

GEOPROTEK Grid PV Inverter GS 1500 / 2000 / 3000 / 4000 Installation Guide



Table of Contents

1	Notes on this Manual	3
2	Conventions	4
3	Safety Instructions	5
3.1	Appropriate Usage	5
4	Unpacking	6
4.1	Scope of Delivery	6
4.2	Check for Transport Damage.....	6
4.3	Identification of the GS INVERTER.....	7
5	Mounting.....	8
5.1	Important Safety Information	8
5.2	Selecting the Mounting Location	9
5.2.1	Dimensions and Weight	9
5.2.2	Ambient Conditions	9
5.2.3	Safety Distances.....	10
5.2.4	Position	10
5.3	Mounting Instructions	11
5.3.1	Mounting with Wall Bracket.....	11
6	Electrical Connection.....	15
6.1	Overview of Connection Area	15
6.2	Connecting the Public Grid (AC side).....	16
6.3	Connecting the PV Array (DC side)	18
	The PV Array design and installation must comply with the requirements of AS/NZS 5033.....	18
6.3.1	One string connection for GS-1500/GS-2000/GS-3000.....	18
6.3.2	Three string connection for GS-4000	19
6.4	Installing a Communication Module.....	20
6.5	Commissioning the PV Array System	21
6.6	Removal	22
7	Inverter Display.....	23
7.1	Normal Mode.....	23
7.2	Fault Mode.....	23
7.3	Information Display	23
7.4	Display Setting.....	25
8	Messages.....	26
8.1	Error Messages and troubleshooting	26
8.2	Update Messages	28
9	Specification.....	29

1 Notes on this Manual

Congratulations on purchasing GS series Grid PV-Inverter. GS INVERTER converts the direct current from your solar system into grid-compliant alternating current. GS INVERTER is a highly reliable product due to innovative design and perfect quality control.

This user manual describes the installation, operation, safety, and commissioning of GEOPROTEK Solar Technology Inverters. Be sure to read this manual carefully before enjoying this product.

If you encounter any problem during installing or using this inverter, please check this manual first before contacting with your local dealer or representative. Most of the problems you encountered will be solved according to the instruction inside.

2 Conventions

The following conventions are used in this manual:



This icon denotes a tip, which alerts you to advisory information.



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

3 Safety Instructions

The following section contains important safety information that you *must* follow when installing and using the product.

3.1 Appropriate Usage

A GS INVERTER is a Grid-connected inverter for PV power system. It converts the direct current generated by the PV array into stable alternating current and feeds to the utility grid.



- Do *not* operate the product in a manner not specified in this document. Misuse of the product can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to GEOPROTEK for repair through its local agent in Australia, Powerbox Australia Pty Ltd.
- Do *not* substitute parts or modify the product except as described in this document. Use the product only with the chassis, modules, accessories, and cables specified in the installation instructions. You *must* have all covers and filler panels installed during operation of the product.
- GS INVERTER converts DC power from PV array to AC (Alternative Current) power. Because GS is a grid-connected inverter, it works to control its current amplitude according to power provided from PV array. GS Inverter always tries to get maximum power from PV array.
- Large electric arcs may be generated if connectors are disconnected on the DC side during operation. The DC power must be disconnected before removing the connectors by means of the DC isolation switch on the button side of the inverter.
- GS INVERTER is designed to feed power to grid (utility) only, DO NOT connect this unit to standalone inverter or generator. If connecting to those facilities, AC power supplier will be damaged.



Before installing the GS INVERTER, the DC and AC feed lines must be disconnected.



GS INVERTER MUST be installed only by a qualified electrician and an accredited solar installer.



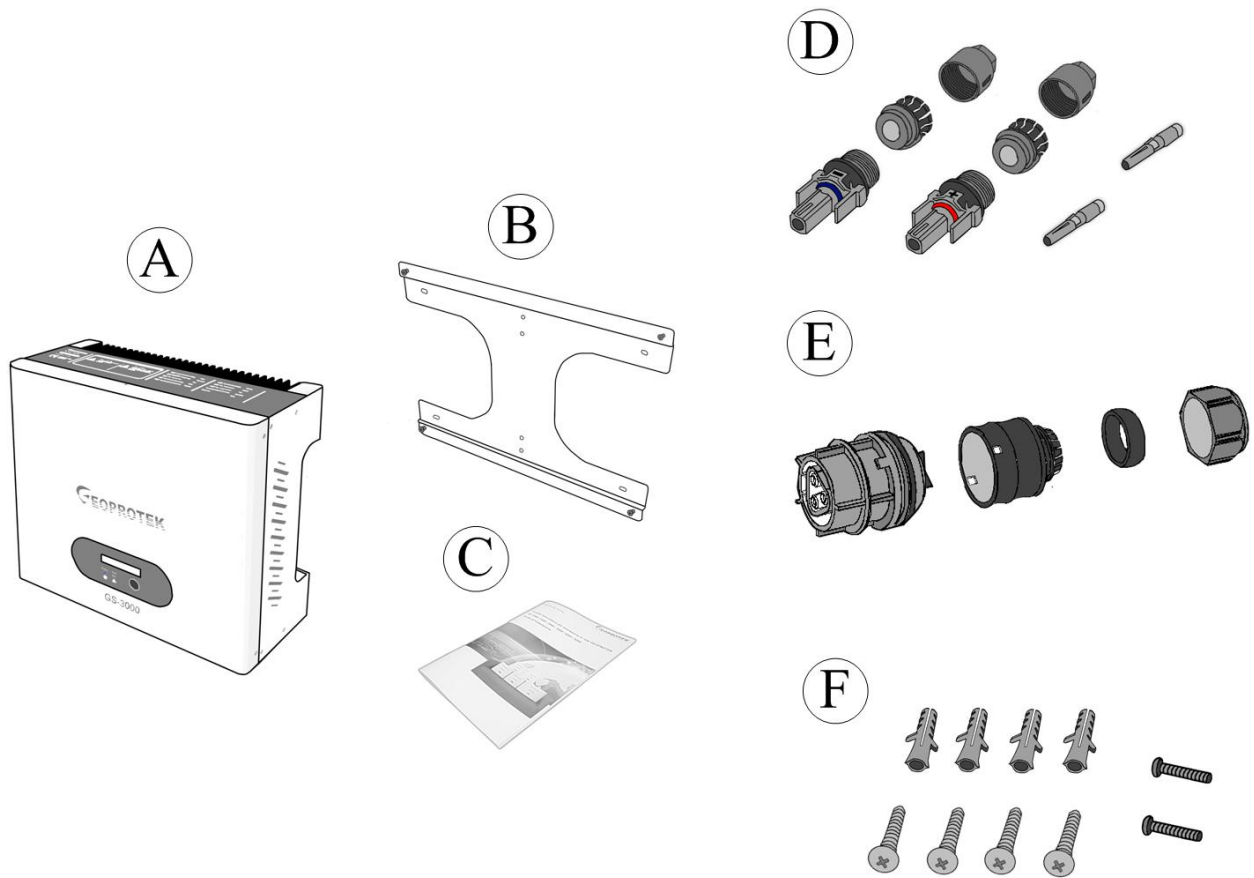
Ensure that the DC input voltage never exceeds the DC maximum input voltage rating of the inverter (500Vdc) under all conditions.



The PV array framework must be bonded to protective with an earthing conductor sized according to AS/NZS 3000.

4 Unpacking

4.1 Scope of Delivery



Object	Description
A	GS Inverter
B	Wall mounting bracket
C	User manual
D	DC connector socket (Tyco)*
E	AC connector socket with rubber bushing
F	Four screws for fixing wall mounting bracket Two safety lock screws for fixing two sides of the inverter

4.2 Check for Transport Damage

Please take out the unit from packaging box carefully. Check the GS INVERTER for visible external damage, such as cracks in the housing or display. Please contact your local dealer if you find any damage.

4.3 Identification of the GS INVERTER

You can identify the GS INVERTER using the name plate. The name plate is on the top side of the casing.

Device Type

Grid Voltage
(suitable for 220v ~ 240v)

DC Nominal operating voltage	360V	AC Nominal output power	2000W
DC MPPT voltage range	150-500V	AC Max. output power	2200W
DC Max. input current	10A	AC Max. output current	8.7A
AC Nominal operating voltage	230V	Operating temperature range	-20-55°C
AC Nominal operating frequency	50/60Hz	Enclosure	IP65

ATTENTION

Risk of burning:

- During operation the case temperature may exceed 140°F (60°C)
- Do not touch.

High voltage:

- Before opening the device, disconnect from the grid and the PV generator.
- The device may only be opened by an electrician.

