Voltage	<i>DC Voltage (V)</i>
Apparent Power	<i>Apparent AC Power output (VA)</i>
Reactive Power	<i>Reactive AC Power output (VAr)</i>
Reactive Avail	<i>Available Reactive AC Power output (Var)</i>
React. Energy (+)	<i>Cumulative reactive energy generated (kVArh)</i>
React. Energy (-)	<i>Cumulative reactive energy received (kVArh)</i>
DC Current #1-2	<i>DC Current (A) #1-2 (Only available with 8-zone or 16-zone)</i>
DC Current #3-4	<i>DC Current (A) #3-4 (Only available with 8-zone or 16-zone)</i>
DC Current #5-6	<i>DC Current (A) #5-6 (Only available with 8-zone or 16-zone)</i>
DC Current #7-8	<i>DC Current (A) #7-8 (Only available with 8-zone or 16-zone)</i>
DC Current #9-10	<i>DC Current (A) #9-10 (Only available with 16-zone SolZone)</i>
DC Current #11-12	<i>DC Current (A) #11-12 (Only available with 16-zone SolZone)</i>
DC Current #13-14	<i>DC Current (A) #13-14 (Only available with 16-zone SolZone)</i>
DC Current #15-16	<i>DC Current (A) #15-16 (Only available with 16-zone SolZone)</i>
PS Temp #1	<i>Power Stage Temperatures ( °C)</i>
PS Temp #2	<i>Power Stage Temperatures ( °C)</i>
PS Temp #3	<i>Power Stage Temperatures ( °C)</i>

**Table 10.1 – Available Measurements**



**NOTE:** DC Currents 1-16 are only available if the SolZone sub-array monitoring option is installed.



**NOTE:** The DC current number aligns to the customer input number on the DC combiner.



**NOTE:** Data for measurements is only available when the inverter is operating.

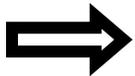
### 10.8 Modification of Inverter Settings

Many inverter functions can be controlled through the UI under the **Set Inverter** menu option. External data monitoring system Modbus (RS-485) settings can be viewed and modified, including inverter ID and Baud Rate. Inverter AC voltage and frequency trip settings can be viewed and modified as well.

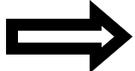
The following table summarizes the Set Inverter menu options:

Menu Item	Description
Power Stopped	Temporarily disables the AC output of the inverter.
Inverter ID	Inverter Modbus (RS-485).
Baud Rate	Inverter Modbus (RS-485) baud rate (19200 or 9600).
Vac Very High	AC Voltage Critical High Trip Setting.
Vac High	AC Voltage High Trip Settings.
Vac Low	AC Voltage Low Trip Settings.
Vac Very Low	AC Voltage Critical Low Trip Setting.
Fac Low	AC Frequency Low Trip Setting.
Fac Very Low	AC Frequency Critical Low Trip Setting (Not Adjustable).
Fac High	AC Frequency High Trip Setting (Not Adjustable).
Restart Delay	UL Reconnect wait time in minutes/seconds.
Lim Cur (Tmp)	Temporary AC Current Curtailment (%).
Lim AC (Perm)	Permanent AC Output Limit (%) Power or Current.
Power Factor	Power Factor Set Point.
RCM Mode*	Specifies how Residual Current Measurement (RCM) functions (Not Installed, Not Enabled, Warning Only, Shutdown).
RCM Event Lim*	Number of RCM Events before an RCM Fault is generated.
RCM Duration*	Minimum duration (MM:SS:MSEC) of RCM Events before RCM Fault is issued.
RCM Restart*	Number of RCM faults before the inverter will stop functioning without human intervention.
Password	4-digit pin code to protect settings.

**Table 10.2 – Set Inverter Menu Options**



**NOTE:** Data for many functions is only available when inverter is operating.

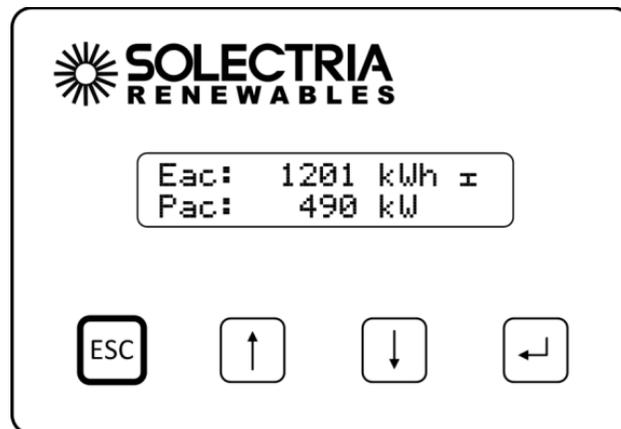


**NOTE:** (\*) These menu items are optional and require the installation of Residual Current Measurement.

### 10.9 Stopping and Starting the Inverter



**WARNING:** Before conducting any maintenance or service on the system, the inverter disconnect switches must be set to the OFF position, all sources of energy that connect to the inverter must be disconnected and locked out, and the absence of voltage must be verified by qualified personnel. Do not rely on the front panel UI functions to stop the inverter, as a reset might cause it to start unexpectedly.



When shutting off the inverter for maintenance or non-emergency it is best to use the soft shutdown. This is activated by pressing and hold down the **ESCAPE** button for two seconds to **temporarily stop** the inverter if it is running. Then open the DC and AC disconnects to remove power to the inverter. Likewise, hold down the **ESCAPE** button for two seconds **to initiate the inverter starting** if it is stopped.

Alternatively, the inverter can be started and temporarily stopped by walking through the **Set Inverter** menu to turn the inverter on or off.



**NOTE:** The inverter will be restart if the system power is cycled for any reason, if the system experiences certain fault conditions, or if it has been in that state for 8 hours.

1. From the **Main Menu**, select the **Set Inverter** function and then press the **ENTER** button.

```
→2. Set Inverter
   3. Inv Events
```

2. The **Power Stopped** status will be displayed, indicating the current (**Yes** or **No**) status.

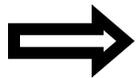
```
1. Power Stopped:
→No
```

3. Press the **ENTER** button. The display prompt will change to **Power Stop** and the setting can be modified. Press the **DOWN** button to change the setting to **Yes**.

```
Power Stop:
Yes
```

4. Press the **ENTER** button to accept the setting, causing the inverter to shut down.

```
Power
Stopping...
```



**NOTE:** To start the inverter, change the **Power Stop** setting in step 3 to **No** instead of **Yes**.



**NOTE:** The inverter will be restarted if the system power is cycled for any reason, if the system experiences certain fault conditions, or if it has been in that state for 8 hours.

### 10.10 Accessing Password Protected Functions

Certain menu functions can only be accessed after the four digit password (or PIN) is entered through the UI.

1. Select the **Set Inverter** submenu from the **Main Menu**.

```
→2. Set Inverter
3. Inv Events
```

2. Select the **Password** function at the bottom of the **Set Inverter** submenu.

```
19.Password
```



**NOTE:** This option can quickly be accessed by pressing the **UP** button from the top of the **Set Inverter** submenu, as the menu wraps around.

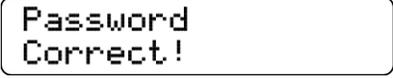
3. The **Password** screen will appear.

```
19.Password
->*****
```

4. Press the **ENTER** button to begin entering the default password (PIN).

```
Enter PIN#:
*****
```

- Specify each of the four PIN digits one at a time. Press the **UP** button to increment the digit. Press the **DOWN** button to decrement the digit. Press the **ENTER** button to accept the digit. Press the **ESCAPE** button to cancel PIN entry at any point. When the fourth digit is entered the PIN entry will be evaluated and the “Password Correct” message will flash if the PIN is verified.

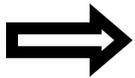


Password  
Correct!

- The **Password** screen will be shown again. Press **ESCAPE** twice to return to the **Main Menu**.

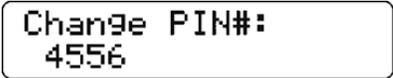
### 10.11 Changing the Inverter Password

The inverter password ensures that unauthorized users are not able to access certain menu functions.



**NOTE:** The default password (0000) should be changed on commissioning. Please use a password that you can easily remember. Solectria Renewables does NOT provide a master password to reset the unit.

- Enter the inverter password (PIN) as shown in Section 10.10.
- Once the current password has successfully been entered, the password can be changed by pressing the **ENTER** button from the **Password** screen. (Second time allows changing the PIN.)



Change PIN#:  
4556

- Specify each of the four password digits one at a time. Press the **UP** button to increment the digit. Press the **DOWN** button to decrement the digit. Press the **ENTER** button to accept the digit. Press the **ESCAPE** button to cancel password entry. When the fourth digit is entered the password entry will be changed.



Updating...

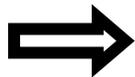
- The **Password** screen will be shown again. Press **ESCAPE** twice to return to the **Main Menu**.

### 10.12 Changing Voltage and Frequency Trip Settings

The inverter is designed to operate within certain voltage and frequency ranges, as specified by the utility. When the inverter senses that the inverter and/or grid are outside any of these ranges, the inverter ceases exporting power. This action is referred to as an “inverter trip.”

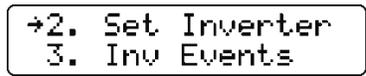
Inverter trip settings that can be reviewed include:

- Vac Very High Voltage
- Vac Very High Trip Time (Not Changeable)
- Vac High Voltage
- Vac High Voltage Trip Time
- Vac Low Voltage
- Vac Low Voltage Trip Time
- Vac Very Low Voltage
- Vac Very Low Voltage Trip Time (Not Changeable)
- Fac Low Frequency
- Fac Low Frequency Trip Time
- Fac Very Low Frequency (Not Changeable)
- Fac Very Low Frequency Trip Time (Not Changeable)
- Fac High Frequency (Not Changeable)

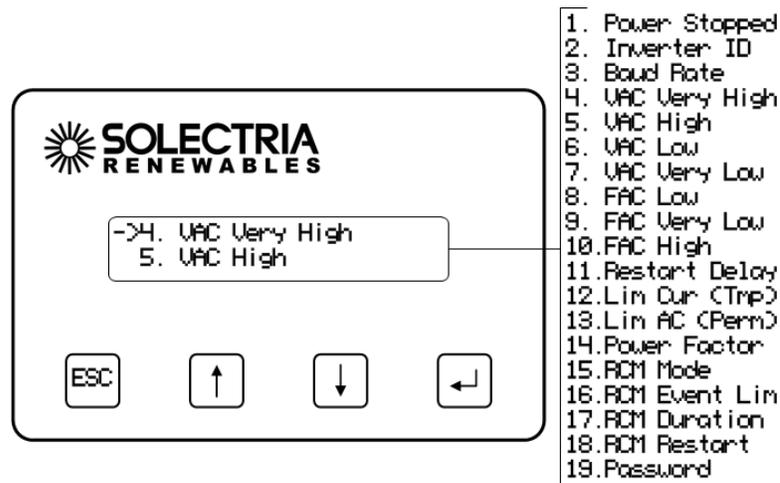


**NOTE:** Prior to changing trip settings, the password must be entered through the UI. See Section 10.10 for details on entering the password.

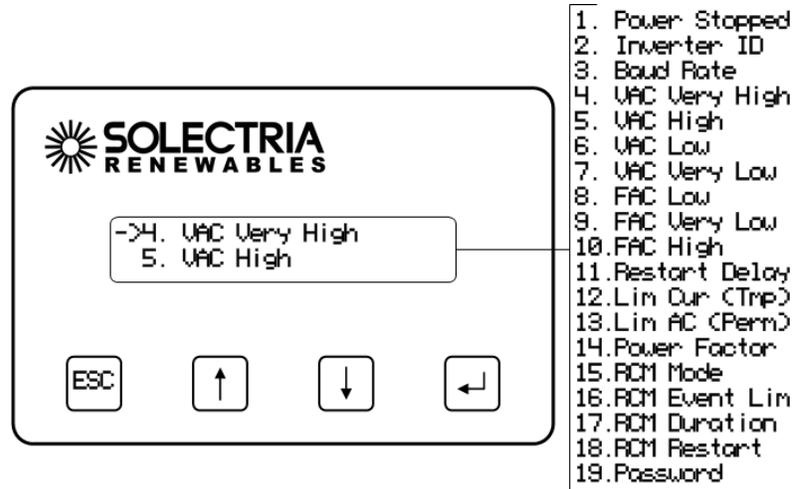
1. To change trip settings, first select **Set Inverter** on the **Main Menu**:



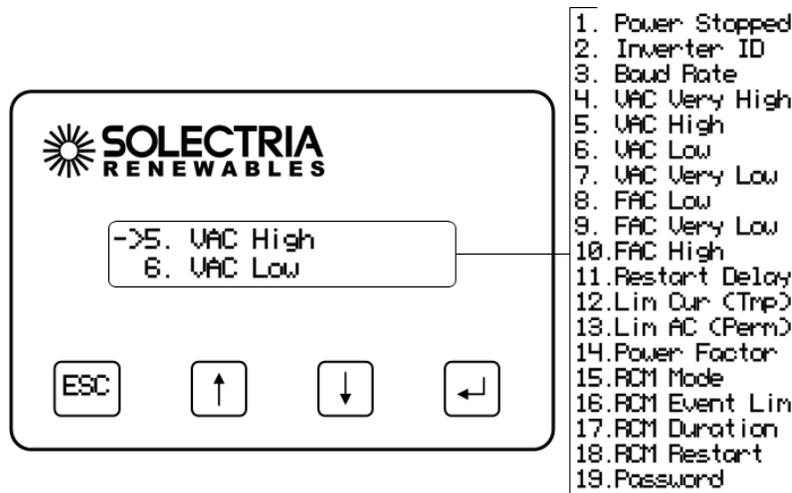
2. Next, select **VAC Very High** function on the **Set Inverter** submenu:



- The **VAC Very High** settings will be displayed. Press **ENTER** to modify the setting. The voltage value will flash, indicating that it can be changed. Press the **DOWN** and **UP** buttons to change the voltage setting. Voltage is entered in V (Volts).



