



SGI 225

SGI 250

SGI 266

SGI 300

SGI 500

INSTALLATION AND OPERATION MANUAL

Revision A

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IMPORTANT SAFETY INSTRUCTIONS

In this manual “Inverter” or “Inverters” refers to the inverter models: SGI 225, SGI 250, SGI 266, SGI 300 and SGI 500 unless one of the specific models is noted.

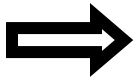
This manual contains important instructions that shall be followed during installation and maintenance of the SGI Inverter.

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



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

Use extreme caution when performing this task.



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



EXAMPLE: This indicates an example.

SAVE THESE INSTRUCTIONS

IMPORTANT SAFETY INSTRUCTIONS

- All electrical installations shall be performed in accordance with the local, American and Canadian electrical codes ANSI/NFPA 70.
- The Inverter contains no user serviceable parts. Please contact Solectria Renewables or a Solectria Renewables authorized system installer for maintenance. (Appendix C for Solectria Renewables contact information and authorized system installers.)
- Before installing or using the Inverter, please read all instructions and caution markings in this manual and on the Inverter unit as well as the PV modules.
- Connection of the Inverter to the electric utility grid must be completed after receiving prior approval from the utility company (unless connection agreement) and must only be performed by qualified personnel.
- Completely cover the surface of all PV-arrays with opaque (dark) 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 persons. 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 for a lost 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 ainsi qu'à la norme nationale américaine et canadienne ANSI/NFPA 70.
- Le SGI ne contient aucune pièce requérant un entretien effectué par l'utilisateur. Pour toute maintenance, veuillez consulter Solectria Renewables ou un installateur agréé par Solectria Renewables (les coordonnées de Solectria Renewables et des installateurs agréés sont indiquées sur le site web de Solectria Renewables: www.solren.com).
- Avant d'installer ou d'utiliser le SGI, veuillez lire toutes instructions et toutes les mises en garde présentes dans ce manuel, sur le SGI et sur les modules PV.
- Le raccordement du SGI au réseau électrique ne doit être effectuée qu'après avoir obtenu une entente d'interconnexion auprès de la compagnie locale de distribution électrique et uniquement par du personnel autorisé et qualifié.
- La surface de tous les capteurs PV doivent être recouverte entièrement d'un matériel opaque
- (noir) avant de procéder au câblage. Les capteurs PV exposés a la lumière produisent du courant électrique susceptible de créer une situation de risque.

CONSERVEZ CES INSTRUCTIONS

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1 Introduction

The SGI Series inverters (Smart Grid) are commercial, 3-phase grid-tied PV inverters designed to be inter-connected to the electric utility grid. By following this manual the Inverters can be installed and operated safely. This installation guide is used as reference for the commissioning and as a guideline on how to use the inverter most effectively.

Feeding power into the grid involves conversion of the DC voltage from the PV-array to grid compatible AC voltage by “inverting” DC to AC. This unit feeds power into a standard, 3-phase commercial, industrial, institutional or electrical utility facility’s electrical system which is connected to the electrical grid.

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

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

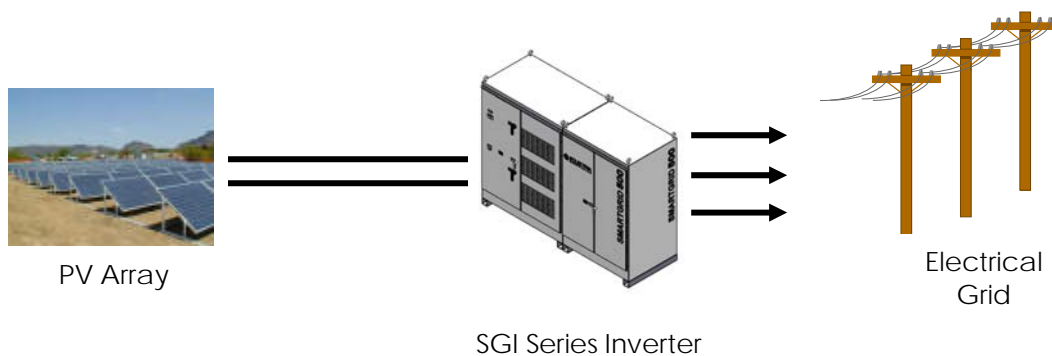


Fig. 1.1 Grid tied inverter application

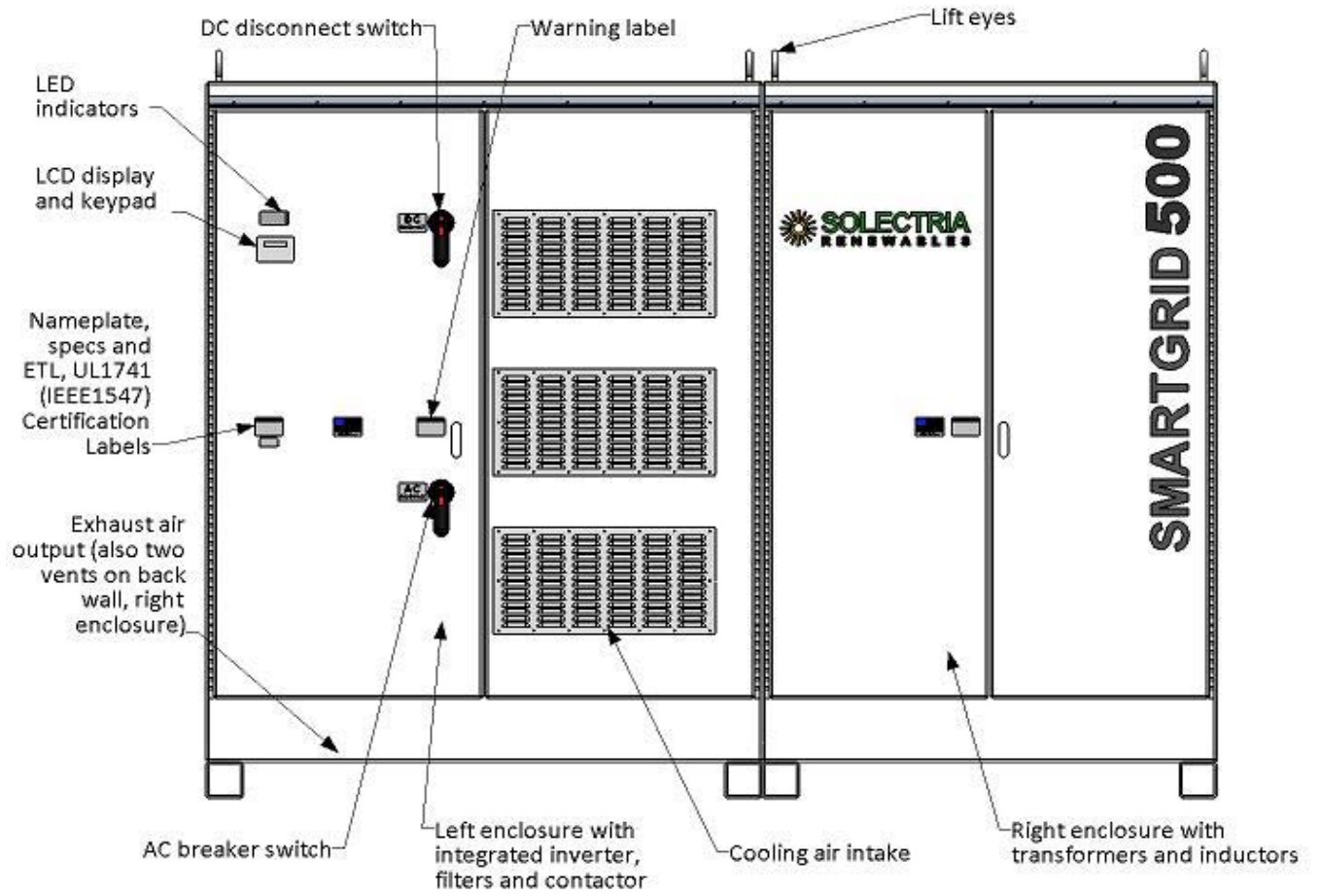
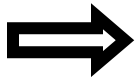


Figure 1.2 The SGI Inverter

2.0 Site Preparation and Inverter Placement

The Inverter is comprised of a rainproof industrial enclosure containing electrical and electronic components and AC and DC integrated disconnects.



NOTE: If the Inverter is mounted outside, please make sure the enclosure doors remain closed during the installation process in case of rain or snow. (Leaving these doors open voids the warranty.)

Criteria for device mounting:

- Because the power electronics are within the rainproof main enclosure, 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.
- For optimal electrical system efficiency, use the shortest possible AC and DC cables and use the maximum allowable cable size.
- Avoid installation in close proximity to people or animals, as there is audible high-frequency switching noise.
- Install the inverter in an accessible location following NEC codes for enclosure and disconnect door clearances and proximity to other equipment.
- For optimal inverter life and performance, do not mount the inverter in direct sunlight, especially in hot climates, although the inverter is designed to function at full power continuously in up to 50°C ambient temperatures. In hot climates if the unit must be mounted in direct sunlight 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 . It is also recommended to face to door north or east if possible.



CAUTION: Please follow these guidelines:

- Be sure to verify load capacity of floor, roof or concrete pad mounting area.