5 Mounting

5.1 Important Safety Information

- **IMPORTANT:** Isolate this inverter from both the PV array and mains grid **BEFORE** commencing any installation or service work.
- A licensed electrician and accredited solar installer must install the entire system, including the PV array and associated wiring.
- The entire generating system **MUST** be designed and installed in accordance with AS/NZS3000, AS4777, AS/NZS5033, and any requirements of the local electricity utility. Particular attention should be paid to the design of and selection of components for the following:
 - PV and mains disconnection devices.
 - PV and mains fault current protection.
 - PV cable selection, current rating and insulation.
 - PV system and equipment earthing including earth of PV array frames.
 - PV module equipment class and required approvals.
- Protection from lightning should be provided per AS/NZS1768.
- This inverter is classified as a “non-isolated PCU” per AS/NZS5033.
- This inverter is a non-isolated (transformerless) grid-feeding inverter. LV mains voltage will be present between the PV array and earth when the inverter is operating.
- The PV array framework must be bonded to earth with an earthing conductor sized according to AS/NZS3000.
- When connecting and disconnecting the PV array to this inverter, protective earth must remain connected. The grid (AC utility) connector must be connected first and disconnected last. This connector is a permanently-latching type requiring use of a tool for removal to avoid inadvertent disconnection.
- **NEVER** connect an AC generator, wind generator or battery bank to the input of the inverter. Severe damage will result. Only PV panels may supply this inverter.
- Hazardous voltages can be present inside this inverter even after disconnection. Removal of the cover will invalidate the warranty and may result in injury.
- Generally, this inverter is not suitable for use with thin film PV panels. Check with your panel manufacturer that the PV panels can be used with a non-isolated (transformerless) grid feeding inverter.
- This inverter has an integral GFCI (ground fault current interrupter) which detects ground fault current or residual current in the system ground. This circuit disconnects the inverter from the grid if this current is greater than 30mA. This circuit provides protection from a ground fault in the PV array or accidental contact with PV array circuitry.
- **Warning:** If either of the PV (DC) input supply cords or the AC mains cord are damaged, they shall be replaced by the manufacturer, their service agent or a similarly qualified person in order to avoid hazards.

5.2 Selecting the Mounting Location

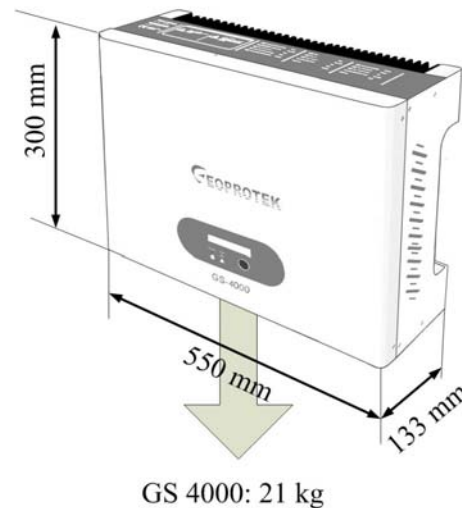
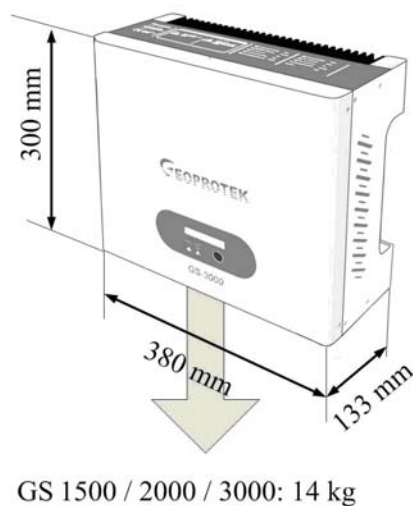


Do *not* mount the GS INVERTER in an explosive atmosphere or where there may be flammable gases or fumes. If you must operate the product in such an environment, it must be in a suitably rated enclosure.



Do *not* exceed the maximum ratings for the GS INVERTER. Do not install wiring while the product is live with electrical power. Do not remove or add connector blocks when power is connected to the system. Avoid contact between your body and the connector block. Remove power from feed lines before connecting them to or disconnecting them from GS INVERTER.

5.2.1 Dimensions and Weight



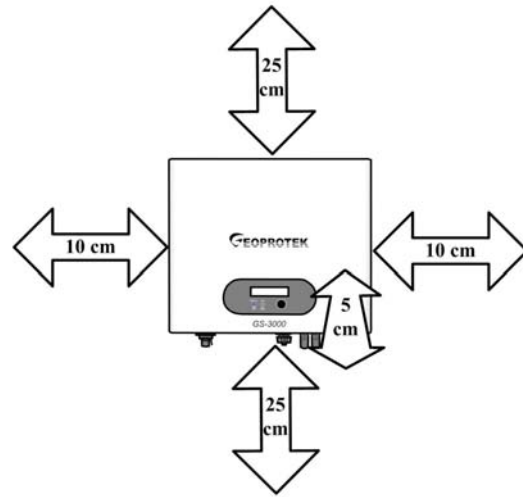
5.2.2 Ambient Conditions

- The GS INVERTER housing meets the requirements of protection type IP65 and is suitable for outdoor and indoor installation. Protection rating IP65 is only met if the enclosed AC connector the Tyco DC connectors are used.
 - In order to maximize the energy yield it is important to position the inverter correctly. The lower the ambient temperature, the more efficiently the inverter will operate. The ambient temperature of installation must be in the range $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$.
 - Do *not* expose the GS INVERTER to the sun directly, in order to avoid power reduction due to high temperature. A protected installation location, for example under a canopy or a solar module, would be an advantage. The device should also be protected from splashing, for example rainwater dripping off roof or module edges.
 - The inverter must be mounted on a solid surface.
 - If the GS INVERTER is installed inside a building, the space should be well ventilated.
- In external installations direct sunlight should be avoided.
- Due to noise emission it is advisable to avoid installation in living areas.
 - The installation must be done by a qualified solar installer.
 - Please ensure GS INVERTER connection to grid is approved by the utility company. And the grid to be connected is 230V system.

5.2.3 Safety Distances

For optimum cooling the following are the minimum distances to walls, other devices or objects to guarantee sufficient heat dissipation and enough space for turning off the DC switch.

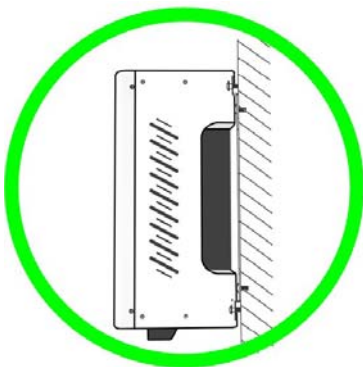
Direction	Minimum distances
sides	10 cm
above	25 cm
below	25 cm
front	5 cm



If necessary, increase the distance and ensure that the supply of cool air is sufficient to cool the GS INVERTER.

5.2.4 Position

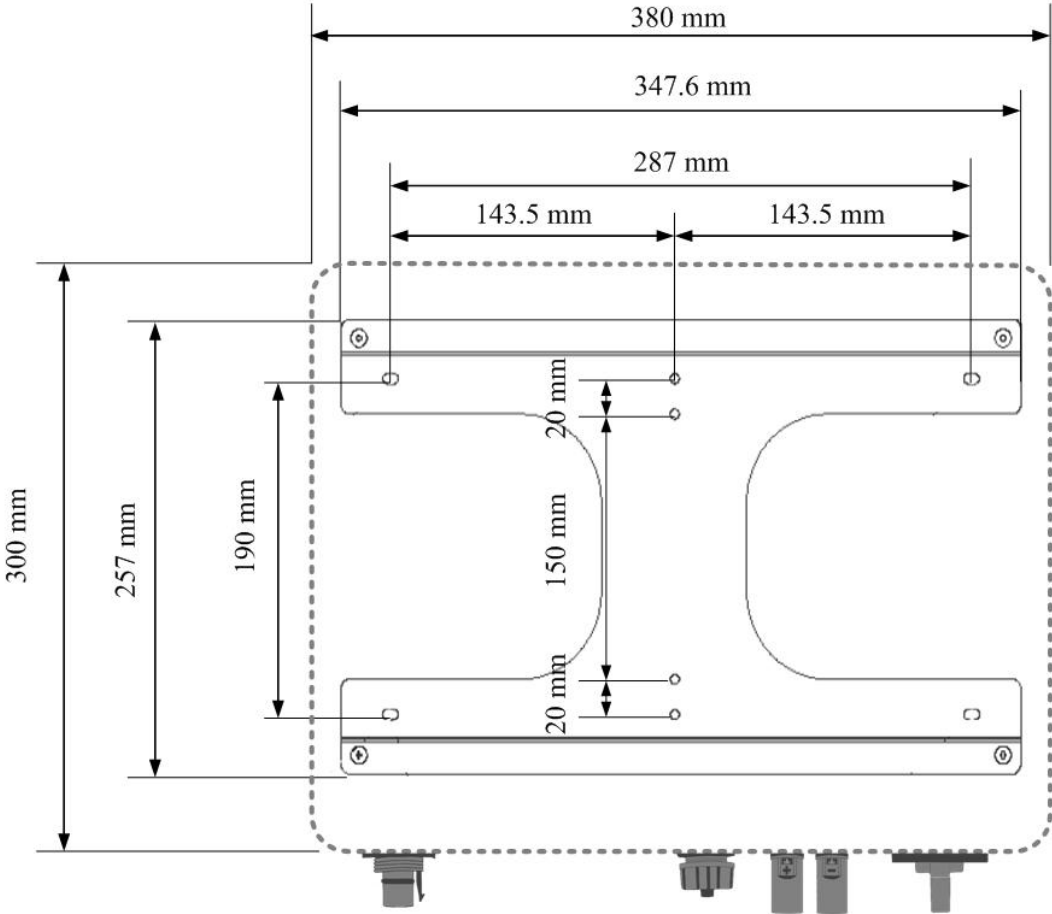
- Install the GS INVERTER vertically to ensure the device is properly fixed to the bracket. Never install the device with a forward tilt. Do not mount the inverter horizontally.
- Install at eye level to allow operating status to be read at all times.