- Press the **ENTER** button to accept the voltage setting change.
- If the trip time is adjustable, it will flash to indicate that it can be changed. Press the **DOWN** and **UP** buttons to change the trip time setting.
- Press the **ENTER** button to accept the trip time setting change.
- Press the **DOWN** button to step to the next trip setting (**VAC High**).



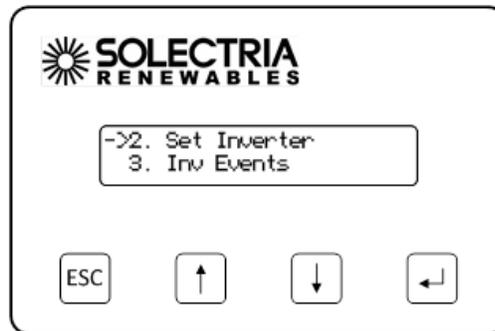
- Repeat steps 3–6 for each trip setting to be modified.

### 10.13 Setting Temporary Current Limit

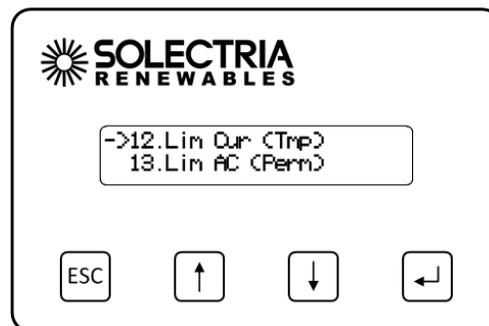
The temporary limit overrides the standard system configuration. If the inverter power is cycled for any reason or if the inverter experiences certain fault conditions the temporary limiting mode will be reset.

To set temporary limiting, use the following instructions:

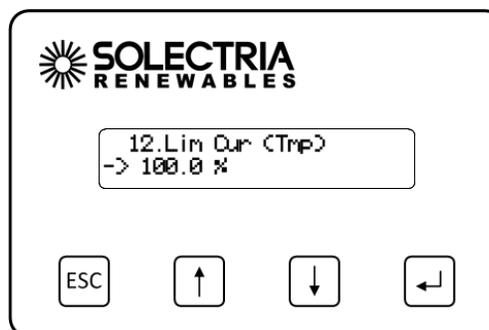
1. Select **Set Inverter** from the **Main Menu**.



2. Select **Lim Cur (TMP)**.



3. Input the desired percentage (%) using the **UP** and **DOWN** arrows.

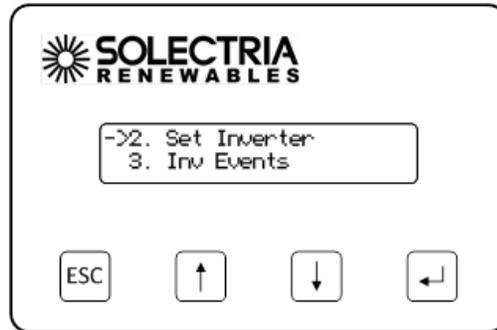


**NOTE:** The adjusted limit will be reset if the system power is cycled for any reason or if the system experiences certain fault conditions.

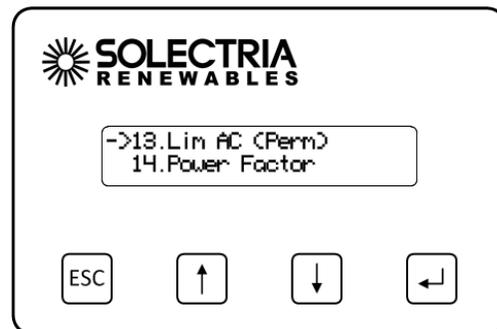
### 10.14 Setting Power and Current Limit

To permanently set either power limit or current limit, use the UI to perform the following actions:

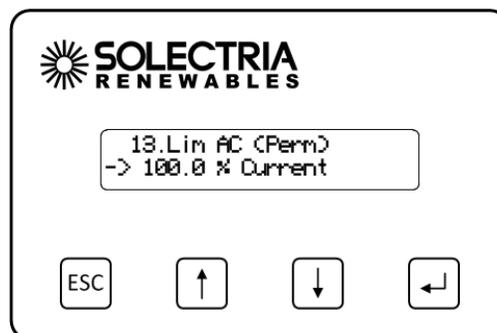
1. Select **Set Inverter** from the **Main Menu**.



2. Select **Lim AC (Perm)**.



3. Use the **UP** and **DOWN** arrows to input the desired percentage (%). Press **ENTER** to accept the limit. Then use the **UP** and **DOWN** arrows to select either **Current** or **Power** limiting.



4. The power to the inverter must be cycled for the new limits to go into effect.

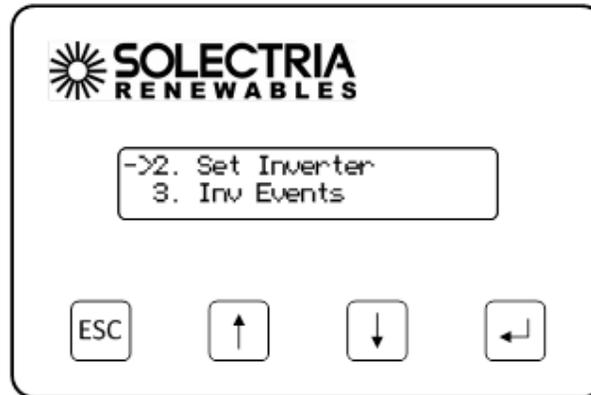


**NOTE:** Power limit and current limit alterations made through the UI are permanent changes to the system configuration.

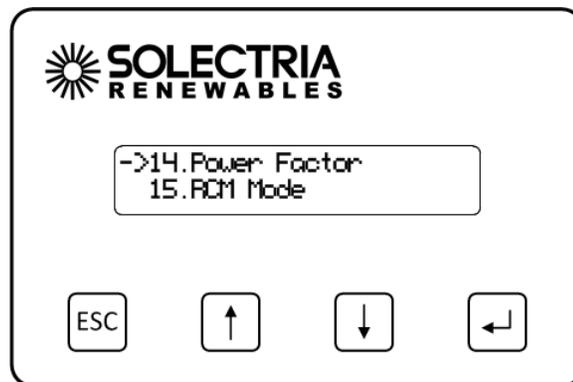
### 10.15 Setting the Power Factor

To set the power factor, use the following steps:

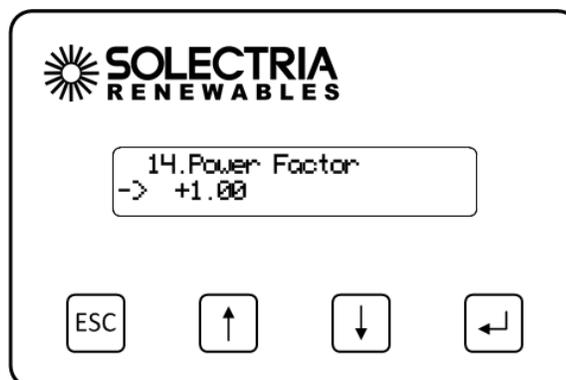
1. Select **Set Inverter** from the **Main Menu**.



2. Select **Power Factor**.



3. Input the desired power factor (first selecting + or -) using the **UP** and **DOWN** arrows. Press **ENTER** to accept and move on.



4. The power to the inverter must be cycled for the new value to go into effect.

### 10.16 Inverter Error Counts and Logs

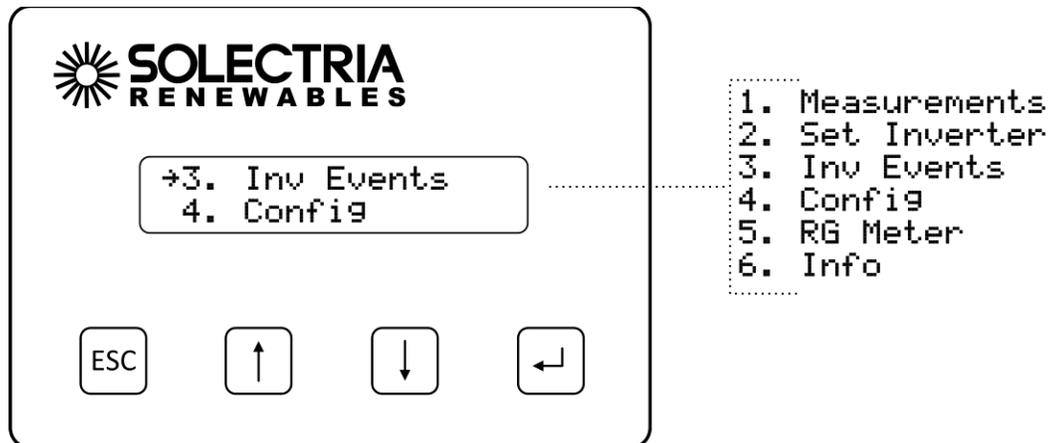
The inverter keeps track of various events and errors through error logging and cumulative counters.

Error logs are a record of events (changes of state), with the earliest event shown first. There are a total of 30 log entries available and newer entries overwrite older entries. Each entry in the log is time stamped in MM/DD/YY format.

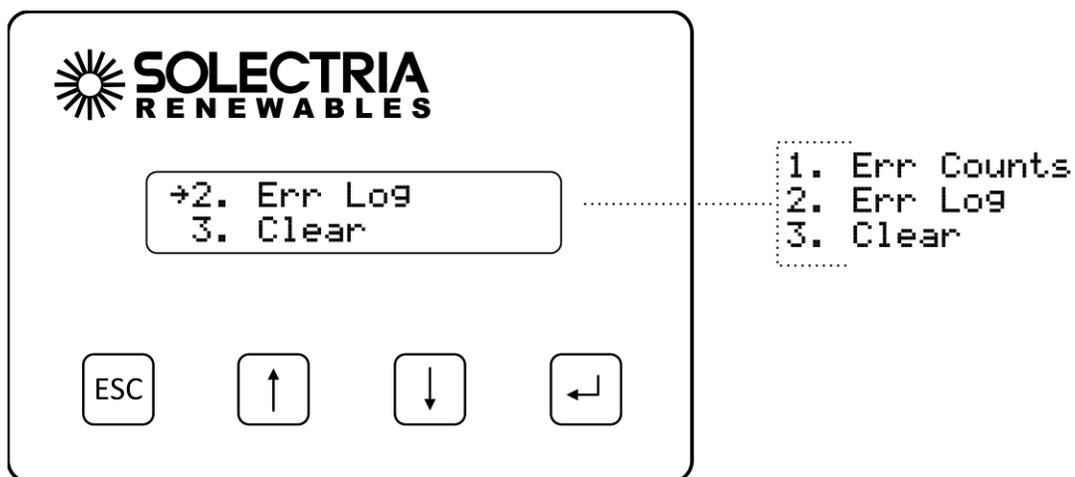
Error counts display cumulative counters for each supported event/error, with the highest error count shown first.

### 10.17 Displaying Error Counts

1. Select **Inv Events** from the **Main Menu** and press **ENTER**.



2. Select **Err Counts** from the **Inv Events Menu** and press **ENTER**.



- The Error Counts are displayed in order of occurrence, with the most frequent error displayed at index position 1. In this example, the most frequent error is Contactor Failure; two contactor fail events were logged with the last one logged on Jan 02, 2013 at 7:12 am.

```
1. 1/02/13 2x
   Contactor Fail
```

```
1. 7:12 am 2x
   Contactor Fail
```

The data format is index number, date/time (switching between date and time) and occurrences on the first line. The second line is the event type.

- Press the **DOWN** button to see the next Error Count entry.
- If no Count data is recorded, the date and time that the Counts were last cleared is displayed.

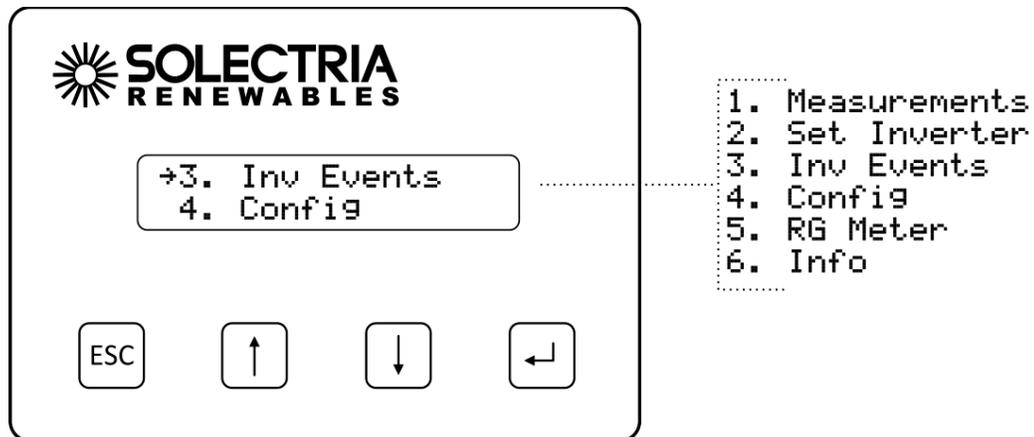
```
Counters cleared
1/01/2013
```

```
Counters cleared
08:15 am
```

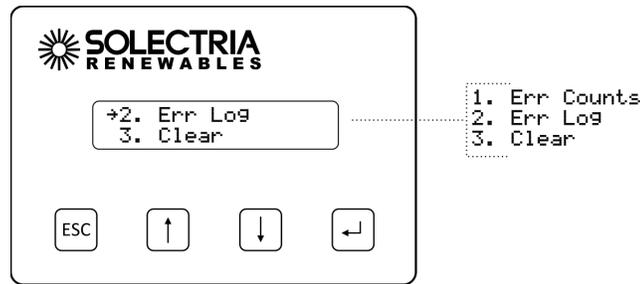
- Press the **ESCAPE** button to return to the **Inv Events** menu.