Inverter Model	Weight	Fork Lift
SGI 500	6980 lbs.	8000 lbs
SGI 300	5650 lbs.	6000 lbs
SGI 225 255 266	5170 lbs	6000 lbs

Table 2.1 Weight and Required fork lift capacity

- The ambient temperature must be between -25°C and $+50^{\circ}\text{C}$ for full power, continuous operation. (The inverter will automatically reduce power or may shut down to protect itself if ambient air temperature at the intake rises above 50°C).
- The National Electrical Code (NEC) requires that the inverter be connected to a dedicated circuit and no other outlets or device may be connected to this circuit. See NEC Section 690-64(b)(1). The NEC also imposes limitations on the size of the inverter and the manner in which it is connected to the utility grid. See NEC Section 690-64(b) (2).
- The cooling air exhausts at the back of the unit. Nothing should block 6" clear space behind the enclosure. Air should be able to flow from bottom to top along the back of the inverter. It is also recommended to have 6" clearance on the left and right sides although this is not required.
- A minimum distance of 12 inches (300mm) must be clear above the inverter for ventilation.
- If you are installing the inverter in a utility vault or electrical closet, the air circulation must be sufficient for heat dissipation – provide external ventilation, to maintain an ambient condition of less than 50°C . The ambient temperature should be kept as low as possible at all times.

Model	Max. heat loss
SGI 500	55000 Btu/hr
SGI 300	32000 Btu/hr
SGI 266	28000 Btu/hr
SGI 250	26000 Btu/hr
SGI 225	24000 Btu/hr

Table 2.2 indoor cooling requirements

2.1 Inverter Positioning

Correct mounting position for the inverter is vertical with the mounting feet on the floor. This diagram shows the basic inverter dimensions:

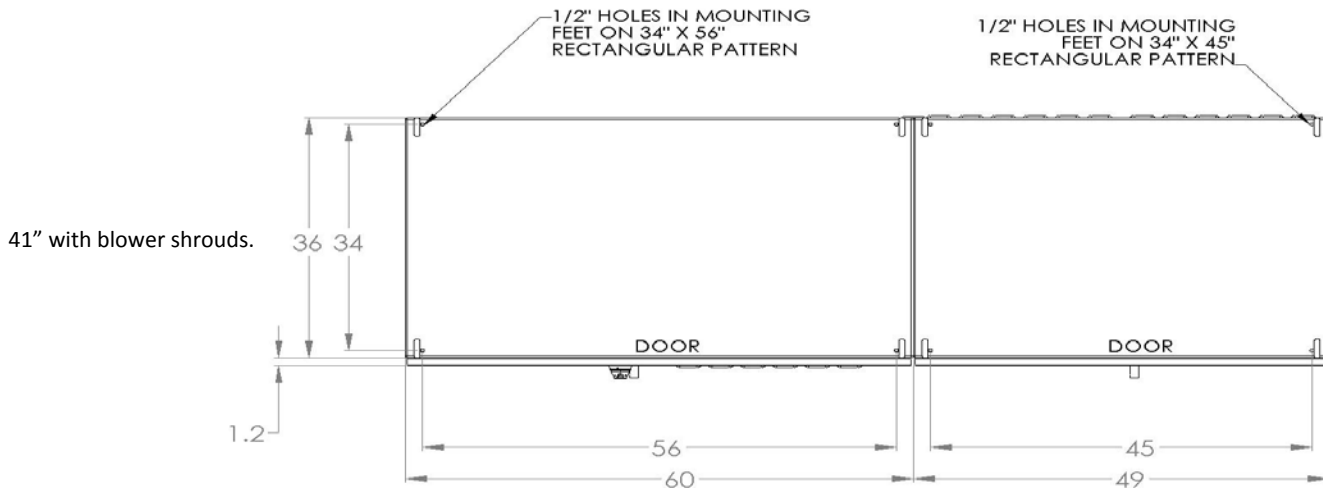


Figure 2.1 SGI 225 – SGI 500 dimensions

2.2 Mounting Details

Using the mounting diagram Fig. 2.2, concrete pad mounting will be used. The inverter includes mounting feet with 8 holes (1/2", 12mm diameter) on a 105" x 34" rectangular pattern for attaching the inverter. Note that these 4 mounting holes are 2" inside each corner of the main inverter enclosure dimensions which are 37" x 109" (41" x 109" with blower shrouds).

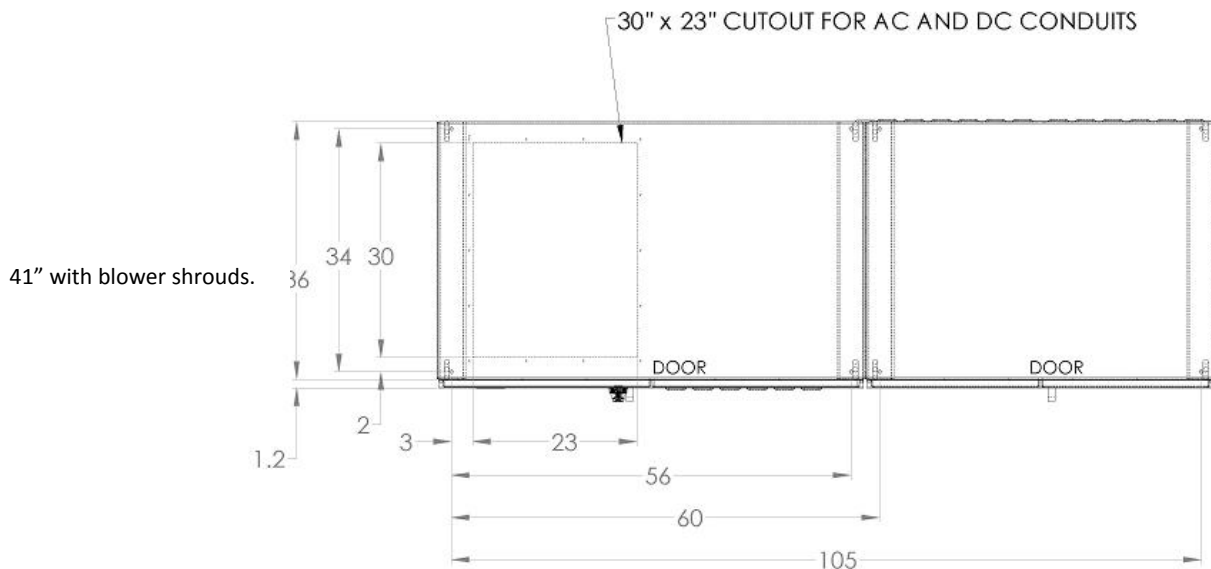
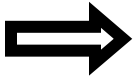


Figure 2.2 SGI Series mounting pattern (top view)

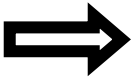
It is recommended to use eight hot dip galvanized grade 5 or 8 steel bolts or stainless steel bolts. The correct bolt size is 3/8" (10mm) diameter. Use a heavy lock washer and flat washer with each bolt. Alternatively, a "toe-plate" can be used at the end of each 4x4" tube foot. After mounting is completed, remove shipping aids from front shrouds and inside unit.



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



NOTE: The weight of the inverter will exert this added load to floor, roof or pad where mounted. Be sure to verify proper load capacity of mounting surface.



NOTE: If the roof/floor mounting only uses the inverter's mounting feet, be sure you use all 8 available foot mount bolt positions.

2.3 DC and AC wire Entry Points

AC and DC wiring must enter through the provided conduit cutout in the bottom of the inverter enclosure. Alternative locations are the left side for DC and back panel for AC.

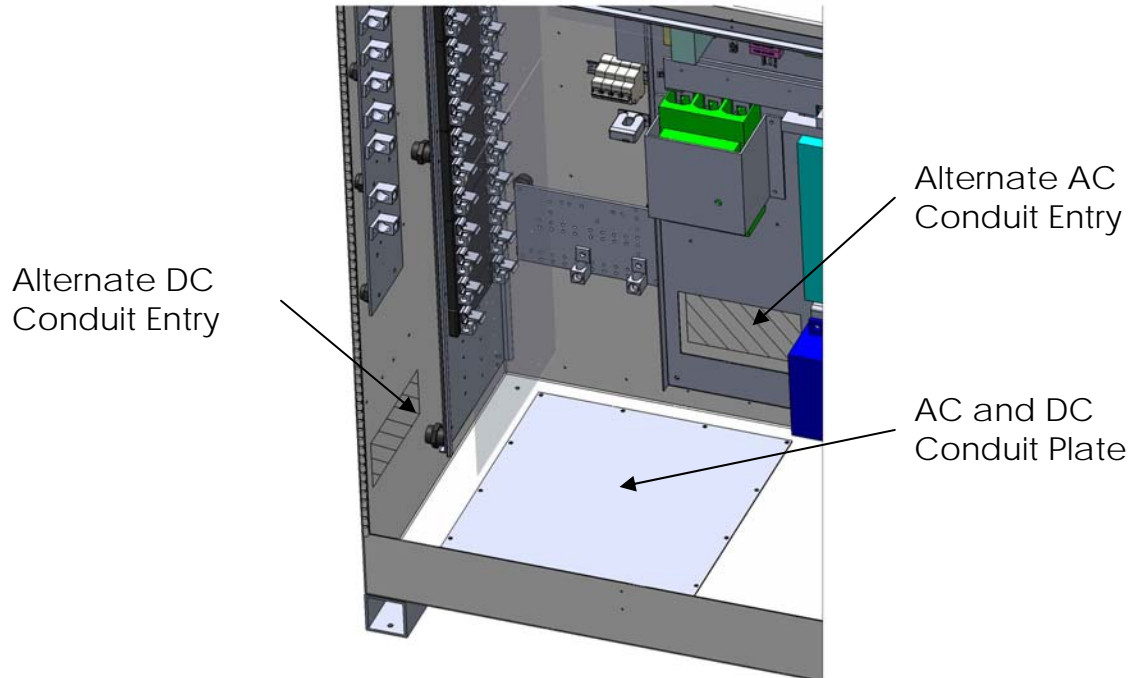


Figure 2.3 AC and DC conduit cut-outs

3.0 Installation



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



WARNING: Electrical installation shall be performed in accordance with all local electrical codes and the National Electrical Code (NEC), Canadian Electrical Code for Canada (CEC), ANSI/NFPA 70.