5.3 Mounting Instructions

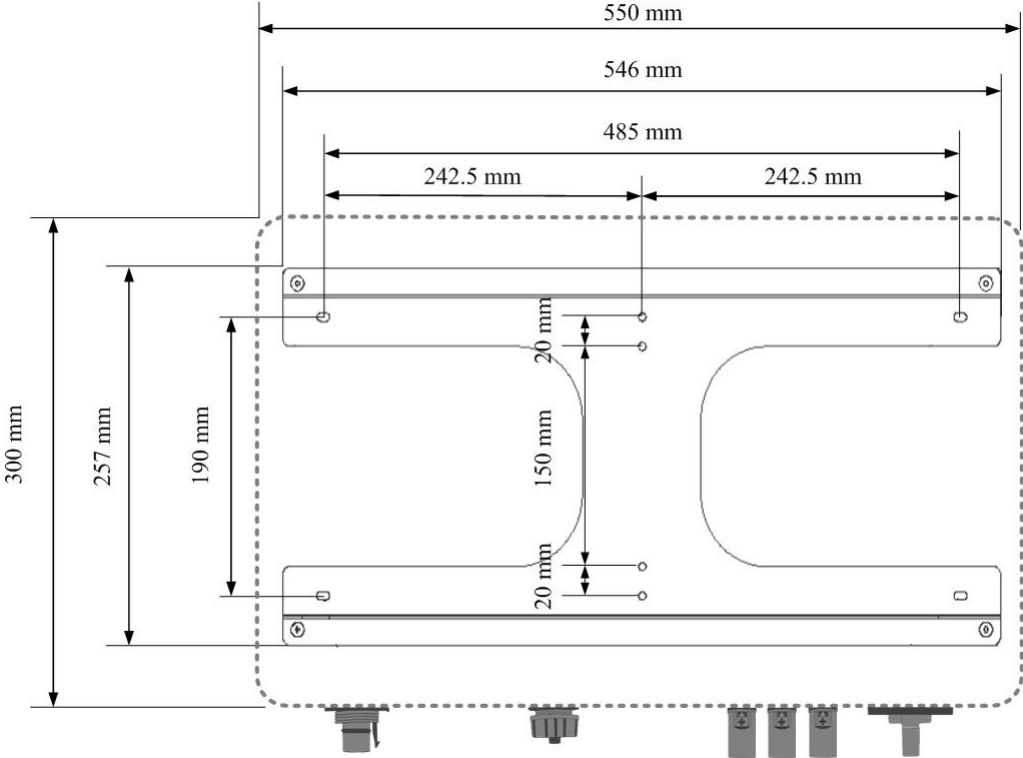
5.3.1 Mounting with Wall Bracket

For GS 1500/2000/3000:



GEOPROTEK Solar Technology

For GS 4000:

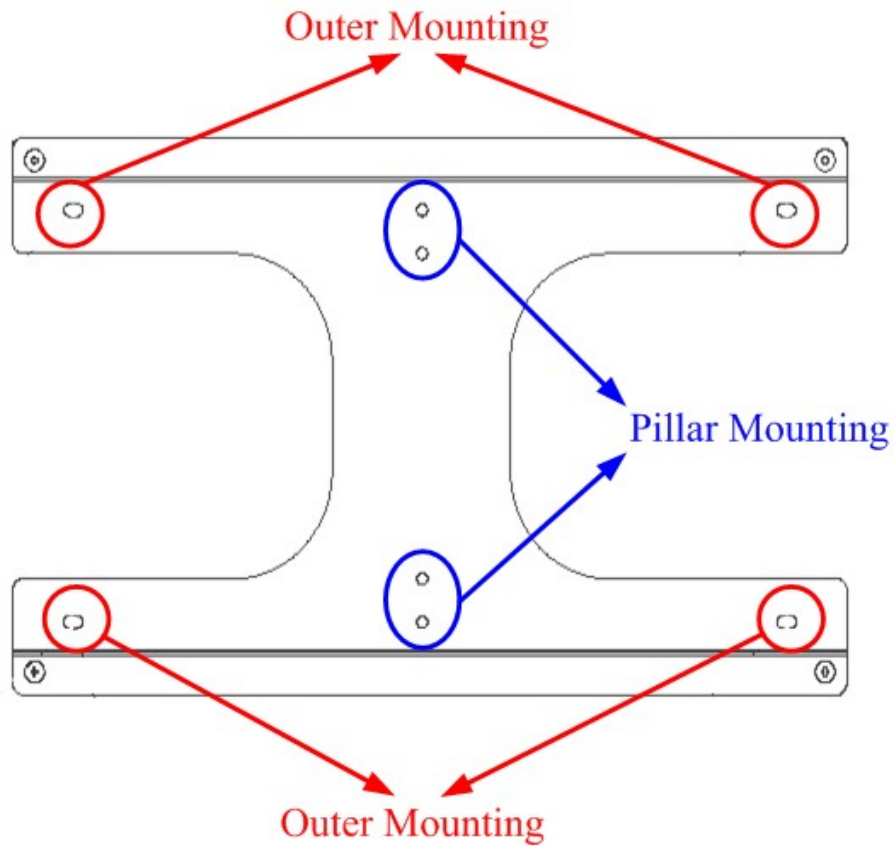


GEOPROTEK Solar Technology

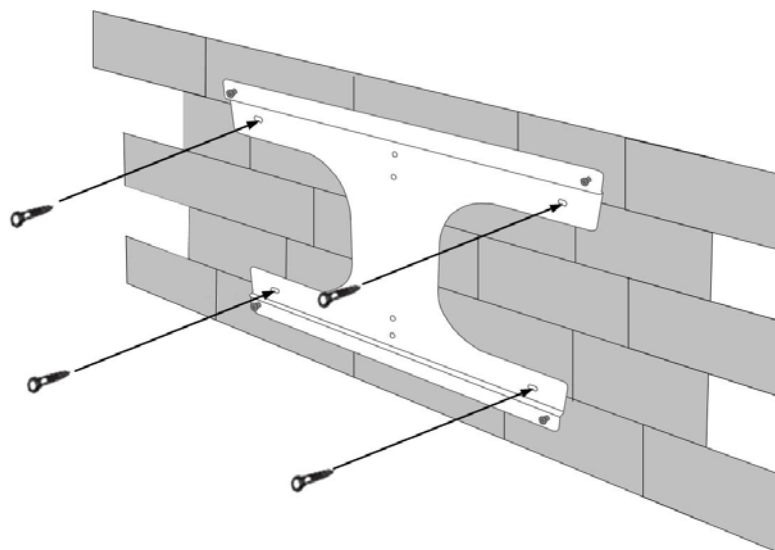
Step1: Mark the drill holes position according to the wall mounting bracket.



Outer Mounting: Use the positions of the 4 outer mounting holes to fix.
Pillar Mounting: Use the positions of the 4 central mounting holes to fix.

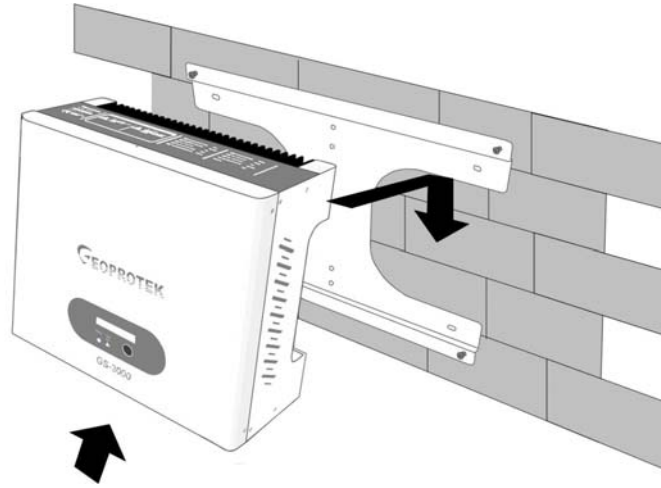


Step2: Drill the 4 marked holes in the wall, and then drive in the 4 snap bushings. Secure the wall bracket using suitable screws.