### 10.18 Displaying Error Logs

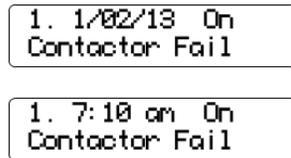
- Select **Inv Events** from the **Main Menu** and press **ENTER**.



- Select **Err Log** from the **Inv Events Menu** and press **ENTER**.

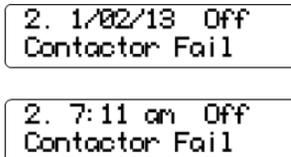


3. The most recent Error Log entries are displayed at index position 1.



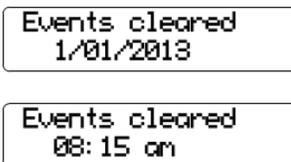
The data format is index number, date/time, and event state on the first line. When the Error is first asserted, the event state is shown as **On**. When the Error ceases the event state is shown as **Off**. The second line is the type of the event.

4. Press the **DOWN** buttons to see the next event stored in the log.

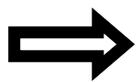


In this example, the inverter asserted a Contactor Fail error on Jan 02, 2013 at 7:10 am and ceased to assert the Contactor Fail error on Jan 02, 2013 at 7:11 am.

5. If no Events are recorded, the date and time that the Events were last cleared is displayed.



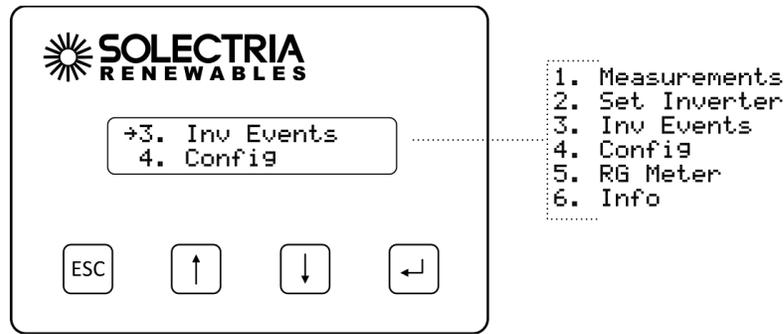
6. Press the **ESCAPE** button to return to the **Inv Events Menu**.



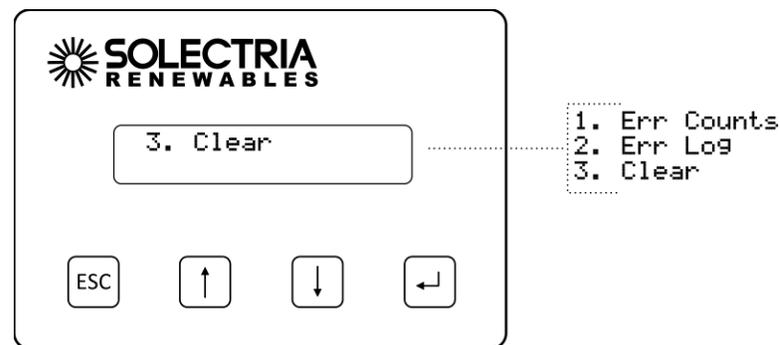
**NOTE:** Press the **UP** button from Error log index 1 to see the most recent Error logged.

### 10.19 Clearing Error Counts or the Log

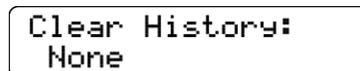
1. Select **Inv Events** from the **Main Menu** and press **ENTER**.



2. Select **Clear** from the **Inv Events Menu** and press **ENTER**.



The **Clear History** prompt will be shown. Select the type of history to be cleared by pressing the **UP** and **DOWN** buttons. Press **ENTER** to clear the history based on one of these settings. Press the **ESCAPE** button to cancel.



**History Clearing Options**

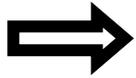
- None: History is not cleared
- Err Log: Clears the Error Log only
- Err Counts: Clears the Error Counts only
- All: Clears the Error Counts and Error Log

For a list of logged and displayed events, see Section 12.

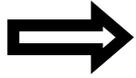
**10.20 Setting up TCP/IP Networking**

Connection to the Internet and to the SolrenView web-based monitoring service requires functioning TCP/IP connection. This connection runs over twisted pair Ethernet wiring and requires certain configurations to properly operate. See Sections 7.4 and 10.23 for details on establishing Ethernet connectivity. By default, the SolrenView DAS should automatically configure TCP/IP

addresses from a network router by using the DHCP protocol. In certain cases it may be necessary to override or manually configure the TCP/IP settings. See Sections 10.23-10.24.



**NOTE:** The network router must be 10BASE-T compatible.



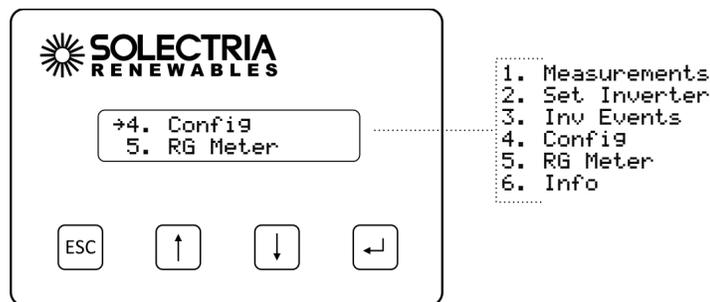
**NOTE:** Units that contain a multiport SolrenView AIR option contain an Ethernet switch that allows for multiple units to connect to the single cellular gateway. In the event that the unit containing the multiport hardware is power cycled, all other units connected to the Ethernet switch must also be power cycled to re-establish the network connection.

### 10.21 Automatically Configuring Network Settings

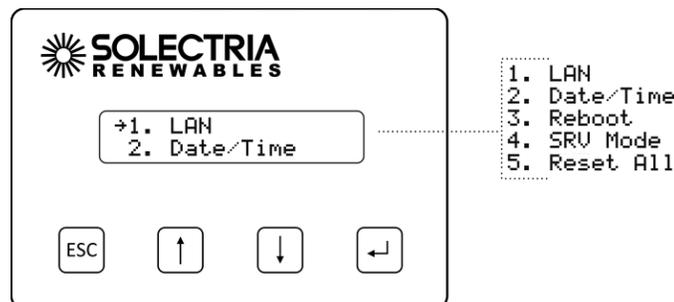
When shipped from the factory, the SolrenView DAS uses DHCP to configure the TCP/IP settings. If the SolrenView DAS has been changed to use a static IP address, the following instructions will explain how to turn DHCP back on.

To configure the SolrenView DAS to use DHCP:

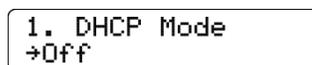
1. Select **Config** from the **Main Menu** and press **ENTER**.



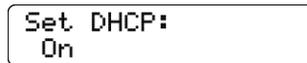
2. Select **LAN** from the **Config Menu** and press **ENTER**.



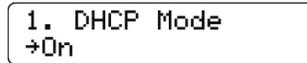
3. Select the **DHCP** function and press **ENTER** to edit this setting.



- Press the **DOWN** button to turn **DHCP Mode On** and press **ENTER** to save this setting.

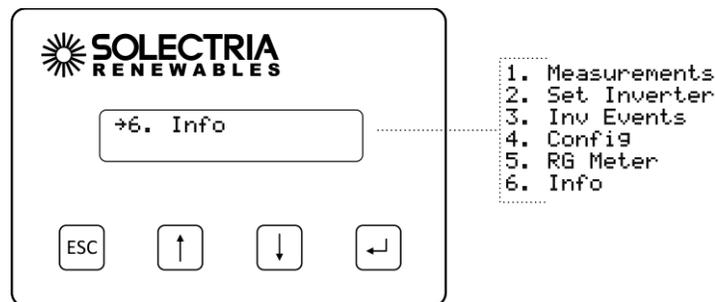


- The **DHCP Mode** setting will now show **On**.

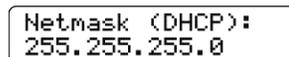
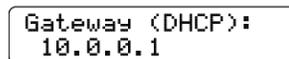
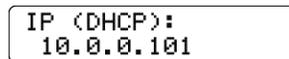


### 10.22 Viewing Current TCP/IP Settings

- Select the **Info** function on the **Main Menu** and the press **ENTER** button.



- Information on the inverter will be displayed including the IP, gateway, and Netmask settings. Press the **ENTER** button to hold the display on the item of interest.



In the above example, the IP address, gateway, and Netmask values are automatically set through the DHCP service. The exact values displayed will depend on the configuration of the network, but typically are in one of three ranges:

10.0.0.0 – 10.255.255.255  
 192.168.0.0 – 192.168.255.255  
 172.16.0.0 – 172.31.255.255

- If the network is working on the Ethernet protocol level, but the SolrenView DAS is unable to obtain settings through the DHCP service, the following will typically be displayed:

```
IP (Fallback):
192.168.1.1

Gateway:
0.0.0.0

Netmask:
255.255.255.0
```

If the network is not working at the Ethernet protocol level, e.g., if the twisted pair Ethernet cable is not plugged in, the following will be displayed:

```
LAN IP:
Unknown

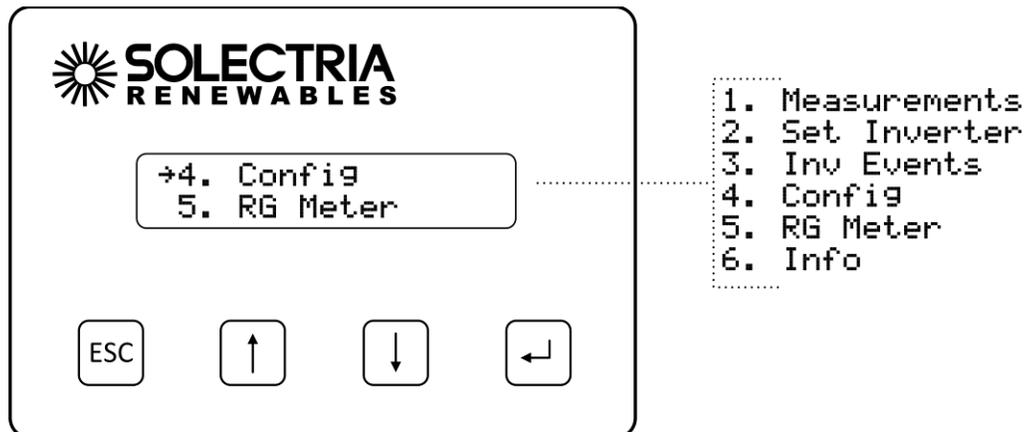
Gateway:
0.0.0.0

Netmask:
255.255.255.0
```

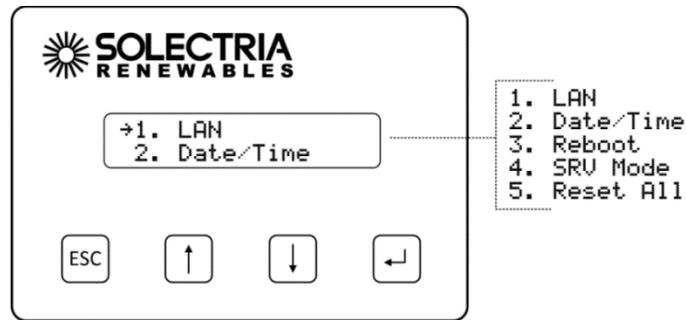
### 10.23 Manually Configuring Network Settings

To manually configure network settings:

1. Select **Config** from the **Main Menu** and press **ENTER**.



2. Select **LAN** from the **Config Menu** and press **ENTER**.



3. Select the **DHCP** function and press **ENTER** to edit this setting.

```
1. DHCP Mode
→On
```

4. Press the **DOWN** button to turn **DHCP Mode Off** and press **ENTER** to save this setting.

```
Set DHCP:
Off
```

5. The **DHCP Mode** setting will now show **Off**.

```
1. DHCP Mode
→Off
```

6. Press the **DOWN** button to access the **Static IP** setting.

```
2. Static IP
→192.168.1.11
```

7. Press **ENTER** to modify the **Static IP** value.

```
Set Static IP:
192.168.1.11
```

8. Specify each of the four octet values (0-255), one at a time. Press the **UP** button to increment the octet. Press the **DOWN** button to decrement the octet. Press the **ENTER** button to accept the octet. Press the **ESCAPE** button to cancel entry at any point. When the fourth octet is entered, the entry will be saved.

```
2. Static IP
→192.168.1.11
```

9. Press the **DOWN** button to access the Gateway setting. Change in the same manner that the **Static IP** was modified.

```
3. Gateway IP:
→0.0.0.0
```

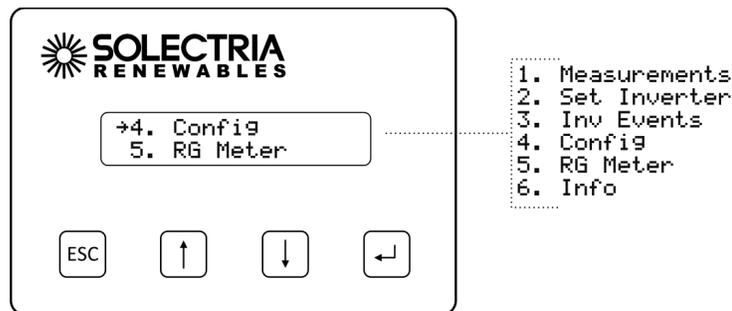
10. Press the **DOWN** button to access the **Netmask IP** setting. Change in the same manner that the **Static IP** was modified.

```
4. Netmask IP:
→255.255.255.0
```

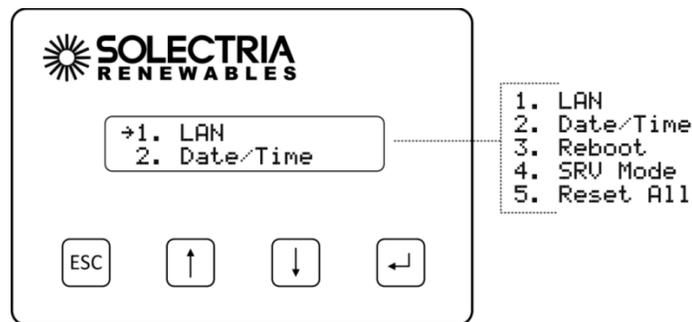
### 10.24 Setting Fallback IP Address

When the SolrenView DAS is set to use DHCP, but is unable to acquire an IP address lease, it will “fallback” to using a specified IP address after a few seconds.