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

3.1 Checking for Shipping Damage

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

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

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

3.2 Inverter Mounting



WARNING: The SGI may tip over if improperly moved potentially causing damage to equipment, personnel injury or death.

- Note the center of gravity to guide lifting methods.
- Do not tilt the pallet or inverter while moving it.
- Please follow the following guidelines.
- Safety chains and straps must be used to prevent any possible tilting or shifting of the inverter in any direction while being lifted.



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

3.2 Removing inverter from pallet and moving inverter:

It is recommended to keep the inverter secured to the pallet and moved as close as possible to the final location prior to removing the pallet.

To remove the securing bolts use a 9/16" socket and/or wrench. Completely remove each nut and bolt from the pallet.

The center-of-gravity of the inverter is well to the right of center, 36" from right side of the inverter directly under the left door of the transformer enclosure (right side enclosure).

Use an 8,000lb For the SGI500 and 6,000lb for SGI 225-SGI300 capable forklift or fork attachment on other equipment if lifting from the bottom. The forks should be set at a 50" inside spacing so they fit just to the left of the inverter's 4" x 4" aluminum tube feet.

Before lifting, make sure forks are against the left edges of both the right most foot and center feet and install safety chains (with failsafe hooks) to prevent inverter from sliding right on fork lift and from sliding off forklift (see diagrams).

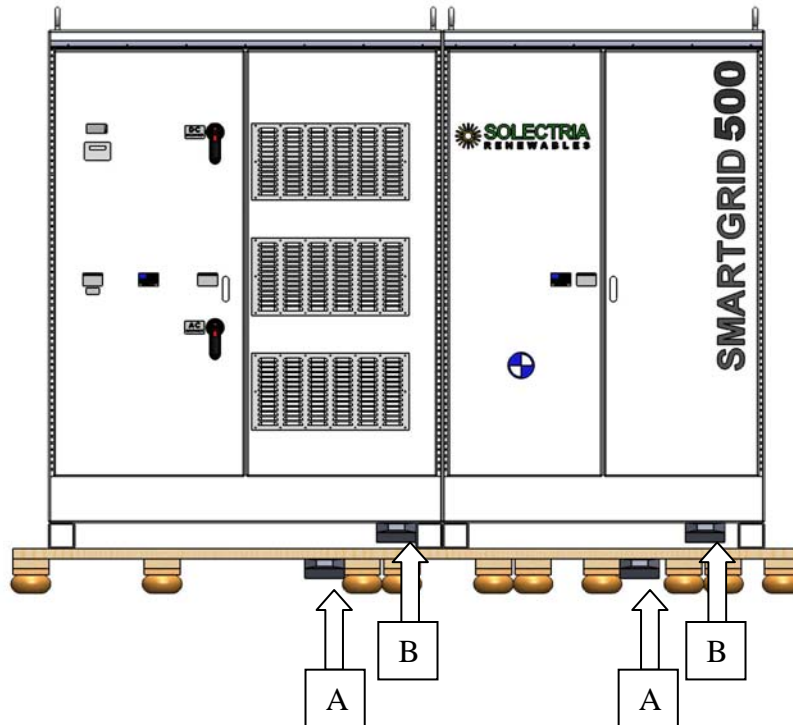


Figure 3.1 forklift lifting positions

Use positions A when lifting or moving the inverter while attached to the pallet
 Use positions B when lifting or moving the inverter removed from the pallet.

Note that the lifting diagrams show the inverter being lifted while mounted on the shipping pallet. If the inverter is lifted without the shipping pallet, a properly rated safety strap must be placed over the top of the inverter firmly holding it down on the lifting devices forks. It is recommended to use two lifting straps, one holding the inverter to the left fork and another to the right fork.

Alternatively, the inverter can be lifted using the lifting eyes on the top. If using this lifting method, lift with vertical chains and hooks connected to a proper lifting device. Do not lift with an "A" chain between the two eyes left-to-right as this could bend the inverter's roof, however 3-4 "A" chain sets can be used with each "A" chain on front and rear pairs of eyebolts with a each side of "A" having a chain length of 4 feet minimum. Each "A" chain must be tensioned. The recommended method is a 3 or 4 beam hoist with 6-8 equal-length tensioned chains hanging down, one over each eye bolt. An A-frame can be used above the 3-4 beams. At a minimum, lift by the left two eyes, the right two eyes and 1-2 of the center eyes at the front and 1-2 of the center eyes at the back. Never lift only by the outer 4 eyebolts as this will damage the enclosure and doors.

A-Chain Tension Chain Method

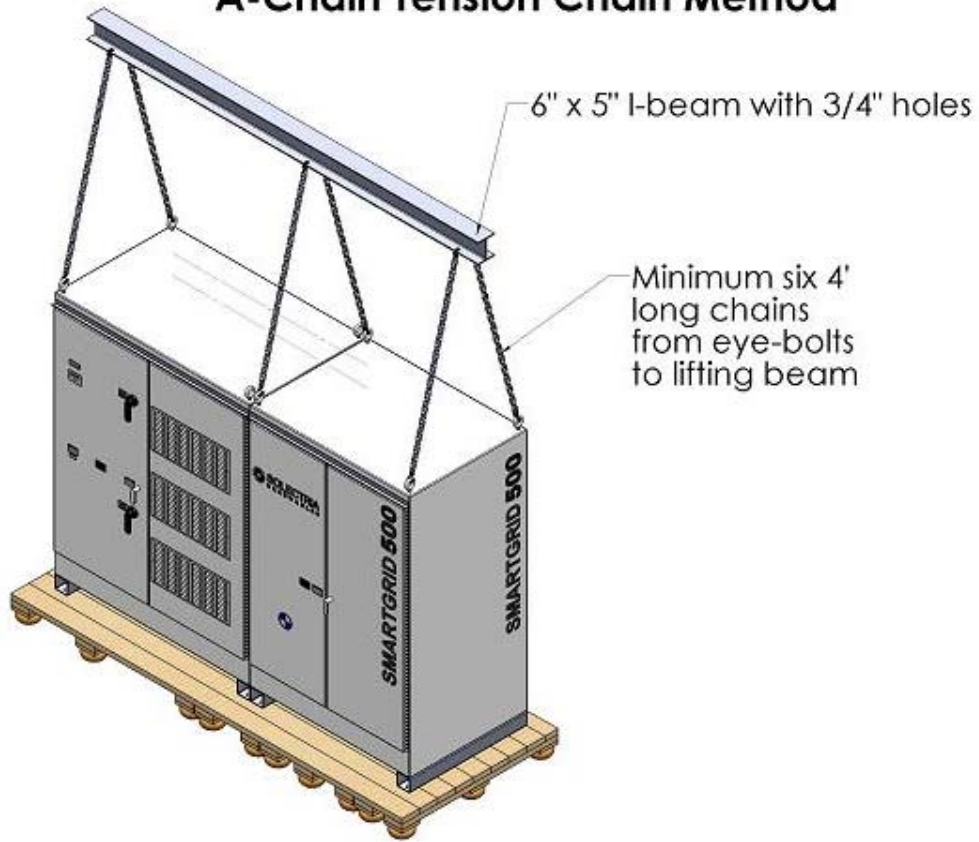


Figure 3.2 Eyebolt lifting



NOTE: Failure to follow the instructions may cause structural damage to the inverter and void the warranty.

4.0 DC Electrical Connections and Connection to the Electrical Utility Grid



WARNING: All electrical installations shall be performed in accordance with all local electrical codes and the National Electrical Code, Canadian Electrical Code for Canada and ANSI/NFPA 70. Only make AC connections directly to the AC breaker and DC connections to the DC sub combiner panel.

4.1 Grounding Electrode Conductor (GEC)

As with all PV systems, a Grounding Electrode Conductor must be installed per NEC690. This conductor should be sized according to NEC requirements. You should use an appropriate lug for the conductor and corrosion-prevention grease between lug and aluminum bracket.

A lug position is provided on the ground bond plate (use double wire rated lug) for AC output grounded conductor and grounding electrode conductor:

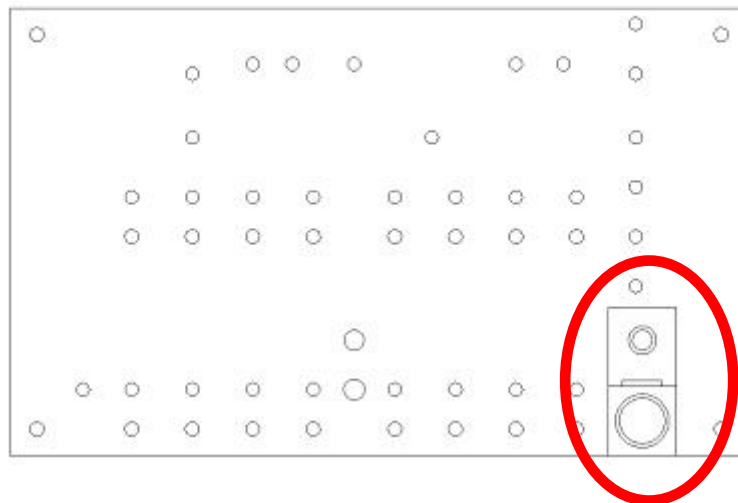


Figure 4.1 AC grounding lug positions



WARNING: Make sure to establish a solid connection from the inverter enclosure to the AC system ground before proceeding to connect any DC or AC wires.



WARNING: The wiring connections of the inverter to the DC voltage from the PV strings and the AC voltage of the utility must be performed with the AC and DC

disconnects off, building AC source circuit panel/breaker off and the PV module strings disconnected (or modules covered up).