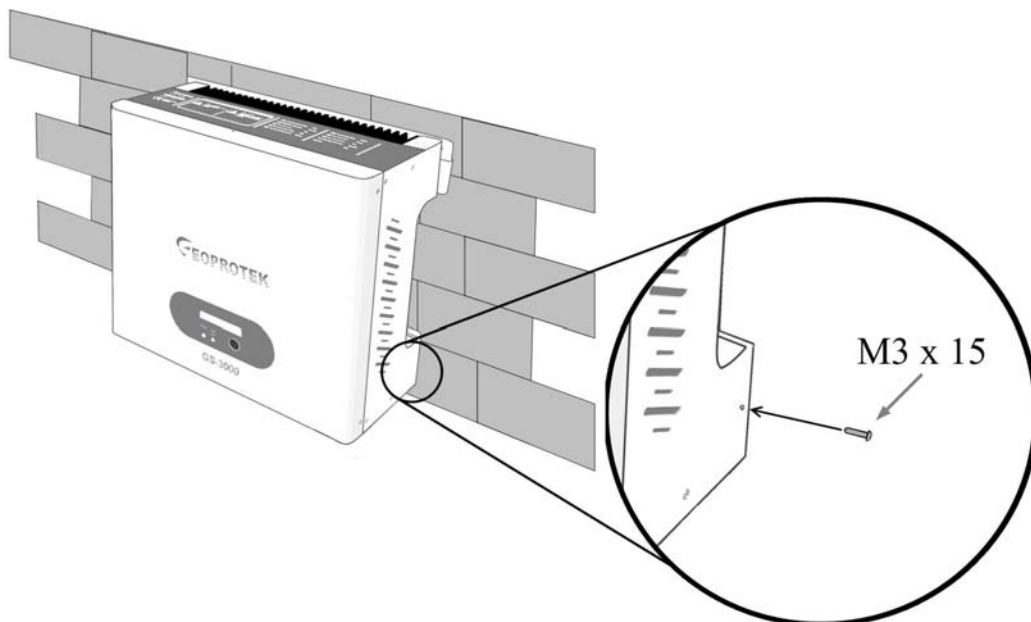
GEOPROTEK Solar Technology

Step3: Mount the GS INVERTER to the wall bracket slightly onto the bracket.



Step4: Secure the GS INVERTER with the safety lock screws on two sides of the inverter to fix the PV-Inverter in place.

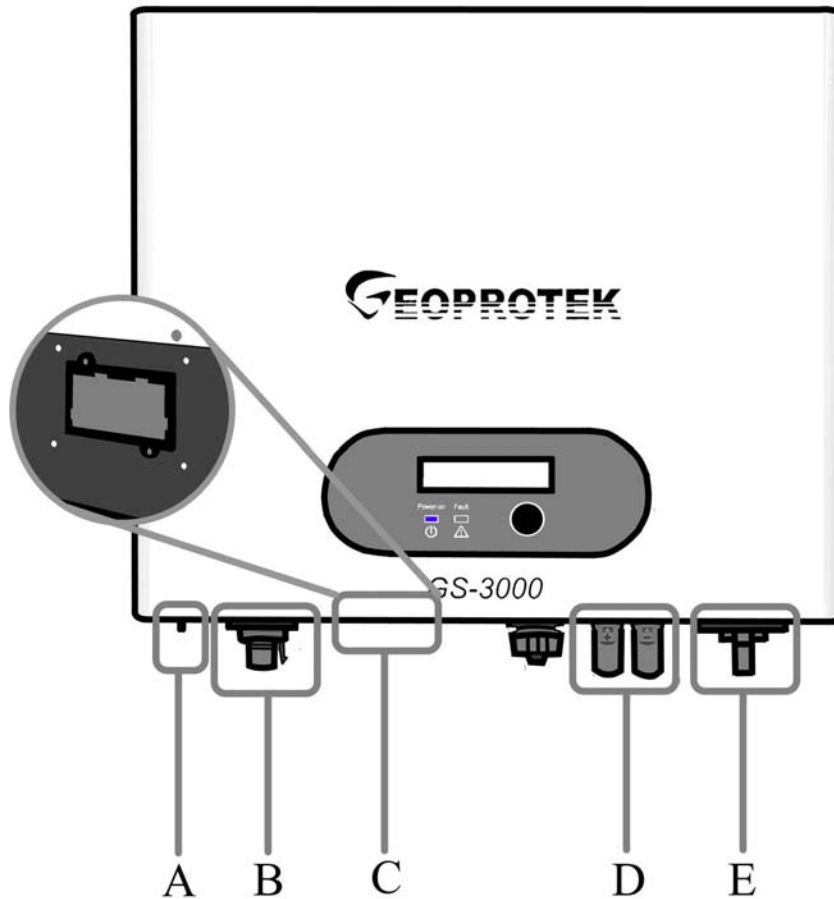
The screw must meet the following requirements:



Step5: Check the mounting of inverter. Try to lift up the inverter on the bottom, make sure it is firmly attached to the correct position.

6 Electrical Connection

6.1 Overview of Connection Area



Object	Description
A	Grounding terminal for additional grounding of the GS INVERTER
B	AC connector
C	Communication module slot
D	DC connector
E	DC isolation switch

6.2 Connecting the Public Grid (AC side)



Connections to the main switchboard or a distribution board must comply with the appropriate requirements of AS/NZS 3000 and AS/NZS 4777.1. In all installations, the following items must be provided:

- Solar supply main switch and overcurrent protection. This is located in the main switchboard or distribution board to which the inverter is to be connected.
- AC isolation device. If the inverter is more than 3 metres away from the main switchboard or distribution board, or if the inverter is not in clear view of this board, an AC isolation device must be provided adjacent to the inverter. This device must be rated to interrupt the maximum AC output current from the inverter.

Step1: Cable Design

Connect the AC cable socket with a flexible cable according to AS/NZS 3008.1.1. Strands with a maximum cross-section of 4 mm² can be connected. According to different model, the suggested minimum cable sizes are shown below:

Inverter Model	Cable cross Section Φ (mm)
GS-1500	≥ 1.5
GS-2000	≥ 1.5
GS-3000	≥ 2.5
GS-4000	≥ 2.5

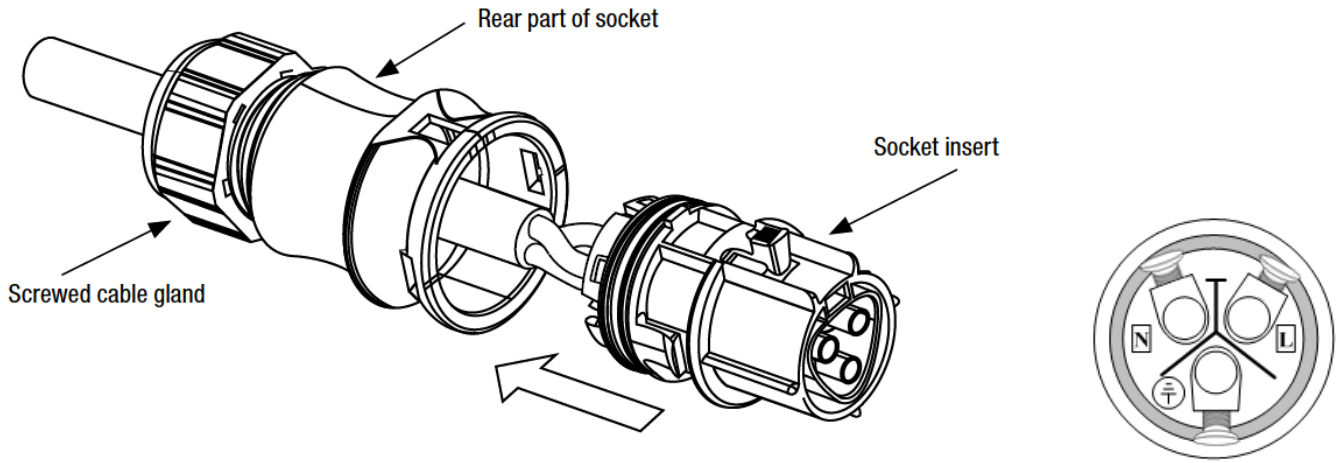
Step2: Check the grid voltage compare with the “AC Nominal Voltage Range” in the specification table. The grid voltage cannot be more than 263V since the GS INVERTER will not be fully operational. In this case, contact the local grid operator for assistance.

Step3: Switch off and lock the solar supply main switch, and make sure no voltage is present.

Step4: Connect AC wire to the socket.

- Push the rear part of the socket over the cable.
- Connect the individual wires with the insert in turn as follows:
 - System ground on the screw terminal with ground symbol.
 - Neutral conductor N on screw terminal with the label N.
 - Phase L on screw terminal with the label L.
- Ensure that the wires are connected properly.
- Snap the rear part of the socket onto the socket insert.
- Tighten the screwed cable gland.