1. To specify a fallback IP, first select **Config** on the **Main Menu** and press **ENTER**.



2. Select **LAN** from the **Config** Menu and press **ENTER**.



3. Confirm that the **DHCP Mode** setting shows **On**. The **Fallback IP** is only available when DHCP is turned on.

```
1. DHCP Mode
→On
```

4. Press the **Down** button to show the **Fallback IP** setting.

```
2. Fallback IP:  
→192.168.1.11
```

5. To change the **Fallback IP**, press the **ENTER** button.

```
Set Fallback IP:  
192.168.1.11
```

6. Specify each of the four octet values (0-255), one at a time. Press the **UP** button to increment the octet. Press the **DOWN** button to decrement the octet. Press the **ENTER** button to accept the octet. Press the **ESCAPE** button to cancel entry at any point. When the fourth octet is entered the entry will be saved.
7. Press the **DOWN** button to show the **Gateway IP** setting.

```
3. Gateway IP:  
→Autodetect
```

8. To change the Gateway, press the **ENTER** button.
9. When DHCP is on, the Gateway can either be auto-detected or manually specified.
10. To configure the SolrenView gateway to autodetect the gateway from the DHCP server, select the "**Autodetect**" option in using the UI. **Autodetect** is the special gateway value of 0.0.0.0.
11. To configure the SolrenView gateway to use a manual gateway, specify each of the four octet values.
12. (0-255), one at a time. Press the **UP** button to increment the octet. Press the **DOWN** button to decrement the octet. Press the **ENTER** button to accept the octet. Press the **ESCAPE** button to cancel entry at any point. When the fourth octet is entered, the entry will be saved.
13. Press the **DOWN** button to access the **Netmask** setting. Change in the same manner that the Fallback IP was modified.

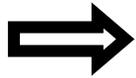
```
4. Netmask IP:  
→255.255.255.0
```

## 10.25 Enabling SolrenView Web-based Monitoring

Before SolrenView web-based monitoring can function, the inverter must be connected to the Internet, see Section 10.20 through 10.24 for more details.

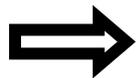
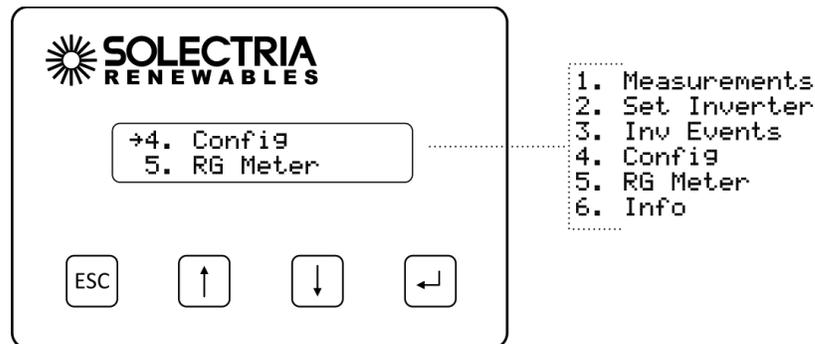
Data logging is one of the main functions of the SolrenView DAS. This option is turned on with the **SRV Mode** setting. Once enabled, the SolrenView DAS will periodically update various operational values and send this data to the SolrenView web-based monitoring server.

If **SRV Mode** is turned on and the SolrenView DAS is unable to transfer data to the monitoring service, data will accumulate in a queue on the SolrenView DAS. This queue is stored in non-volatile flash memory. After a few weeks the data queue will become full and the oldest data will be lost, so it is important to establish Internet connectivity soon after the inverters are commissioned.



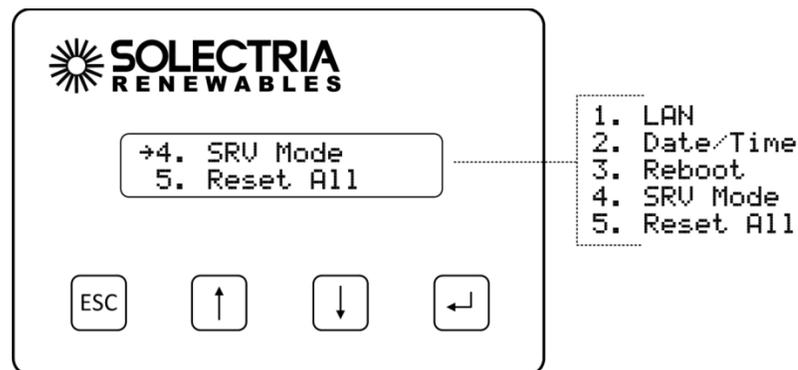
**NOTE:** Enabling SRV Mode when the SolrenView.com data monitoring service has not been purchased is not recommended.

1. To enable SolrenView.com data monitoring, first select **Config** on the **Main Menu** and press **ENTER**.

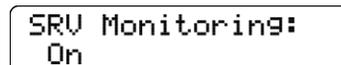


**NOTE:** Revenue Grade (RG) Meter is an option.

2. Next, select the **SRV Mode** function on the **Config Menu** and press **ENTER**.



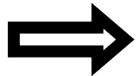
3. The **SRV Monitoring** function will be displayed. Press **ENTER** to modify the setting. Press the **DOWN** button to change the setting to **On**.



4. Press the **ENTER** button to accept the setting change.

### 10.26 Viewing and Setting the Date/Time

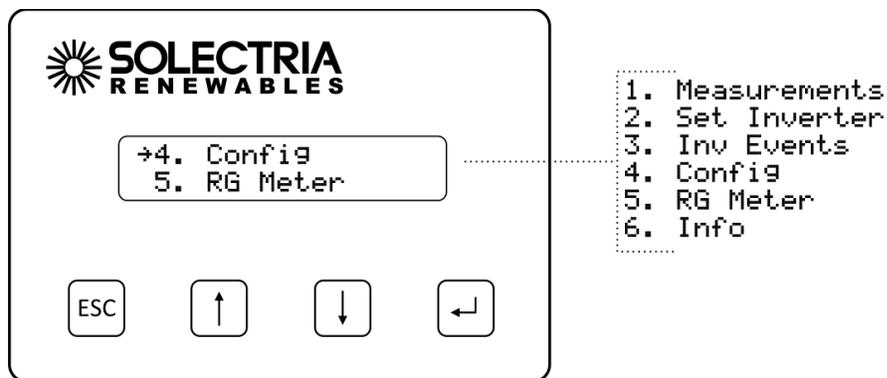
When the SolrenView web-based monitoring service is purchased and functioning, it is normally not necessary to set or maintain the time on the inverter. The time will automatically be set and adjusted based on the inverter’s time-zone.



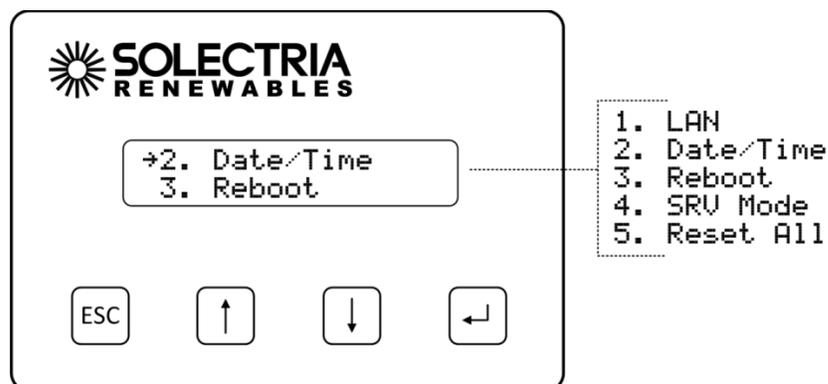
**NOTE:** The date is only editable if **SRV Mode** is off.

To view the date and time:

1. First select **Config** on the **Main Menu** and press **ENTER**.



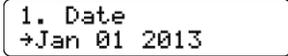
2. Select the **Date/Time** option on the **Config Menu** and press **ENTER**.



3. The current date will be displayed. If the date can be modified an arrow will appear just before the month.

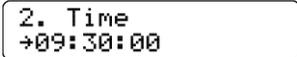


**NOTE:** The date is only editable if **SRV Mode** is off. When **SRV Mode** is on, both the date and time are automatically set.



```
1. Date
→Jan 01 2013
```

4. Press the **ENTER** button to begin changing the date. The month will flash, indicating that this portion of the date can be changed with the buttons. Press the **UP** button to increment the month and the **DOWN** button to decrement the month. Press the **ENTER** button to accept the month. Press the **ESCAPE** button to cancel and return to the menu.
5. The day will flash, indicating that this portion of the date can be changed with the buttons. Press the **UP** button to increment the day of the month and the **DOWN** button to decrement the day of the month. Press the **ENTER** button to accept the day value. Press the **ESCAPE** button to cancel and return to the menu.
6. The year will flash, indicating that this portion of the date can be changed with the buttons. Press the **UP** button to increment the year and the **DOWN** button to decrement the year. Press the **ESCAPE** button to cancel and return to the menu. Press the **ENTER** button to accept the year value and save the date to the SolrenView unit's memory.
7. After modifying the date, the new date will be shown. Press the **DOWN** button to proceed to the time.



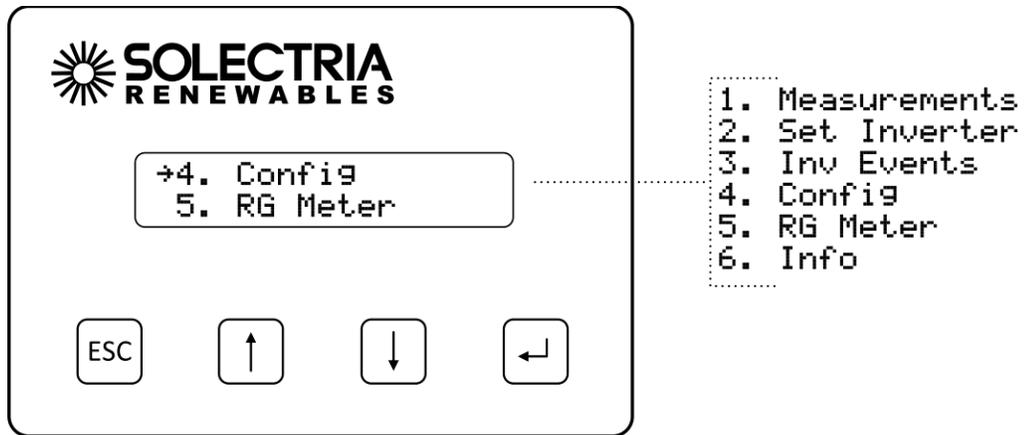
```
2. Time
→09:30:00
```

8. Press the **ENTER** button to begin changing the time. The format is HH:MM:SS and hours are shown in 24 hour format. The hour will flash, indicating that this portion of the time can be changed with the buttons. Press the **UP** button to increment the hour and the **DOWN** button to decrement the hour. Press the **ENTER** button to accept the hour value. Press the **ESCAPE** button to cancel and return to the menu.
9. The minute will flash, indicating that this portion of the time can be changed with the buttons. Press the **UP** button to increment the minute and the **DOWN** button to decrement the minute. Press the **ENTER** button to accept the minute value. Press the **ESCAPE** button to cancel and return to the menu.
10. The second value will flash, indicating that this portion of the time can be changed with the buttons. Press the **UP** button to increment the seconds and the **DOWN** button to decrement the seconds. Press the **ESCAPE** button to cancel and return to the menu. Press the **ENTER** button to accept the second value and save the time to the SolrenView unit's memory.