4.2 DC Wiring

Copper wire must be used for the DC (PV) positive and negative conductors. Your SGI comes with one of the following DC subcombiner options installed:

<p>SGI 500 : 8 positions, 225 – 400 A fuses</p> <p>SGI 225 -300: 6 positions, 225 – 350A 600VDC fuses or 8 positions, 225 – 250A 600VDC fuses</p>	<p>SGI 500 : 16 positions 110 – 200A 600VDC fuses</p> <p>SGI 225 -300: 12 positions 110 – 175A 600VDC fuses or SGI 225 -300: 16 positions 110 – 125A 600VDC fuses</p>	<p>SGI 500 : 32 positions 70 – 100A 600VDC fuses or SGI 500 : 24 positions 70 – 100A 600VDC fuses or SGI 225 -300: 24 positions 70 – 100A 600VDC fuses</p>
<p>Max. 16 (12) x 2AWG- 350kcmil, 75 C connections, 275 in-lbs 1-2 wires per fuse position</p>	<p>Max. 16 (12) x 2AWG- 350kcmil 75 C connections, 375 in-lbs 1 wire per fuse position</p>	<p>Max. 32 (24) x 6AWG-1/0 75 C connections, 100 in-lbs 1 wire per fuse position</p>

Table 4.1 DC sub-combiner options

The negative subcombiner plate will accept up to thirty-two 75°C (167°F) rated aluminum set screw terminals and 75°C (167°F) rated aluminum or (tin plated) copper listed compression lugs. The following is a table of aluminum set screw lugs available from the factory specified with an inverter order.

SGI 500 : 8 positions SGI 225 -300: 6 or 8 positions 6-8 lugs	SGI 500 : 16 positions SGI 225 -300: 12 or 16 positions 6-8 lugs (dual wire)	SGI 500 : 24 or 32 positions SGI 225 -300: 24 positions 12-16 lugs (dual wire)
Max. 16 (12) x 2AWG-350kcmil, 75 C connections, 550 in-lbs 1-2 wires per lug	Max. 16 (12) x 2AWG-350kcmil 75 C connections, 550 in-lbs 2 wire per lug	Max. 32 (24) x 6AWG-1/0 75 C connections, 50 in-lbs 1 wire per lug terminal

Table 4.2 DC subcombiner grounded terminals

The negative DC connection is grounded within the inverter through the ground fault detection and interrupt circuit (GFDI). The PV negative should not be grounded at any other point in the system. The PV positive must never be grounded at any time. (Unless the inverter is configured for Positive Ground, check the labels prior to connecting cables)



WARNING: Fuses in the inverter’s DC disconnect must only be replaced with the same type (600VDC rated) fuses as originally installed.

Up to 16 individual DC equipment ground connections can be made directly to the ground bond plate:

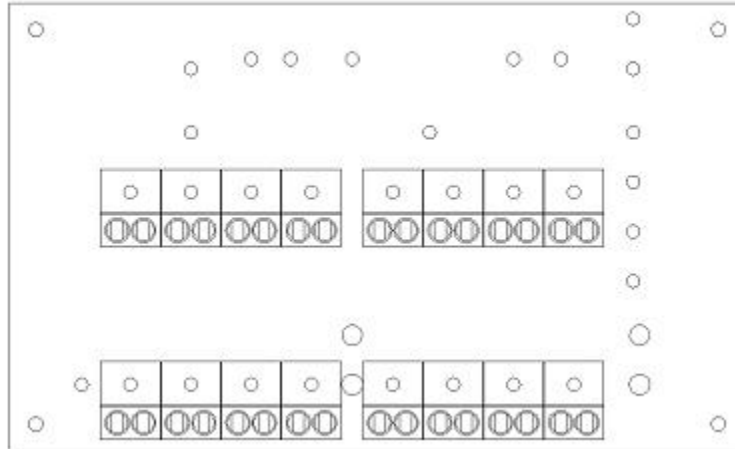


Figure 4.2 DC equipment ground combiner lug positions (16 x 14AWG-2/0 lugs)

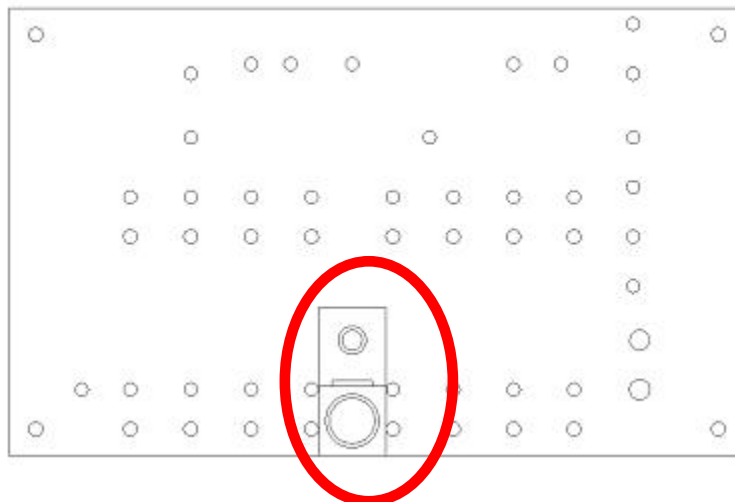


Figure 4.3 DC equipment ground combiner lug position (1 x 0AWG-750MCM lug)

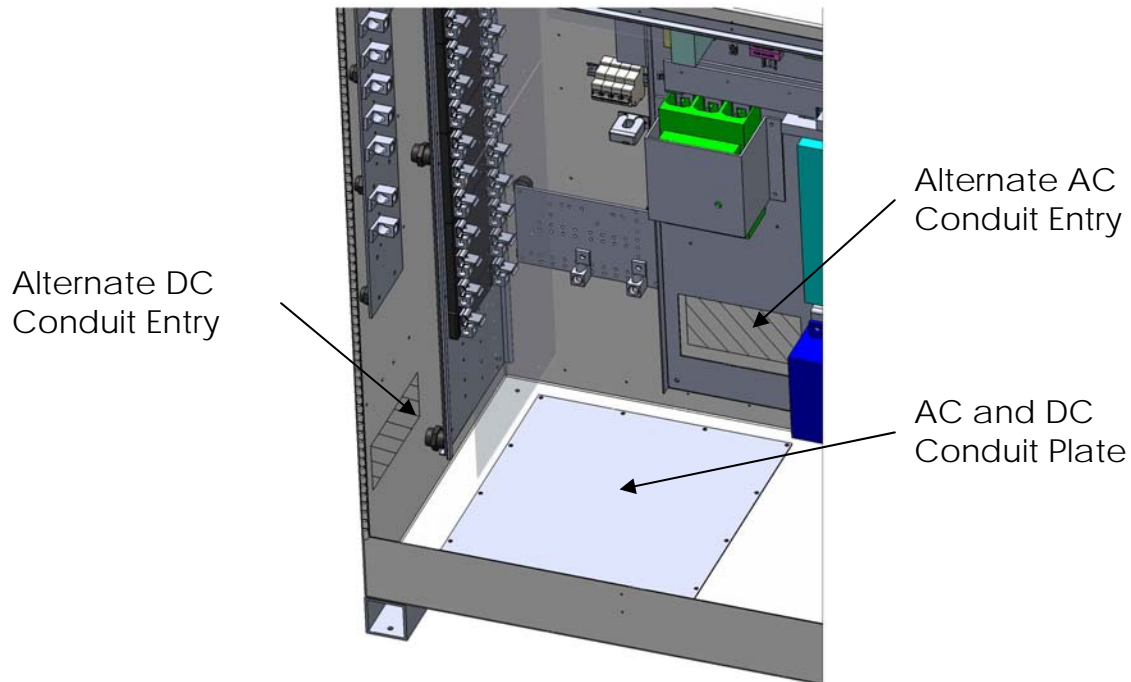


Figure 4.4 AC and DC conduit cut-outs

Connect the PV combined strings to the DC subcombiner fuse holders (ungrounded DC conductor) and negative subcombiner plate (grounded DC conductor). Connect the DC equipment ground to the ground bond plate.



WARNING: Before connecting the connectors of the PV-panel to the DC disconnect enclosure fused PV sub-combiner check the correct polarity and admissible PV-panel voltage between the + and the - cable connectors of the PV panel.

The PV-panel open circuit voltage must be below 600V DC ($V_{pv} < 600V$ DC) under all conditions as per NEC 690-7. Please read the Technical Info section for details. Any DC voltage over 625 will damage the inverter and void the warranty.

Connect PV modules, strings, combiners or uncover them. Verify correct DC voltage polarity again and make sure the GFDI breaker stays in the lever-up position.

4.3 DC Ground Fault Detection and Interruption

Your SGI inverter is equipped with an automatic DC Ground Fault detection and interruption circuit. When ground fault exceeding the pickup value is present in the PV array or in the DC wiring to the inverter, the DC GFDI breaker will trip and ground fault will be signaled by means of yellow LED and display.



Figure 4.5

	DC Ground Fault Current Pickup	Maximum Trip Time
SGI 225 - 250	4 A	1 s
SGI 266 - 500	5 A	1 s

Table 4.5



WARNING: If the GFDI breaker trips upon connection of one or more combined strings you must locate and eliminate the ground fault in the array before proceeding. The DC ground fault is eliminated when the GFDI breaker can be engaged back into its lever-up position. Failure to obey these instructions will cause the negative conductor to rise to potentially unsafe voltage levels (unsafe for a human to touch; the inverter can withstand DC ground faults of 2400A).



WARNING: Even when the DC disconnect is in the off position, the ungrounded DC conductor leading up to the DC disconnect will remain live on the PV side as long as the PV modules are in daylight. The inverter side of the DC disconnect will also remain live after the disconnect has been shut off until 60 seconds after the LEDs turn off, as DC bus capacitors in the inverter discharge.

4.4 AC Wiring

For 3-phase AC wiring, first verify clockwise phase sequence, and then use minimum 90°C (194°F) copper wire to connect to the inverter's 3-phase AC breaker. See NEC 310.10 regarding temperature ratings of wire. Follow local code to determine minimum wire gauge and temperature rating of the wires. Voltage drop and other considerations may dictate that larger wire sizes be used.