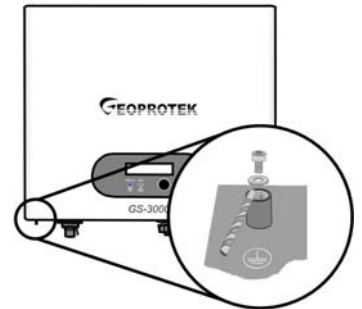
GEOPROTEK Solar Technology



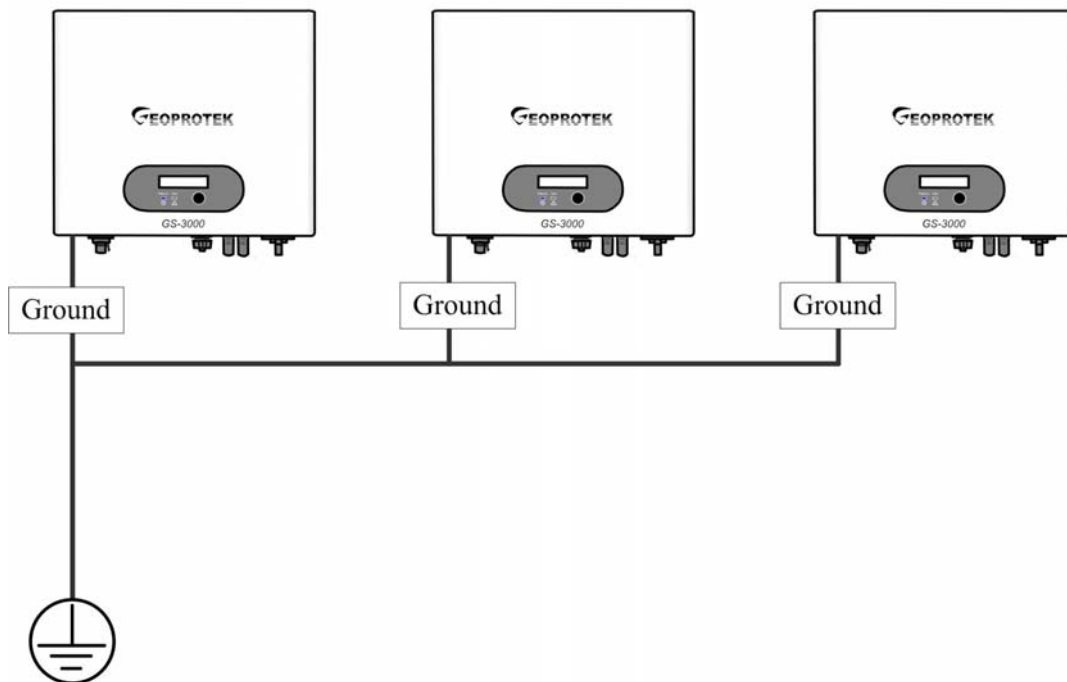
Do not switch on the line circuit breaker until the PV array (DC side) has been connected.



If a second protective earth connection is required, you can also ground the GS INVERTER with an additional protective earth ground on the connection terminal of the housing as shown below:



You can ground multiple GS INVERTERS as shown below:



6.3 Connecting the PV Array (DC side)



The PV Array design and installation must comply with the requirements of AS/NZS 5033.

6.3.1 One string connection for GS-1500/GS-2000/GS-3000

Step1: The following limiting values at the DC input of the GS INVERTER may not be exceeded (under ANY CONDITIONS for VOC & ISC):

Inverter Model	Maximum input voltage (VOC)	Maximum input current (Imp)	Maximum short circuit current (Isc)
GS-1500	500 V (DC)	7.5 A (DC)	11.25 A (DC)
GS-2000	500 V (DC)	10 A (DC)	15 A (DC)
GS-3000	500 V (DC)	15 A (DC)	22.5 A (DC)

Step2: Use Tyco connectors as PV array terminals.

Step3: Before installing the DC side, check the polarity once more. Connect positive from array to (+) terminals and negative to (-) terminals.

Step4: Connect the PV array terminals to the DC side of the GS INVERTER via the Tyco connectors.

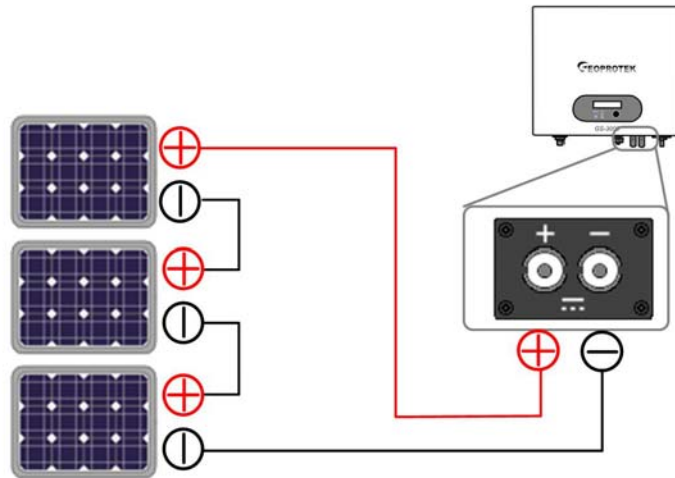


Requirements for the connected modules are valid for the strings:

- Same type
- Same quantity
- Identical alignment
- Identical tilt

GEOPROTEK Solar Technology

Typical PV wiring for GS INVERTER is shown in the following figure:



A PV DC Isolator & Overcurrent protection (not shown) is required between the output of the array and the input of the inverter per AS/NZS 5033. This isolation must be lockable and be rated for the load-breaking. It must comply with the requirements for current breaking switching devices per AS/NZS 5033. This part must break both poles at the PV array simultaneously.

6.3.2 Three string connection for GS-4000

Step1: The following limiting values at the DC input of the GS INVERTER may not be exceeded (under ANY CONDITIONS for VOC & ISC):

Inverter Model	Maximum input voltage (VOC)	Maximum input current (I_{mp})	Maximum short circuit current (I_{sc})
GS-4000	500 V (DC)	20 A (DC)	30 A (DC)

Step2: Use Tyco connectors as PV array terminals.

Step3: Before installing the DC side, check the polarity once more. Connect positive from array to (+) terminals and negative to (-) terminals.

Step4: Connect the PV array terminals to the DC side of the GS INVERTER via the Tyco connectors.

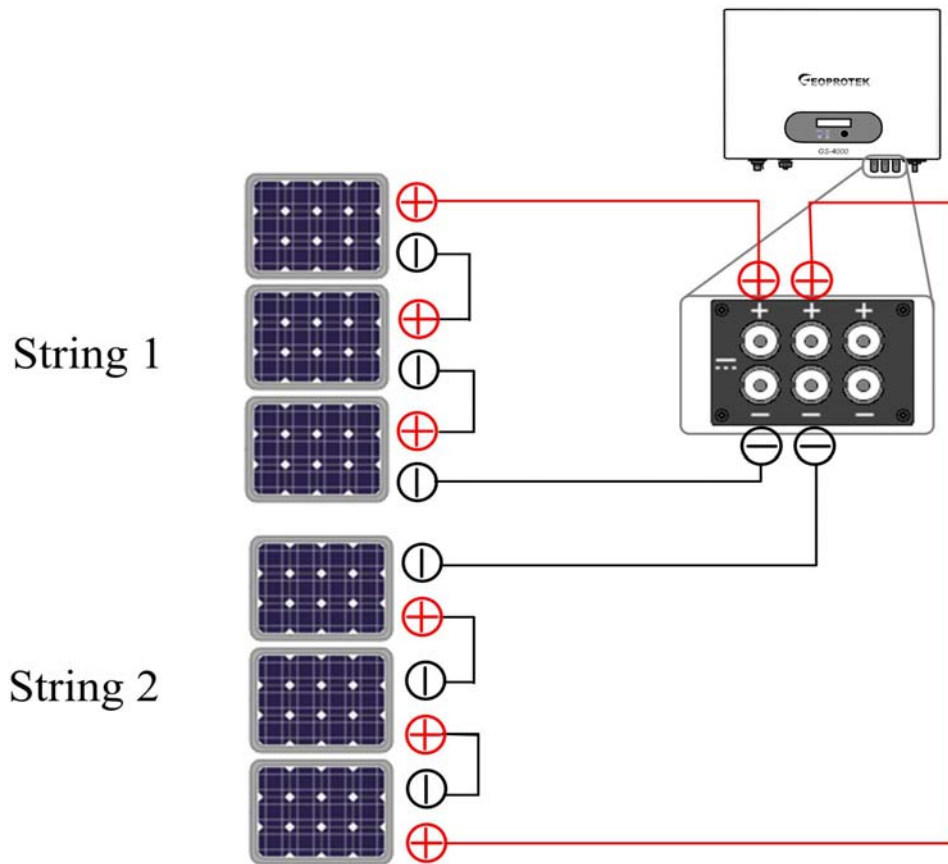


Requirements for the connected modules are valid for the strings:

- Same type
- Same quantity
- Identical alignment
- Identical tilt

GEOPROTEK Solar Technology

Typical PV wiring for GS INVERTER is shown in the following figure:



PV DC isolators and overcurrent protection (not shown) are required between the outputs of the arrays and each input of the inverter per AS/NZS 5033. These isolators must comply with the requirements of current breaking switching devices per AS/NZS 5033. They **MUST NOT** be polarity sensitive since the PV Inputs are connected in parallel inside the inverter and fault currents can flow in either direction. These parts must break both poles of the array simultaneously.