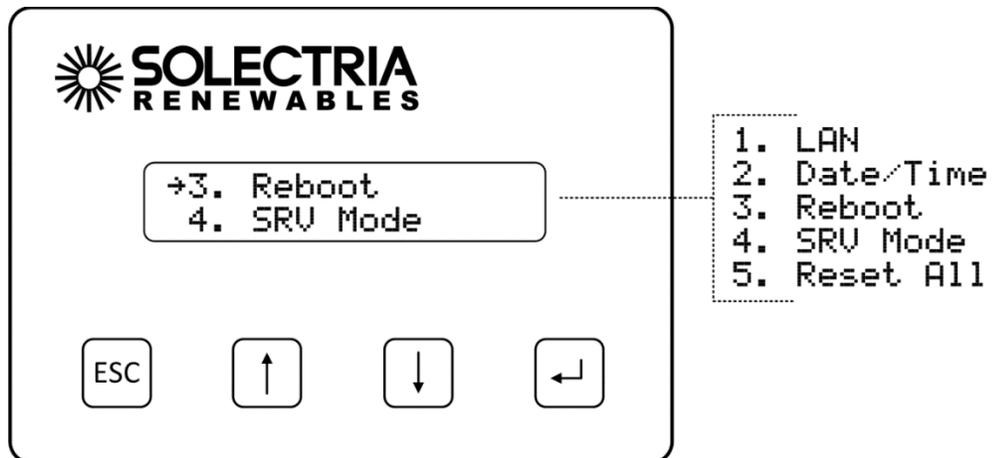
### 10.27 Rebooting the SolrenView DAS

If the SolrenView DAS cannot communicate over the Internet or is not updating inverter data it may need to be rebooted. To reboot SolrenView DAS:

1. First select **Config** on the **Main Menu** and press **ENTER**.



2. Select the **Reboot** option from the menu and press **ENTER**.



3. The **Reboot monitor** prompt will be shown. Press the **ENTER** button to reboot the SolrenView DAS.



### 10.28 Resetting the SolrenView DAS to Factory Defaults

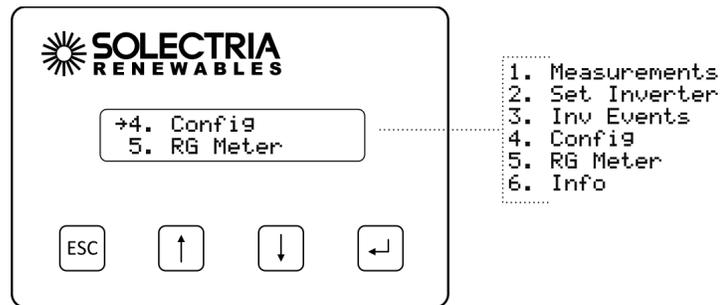
It may be necessary to reset the SolrenView DAS to factory defaults. This does not reset the inverter core or shutdown the inverter for any period of time.



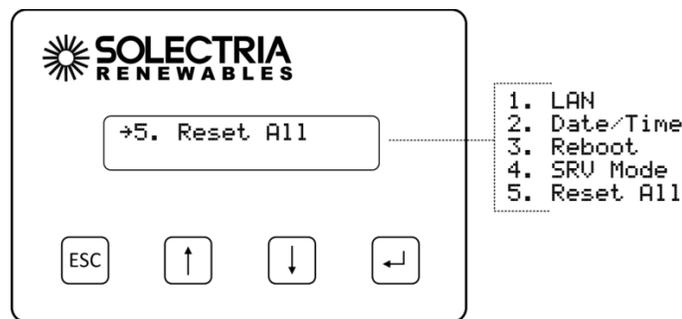
**NOTE:** Resetting the SolrenView DAS will also clear events and the SolrenView.com data queue. Caution should be used with this function to avoid data loss.

To reset the SolrenView DAS:

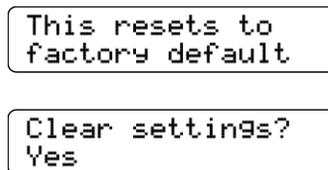
1. First select **Config** on the **Main Menu** and press **ENTER**.



2. Select the **Reset All** option from the menu and press **ENTER**.



3. A message warning that the SolrenView gateway is about to be set to factory defaults is shown. Press the **ESCAPE** button to cancel the reset.



4. Select the **Yes** option under **Clear settings** to reset the SolrenView gateway to factory defaults. The **Reset Storage** screen will appear for a moment.



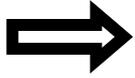
### 10.29 Preparing the XTM Inverter for Modbus (RS-485) Communications

In order for the SolrenView DAS to start communicating with the external data monitoring system, the following configuration steps must be taken:

1. Set the inverter Modbus ID to the same ID as required for the external data monitoring system.
2. Set the inverter baud rate to the same as required for the external data monitoring system.
3. Configure the SRV mode to OFF as shown in Section 10.25, Enabling SolrenView Web-based Monitoring.

## 11 Commissioning the Inverter PV System

At this point the inverter is mounted, all connections are made, and power is ready to be applied.



**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 using a digital volt meter and probing the positive (+) and negative (-) PV connections. Verify clockwise AC phase rotation for L1, L2, L3 using a phase rotation meter. Also check that the status of the GFDI breaker and that one or both of the first two positions on the DC combiner are populated.

### 11.1 Turning On the Inverter

To turn on the inverter, adhere to the following steps:

1. Turn on the inverter's DC disconnect using the DC handle on the front door.
2. Turn on the dedicated three-phase circuit breaker or disconnect at the service or distribution equipment. If AC disconnect or breaker option are purchased, turn on the inverter's AC handle on the front door.
3. Watch the LED indicators for initialization (flashing green).
4. Wait for countdown timer, seen on the UI.
5. Listen for contactor closing.
6. Following the blinking green LED and high frequency switching sound you should see a solid green LED. This confirms that the inverter is operating normally. The UI will show the AC Power (PAC) and Energy (EAC).

### 11.2 System Startup

The control electronics are active whenever the AC side of the inverter is energized. Once the open circuit voltage of the array reaches 540VDC the contactors will connect the array to the inverter. Once the open circuit array voltage reaches 700VDC the inverter will start exporting power. If there is insufficient power available from the array, the inverter will disconnect and wait 5 minutes before attempting to export power again. The contactors will cycle every time the system attempts to connect to the array.



**NOTE:** The inverter will connect the contactors but will not start outputting power if the array's open circuit voltage is above 1000VDC.

## 12 Troubleshooting and Maintenance

This section provides guidelines for troubleshooting and routine maintenance of your inverter.



**WARNING:** These troubleshooting and maintenance instructions are for use by qualified personnel only. To reduce the risk of electric shock, you should never attempt to open the inverter, DC or AC enclosure doors, or perform any service or troubleshooting without prior training. Before attempting to service or troubleshoot the inverter, please read the entire manual.

To allow for remote diagnostics, Solectria has added service ports (Figures 12.1 and 12.2) to this series inverter, just inside the doors (see Section 2.5). The plate can be removed and wires can be routed through these entrance ways. Always replace the cover when not in use to prevent water or animal intrusion.

## 12.1 Critical Messages

Although the inverter is designed for many years of uninterrupted power production, there may be instances where messages are displayed on the UI. For ease of diagnostics, most messages are displayed as an error message. Examples of Error Messages, Descriptions, and Corrective Actions are found in this section.

Text on UI	In Event Log (Y/N)	Description	Corrective Actions
Contactors Fail	Y	Filter contactor failed to close.	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
CT Failure	Y	The internal current monitoring has failed.	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
DC GND Fault	Y	A ground fault has been detected in the PV array.	DO NOT TOUCH any equipment (including, but not limited to: the inverter, the PV array disconnect switch, 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.
Desat Error	Y	Internal component sensing fault.	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
IGBT Overtemp	Y	The internal temperature is exceeding operational limits.	Turn the DC and AC off, let the inverter cool to ambient temperature and restart the inverter.
MOV Fault	Y	DC MOV is in fault condition, but the inverter will stay running.	Site visit is recommended but not needed immediately.
NTC Failure	Y	The internal temperature sensor has failed.	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
Open Phase	Y	One of the AC phases is not present at the inverter.	Verify that there is AC voltage on all phases at the inverter and all inverter fuses are intact.
RCM Fault	Y	The RCM has experienced a fault.	DO NOT TOUCH any equipment (including, but not limited to: the inverter, the PV array disconnect switch, 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.
Shunt Trip	Y	The inverter received a command to open the AC breaker.	Turn the DC and AC off and verify that the shunt trip command has been removed. Verify that grid voltage and frequency are within limits and then restart the inverter. If the problem persists the AC grid connection and invert may need to be inspected and serviced by an authorized service provider.
Vsense Error	Y	An internal failure of the voltage sensing circuit has occurred.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.

## 12.2 Informative Messages

Informative messages are meant as inverter status information messages. Unlike the Critical messages, immediate attention or site visits are not required.

Text on UI	In Event Log (Y/N)	Description	Corrective Actions
AC Islanding	Y	Temporary loss of grid.	Verify the grid voltage and frequency has been restored.
Current Limit	Y	Inverter reached current limit because of high input power, high temperature, or AC line impedance.	Check string sizing, ambient temp, fans operating, vents are clear.
DC Cont. Err	Y	DC contactor failed to open properly.	Inverter may need to be inspected and serviced by an authorized service provider.
DC Overshoot	Y	DC bus voltage overshoot during normal operation.	Turn the DC and AC off, restart the inverter. If problem persists, the array may not be sized correctly.
DC Volt High	Y	The DC voltage is higher than maximum DC voltage limit.	The array may need to be adjusted to remove the DC high condition.
DC Volt Low	N	Inverter waiting for more DC power.	No action needed.
Fac High	Y	The AC grid frequency is exceeding the high limit.	If possible measure the frequency or contact local utility provider. If AC frequency is above acceptable limits, the inverter will restart when frequency returns to normal range.
Fac Low	Y	The AC grid frequency is less than the low limit.	If possible measure the frequency or contact local utility provider. If AC frequency is below acceptable limits, the inverter will restart when frequency returns to normal range.
Fac Very Low	Y	The AC grid frequency is critically less than the low limit.	If possible measure the frequency or contact local utility provider. If AC frequency is below acceptable limits, the inverter will restart when frequency returns to normal range.
Fan Life Reached	Y	Fan life has been reached.	Contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
Filter Cont. Err	Y	LC Filter not working, but AC power is still being produced.	Turn the DC and AC off, restart the inverter. If problem persists, the inverter may need to be inspected and serviced by an authorized service provider.
Flux Error	Y	The internal phase lock loop has failed.	Turn the DC and AC off, restart the inverter. If problem persists, the inverter may need to be inspected and serviced by an authorized service provider.
Hw Interlock	N	Hardware safety interlock not satisfied or DC voltage too low to connect.	Check the DC switch position. Verify DC voltage. Turn the DC and AC off, restart the inverter. If problem persists, the array may not be sized correctly.
Low DC Power	N	Inverter is at IDLE state, waiting for more power.	No action needed.
Master NTC Error	Y	The Master power stage has NTC failure.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
MPP Tracking	N	Maximum power point tracking algorithm is active.	No action needed.

Nameplate Limits	Y	The power is limited by the name plate rating.	No action needed.
Other PB Fault	N	Power stage error detected.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
Outside MPPT	N	Inverter is not tracking maximum power point.	No action needed.
PAR Backup Err	N	Inverter configuration back up error occurred.	Inverter may need to be inspected and serviced by an authorized service provider.
PAR Config Err	N	Inverter configuration error detected.	Inverter may need to be inspected and serviced by an authorized service provider.
Power Derated	Y	Inverter power level has been limited due to temperature.	Inverter may need to be inspected and serviced by an authorized service provider.
Power Disabled	N	The inverter is disabled by the remote disable function.	Remove the power disable signal.
PS Fail	Y	An internal failure of the power stage.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
PS Wake Fail	Y	The power stage has failed during inverter wake up.	Turn the DC and AC off, restart the inverter. If problem persists, the inverter may need to be inspected and serviced by an authorized service provider.
Pw Brd Mismatch	N	Power stage configuration error detected.	Inverter may need to be inspected and serviced by an authorized service provider.
PWM Trip	Y	An internal failure of the power stage.	Turn the DC and AC off, restart the inverter. If problem persists, the inverter may need to be inspected and serviced by an authorized service provider.
RCM Warn	Y	This is an RCM fault, but alarm only.	A site visit is recommended.
Remote Limiting	N	Temporary current limit was set through either Modbus or UI.	No action needed.
Reverse Phase	N	Inverter is hooked up with wrong phase and will not run.	Electrician to swap two of the phase wire positions at the inverter AC wiring terminals in the AC output, then restart.
Slave NTC Error	Y	Slave power stage has experienced NTC failure.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
Soft Shutdown	N	The inverter is disabled by the soft shutdown function.	Turn inverter on using UI and check Modbus command.
Slave Trip	Y	The slave power stage has failed.	Turn off the inverter and contact Solectria Renewables. The inverter may need to be serviced by an authorized service provider.
Temp 1 Limiting	Y	Output has been limited due to an internal temperature higher than the derating limits.	Inverter may need to be inspected and serviced by an authorized service provider.
Temp 2 Limiting	Y	Output has been limited due to an internal temperature higher than the derating limits.	Inverter may need to be inspected and serviced by an authorized service provider.
Temp 3 Limiting	Y	Output has been limited due to an internal temperature higher than the derating limits.	Inverter may need to be inspected and serviced by an authorized service provider.
Temp 4	Y	Output has been limited due	Inverter may need to be inspected and serviced by an

Limiting		to an internal temperature higher than the derating limits.	authorized service provider.
Vac High	Y	The AC grid voltage is exceeding the high limit.	If possible measure the actual VAC compared to the UI VAC. If VAC is greater than acceptable limits, the inverter will restart when VAC returns to normal range.
Vac Low	Y	The AC grid is less than the low limit.	If possible measure the actual VAC compared to the UI VAC. If VAC is less than acceptable limits, the inverter will restart when VAC returns to normal range.
Vac Very High	Y	The AC grid voltage is critically exceeding the high limit.	If possible measure the actual VAC compared to the UI VAC. If VAC is greater than acceptable limits, the inverter will restart when VAC returns to normal range.
Vac Very Low	Y	The AC grid voltage is critically lower than the low limit.	If possible measure the actual VAC compared to the UI VAC. If VAC is less than acceptable limits, the inverter will restart when VAC returns to normal range.
Vsense Mismatch	N	Wrong voltage sensing firmware version was used.	Inverter may need to be inspected and serviced by an authorized service provider.
Wait for Grid	N	Grid voltage may not be present.	Check for grid voltage on all phases.
Wait to Restart	N	Grid reconnect countdown in process.	No action needed.