Model	Number of AC terminals per phase	Minimum cable size AWG	Maximum cable size kcmil	Torque Specs (in. lbs.)
SGI 225	2	3/0	500	450
SGI 250	2	3/0	500	450
SGI 266	2	3/0	500	450
SGI 300	2	3/0	500	450
SGI 500	3	2/0	400	450

Table 4.6 Wire size limits


4.5 Connection Wiring to the Electrical Utility Grid

The SGI Series Inverter must be connected to the grid with 3 conductors and an AC equipment-grounding conductor.

SGI 225-480VAC	SGI 250-480VAC	SGI 266-480VAC	SGI 300-480VAC	SGI 500-480VAC
350A (10kA)	400A (10kA)	400A (10kA)	450A (10kA)	800A (10kA)

Table 4.7 minimum AC breaker size

The grid impedance value 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 feeds to the grid. Less than 1% AC phase-to-phase voltage drop is recommended. Minimizing wiring impedance also results in higher system efficiency.

	1% voltage drop single conductor resistance	Min. AWG for 200ft	Min. AWG for 400ft	Min. AWG for 800ft
 SGI 250-480VAC	8.0 mOhm	350mcm	2x350mcm	4x350mcm
SGI 266-480VAC	7.5 mOhm	350mcm	2x350mcm	4x350mcm
SGI 300-480VAC	6.7 mOhm	400mcm	2x400mcm	4x400mcm
SGI 500-480VAC	4.0 mOhm	2x350mcm	3x500mcm	4x750mcm

Example: Copper AWG needed to stay below recommended limit of 1% AC wire loss (400' and over requires splicing 2 wires to maintain this low desired system resistance)

All AC wiring must enter through the provided conduit cutout in the bottom on the inverter enclosure or the rear panel (see figure 4.4).

Connect the building 3-phase conductors into the bottom of the integrated AC breaker as shown in figure 4.6. Phase A should connect to the leftmost position of the breaker, phase B to the middle and phase C to the rightmost position.

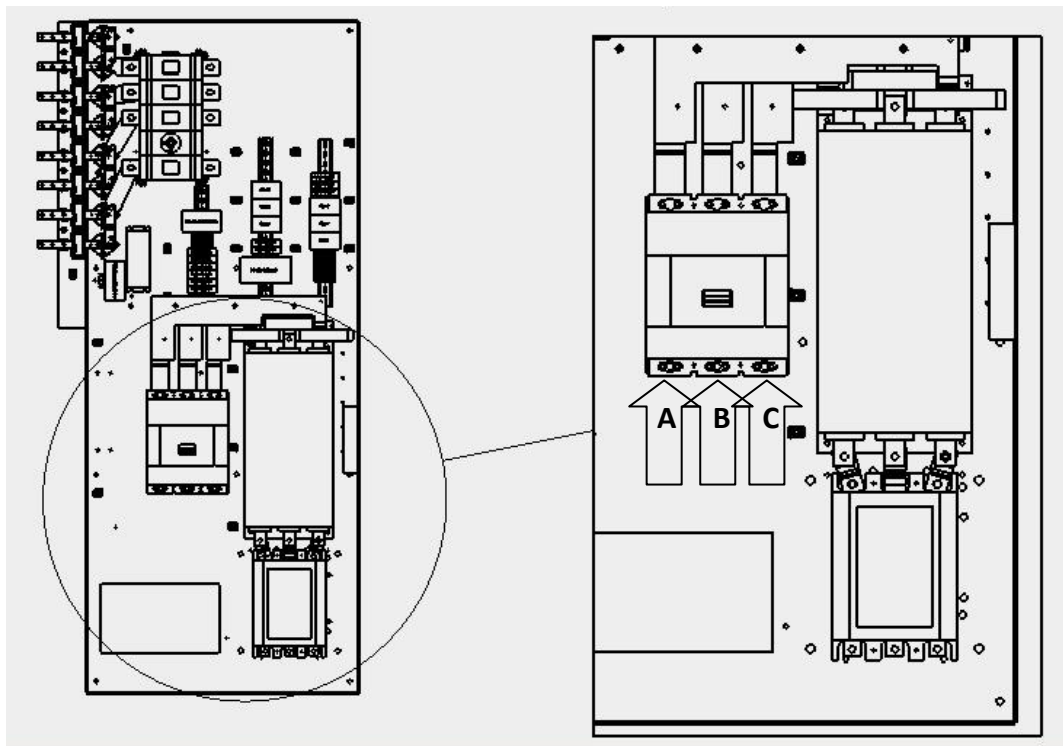


Figure 4.6 AC Connection point

Energize the AC to the inverter by switching building/utility 3-phase breakers ON.

4.6 AC Ground Fault Detection

Your SGI inverter is not equipped with an AC Ground Fault detection circuit. Where required by local electrical code, the inverter AC output needs to be connected to the supply side of the installation's AC ground fault protection.

4.7 Lightning and Surge Protection

The SGI series is designed with certain protections against surges in voltage including certification to ANSI/IEEE 62.41/62.42 (as required in the NY SIR), however added protection and solid grounding provisions are important for best protection against utility surges and surges created by indirect lightning strikes.

The installation of a UL listed lightning arrester of the correct specification is recommended on both the DC and AC inputs of inverter. This can be installed and wired using the manufacturer's directions. This device gives important added protection from indirect lightning strikes and resulting surges that provide protection beyond the inverter's IEEE 1547 requirements.

It is suggested to drive a ground rod specifically for the PV array. It is also a very good idea to have the lightning protection system of the building checked and upgraded if needed before the PV system is installed. These added protections are especially important for area prone to thunder storms and possible nearby lightning strikes. Although these added precautions will not guarantee that there will be *no* damage from lightning, they can help prevent or limit potential damage.

4.8 SolrenView Monitoring

SolrenView is a state of the art web based inverter monitoring system. The SGL series inverters are equipped with SolrenView monitoring DAS as part of the display module. If the customer has ordered and subscribed to SolrenView monitoring this must be turned on and Ethernet (CAT5) cable connected to the display module. The Ethernet cable is then connected to a router for IP address assignment. Please see chapter 6.0 for display set up and static IP address configuration.

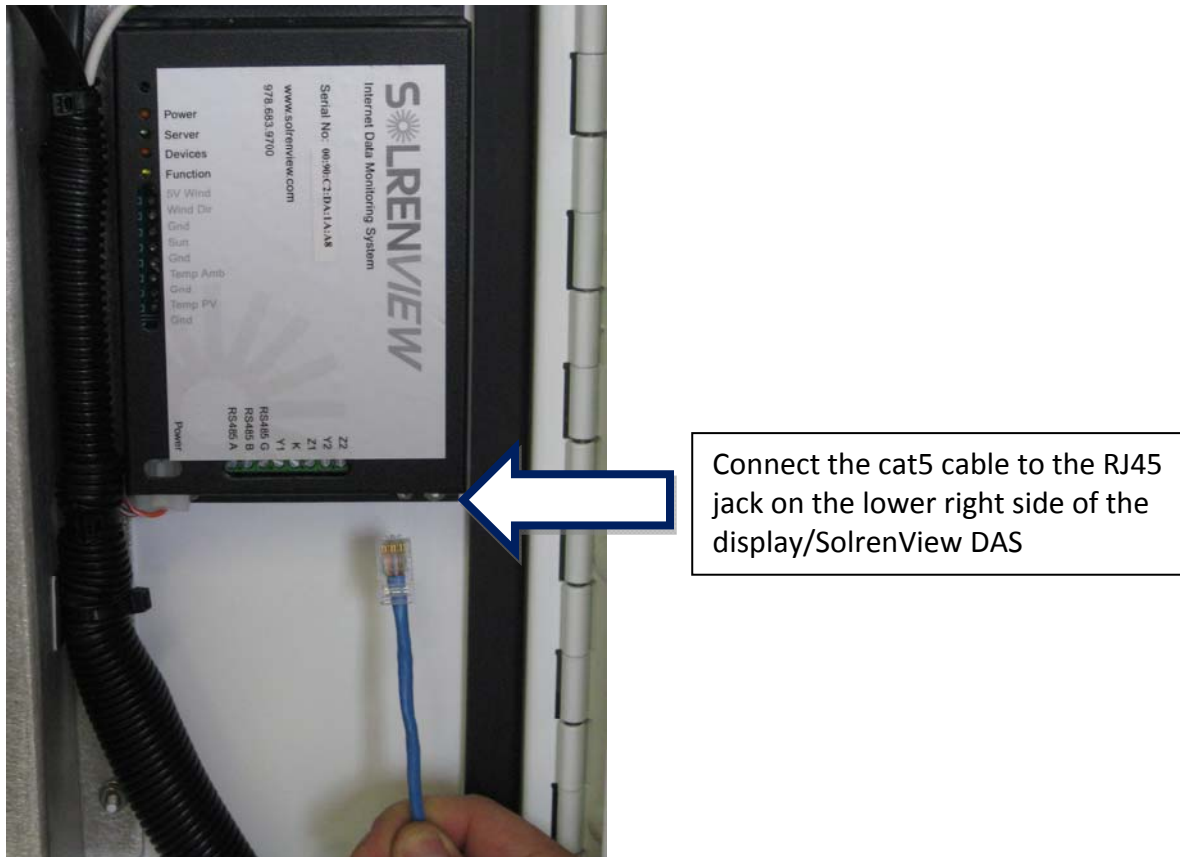








Figure 4.6 Ethernet connection

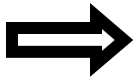
For multiple inverters at one location it is necessary to connect an Ethernet cable to each inverter then to a router or switch for connection to the customer broadband internet device. To enable the SolrenView monitoring follow these steps using the display panel

1. Press  to enter the display set mode
2. Press  to MONITOR
3. Press  to enter monitor set mode
4. Press  to SRV Mode
5. Press  to activate the change mode
6. Press  to select Yes

7. Press  to confirm

5.0 Commissioning the Inverter PV System

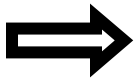
The inverter is mounted, all connections are made and you are ready to power it up.