6.4 Installing a Communication Module

The GS INVERTER is equipped with a slot for communication interfaces in order to communicate with data acquisition devices or a PC with corresponding software. Refer to the communication module documentation for a detailed wiring diagram. This section describes how to install the communication module in the GS INVERTER. For the installation, proceed as follows steps:

Step1: Release the four screws of the communication slot on the bottom of the GS INVERTER. **The inverter does not have to be opened to install the communication module.**

Step2: Insert the communication module into the slot and fixed the screws on two sides.

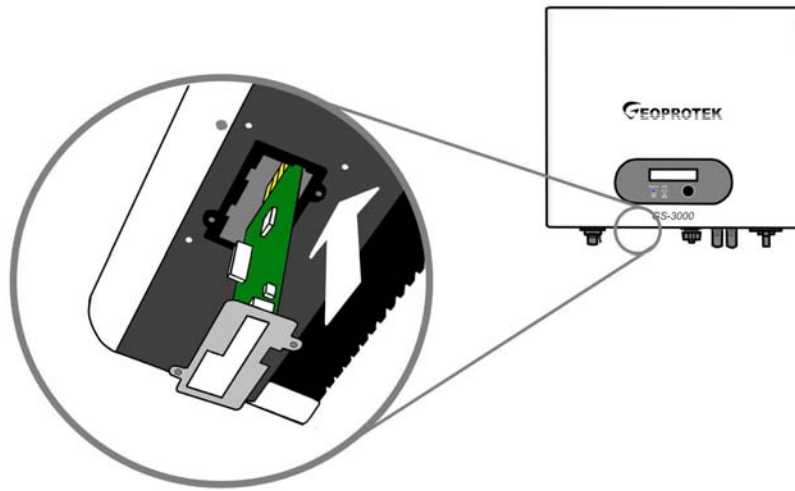
Step3: Connect the communication cables to the terminal.

GEOPROTEK Solar Technology

Step4: Close the water proof cap and fix the screws on four corners.



Before proceeding with communication module installation, ensure system is not operating (all breakers ARE turned off).

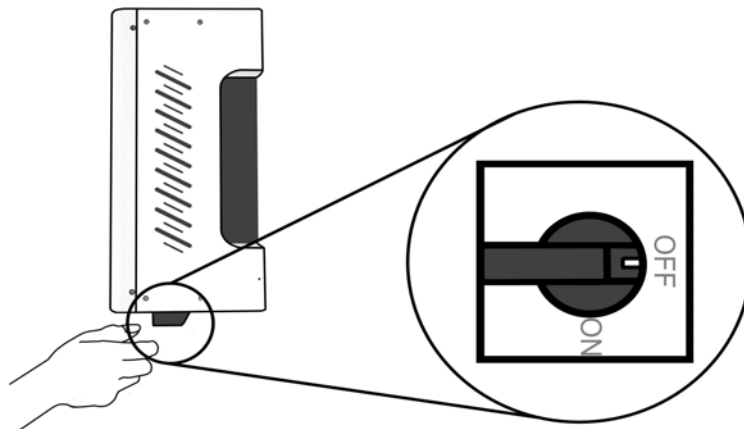


6.5 Commissioning the PV Array System



Before commissioning the PV array, ensure that **ALL** the circuit breakers are switched off.

Step1: Please switch off the DC insulation switch on the GS INVERTER.



Step2: Check the connection cables of the PV modules for the correct polarity and compliance with the maximum input voltage of GS INVERTER.



Exceeding the maximum input voltage will damage the GS INVERTER!

Step3: Plug in and check the AC connector to the AC side of the GS INVERTER.

GEOPROTEK Solar Technology

Step4: Plug in and check the DC connector to the DC side of the GS INVERTER.

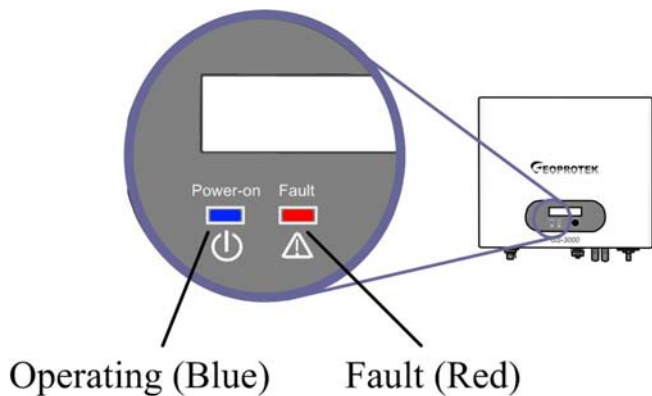
Step5: Switch on the DC isolator switch on the GS INVERTER and the PV array DC Isolator(s).

Step6: Switch on the solar supply main switch and AC isolator device (if present).



DO NOT disconnect the inverter's PV input connectors under load. De-energize the system by turning off the inverter's DC isolation switch, PV array DC isolators, the solar supply main switch and the AC isolator device (if present) before disconnecting the PV input connectors.

Step7: Look at the LED display and refer the following chapter to check whether the GS INVERTER is in a fault-free and expedient operating mode.



6.6 Removal



Before removing the GS INVERTER, ensure that **ALL** the circuit breakers are switched off and locked.

Step1: Turn off and lock the solar supply main switch and AC isolator device (if present).

Step2: Switch off the DC isolation switch on the GS INVERTER and turn off and lock the PV array DC isolators.

Step3: Disconnect the PV input connectors from the inverter.

Step4: Disconnect the output connection and the additional protective earth connection (if used).

Step5: Before releasing the screws ensure that the bottom of the device (heat sink) has cooled sufficiently to allow the device to be safely handled.

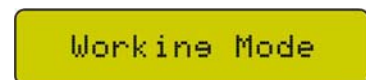
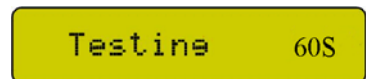
Step6: Release the two locking screws on the left and right and remove the inverter from the mounting.


7 Inverter Display

7.1 Normal Mode

With a fault-free grid connection to the GS INVERTER, it will operate in normal mode and the 'Power-on' LED will be in lighted up in BLUE. Then it will go into the following steps:

1. As the PV array is greater than 100V, the GS INVERTER is waiting to feed to the grid and shows 'INV Waiting'.
2. When PV array is greater than 150V, GS INVERTER is checking the feeding conditions and shows 'Testing' counting down from 60 to 0.
3. After checking the grid and the internal status, the GS INVERTER will start to feed power to the grid and shows 'Working Mode'. Otherwise it will go into the fault mode.



 As the PV array is greater than 90V and less than 100V, the GS INVERTER is in standby and shows 'INV Standby'.



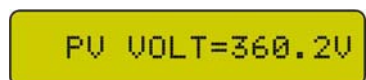
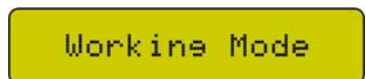
7.2 Fault Mode

In a fault condition, the GS INVERTER will go into fault mode. The 'Fault' LED will be RED and the 'Power-on' LED will turn off. According to the message display on the LCD, please check the list in Section 8.1 error message table for troubleshooting.

7.3 Information Display

As GS INVERTER operates in working mode, you can press the function button to check the inverter information. The function button cycles through the various system parameters. The LCD will show the following information in sequence:

1. Pressing the function button once during the 'Working Mode' state displays the AC output power.
2. Pressing the function button twice to display the DC input voltage.
3. Pressing the function button three times displays the DC input current.



GEOPROTEK Solar Technology

- Pressing the function button four times displays the AC output voltage.
- Pressing the function button five times displays the AC frequency.
- Pressing the function button six times displays the AC output current.
- Pressing the function button seven times displays the Total AC output energy since commissioning.
- Pressing the function button eight times displays the Inverter Rating.
- Pressing the function button nine times displays the Master CPU version.
- Pressing the function button ten times displays the Slave CPU version.

GRID VOLT=220.7V

GRID FREQ=60.2HZ

O/P CUR= 3.2A

255 KWH

RATING = 1.5KW

M CPU VER IP3.2

S CPU VER IP3.2



After 5 seconds of inactivity, the LCD will back to the main screen and shows 'Working Mode'.



If you need to lock the current information display, you can use the following steps to lock and unlock the information display:

- Press the function button to display the information you need to lock.
- Press the function button for 5 seconds, it will show "Freeze".
- The LCD will always show the information you need to display.
- If you need to unlock it, please press the function button for 5 seconds. The LCD will show "Unfreeze" and go back to the main screen.