## 12.3 Troubleshooting

### 12.3.1 Steps to Perform When PV System is Not Functioning

- Check inverter LED indicator status and UI for inverter status and error messages.
- Check to ensure that inverter is connected to AC power.
- Ensure that no 24VDC remote shut down or shunt trip signal is applied to the inverter.
- Check for *clockwise* phase rotation of AC power connections.
- Check to ensure that DC (PV) input is connected on inputs #1 or #2.
- Verify proper polarity of DC (PV) positive (+) and negative (-) input pairs.
- Verify PV string Maximum Power Point Voltage at design high temperature and PV string sizing.
- Verify open Circuit Voltage at design low temperature and ensure it is compatible with inverter input voltage specifications.
- Check all internal fuses to see if any are open.
- Check status of GFDI breaker.
- Verify that both the AC and DC disconnects are closed.
- Contact installer or Solectria Renewables if malfunction persists.

### 12.3.2 If Contacting Solectria Renewables for Assistance, Please Provide the Following

- Inverter Model Number/Part Number
- Inverter Serial Numbers
- Short Description of Problem (UI messages, when problem started, how often problem occurs, under what conditions the problem occurs)
- Design Information (PV modules, string sizing, output power, short-circuit current, and open circuit voltage string layout)



**NOTE:** See **Appendix F** for Solectria contact information.

### 12.3.3 Some Specific Problems that can be Identified Quickly

**GFDI Problem:** If the LED indicators and UI show a ground fault problem and the GFDI breaker is tripped, the fault in the PV array or wiring must be found and the GFDI breaker reset.

**Unit Overheating, Power Derating, or Unit Not Outputting Power:** If the power output is lower than normal and there is a UI indication of power derating due to high temperature, check the following:

- Is the ambient air temperature above 50°C?
- Check the insect screens in the front louver grill or air filters on the main enclosure door for clogging from dust, pollen and debris.
- Fan not running, blocked, or slow:
  - Check the fan fuses inside the main enclosure.
  - Check the fan relay, including overload device, inside the main enclosure.
  - Check the fan and make sure it spins freely.
  - Check that the fan is directing air into the intake baffles.
- No grid sensing:
  - Check if grid sensing fuses are blown inside the main enclosure. If so, contact Solectria Renewables (do not replace fuses, as this represents an abnormal failure).
- No LED indications when the AC is energized. If the grid voltage and DC voltage is present and no response from inverter is evident:
  - Verify AC and DC voltages are within proper ranges.

### 12.4 Response to Abnormal Volt and Frequency Conditions

Factory default settings for response to abnormal voltage and frequency comply with IEEE1547 (2010). Alternative utility trip settings can be factory configured if identified at time of purchase. Trip settings can also be modified through the UI (see Section 10.12).

## 12.5 Preventative Maintenance



**WARNING:** These maintenance instructions are for use by qualified personnel only. To reduce the risk of electric shock, you should never attempt to open the inverter, DC or AC enclosure doors, or perform any service or maintenance without prior training. Before attempting to service the inverter, please read the entire manual.

For most installations, preventative maintenance should be performed once every 12 months. If the inverter is installed in harsh environments the frequency of some items should be increased. For the air intake filters, however, it is recommended that they be inspected and cleaned monthly for the first year of operation and then have the maintenance schedule adjusted as necessary.

Installation Specifics	Visual Inspection	Clean Front Screen and Rear Louvers	Clean the Air Intake Filter	Verify Electrical Connections	Verify Signal Connections
Inside & climate controlled	Once per 12 months	Once per 12 months	Once per 1 month	Once per 12 months	Once per 24 months
Outside covered	Once per 12 months	Once per 6 months	Once per 1 month	Once per 6 months	Once per 12 months
Outside exposed	Once per 6 months	Once per 6 months	Once per 1 month	Once per 6 months	Once per 12 months
Outside harsh environment	Once per 3 months	Once per 3 months	Once per 1 month	Once per 6 months	Once per 12 months
Outside extremely harsh environment	Once per 1 month	Once per 1 month	Once per 1 month	Once per 6 months	Once per 12 months

**Table 12.1 – Preventative Maintenance**

A harsh environment is defined as *any* of the following conditions:

- Excessive temperature (hot or cold)
- Desert area with sand or other debris, constantly in contact with the inverter
- Areas with excessive pollen or dust
- Indoors, if located in an area with airborne particles
- Coastal regions exposed to salt water

## 12.6 Intake Louver Vent Cleaning



**WARNING:** The intake louver vent must be cleaned only when the inverter is off and both DC and AC disconnect switches are off. The absence of dangerous voltages must be verified by qualified personnel before performing any service.

Intake louver vent cleaning is recommended at the intervals specified in Section 12.5. Consider cleaning the intake louver vent during the early morning or late evening so little or no energy generation is lost.

**Method 1:** Remove the shroud by removing all Philips Pan Head #2 machine screws around the shroud (sides and top only, do not remove bottom screws), and remove the shroud. Without removing the vent, use a powerful vacuum and clean entire louver vent/screen.

**Method 2:** Remove the shroud by removing all Philips Pan Head #2 machine screws around the shroud (sides and top), and remove the shroud. Next remove the remaining bottom screws holding the louver vent onto the inverter. Use compressed air from the back (insect screen) side of the louver vent/screen unit to remove all debris.

Re-assemble, putting all screws in *loosely* first and then tighten snugly (do not over-tighten).

## 12.7 Air Filter Cleaning

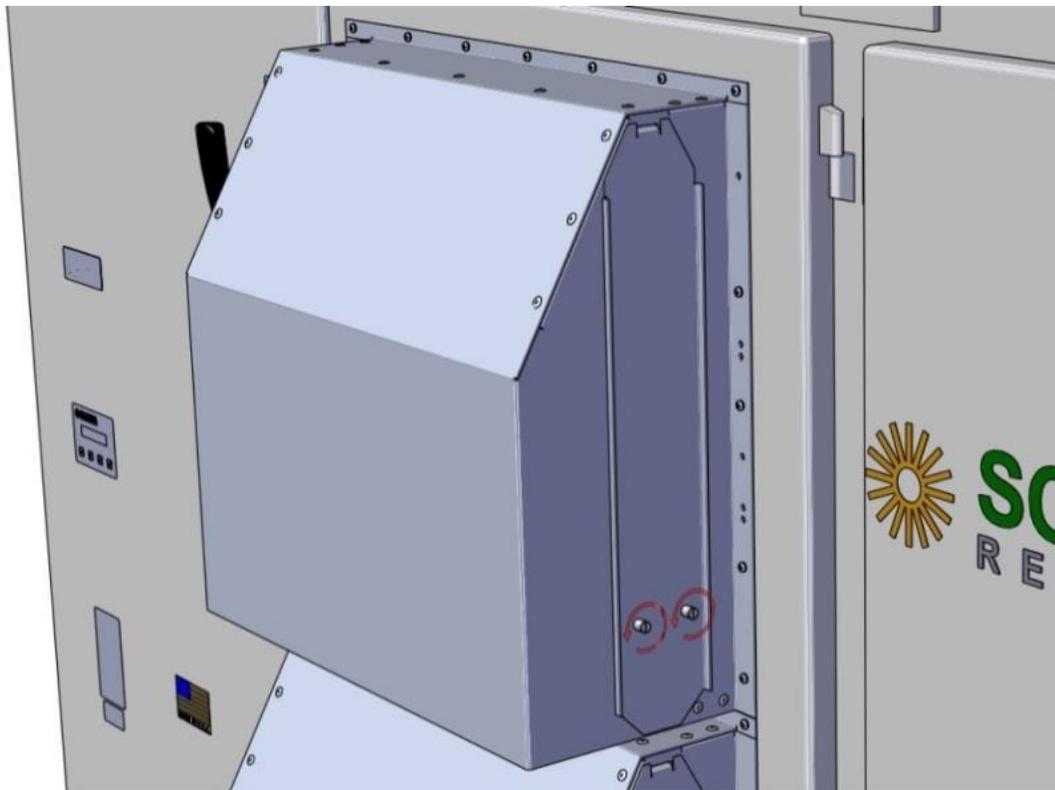


**WARNING:** The intake louver vent must be cleaned only when the inverter is off and both DC and AC Disconnect switches are off. The absence of dangerous voltages must be verified by qualified personnel before performing any service.

All of the available filters are washable and can be reused. For the economy filter, flush the filter with clean water and a dilute mixture of a mild soap and water. Rinse the filter thoroughly and allow it to air dry completely before replacing. For either of the electrostatic filters, begin by flushing the filter with clean water. Remove stains with a spray application of ZAP Electrostatic Air Filter Cleaner. Do not use any other type of soap or cleaner. Rinse the filter thoroughly and allow it to air dry completely before replacing.

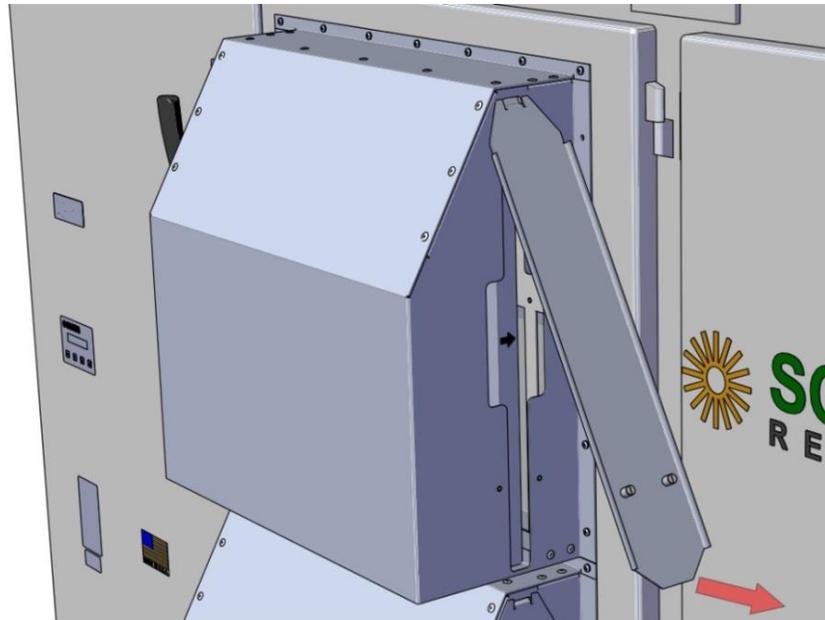
To remove the filter for inspection, cleaning or replacement, perform the following steps:

5. Loosen the two screws on the cover plate located on the right side of the air intake housing.



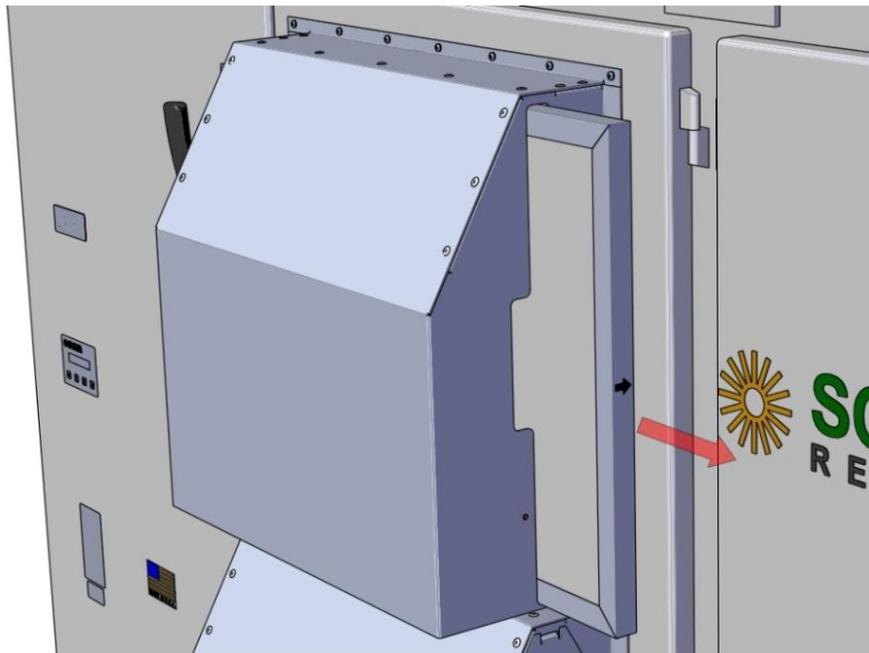
**Figure 12.1 – Loosen Filter Screws**

6. The screws will remain captured in the cover plate. Swing the cover plate up and pull it out of the air intake housing.



**Figure 12.2 – Swing Cover Plate Up and Remove**

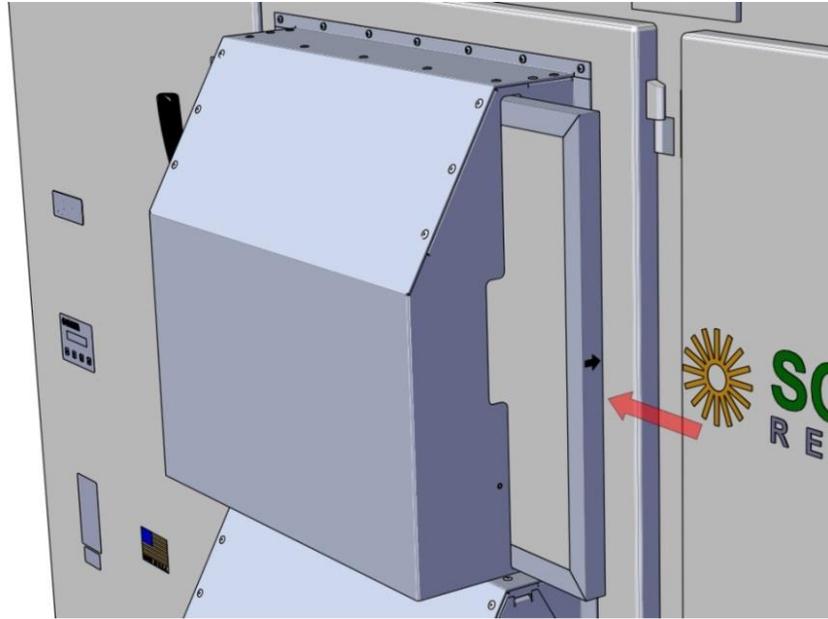
7. Finally, slide the dirty filter out of the housing.