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



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



NOTE: With the PV modules connected and inverter disconnects still off, it is a good final precaution to check PV voltage and polarity once more 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.

5.1 Turning on the inverter:

- Turn on the dedicated 3-phase circuit breaker on the building electrical panel.
- Turn on the Inverter's 3-phase AC disconnect.
- Turn on the Inverter's DC disconnect.
- Watch the LED indicators for initialization (green and red LEDs on), then slow blinking green LED followed by faster blinking green LED. Watch the LCD display for prompts and system status.
- Listen for contactor closing (inverter on-line).
- Listen for slight 60 Hz hum (transformer on-line).
- 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 LCD display will show the AC Power (PAC), Energy (EAC), current and voltage as well as DC voltage.

5.2 Operation:

The control electronics will be active as soon as DC (PV) voltage reaches 300V DC. The inverter will go on-line with the utility/building 3-phase grid when the DC voltage first exceeds 370V DC (strike voltage). Next, the inverter will load the array, bringing the DC voltage down from 370V DC to not less than 300V DC.

Once there is enough PV power at 300V DC to back feed 3-phase AC power switching will automatically feed power to the grid.

Operating states, GFDI status and error indications shown by the LED indicators, which are described in chapter 6, “Power, GFDI and Error LED Indicators”.

6.0 LCD Display and LED Indicators

The inverter operates automatically without the need for user interaction or maintenance.

The Inverter automatically starts back feeding 3-phase AC power into the grid when there is sufficient DC voltage and PV power is available. The inverter runs through various checks before connecting to the grid. This will be displayed on the LED’s and the LCD display during start up.

6.1 LCD Display

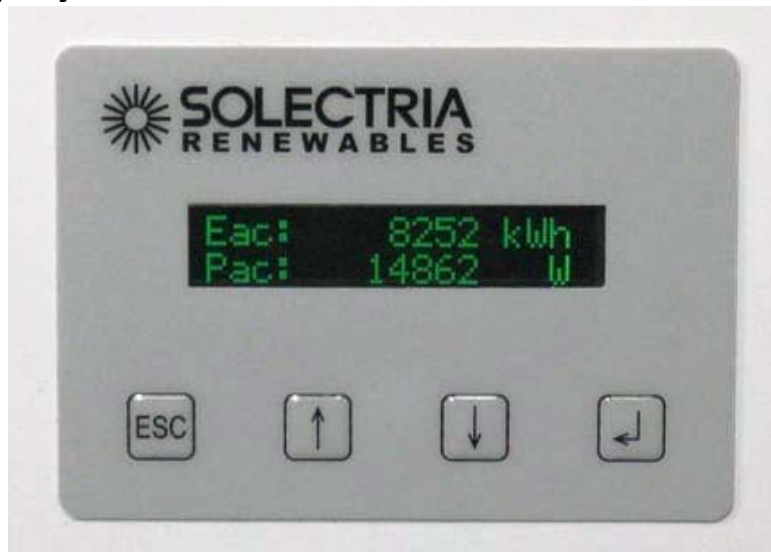


Figure 6.1 LCD Display example

Button Description



: To move up a level from the current menu.







: To scroll up/down the individual menu items



: To enter into selected menu.

6.1.2 Main/Default Screen



Eac: XXXX kWh
 Pac: XX W

Press  or  or  to move from the main/default screen into the Start Menu
 To enter into selected menu item, press the  key.


Start Menu

1. Measurements
2. Set Inverter
3. Set Monitor
4. KYZ Meter
5. Display Info

Measurements Menu

This displays the data retrieved from the inverter. Use the   buttons to move up and down the list:

AC Energy	<i>Cumulative AC Energy (kWh)</i>
AC Power	<i>AC Power output (W)</i>
AC Voltage	<i>AC Voltage, 3-phase (V)</i>
AC Current (average)	<i>AC Current, 3-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>
VAR Avail.	<i>Available Reactive AC Power output (VAr)</i>
KVArh supplied	<i>Cumulative reactive energy generated (kVArh)</i>
KVArh absorbed	<i>Cumulative reactive energy received (kVArh)</i>
Heat Sink	<i>Heat Sink Temperatures (°C) #1-3</i>
DC Current #1-2	<i>DC Current(A) #1- 2</i>
DC Current #3-4	<i>DC Current(A) #3-4</i>
DC Current #5-6	<i>DC Current(A) #5-6</i>
DC Current #7-8	<i>DC Current(A) #7-8</i>

Pressing  will take the screen back to the start menu.

Note: data will only be available when inverter is awake and communicating.

Set Inverter Menu

Displays inverter parameters, some of which may be modified with the keypad.

- | | |
|------------------|---|
| 1. Inverter ID | <i>Serial port address/ID of the inverter</i> |
| 2. Baud Rate | <i>Serial port baud rate (19200 or 9600)</i> |
| 3. Power Level | <i>Inverter AC power output level</i> |
| 4. VAC | <i>Inverter VAC</i> |
| 5. Transformer | <i>Transformer model</i> |
| 6. Disable Power | <i>Disable AC Power</i> |
| 7. UL Reconnect | <i>Wait time in seconds</i> |
| 8. Vac Very High | <i>AC Voltage Critical High</i> |
| 9. Vac High | <i>AC Voltage High</i> |
| 10. Vac Low | <i>AC Voltage Low</i> |
| 11. Vac Very Low | <i>AC Voltage Critical Low</i> |
| 12. Fac Low | <i>AC Frequency Low</i> |
| 13. Fac Very Low | <i>AC Frequency Critical Low</i> |
| 14. Fac High | <i>AC Frequency High (Not adjustable)</i> |
| 15. Password | <i>4-digit pin code to set limits</i> |

Note: data is only available when inverter is operating.

Monitor Menu

Displays monitor settings that may be modified with the keypad.

- | | |
|-----------------------|---|
| 1. LAN | <i>Local Area Network configuration, applicable only for SolrenView monitoring</i> |
| 1. DHCP Mode | <i>See SolrenView manual on DHCP</i> |
| 2. Static/Fallback IP | <i>If DHCP is turned on, this is then used as the fallback IP</i> |
| 3. Gateway IP | <i>IP address of LAN's default gateway.</i> |
| 4. Netmask | <i>Subnet mask</i> |
| 2. Date/Time | <i>Manual time set. This may be overwritten by scheduled NIST updates.</i> |
| 3. Reboot | <i>Reboots the monitor</i> |
| 4. Remote SRV | <i>This starts the transmit process necessary for SolrenView monitoring. Note: Enabling this field when SolrenView service has not been confirmed or authorized may result in unnecessary wear on the unit.</i> |
| 5. Reset SRV | <i>Settings are cleared to factory defaults. Caution: This will also clear Revenue-grade KYZ counters.</i> |

6.2 LED Indicators

The LED indicators mounted on the front of the left enclosure just above the LCD give the installer and user a good, quick look at what state the inverter is in and if it is operating normally.

GREEN – indicates “power”, the unit is powered up and/or feeding power to the grid

RED – “ERROR” or “FAULT”, the inverter is not providing power due to an error or fault

YELLOW – RED together indicate that a ground fault has been detected and it must be located and repaired before the inverter will function. Check GFDI breaker if YELLOW LED remains solid.

If the GFDI breaker is tripped (lever in down position), it will need to be reset to return the inverter to proper operation.

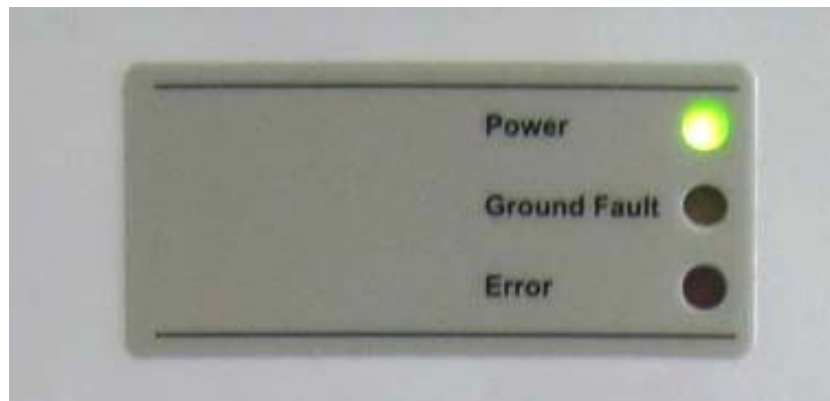


Fig. 6.2 LED indicators

green:	○	GFDI breaker tripped	GFDI breaker needs to be reset after DC ground fault is removed in the array or the wiring leading up to the inverter see chapter 5
yellow:	●		
red:	○		

For other LED indications please contact Solectria Renewables Customer Support.

7 Troubleshooting, Inverter Messages

Although the inverter is designed for many years of power production there may be instances where messages may be displayed on the LCD screen. For ease of diagnostics most messages are in plain English.