O/P WATT= 216 W

Freeze

O/P WATT= 216 W

Unfreeze

7.4 Display Setting

In the display setting, you can select different language display and adjust the contrast. Please setup by the following steps:

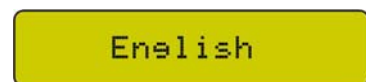
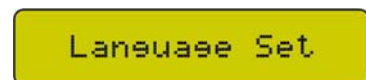
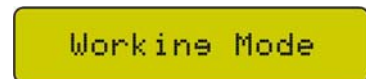
Contrast setting procedure:

1. Press the function button for 3 seconds as the LCD in 'Working Mode'.
2. The LCD shows 'Setting' in the screen.
3. Press the function button for 3 seconds to enter the contrast setting.
4. Press the function button to adjust the contrast from 1 to 5.
5. After finished, press the function button for 3 seconds to confirm the setting and it will back to "Setting".



Language setting procedure:

1. Press the function button for 3 seconds as the LCD in 'Working Mode'.
2. The LCD shows 'Setting' in the screen.
3. Press the function button for 3 seconds to enter the language setting.
4. Press the function button to select different language.
5. After finished, press the function button for 3 seconds to confirm the setting and it will back to "Setting".



8 Messages

8.1 Error Messages and troubleshooting

Corresponding display messages are shown in the scrolling text line of the display with relevant event numbers. Once an error occurs, the fault LED will light up in RED. Please refer to the following message table for trouble shooting:



Any diagnostic procedures **MUST** to be performed by a qualified solar installer.

Error Message	Possible cause	Remedy
Grid Fault	The grid voltage or frequency is out of the permitted range.	<ul style="list-style-type: none"> •The GS INVERTER will reset automatically when the grid returns to normal operation. •Test the grid voltage, frequency, and grid Connection on GS INVERTER. •Make sure grid voltage and frequency meet the specifications. •If the grid voltage is within the acceptable range, but the error is still displayed, discuss the proposed parameters with the service line.
PV Over Voltage	The DC input voltage at the GS INVERTER is too high.	<ul style="list-style-type: none"> •Disconnect the GS INVERTER from the PV array immediately. • Check the DC voltage of the strings to ensure that they comply with the maximum input voltage of the GS INVERTER before connecting it to the PV array again.
Ground I Fault	The leakage current of the GS INVERTER and the PV array is too high. This can be caused by a sudden fault in the connection to ground, a fault current or a malfunction.	<ul style="list-style-type: none"> •Check the strings for ground faults, Unplug the PV array from the DC-input, check the AC peripheral system. •After the cause is cleared, plug PV in again and check the status of Inverter.
Isolation Fault	Earth leakage or insulation fault on the DC side. Or phase and neutral conductor interchanged.	<ul style="list-style-type: none"> •Check PV array and DC cabling. •Check the phase on the AC mains supply. •Check the impedance between the DC (+) and DC (-) and earth ground. The impedance must be larger than $8M\Omega$. •If the error is still displayed, please contact the service line.

Error Message	Possible cause	Remedy
----------------------	-----------------------	---------------

GEOPROTEK Solar Technology

Over Temperature	The internal temperature of GS INVERTER is too high Insufficient air circulation	<ul style="list-style-type: none"> •Ensure air can circulate at the side of the GS INVERTER. •improve ventilation around the inverter. •If it is not effective, the temperature sensors fails, please contact the service line.
No Utility	Grid is not connected; check the AC connection by multi-meter.	<ul style="list-style-type: none"> • Check AC installation and grid connection. • Check whether there is a general power failure. • Check breaker between inverter and grid; if it is tripped, DO NOT CLOSE again, replace the inverter.
Impedance Fault	The grid impedance at the connection point of the GS INVERTER is too high.	<ul style="list-style-type: none"> •Observe the error for 30 seconds, check if it works normally. •Check the wires between inverter and grid. Change larger wires if necessary. •If the error is still displayed, please contact the service line for further assistance.
Consistent Fault	It may cause by the reading difference between main and redundant controllers.	<ul style="list-style-type: none"> •Switch off the DC isolator switch and PV array isolators. •Switch off solar supply main switch. •Disconnect DC (+) and DC (-) from the input for one minute and reconnect it again. •Switch on the solar supply main switch. •Switch on the DC isolator switch and PV Array isolators. •If it does not work, please contact service line.
DC Curr Mismatch	The reading difference of output DC current between main and redundant controllers.	
GFCI Mismatch	The reading difference of GFCI value current between main and redundant controllers.	
Grid V Mismatch	The reading difference of Grid V between main and redundant controllers.	
Grid F Mismatch	The reading difference of Grid F between main and redundant controllers.	
Grid Z Mismatch	The reading difference of Grid impedance between main and redundant controllers.	
Sci Fault	Communication error between main and redundant controllers.	
CPU Ver Mismatch	The reading difference of firmware version between main and redundant controllers.	

Error Message	Possible cause	Remedy
---------------	----------------	--------

GEOPROTEK Solar Technology

Device Fault	It may cause by improper operation of the circuit.	<ul style="list-style-type: none"> •Switch off the DC isolator switch and PV array isolators. •Switch off solar supply main switch. •Disconnect DC (+) and DC (-) from the input for one minute and reconnect it again. •Switch on the solar supply main switch •Switch on the DC isolator switch and PV Array isolators. •If it does not work, please contact service line
Relay Failure	It may cause by the failure of output relay.	
DC INJ High	It may cause by the DC output injection was too high	
Ref 2.5V Fault	2.5V reference voltage inside problem	
DC Sensor Fault	It may cause by the abnormal of DC output sensor.	
GFCI Fault	GFCI detection problem	
EEPROM Fault	EEPROM problem	
DC Bus High	It may cause by the voltage of DC bus was too high.	
DC Bus Low	It may cause by the voltage of DC bus was too low.	

8.2 Update Messages

Corresponding display messages are shown in the LCD display when an firmware update is made.

Update Message	Description
Master Flash	The internal program is updating main controller CPU through RS-232 interface.
Slave Flash	The internal program is updating redundant controller CPU through RS-232 interface.

9 Specification

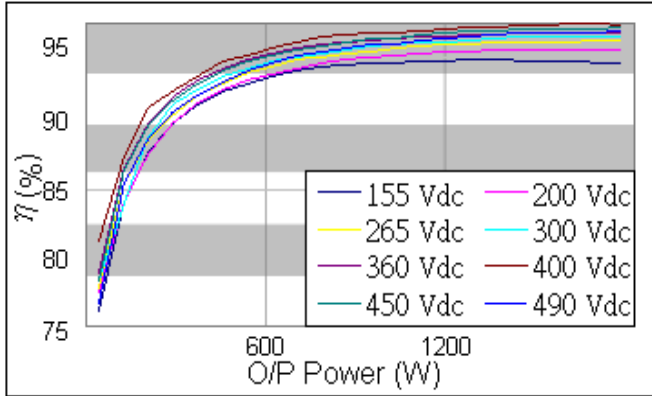
	GS-1500	GS-2000
Maximum Input Power	1750W	2340W
DC Maximum Voltage (VOC)	500 VDC	
MPPT Voltage Range (Vmp)	150VDC ~ 500VDC ± 5%	150VDC ~ 500VDC ± 5%
DC Maximum Input Current (Imp)	7.5 ADC	10 ADC
Maximum PV Array Short Circuit Current (ISC)	11.25 ADC	15 ADC
DC Voltage Ripple	<10%	
Number of String Inputs/ Type	1 (Tyco)	
PV Start Voltage	150VDC ± 5%	150VDC ± 5%
AC Nominal Power	1500W	2000W
AC Maximum Output Power	1650W	2200W
AC Maximum Output Current	6.6 A	8.7 A
AC Nominal Voltage	230VAC	
AC Voltage Range (firmware setting)	207VAC ~ 263VAC	
AC Nominal Frequency	50Hz	
AC Frequency Range (firmware setting)	49.25-50.75 Hz	
Power Factor	>0.99	
Maximum Inverter Efficiency	95%	95%
European Inverter Efficiency	94%	94%
Dimensions: W x H X D (mm)	380 x 300 x 133	380 x 300 x 133
Weight (kg)	14	14
Operating Temperature	-25 to 55 °C	
Humidity	0 to 95%, non-condensing	
Power Consumption: standby/night time	<0.1W	
Heat Dissipation	Convection	
DC Switch	ON/OFF 20A	
O/P current distortion	THD<5%, each harmonics<3%	