**Figure 12.3 – Slide Filter Out**

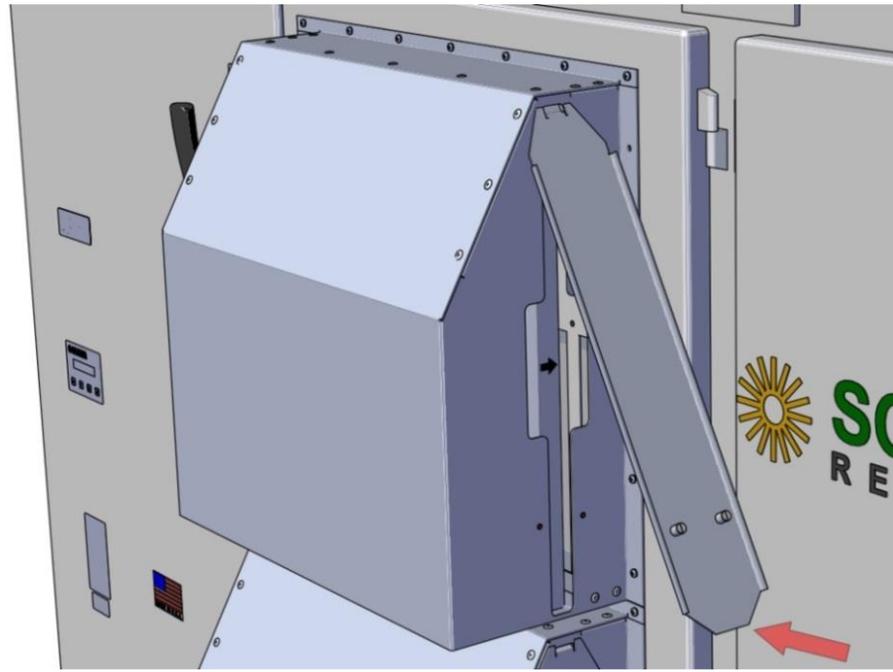
To install a filter, begin by:

1. Sliding the clean filter into the air intake housing. Be sure to note the air flow direction arrow on the filter. The arrow should be pointing towards the inverter.



**Figure 12.4 – Slide Filter In**

2. Now, install the cover plate by inserting the tab into the top of the air intake filter housing and then rotating the cover plate down to meet the air intake housing.



**Figure 12.5 – Install Cover Plate**

3. Secure the two screws in the cover plate.

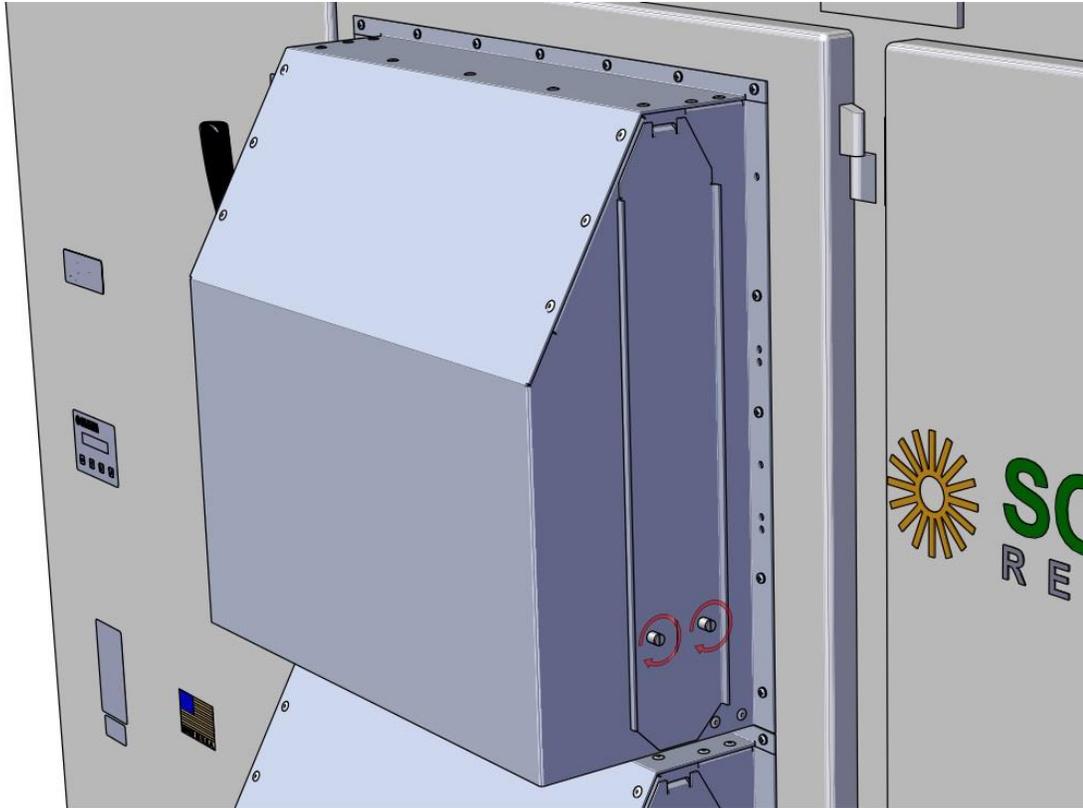


Figure 12.6 – Secure Filter Screws

## 12.8 Opening Main Enclosure, DC Disconnect Switch, and AC Disconnect Switch



**WARNING:** The inverter should only be opened by authorized and qualified service personnel.



**WARNING:** If the inverter is outdoors, only open the inverter when it is clear and dry outside. As with any electrical system, do not work on it if there is potential for an electrical storm.



**WARNING:** Both DC and AC disconnect switches must be in the OFF position then wait 5 minutes after the LED indicators are off before opening as the capacitors on the internal DC and AC bus are discharging during this time.



**WARNING:** DC input wiring from the array may be energized even with inverter OFF and DC disconnect switch open.



**WARNING:** AC output wiring to the transformer may be energized even with the inverter OFF and AC disconnect or breaker open.

Normally the main enclosure DC or AC disconnect switches will not have to be opened for any reason by the user. If opening the unit is necessary, follow these guidelines:

1. Use the SolrenView™ UI to temporarily disable the power output by pressing and holding the **ESCAPE** button for 5 seconds.
2. Disconnect inverter from DC power to ensure that live DC is not entering the inverter.
3. Switch off DC disconnect.
4. Switch off AC disconnect.
5. Watch until all LED indicators have been off for 5 minutes allowing capacitors to discharge.
6. Open handle on door (use key if locked).

Before closing the main enclosure, always check for any signs of problems such as corrosion, loose parts, insect or animal infestation, excessive dirt/dust, or overheated or deformed/aged-looking parts.

## 13 Product Warranty and RMA Policy

The Solectria Renewables Warranty Policy and RMA Policy are available at the following web location:

<http://solectria.com/support/documentation/warranty-information/grid-tied-inverter-warranty-letter/>

## 14 Technical Data

### 14.1 DC Input Specifications

Specification	SGI 500XTM	SGI 750XTM	Unit
Absolute Maximum Voltage	1000		VDC
Operating Voltage Range	545 – 1000		VDC
MPPT Input Voltage Range <sup>1</sup>	545 – 820		VDC
Maximum Operating Current	965	1445	ADC
Maximum Short Circuit Current	2400		ADC
Strike Voltage	700		VDC
DC Disconnect Rating	2400		ADC
DC Voltage Measurement Accuracy	±2		%
<sup>1</sup> At Nominal Operating Voltage and Power Factor of 1.0			

**Table 14.1 – DC Input Specifications**

### 14.2 AC Output Specifications

Specification	SGI 500XTM	SGI 750XTM	Unit
Continuous Power <sup>1</sup>	500	750	kW
Maximum Continuous Current	760	1140	AAC
Nominal Operating Voltage	380		VAC
Operating Voltage Range	335 – 418		VAC
Reconnect Voltage Range	348 – 402		VAC
Nominal Operating Frequency	60.0		Hz
Operating Frequency Range	57.0 – 60.5		Hz
Reconnect Frequency Range	59.3 – 60.5		Hz
Power Factor, Default	1.0		
Power Factor, Adjustable Range	-0.8 to +0.8		
Short Circuit Contribution <sup>2</sup>	7.36		kA <sup>3</sup>
Fault Current Contribution <sup>4</sup>	912	1368	A
Total Harmonic Distortion <sup>5</sup>	<3		%
AC Voltage Measurement Accuracy	±2		%
Frequency Measurement Accuracy	±0.1		Hz
AC Current Measurement Accuracy	±1		%
AC Power Measurement Accuracy	±3		%
<sup>1</sup> At Nominal Operating Voltage, Power Factor of 1.0, Power Limiting Mode			
<sup>2</sup> Duration of 119ms			
<sup>3</sup> Peak to Peak Current			
<sup>4</sup> 1 Cycle RMS			
<sup>5</sup> At Continuous Power, Power Limiting Mode			

**Table 14.2 – AC Output Specifications**

### 14.3 Other Specifications

Specification	Sgi 500XTM	Sgi 750XTM	Unit
DC Ground Fault Protection	Per UL 1741		
Fused Subcombiner Range	4 to 16 Positions: 100A, 110A, 125A, 160A, 175A, 200A, 250A, 300A, 315A, 350A or 400A		
Breaker Subcombiner Range	4 to 15 Positions: 125A, 150A, 175A, 200A, 225A, 250A, 300A or 350A		
Operational Ambient Temperature	-30 to 50		°C
Storage Temperature	-30 to 50		°C
Cooling Design	Automatic Forced Convection		
Inverter Enclosure	Base Model: Powder Coated Mild Steel Optional: Grade 316 Stainless Steel		
Protection Rating	Rainproof per UL 1741		
Inverter Weight without Options (see Table 3.1 for option weight)	2870	3360	lbs
Shipping Weight without Options (see Table 3.1 for option weight)	3080	3570	lbs
Heat Loss at Full Power	35,000	52,500	BTU/h