Inverter Messages

	Possible Cause	Possible Solution
Pac: XXXX W Power Derating	The inverter is in Derating mode. Can be caused by high input power, high temperature, AC line impedance	Check string sizing, ambient temp, fans operating, vents are clear, AC wire sizing
Pac: XXXX W MOV Fault	A high voltage spike has occurred from the AC grid voltage. Usually from lightning	The inverter will need to be inspected and serviced by an authorized service provider.
Pac: XXXX W AC Voltage High	The AC grid voltage is exceeding the high limit.	Measure the actual VAC compared to the LCD display VAC. If VAC is greater than acceptable limits inverter will restart when normal.
Pac: XXXX W AC Voltage Low	The AC grid voltage is less than the low limit.	Measure the actual VAC compared to the LCD display VAC. If VAC is less than acceptable limits inverter will restart when normal.
Pac: XXXX W AC Freq High	The AC grid frequency is exceeding the high limit.	If possible measure the frequency or contact local utility provider.
Pac: XXXX W AC Freq Low	The AC grid voltage is less than the low limit.	If possible measure the frequency or contact local utility provider.
Contactor Fail 978-683-9700	The AC contactor or sensing circuit 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.
CT Failure 978-683-9700	An internal failure has occurred in one or more of the cores	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
Thermal disc. 978-683-9700	Thermal overshoot. One or more of the thermal sensors has ramped up too quickly	Turn the DC and AC off, restart the inverter. The inverter may need to be inspected and serviced by an authorized service provider.
NTC Failure 978-683-9700	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.
IGBT Overtemp 978-683-9700	The internal temperature is exceeding operational limits	Turn the DC and AC off, let the inverter cool to ambient temperature and restart the inverter.
Desat Error 978-683-9700	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.
DC GND Fault Check DC Wiring	The solar array or wiring has a fault to the ground circuit	Verify + and – VDC to ground repair fault and reset the GFDI circuit breaker

<p>VAC Low Reconnecting</p>	<p>The inverter had a “UL event” and is in the 5 minute wait period</p>	<p>Wait for the inverter to restart</p>
<p>Pac: XXXX W Waiting for grid</p>	<p>Grid voltage may not be present</p>	<p>Check for grid voltage</p>
<p>Reverse phasing & restart PVI!</p>	<p>The VAC grid connection phasing does not match the inverter</p>	<p>Change the phase wire positions at the inverter connection on the grid side</p>
<p>Pac: XXXX W Min Vmpp reached</p>	<p>The power point tracking has been reached</p>	<p>The inverter will hold the Vmpp at this level until it increases.</p>

8 Product Warranty & RMA Policy

8.1 Warranty Policy

The Solectria Renewables Warranty Policy is stated below.

Solectria Renewables Warranty Coverage:

Solectria Renewables Limited Warranties are provided by Solectria Renewables, LLC. ("Solectria Renewables") and cover defects in workmanship and materials.

Duration of a Solectria Renewables Warranty Period:

The warranty period is 60 months from the date of purchase of the SGI 225 / SGI 250/ SGI 266 / SGI 300 / SGI 500 by the end user or 64 months after the delivery date from Solectria Renewables to distributor or dealer/installer, whichever is shorter. If a warranty extension has been purchased, the term is defined as extension beyond 60 months. For example, if a 5-year extension (to 10 years total) is purchased, the term becomes 120 months from date of purchase.

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

All warranties are null and void if full payment for products and associated shipping are not received in full and in a timely manner by Solectria Renewables.

Please contact Solectria Renewables Customer Service for further details on other products.

Warranty service provided by Solectria Renewables:

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

Solectria Renewables will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. Solectria Renewables reserves the right to use parts or products of original or improved design in the repair or replacement. All replaced products and all parts removed from repaired products become the property of Solectria Renewables.

Solectria Renewables will attempt to repair the unit within a reasonable time period (there is no reimbursement for lost energy production.)

Solectria Renewables covers both parts and labor necessary to repair the product, and parts shipment to and from customer via a Solectria Renewables-selected non-expedited surface freight within the contiguous United States and Canada. For Alaska, Hawaii, Mexico and other countries shipping charges are one way to the customer location via non-expedited freight. The

customer, end user or installer is required to pay return shipping fees to Solectria Renewables. Contact Solectria Renewables customer service for details on freight policy for return shipments outside of the contiguous United States and Canada. Shipping fees do not include duties, taxes or other Governmental charges.

Obtaining Service:

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

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

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

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

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

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

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

Solectria Renewables normal office hours are Monday-Friday, 8:30am-5:30pm EST. After hours technical assistance is available. Once a problem is identified, necessary replacement component(s) will be dispatched within 48 hours to the jobsite or the designated service personnel's address or will be brought to the site by Solectria Renewables' personnel.

What does the Solectria Renewables warranty not cover?

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

- a) The product, if it has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment;

- b) The product, if it has been subjected to fire, water, generalized corrosion, biological infestations, acts of God or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Solectria Renewables product specifications including high input voltage from generators and lightning strikes;
- c) The product, if repairs have been done to it other than by Solectria Renewables or authorized, trained service personnel;
- d) The product, if it is used as a component part of a product expressly warranted by another manufacturer;
- e) The product, if its original identification (trademark, serial number) markings have been defaced, altered, or removed;
- f) The product, if it has been damaged in shipping (unless approved in writing by Solectria Renewables);
- g) Any installation and operation beyond the scope covered by relevant safety regulations (UL1741, NEC, Canadian standards, etc.);
- h) Any third party accessories installed in or on the product.
- i) Loss of electricity generation, payment for utility bills, or any other costs related to the inverter after installation.

Extended warranties covering Solectria Renewables inverters do not cover external data monitoring hardware.

DISCLAIMER

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

IN NO EVENT WILL SOLECTRIA RENEWABLES, LLC, INCLUDING ITS SUPPLIERS, MANUFACTURERS, VENDORS, SUBCONTRACTORS, DISTRIBUTORS, DEALERS AND ANY OTHER AFFILIATES BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL

DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING WHETHER IN CONTRACT OR TORT INCLUDING WITHOUT RESTRICTION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, ANY PERSONAL INJURY, ANY DAMAGE OR INJURY

ARISING FROM OR AS A RESULT OF ANY USE, MISUSE OR ABUSE, OR THE (IN-) CORRECT INSTALLATION, INTEGRATION OR OPERATION OF THE PRODUCT.

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

Exclusions of the Policy:

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

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

(a) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN MANUALS OR OTHER DOCUMENTATION PROVIDED BY IT IN CONNECTION WITH THE PRODUCT; AND

(b) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSSES, DAMAGES, COSTS OR EXPENSES, WHETHER SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION.

THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK.

WARNING: LIMITATIONS ON USE

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

Please review our Return Merchandise Authorization Policy for returning product to Solectria Renewables.

8.2 Return Material Authorization Policy

Obtaining a required, Return Material Authorization:

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

Information Solectria Renewables needs when you are obtaining service:

- 1) The model names and serial number of your product
- 2) Information about the installation and use of the unit
- 3) Information about the failure and/or reason for the return
- 4) A copy of your dated proof of purchase.

Preparing the product for shipping:

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

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

Returning a product from outside of the USA or Canada:

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

9 Technical Data

Technical Information and specifications – see appendix for complete SGI 225, SGI 250, SGI 266, SGI 300 and SGI 500 data sheet

Input (DC) from PV array:

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



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



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

Because the PV modules also have a reduction in voltage at high cell temperatures, you must make sure the MPP voltage of the strings will not drop below the minimum inverter DC input voltage of 300V DC in very hot temperature conditions.

Both the maximum open circuit voltage (OCV) when at cold extreme and minimum MPP voltage when at hot extreme can be calculated for a PV module using its specification sheet. PV module string sizing can then be used to determine how many modules can/should be used in a string.

9.1 Input DC (PV) specifications

Inverter Model	SGI 225	SGI 250	SGI 266	SGI 300	SGI 500	Unit
Operating voltage range (power)	300-600					VDC
Strike Voltage	370					
Input voltage MPP range	300-500					VDC
DC voltage measurement accuracy	+/- 2%					
Max continuous power range	225	250	266	300	500	kW
Maximum open circuit voltage	600					VDC
Absolute Maximum open circuit voltage	625					VDC
Maximum input current	780	864	918	1036	1727	ADC
Continuous input current	780	864	918	1036	1727	ADC
DC current measurement accuracy (SolZone option only)	+/- 2%					
Ground fault detection trip setting	4		5			ADC

Table 9.1 DC input

9.2 Output to AC grid connection:

The inverters are designed to feed power into a standard 60Hz, 3-phase AC utility service or AC provided within a facility by a transformer of not less than 500kVA.

As required by NEC, there must be a dedicated 3-phase circuit breaker for the PV inverter connection.

The inverter is designed to work with the range of AC voltages for a 3-phase service defined by IEEE Std 1547-2003 and ANSI C84.1.