GEOPROTEK Solar Technology

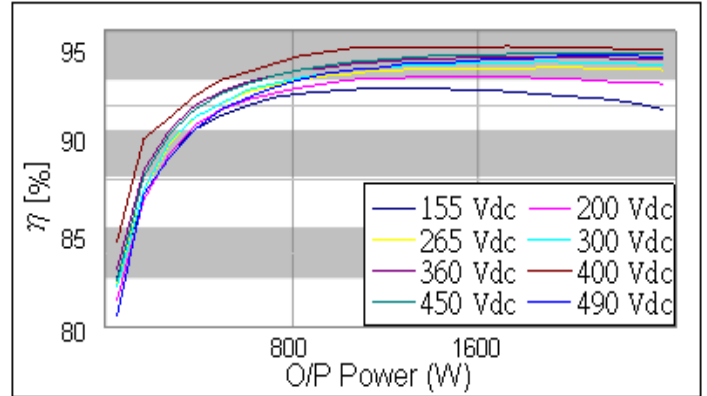
	GS-3000	GS-4000
Maximum Input Power	3510W	4700W
DC Maximum Voltage (VOC)	500 VDC	
MPPT Voltage Range (Vmp)	150VDC ~ 500VDC ± 5%	150VDC ~ 500VDC ± 5%
DC Maximum Input Current (Imp)	15 ADC	20 ADC
Maximum PV Array Short Circuit Current (ISC)	22.5 ADC	30 ADC
DC Voltage Ripple	<10%	
Number of String Inputs/ Type	1 (Tyco)	
PV Start Voltage	150VDC ± 5%	150VDC ± 5%
AC Nominal Power	3000W	4000W
AC Maximum Output Power	3300W	4400W
AC Maximum Output Current	13 A	17.4 A
AC Nominal Voltage	230VAC	
AC Voltage Range (firmware setting)	207VAC - 263VAC	
AC Frequency	50Hz	
AC Frequency Range (firmware setting)	49.25-50.75Hz	
Power Factor	>0.99	
Maximum Inverter Efficiency	95%	96%
European Inverter Efficiency	94%	95%
Dimensions: W x H X D (mm)	380 x 300 x 133	550 x 300 x 133
Weight (kg)	14	21
Operating Temperature	-25 to 55 °C	
Humidity	0 to 95%, non-condensing	
Power Consumption: standby/night time	<0.1W	
Heat Dissipation	Convection	
DC Switch	ON/OFF 20A	
O/P current distortion	THD<5%, each harmonics<3%	

Efficiency graphs

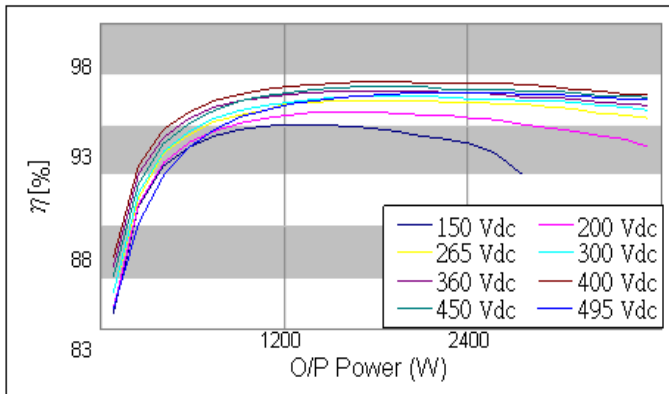
GS-1500 efficiency graph



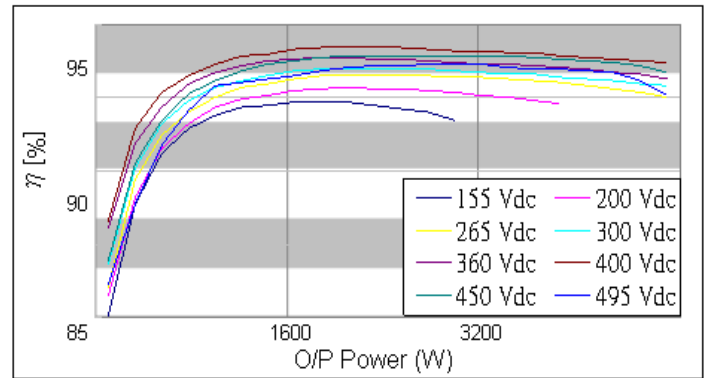
GS-2000 efficiency graph



GS-3000 efficiency graph



GS-4000 efficiency graph



GEOPROTEK Solar Technology

Installation Guide GS-1500, GS-2000, GS-3000, GS-4000

The information contained in this document is the property of **GEOPROTEK Solar Technology**. Publishing its content, either partially or in full, requires the written permission of **GEOPROTEK Solar Technology**. Any internal company copying of the document for the purposes of evaluating the product or its correct implementation is allowed and does not require permission.

GEOPROTEK Solar Technology Product Warranty

- The inverter warranty time is 5 years. See also Powerbox Australia Warranty Terms & Conditions.
- If the inverter is fault, please contact our Australian agent – Powerbox Australia Pty Ltd or its assign agent.

Exclusion of liability

The general terms and conditions of delivery of **GEOPROTEK Solar Technology** shall apply. The content of these documents is continually checked and amended, where necessary. However, discrepancies cannot be excluded. No guarantee is made for the completeness of these documents.

Guarantee or liability claims for damages of any kind are excluded if they are caused by one or more of the following:

- Damages during transportation
- Improper or inappropriate use of the product
- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

The use of supplied software produced by Geoprotek Tech Inc is subject to the following conditions:

- Geoprotek Tech Inc. rejects any liability for direct or indirect damages arising from the use of software developed by Geoprotek Tech Inc. This also applies to the provision or non-provision of support activities.
- Supplied software not developed by Geoprotek Tech Inc is subject to the respective licensing and liability agreements of the manufacturer.

Geoprotek Product Warranty

The current guarantee conditions come enclosed with your device. These are also available online at www.geoprotek.com and can be downloaded or are available on paper from the usual sales channels if required.

Trademarks

All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

GEOPROTEK Solar Technology.

Tel. +886 2 2659 7969

Fax +886 2 2659 7668

www.geoprotek.com

E-Mail: service@geoprotek.com

GEOPROTEK Solar Technology

Powerbox Australia Warranty Terms and Conditions

- It is extremely important that all installation instructions contained within this manual are strictly adhered to. Failure to do so will void your warranty.
- If this unit is installed within 1km of the coast steps should be taken to prevent salt water or spray entering the unit. Any corrosion related problems are not covered under the terms of this warranty. A fully marinised version of this unit is not available.
- Powerbox Australia warrants this inverter against defects in material or workmanship (as per manufacturer's warranty), for a period of five (5) years from the date of purchase, when in normal use and service. The warranty period will provide a total of five (5) years if a completed warranty card is received within 60 days of purchase. No warranty will be provided on units, which have not been paid for in full. Some models may have the option of purchasing an extended warranty period. This warranty is in addition to your consumer rights under local trade practices act and the manufacturer's (Geoprotek Tech Inc) warranty.
- This warranty does not extend to products which have been opened, altered or repaired by persons other than those authorised by Powerbox Australia or to products which become defective due to acts of God, fire, sabotage, vandalism, contaminated fluids, negligence or failure to operate, house and maintain the product in accordance with instructions provided in this manual.
- This warranty does not cover repairs made necessary due to the product coming in contact with dirt, abrasives, moisture, erosion, corrosion, varnish or other similar, or failure due to poor quality of other system components.
- Powerbox Australia will repair or replace the defective product in accordance with its best judgment. For service under warranty, the buyer must contact Powerbox Australia to obtain a "Return Materials Advice" (RMA) document and shipping instructions before returning the unit. Products returned without prior authorisation may be delayed. The buyer will pay all charges incurred in returning the product to the factory, including any charges incurred for the uninstallation or reinstallation of the inverter and / or its system components. Powerbox Australia will pay return freight charges, if the product is found to be defective, within the terms of this warranty. Repair or replacement of any unit does not extend the original warranty terms in any way.
- Powerbox Australia reserves the right, with some models, to supply an accredited installer with replacement parts (Aust. only). This may allow the unit to become operable much quicker. This choice is at Powerbox Australia's discretion. Powerbox Australia will in no way be held responsible for any losses incurred due to the malfunctioning or failure of a product.
- Suitably qualified personnel MUST carry out wiring. Failure to do so cannot justify a warranty claim.
- Except for the foregoing expressed warranty, Powerbox Australia makes no other warranty, expressed or implied, including but not limited to, the warranty of merchantability or fitness for a particular purpose.
- If you have any questions about this warranty please do not hesitate to contact us.
- NOTE: Packing for service and transportation - we recommend you keep the original packing in which your Geoprotek inverter was supplied. This is the best way to protect your unit should shipping be required.
- Powerbox Australia cannot be held responsible for units damaged in transit.

Australian Agent:

Powerbox Australia Pty. Ltd.
4 Beaumont Road,
Mount Kuring-Gai, NSW 2080
Tel.: +61 2 9457 2200
Fax: +61 2 9457 2255
E-mail: sales@powerbox.com.au
www.powerbox.com.au

GEOPROTEK Solar Technology

Tel : +886 2 2659 7969
Fax : +886 2 2659 7678
E-mail : service@geoprotek.com
www.geoprotek.com