**Table 14.3 – Other Specifications**

### 14.4 Minimum MPPT Voltage as a Function of AC Operating Voltage

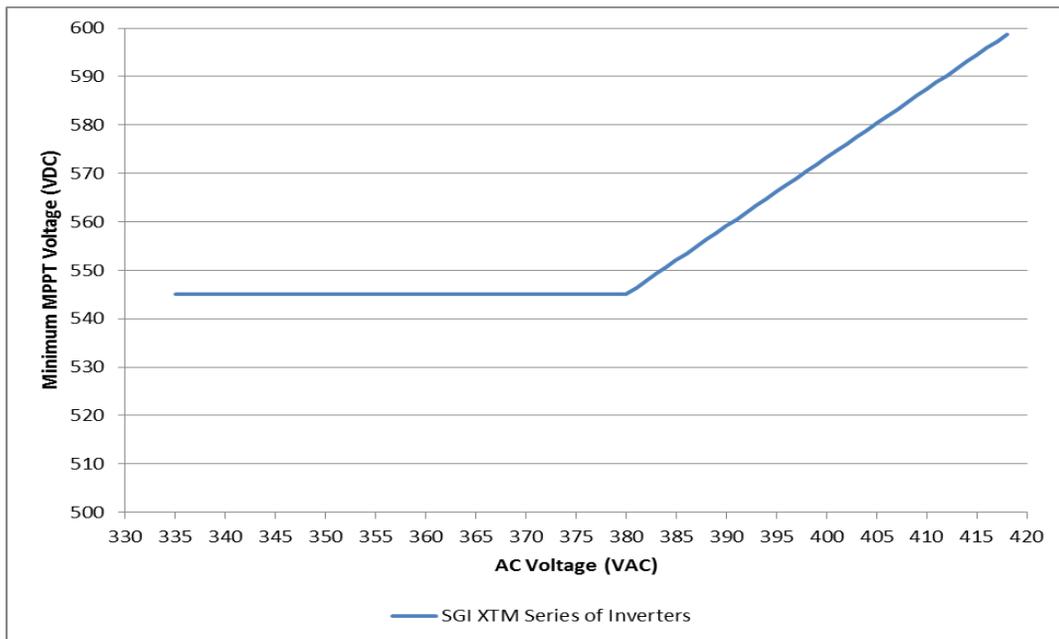


Figure 14.1 – Minimum MPPT Voltage as a Function of AC Operating Voltage

### 14.5 AC Output Power as a Function of DC Input Voltage

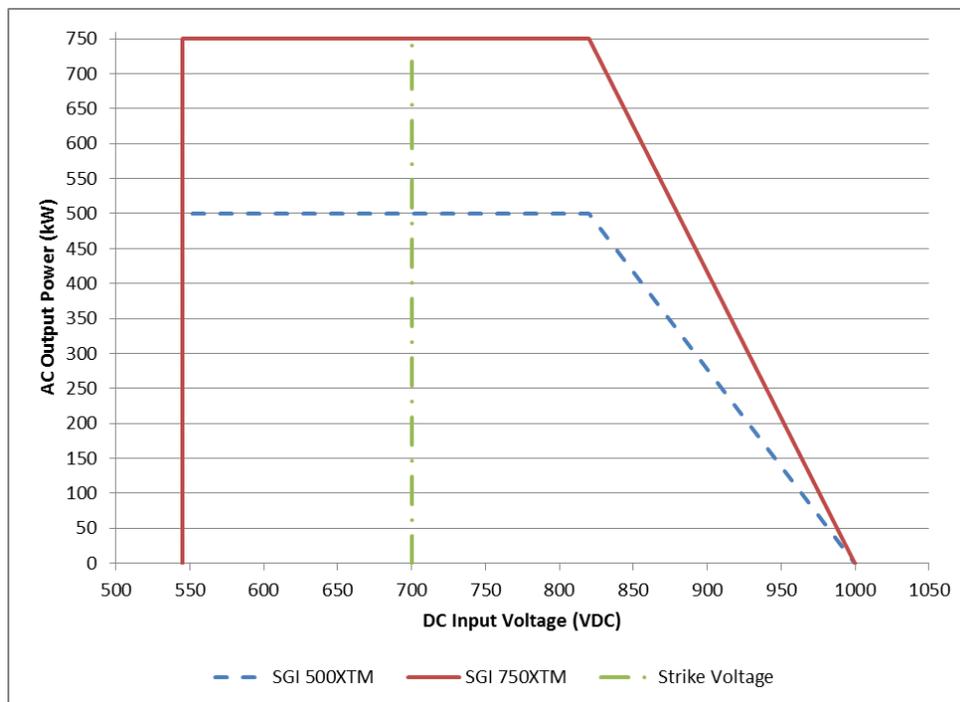


Figure 14.2 – AC Output Power as a Function of DC Input Voltage

### 14.6 AC Output Power as a Function of AC Operating Voltage and Operating Mode

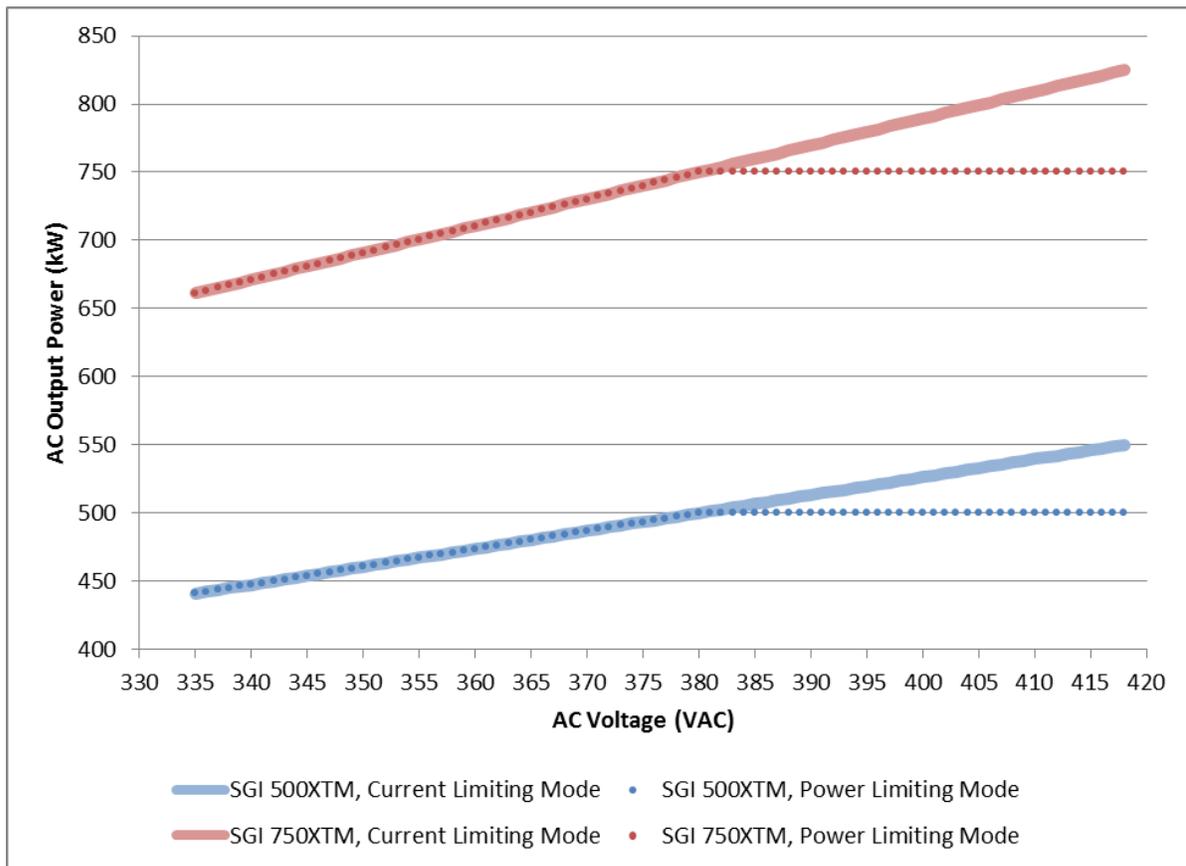


Figure 14.3 – AC Output Power as a Function of AC Operating Voltage and Operating Mode

### 14.7 Power Conversion Efficiency

**DISCLAIMER:** Estimated CEC Efficiency is 98.0%. CEC listing is still pending. This section will be updated once the listing is available.

Figure 14.4 – Inverter Efficiency

### 14.8 Internal Circuit Diagram

The basic power flow within the SGI XTM series of inverters is shown in the simplified circuit diagrams below.

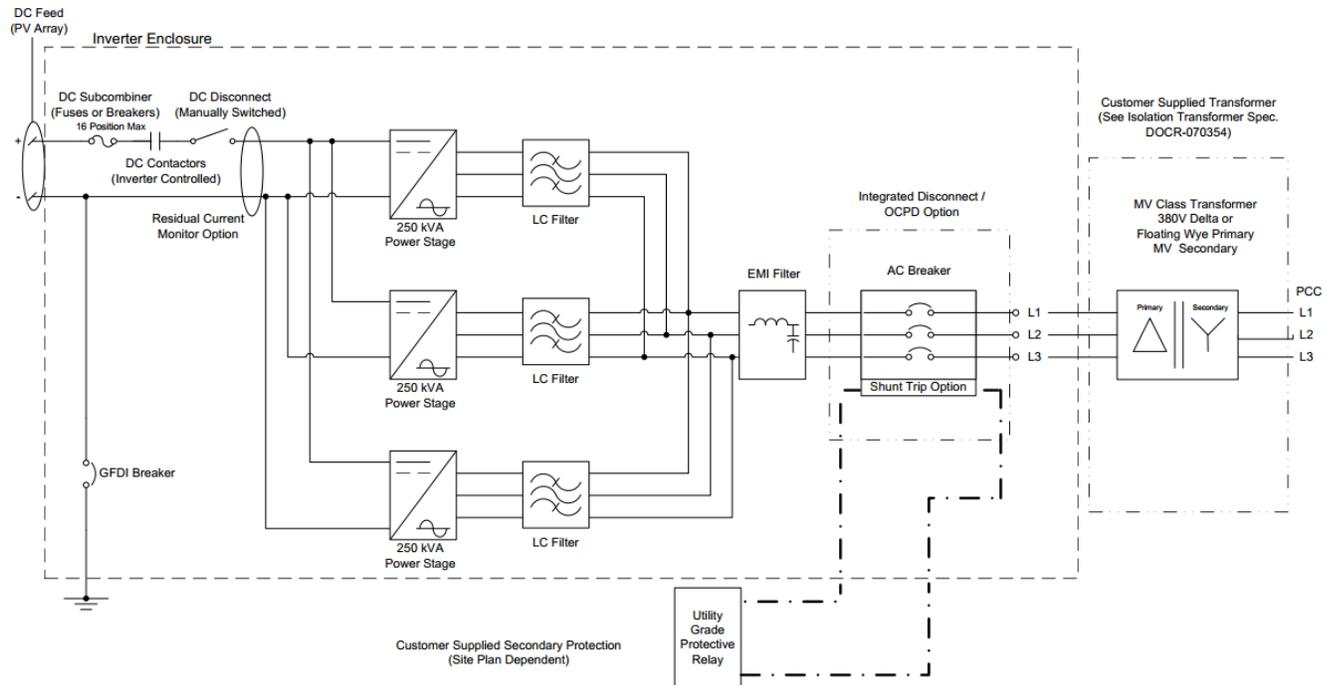


Figure 14.5 – Typical Internal Circuit Diagram for Solectria SGI 750XTM Grid-Tied Inverters

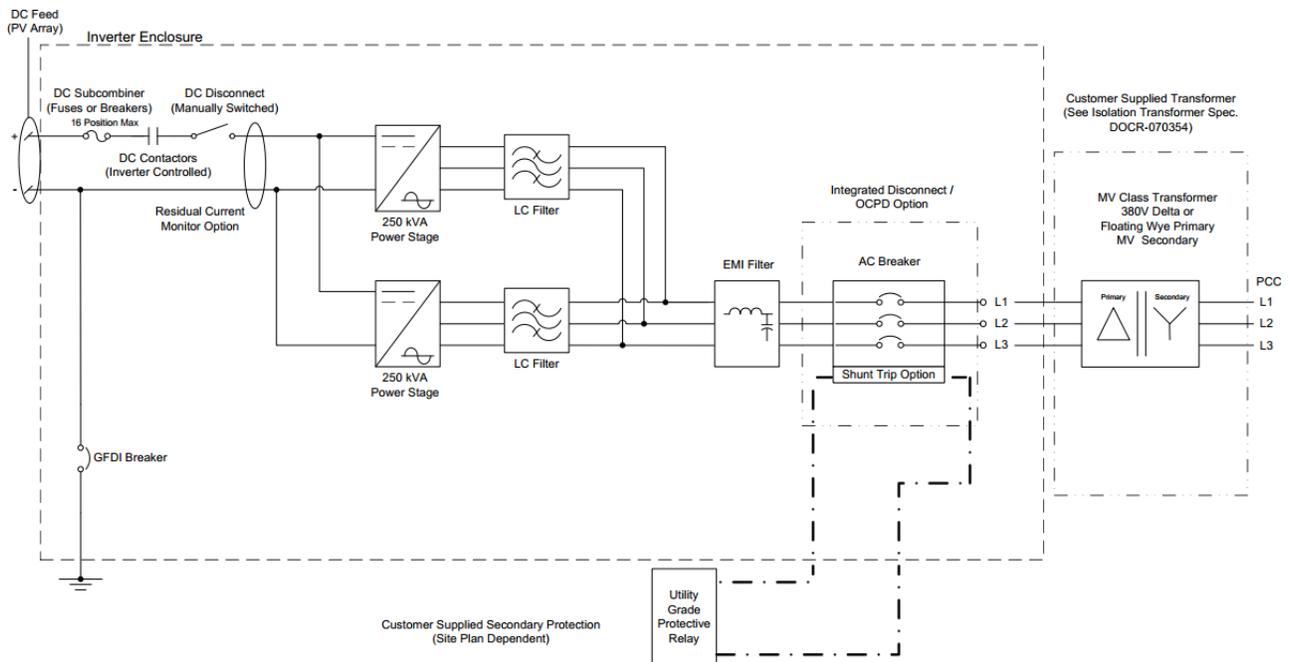


Figure 14.6 – Typical Internal Circuit Diagram for Solectria SGI 500XTM Grid-Tied Inverters

## 15 Appendices

### 15.1 Appendix A – Product Warranty and RMA Information

Please visit:

<http://solectria.com/support/documentation/warranty-information/grid-tied-inverter-warranty-letter/>

### 15.2 Appendix B – SGI XTM Series Data Sheet

Please visit:

<http://solectria.com/support/documentation/inverter-datasheets/sgi-500-sgi-750xtm-external-transformer-utility-scale-inverter-1000-vdc-380-vac/>

### 15.3 Appendix C – Customer Interface Drawings

Please visit:

<http://solectria.com/support/documentation/drawings/sgi-500-750xtm-customer-interface-drawing-pdf/>

### 15.4 Appendix D – Isolation Transformer Specification

Please visit:

<http://solectria.com/support/documentation/isolation-transformer-specifications/sgi-500xtm-sgi-750xtm-isolation-transformer-specification/>

### 15.5 Appendix E – String Sizing Tool

Please visit:

<http://www.solectria.com/support/string-sizing-tool/>

### 15.6 Appendix F – 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@solectria.com](mailto:inverters@solectria.com)  
Customer Support: [service@solectria.com](mailto:service@solectria.com)  
Website: [www.solectria.com](http://www.solectria.com)

### 15.7 Appendix G – Authorized Distributors

Please visit:

<http://www.solectria.com/products/how-to-buy/>

15.8 Appendix H – UL 1741 / IEEE 1547 / CSA 22.2#107.1 Listing Letter



**AUTHORIZATION TO MARK**

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

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<b>Address:</b>	360 Merrimack Street Bldg 9, Floor 2 LAWRENCE, MA 01843	<b>Address:</b>	360 Merrimack Street Bldg 9, Floor 2 LAWRENCE, MA 01843
<b>Country:</b>	USA	<b>Country:</b>	USA
<b>Contact:</b>	Michael Zuercher-Martinson	<b>Contact:</b>	Michael Zuercher-Martinson
<b>Phone:</b>	(978) 683-9700	<b>Phone:</b>	(978) 683-9700
<b>FAX:</b>	(978) 683-9702	<b>FAX:</b>	(978) 683-9702
<b>Email:</b>	Michael@solren.com	<b>Email:</b>	Michael@solren.com
<b>Party Authorized To Apply Mark:</b>	Same as Manufacturer		
<b>Report Issuing Office:</b>	Cortland, NY 13045		
<b>Control Number:</b>	<u>3058249</u>	<b>Authorized by:</b>	 _____
			for Thomas J. Patterson, Certification Manager



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Intertek Testing Services NA Inc.  
545 East Algonquin Road, Arlington Heights, IL 60005  
Telephone 800-345-3851 or 847-439-5667 Fax 312-283-1672

<b>Standard(s):</b>	UL 1741, Standard for Safety Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources- 2nd Edition, Issued 2010/01/28 CSA C22.2 # 107.1-01, Issued 2001/09/01 Ed:3 General Use Power Supplies - (R2011)
<b>Product:</b>	Grid-tied Inverter
<b>Models:</b>	SGI 500, SGI 500 XT, SGI 300, SGI 266, SGI 250, SGI 225 SGI 500PE, SGI-499PE, SGI-499, SGI- 249, SGI 500XTM, SGI 750XTM Note: PE means "premium efficiency"