Output (AC) specifications:

Model	SGI 225	SGI 250	SGI 266	SGI 300	SGI 500	Unit
Operating AC voltage range	88 – 110%					VAC
Turn-on AC voltage range	92% - 105%					VAC
Default over/under voltage trip points and times	per IEEE Std 1547-2003, Table 1 or utility specific order codes					
Over voltage trip magnitude adjustability	100% - 120%					Vnom
Under voltage trip magnitude adjustability	50% - 100%					Vnom
Over / under voltage trip time adjustability	0.1 – 30					sec
Voltage measurement accuracy	+/- 2 %					
Operating frequency adjustability	(60) -3.0 - +0.5					Hz
Under frequency trip time adjustability	0.16 – 300					sec
Frequency measurement accuracy	+/- 0.1					Hz
Maximum Rated Output Current (208VAC) external transformer	624	693	738	832	1388	Arms
Maximum Rated Output Current (208VAC) internal transformer	624	693	738	N/A	N/A	Arms
Maximum Rated Output Current (480VAC)	271	301	320	360	600	Arms
Maximum Rated Output Current (600VAC)	217	241	256	288	480	Arms
Peak short circuit output current	60					kA _{pk}
Short circuit output current duration	< 400					microS
AC current measurement accuracy	+ / - 3%					
AC real power and energy measurement accuracy	+ / - 5%					
Total Harmonic distortion (THD, @ full power)	< 3%					
Power Factor	unity					
Anti-islanding protection	per UL1741 / IEEE1547 / CSA22.2#107.1					
CEC Weighted Efficiency	TBD	TBD	TBD	TBD	TBD	%

Table 9.2 AC Specification

9.3 Other specifications:

DC Ground fault protection	2005 NEC 690.5
DC Ground Fault Current Withstand	Certified in UL 1741 testing to 3.2kADC, components rated to 25kADC
DC sub-combiner-fuse enclosure (Optional)	70A-400A fuses available 8-32 pole, NEMA 3R, TVSS
DC Disconnect (Integral)	Break load rated, NEMA 3R
Operational Ambient Temperature	-35° to 50° C (full power)
Storage Temperature	-40° to 70° C
Cooling	Automatic Forced Convection
Enclosure	Rain Proof UL1741
Enclosure-electronics	IP-62 (sealed design)

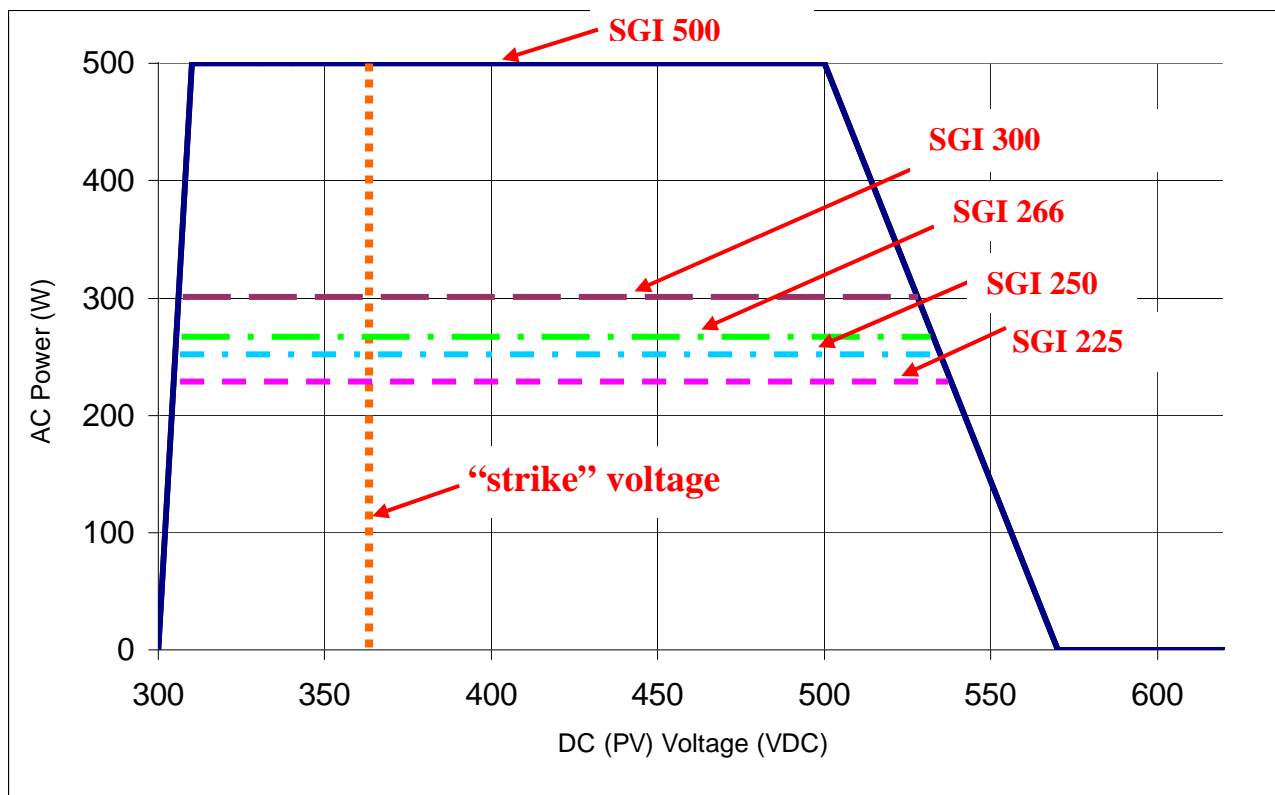


Figure 9.1 AC Output power of SGI Series inverters

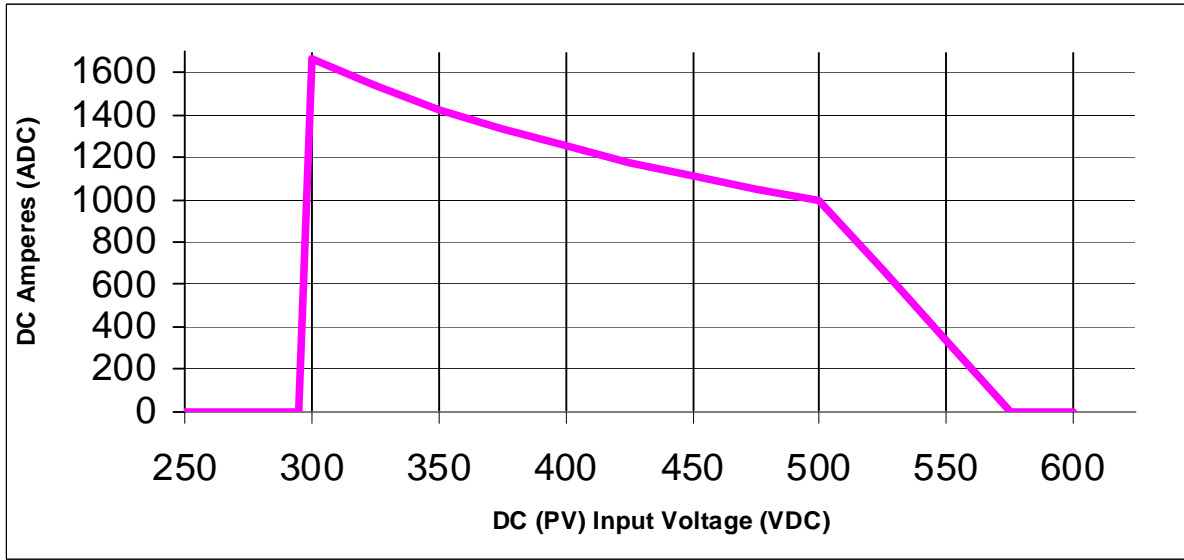


Figure 9.2 Example maximum continuous DC current input for SGI 500

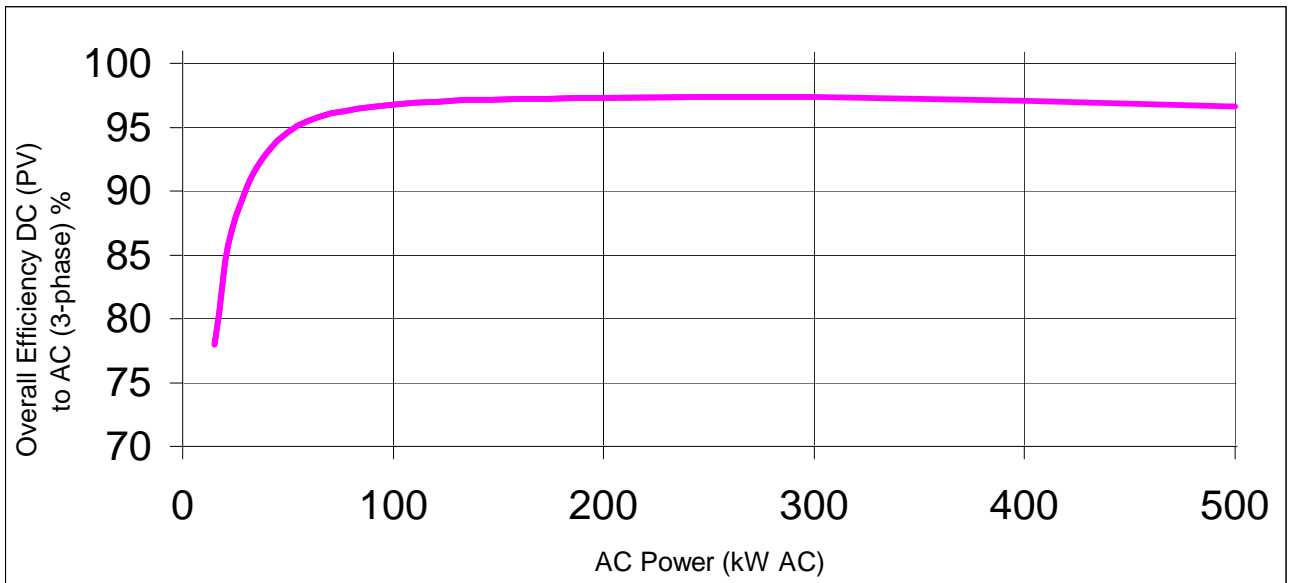


Figure 9.3 SGI 500 efficiency plot at 390VDC input and 25C ambient temperature (efficiency values were measured with a 3% accurate power meter setup and do not include any losses caused by long wires)

10.0 Appendices

Appendix A – SGI 250, SGI 266, SGI 300 and SGI 500 Data Sheet

http://www.solren.com/downloads/SGI250_SGI266_SGI300_SGI500.pdf

Appendix B – String sizing

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

Appendix C - Contact Information

Solectria Renewables LLC
360 Merrimack Street
Building 9, 2nd floor
Lawrence, Massachusetts 01843
USA

Tel: 978.683.9700
Fax: 978.683.9702
Sales/ general info: inverters@solren.com
Customer Support: service@solren.com
Website: www.solren.com

Authorized Distributors/Dealers/Installers/Designers:

See website for complete and updated listing: www.solren.com

Specific Link: <http://www.solren.com/contact/dist.htm>

Appendix D – UL1741 IEEE 1547 CSA22.2#107.1 Listing letter:

