solaredge

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SolarEdge Installation Guide

US Version 1.0

About This Guide

This user guide is intended for Photovoltaic (PV) system owners, installers, technicians, maintainers and integrators who are authorized to install and connect a SolarEdge power harvesting system.

This guide describes the process of installing SolarEdge PowerBoxes and SolarEdge Single Phase Inverters. This guide does not describe how to install the PV modules. The inverter models covered in this guide are: SE3300, SE4000, SE5000 and SE6000. The PowerBox models covered in the guide are PB250-AOB, PB350-AOB, PB250-TFI, PB350-TFI, and all modules with an embedded PowerBox.

The guide includes the following chapters:

- **Chapter 1, Quick Start,** page 13, provides a quick overview of how to set up the SolarEdge system. Each step that is briefly described here is described in detail in the relevant chapters in this guide.
- **Chapter 2, Introducing the SolarEdge Power Harvesting System,** page 19, introduces the components of the SolarEdge power harvesting solution.
- **Chapter 3, Installing the PowerBoxes,** page 27, describes how to install the SolarEdge PowerBoxes.
- **Chapter 4, Installing the Inverter,** page 41, describes the process of installing and connecting a SolarEdge Single Phase Inverter.
- **Chapter 5, Commissioning the Installation,** page 59, describes how to activate the system, commission the PowerBoxes and verify the proper functioning of the system.
- **Chapter 6, Replacing and Adding System Components,** page 69, describes how to replace or add various SolarEdge system components after the initial installation.

- **Chapter 7, Setting Up Communication,** page 73, describes how to install and set up communication between the inverter and the SolarEdge Monitoring Server.
- **Chapter 8, Inverter User Interface,** page 89, describes how to configure the inverter and how to identify its status.
- **Chapter 9, Transport and Storage,** page 109, describes how to transport and store a SolarEdge Inverter.
- **Appendix A, Errors and Troubleshooting,** page 111, lists the error messages that may appear on the inverter's LCD panel, describes their meaning and describes how to troubleshoot each one.
- **Appendix B, Technical Specifications,** page 117, provides the technical specifications of the SolarEdge system components.
- **Appendix C, PowerBox Mechanical Specifications,** page 123, presents the mechanical specifications for the SolarEdge PowerBoxes.
- **Appendix D, Additional Documentation,** page 125, describes where additional information and manuals can be accessed.

Important Notice

This document is solely for the use of SolarEdge customers and employees.

The material furnished in this document is believed to be accurate and reliable. However, SolarEdge assumes no responsibility for the use of this material. SolarEdge reserves the right to make changes to the material at any time and without notice.

You may refer to the SolarEdge web site (www.solaredge.com) for the most updated version.

Exclusion of Liability

The general terms and conditions of delivery of SolarEdge shall apply.

The content of these documents is continually reviewed and amended, where necessary. However, discrepancies cannot be excluded. No guarantee is made for the completeness of these documents.

Table of Contents

List of Figures

Handling and Safety Instructions

During installation, testing and inspection adherence to the following handling and safety instructions is mandatory.

Safety Symbols

The following safety symbols are used throughout this document. Familiarize yourself with the symbols and their meaning before installing or operating this instrument.

WARNING!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer des blessures ou un danger de mort. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

CAUTION:

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the instrument**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer un dommage ou destruction de l'équipement. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

NOTE:

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE:

Denotes information about safety issues.

Important Safety Instructions

Save these instructions.

IMPORTANT SAFETY FEATURE:

The inverter is ungrounded at its DC inputs. The installation must comply with section NEC690.35.

WARNING!

These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions unless you are qualified to do so.

Do not remove the inverter cover before five minutes have elapsed after disconnecting all sources of power. Otherwise, there is a risk of electric shock form energy stored in the capacitor.

Ces instructions s'adressent à un personnel qualifié uniquement. Pour réduire le risque de choc électrique, n'effectuer aucun autre dépannage que celui indiqué dans la notice d'exploitation à moins que vous nous soyez qualifié pour le faire.

Ne pas ouvrir le couvercle de l'onduleur avant que cinq minutes ne se soient ecoulées après coupure de toutes les sources de puissance. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le capaciteur.

WARNING!

Before operating the Single Phase Inverter, ensure that the power cable and wall outlet have been grounded properly.

Avant de mettre l'onduleur monophasé en marche, s'assurer que le cable et la prise murale ont été mis à la terre convenablement.

WARNING!

This unit is not intended to be opened by a user. It must only be opened by a qualified technician for installation and maintenance purposes.

Cet unité n'est pas conçue pour être ouverte par un utilisateur. Elle doit être ouverte uniquement par un technicien qualifié pour installation et maintenance.

WARNING!

Use No. 10 AWG, 75° or 90° copper PV wire only.

Utiliser seulement des câbles PV No. 10 AWG, 75° ou 90°.

IMPORTANT:

The wiring methods that must be used in this installation, and which are described below, must be in accordance with the National Electrical Code and ANSI/NFPA 70 when installed in the USA.

In Canada, the installation and wiring methods used should comply with the Canadian Electrical Code, parts I and II. The input and output circuits are isolated from the enclosure. System grounding, when required by the Canadian Electrical Code, Part I, is the responsibility of the installer.

WARNING!

Unit assembly/disassembly must only be performed when the power cable is not connected to the inverter.

L'assemblage/démontage de l'unité doit se faire seulement quand le câble de puissance n'est pas connecté à l'onduleur.

WARNING!

Proper installation of the inverter requires external DC-disconnection. The DC disconnect must be rated to the operating condition of the inverter (25A, 600V).

The disconnect device shall:

- Open all ungrounded conductors of the circuit to which it is connected.
- Consist of a manually operated switch or a circuit breaker.
- Employ an operating handle that is accessible from outside of the enclosure or located behind a hinged cover not requiring a tool for opening.
- Be marked as DC disconnect.

Using the SolarEdge AC/DC disconnect switch complies with these requirements.

Une installation règlementaire de l'onduleur nécéssite une coupure DC externe. Le coupeur DC doit être spécifié aux conditions de fonctionnement de l'onduleur (25A, 600V).

Le coupeur doit:

- Découpler tout conducteur non mis à la terre du circuit auquel il est connecté.
- Etre constitué d'un interrupteur activé manuellement ou d'un coupeur de circuit
- Employer une poignée accessible de l'extérieur de l'enceinte ou située derriere un couvercle à charnières ne nécéssitant pas d'outil pour l'ouvrir.

WARNING!

Unit requires external AC-disconnect for proper installation. AC disconnect must be rated to the operating condition of the inverter (30A, 240V)

The disconnect device shall:

- Open all ungrounded conductors of the circuit to which it is connected.
- Consist of a manually operated switch or a circuit breaker.
- Employ an operating handle that is accessible from outside of the enclosure or located behind a hinged cover not requiring a tool for opening.
- Be marked as AC disconnect.

Using the SolarEdge AC/DC disconnect switch complies with these requirements.

L'unité nécéssite un coupeur AC externe pour une installation règlementaire. Le coupeur AC doit être spécifié aux conditions de fonctionnement de l'onduleur (30A, 240V).

Le coupeur doit:

- Découpler tout conducteur non mis à la terre du circuit auquel il est connecté.
- Etre constitué d'un interrupteur activé manuellement ou d'un coupeur de circuit
- Employer une poignée accessible de l'extérieur de l'enceinte ou située derrière un couvercle à charnières ne nécéssitant pas d'outil pour l'ouvrir.
- Etre marqué comme un coupeur AC.

IMPORTANT:

Tightening torque of terminal blocks is 1.2-1.5 Nm. (0.88-1.1 pound-foot).

IMPORTANT:

Maximum allowed ambient temperature for the inverter in +50°C. Do not mount in direct sunlight in high ambient temperatures.

WARNING!

ELECTRIC SHOCK HAZARD! The DC conductors of this photovoltaic system are ungrounded and may be energized at all times.

Risque d'électrocution! Les conducteurs DC de ce système photovoltaïque sont sans mise à la terre et peuvent avoir une charge à tout moment. Veillez à relier le conducteur PE (la terre) en premier.

Support and Contact Information

If you have technical problems concerning our products, please contact us:

USA & Worldwide Support Line: +1.650.319.8843

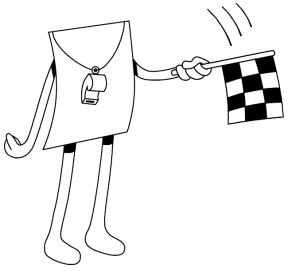
Germany:	+49.89.23513100
France:	+33.(0)970.465.662
Israel:	+972.73.2403118
Fax:	+972.73.2403117
Email to:	support@solaredge.com

Before contact, please gather the following information:

- Inverter and PowerBox type.
- Serial number of the inverter and the PowerBox in question.
- The error indicated on the inverter screen or on the SolarEdge Monitoring Portal.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge server.

The **Support** 

option on the top right of the SolarEdge Configuration Tool's main window can be used to automatically collect all relevant information to be sent to SolarEdge Professional Services for support. This option is described in detail in the *SolarEdge Configuration Tool Software Guide*.



Chapter 1

Quick Start

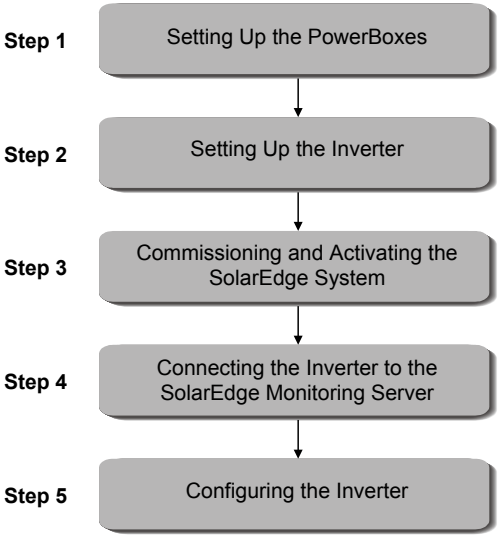
About This Chapter

This chapter provides a quick overview of how to set up the SolarEdge system. Each step that is briefly described here is described in detail in the relevant chapters in this guide.

This chapter contains the following sections:

SolarEdge System Installation Workflow

This section provides an overview of the workflow for installing and setting up a new SolarEdge site. Most of these procedures can also be used for adding components to an existing SolarEdge site.



Step 1, Setting Up the PowerBoxes

- **Mounting the PowerBoxes on the PV Modules:** Mechanically mount the PowerBoxes near the PV modules on the structure or racking to which the module is attached, as follows:
  - The **Add-On PowerBox** (AOB) is mounted near a single PV module.
  - The **Thin-Film Solution PowerBox** (TFI) is mounted in a manner enabling its connection to between two and four PV modules.
- **Connecting Each PV Module to a PowerBox:** Electronically connect one or more PV modules to each PowerBox, as follows:
  - **AOB PowerBox** connects to a single PV module.
  - **TFI PowerBox** can be connected to between two and four PV modules.

NOTE:

The modules with embedded PowerBoxes come pre-connected and, therefore, it is not necessary to perform the mounting and PV module connection stages.

For more information, you may refer to the *Step 2, Connecting Each PV Module to a PowerBox* section on page 31.

- **Connecting the PowerBoxes:** PowerBoxes are serially connected in a string. For more information, you may refer to the *Step 3, Connecting PowerBoxes in Strings* section on page 35.

Step 2, Setting Up the Inverter

- **Mounting the Single Phase Inverter:** This process involves attaching the mounting bracket to a wall or pole and then mounting the Single Phase Inverter onto it. For more information, you may refer to the *Mounting the Inverter* section on page 46.
- **Connecting the PowerBox Strings to the Inverter:** PowerBox strings can be connected in parallel to the DC input of the inverter. As many strings as required can be connected in parallel as long as the maximum power rating of the inverter is not exceeded. Strings of unequal length can be connected in parallel. For more information, you may refer to the *Connecting the Inverter* section on page 48.
- **Connecting the Single Phase Inverter:** This process involves connecting the Single Phase Inverter to the AC output. For more information, you may refer to the *Connecting the Inverter* section on page 48.

Step 3, Commissioning and Activating the SolarEdge System

After all connections are made, all the PowerBoxes must be logically paired (or electronically introduced) to their inverter before they can start working with it. This step describes how to commission the PowerBoxes to the inverter and how to activate the entire power harvesting system. For more information, you may refer to *Chapter 5, Commissioning the Installation* on page 59.

Step 4, Connecting the Inverter to the SolarEdge Monitoring Server

This step is only required if the user wishes to use the SolarEdge Monitoring Portal to access SolarEdge site information, as described in the *SolarEdge Monitoring Portal User Guide*.

This process involves connecting the inverter to the SolarEdge Monitoring Server via a LAN, an external modem connected to the RS232 port, an RS485 bus or a ZigBee modem. This connection enables the inverter to send the data that it collects from the PowerBoxes and inverter to the SolarEdge Monitoring Server. For more information, you may refer to *Chapter 7, Setting Up Communication* on page 73.

You may report the physical and logical mapping of the installed PowerBoxes by mail, email or fax to SolarEdge. SolarEdge will then upload this information to the SolarEdge Monitoring Server. For more information, you may refer to the *Step 4, Reporting Installation Data* section on page 65.

Step 5, Configuring the Inverter

After installation, the inverter must be configured according to the site's requirements using the inverter internal buttons or by using the SolarEdge configuration tool connected to the RS232 port. For more information, you may refer to the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.

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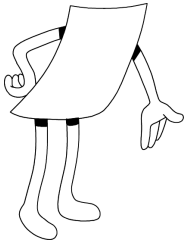

Chapter 2

Introducing the SolarEdge Power Harvesting System

About This Chapter

This chapter introduces the components of the SolarEdge power harvesting solution.

This chapter contains the following sections:

What is the SolarEdge Power Harvesting Solution?

SolarEdge has developed the most advanced distributed power harvesting solution that maximizes the power output from any type of solar PV installation while reducing the average cost per watt.

The SolarEdge system enables:

- Maximum power harvesting.
- Simple, error-free system design and installation.
- Reduced cost of installation and associated balance-of-system costs.
- PV module-level monitoring and troubleshooting for cost-effective maintenance and operation.
- Installer and firefighter safety.

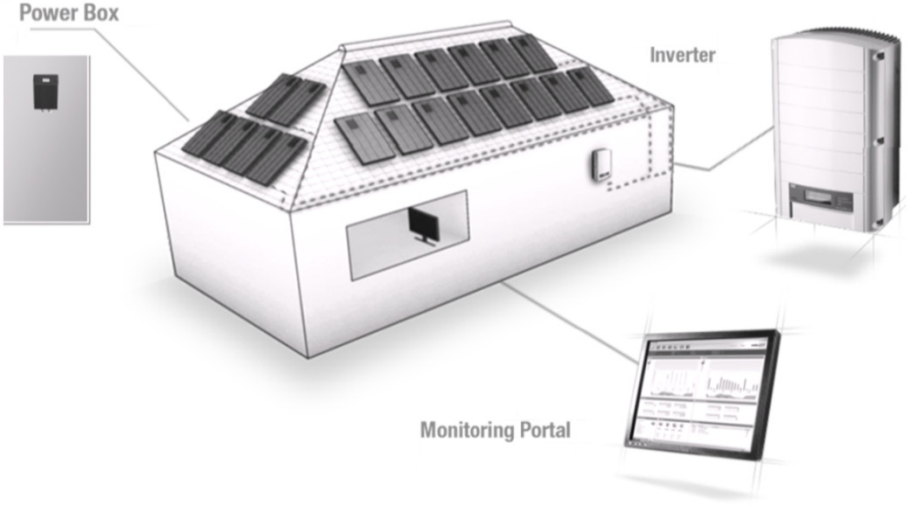

Figure 1: SolarEdge Power Harvesting Solution

SolarEdge PowerBox

SolarEdge PowerBoxes can be connected to existing PV modules or embedded directly into each PV module instead of the traditional Junction Boxes, in order to maximize power harvesting by locally performing Maximum Power Point Tracking (MPPT) at the PV module level.

The PowerBoxes keep the string voltage fixed, regardless of the length of the string and of the environmental conditions. Without additional wires, the sophisticated electronics within each SolarEdge PowerBox directly transmit performance data from every PV module over the power line. This data includes the PV module's current, voltage, power and temperature.

Three types of PowerBoxes are provided by SolarEdge, as follows:

- **Module Add-On Box Solution (AOB),** connected during installation to one PV module. P/N: PB250-AOB, PB350-AOB.
- **Thin Film Solution (TFI),** connected during installation to between two and four PV modules. P/N: PB350-TFI.
- **Module Embedded Solution (CSI),** is supplied embedded into a PV module.

You may refer to the SolarEdge PowerBox datasheets in order to determine which PowerBox is most suitable for you requirements.

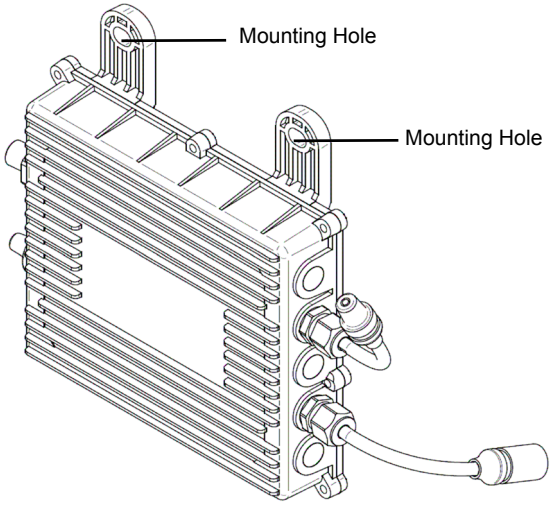

Figure 2: Add-On Box Solution

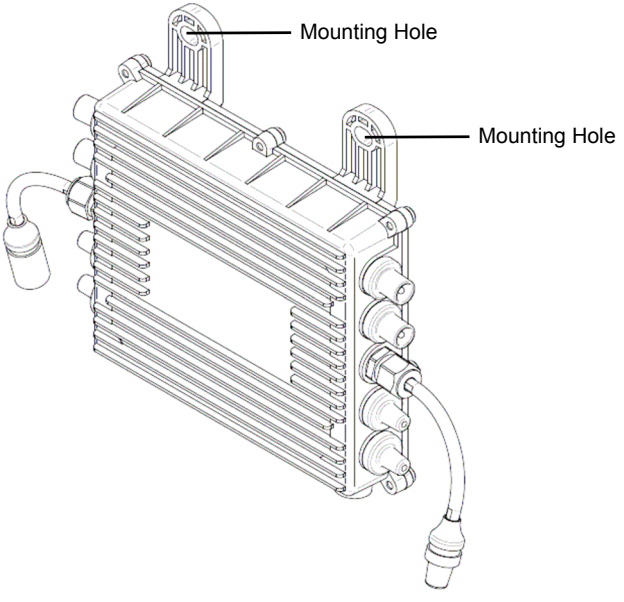

Figure 3: Thin Film Solution

Single Phase Inverter

The Single Phase Inverter efficiently converts DC power received from the PV modules into AC power that can be fed into the main circuit board of the site and from there to the grid. The inverter also receives the monitoring data from each PowerBox and transmits it to a central server (called the Monitoring Server) through an Ethernet network to an external modem connection.

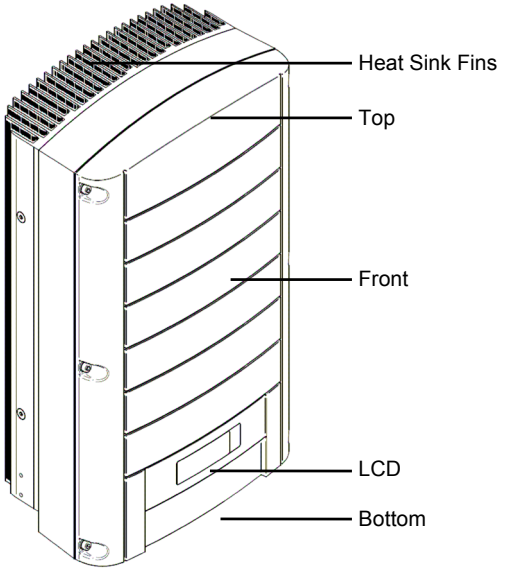

Figure 4: Single Phase Inverter

Single Phase Inverter Package Contents

The Single Phase Inverter package consists of the Single Phase Inverter and a mounting bracket that is required for connection of the inverter to the wall, as well as screws and washers for the inverter cover and nuts and bolts. Cables are not provided. Standard tools can be used during its installation.

The following lists the contents of the Single Phase Inverter installation package:

- One SolarEdge Single Phase Inverter.
- One wall-mounting bracket.
- Two flat head screws for fastening the inverter to the wall-mounting bracket.

SolarEdge Monitoring Portal

The SolarEdge Monitoring Portal enables you to monitor the technical and financial performance of one or more SolarEdge Photovoltaic sites. It provides accurate information about present and past performance of each PV module individually and about the system as a whole, enabling you to detect, pinpoint and troubleshoot faults, efficiently manage maintenance operations and analyze site profitability.

NOTE:

You may refer to the *SolarEdge Monitoring Portal User Guide* for more information about this option.

Smart algorithms continuously track the power, voltage and current of all modules and inverters, as well as a range of statistical and meteorological indicators to detect suboptimal performance or events that require intervention or maintenance.

Equipment List

Standard tools can be used during the installation of the SolarEdge system. The following is a recommendation of the equipment to be used when installing a SolarEdge system:

- Allen screwdriver for M6 and M5 screw types.
- Flat Head screwdriver.
- Electrical screwdriver (tester).
- Drilling machine and bits suitable for a wall or pole, where the inverter mounting bracket is installed.
- Suitable screws for attaching the inverter mounting bracket to a wall.
- 5/16" screws for attaching the PowerBox to PV racking.
- 5/16" stainless steel washer to properly ground the PowerBox to the railing (provided with PowerBox).
- Wire cutters.
- Wire strippers.
- Voltmeter.

For installing the communication option, you may also need the following:

- For Ethernet:
  - RJ45 connectors
  - CAT5 twisted pair Ethernet cable
  - RJ45 crimping tool
- For RS485:
  - Four- or six-wire twisted pair telephone cable
  - RJ11 six-pin connector (also known as RJ25)
  - RJ11 crimping tool

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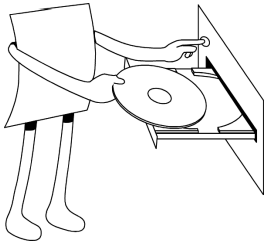


Chapter 3

Installing the PowerBoxes

About This Chapter

This chapter describes how to install the SolarEdge PowerBoxes. The following describes the sections in this chapter and the workflow for installing the PowerBoxes:

- **Step 1, Mounting and Grounding the PowerBoxes,** page 28
- **Step 2, Connecting Each PV Module to a PowerBox,** page 31
- **Step 3, Connecting PowerBoxes in Strings,** page 35

WARNING!

Before performing these steps, turn OFF the Single Phase Inverter by turning off the ON/OFF switch at the bottom of the inverter. All inverters in an installation site must be switched OFF in this manner.

Avant de faire ces étapes, éteignez l'onduleur monophasé en mettant sur OFF l'interrupteur ON/OFF situé au bas de l'onduleur. Tous les onduleurs sur un site d'installation doivent être etteints de la même manière.

Step 1, Mounting and Grounding the PowerBoxes

The instructions provided in this section describe how to mount and ground a single PowerBox near a PV module. These instructions should be repeated for each PowerBox.

NOTE:

The instructions for mounting the AOB and TFI PowerBoxes to the PV module are nearly identical. The only difference is that an AOB PowerBox connects to a single PV module and a TFI PowerBox can connect to up to four PV modules.

NOTE:

If you are installing modules with embedded PowerBoxes, then skip to *Step 3, Connecting PowerBoxes in Strings* on page 35.

IMPORTANT SAFETY FEATURE:

PV modules with SolarEdge PowerBoxes are safe. They only carry a low safety voltage before the Single Phase Inverter is turned on.

IMPORTANT SAFETY FEATURE:

As long as the PowerBoxes are unconnected to the inverter and the inverter is OFF, the PowerBoxes will output a safe 1V voltage during installation.

- Determine the mounting location of each PowerBox. The PowerBox should be mounted in a place where it can be mounted securely by using both mounting holes and in a location near enough so that an AOB PowerBox can connect to a single PV module and a TFI PowerBox can connect to up to four PV modules, per your plan.

NOTE:

The PowerBox is waterproof and has no need for shelter. The PowerBox can be placed in any orientation, meaning there is no up side.

NOTE:

The PowerBox should be mounted in a location that is either ventilated or that has a free space of air around it for heat dissipation.

NOTE:

Mounting brackets are suited to either a flat surface or a pole and can be attached to any surface texture.

CAUTION:

If installing directly on the module or module frame, first consult the module manufacturer for guidance regarding location and the impact on the module warranty.

Pour installation à même le module ou la monture du module, consultez d'abord le fabricant du module sur la position et son impact sur la garantie du module.

- Mark all mounting hole locations.
- Each PowerBox must be attached to the rack using both mounting holes.
- Drill the holes.

CAUTION!

Do not drill through the PowerBox or through the mounting holes. The vibrations created by the drill can damage the PowerBox..

Ne pas percer à travers la Powerbox ou ses trous de fixation. Les vibrations qui en résulteraient peuvent endommager la Powerbox.

- Mount one PowerBox at each location using 5/16" screws and washers.
- Verify that the PowerBox is securely attached.

IMPORTANT SAFETY FEATURE:

The installation is an ungrounded. There is no need for system grounding of the DC lines or of the PowerBoxes. You should not ground DC+ or DC- lines at any point. Grounding the DC lines will result in the inverter not turning ON due to an **isolation test fault**.

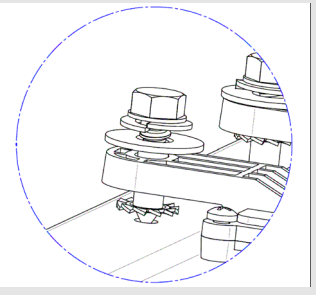
WARNING!

The metallic enclosure of the PowerBox must have equipment grounding. Perform the following in order to properly ground the PowerBox enclosure. Grounding of the PowerBox can be performed in either of two ways:

L'enceinte metallique de la Powerbox doit être mise à la terre. Suivre la procédure suivante afin de mettre l'enceinte de la Powerbox à la terre convenablement. La mise à la terre de la Powerbox peut s'accomplir par l'une des deux méthodes suivantes:

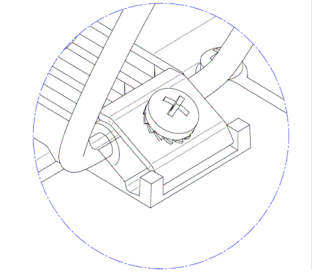
- For mounting the PowerBox on a grounded rail, use a 5/16" stainless steel star washer between the railing and the un-coated mounting bracket. The star washer should break through the anodize coating of the railing to ensure low-resistive connection. Use a stainless steel washer.

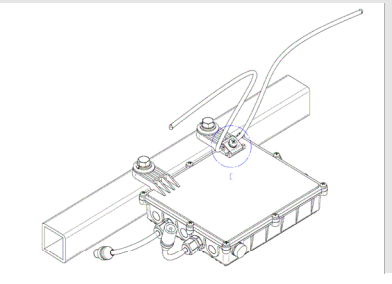
  Pour monter la Powerbox sur un rail mis à la terre, utilisez une rondelle étoile en acier inoxydable entre le rail et la bretelle de montage non recouverte. La rondelle étoile devra pénetrer la couverture anodisée du rail afin d'assurer une adhésion à basse résistivité. Utilisez une rondelle en acier inoxydable.



- For mounting the PowerBox on an un-grounded structure (such as a wooden structure), use the grounding terminal to fasten an unshielded copper wire between the PowerBoxes. The wire can be size 6-14AWG.

  Pour monter la Powerbox sur une structure non mise à la terre (comme une poutre en bois), utilisez la borne de mise à la terre pour fixer un fil de cuivre non isolé entre les Powerboxes. La taille du fil peut etre 6-14AWG.





Step 2, Connecting Each PV Module to a PowerBox

The instructions provided in this section describe how to connect a single PowerBox to the output of a PV module. These instructions can be repeated for each PowerBox.

WARNING!

The SolarEdge inverter is a transformer less ungrounded inverter. You must only use modules that have UL rated PV wires as outputs.

L'onduleur SolarEdge est un onduleur sans transformateur et sans mise à la terre. N'utilisez que des modules qui ont des câbles de sortie certifiés UL.

NOTE:

The instructions for connecting the AOB and TFI PowerBoxes to the PV module are nearly identical. The only difference is that an AOB PowerBox connects to a single PV module and a TFI PowerBox connects to up to four PV modules.

NOTE:

If you are installing PowerBoxes that are embedded into a module skip to *Step 3, Connecting PowerBoxes in Strings* section on page 35.

WARNING!

Before performing this step, turn OFF the Single Phase Inverter by turning off the ON/OFF switch at the bottom of the inverter and the DC switch of the main circuit board. All inverters in an installation site should be switched OFF in this manner. This step is required to verify that the PowerBoxes will output a safe 1V voltage during installation.

Avant de faire ces étapes, éteignez l'onduleur monophasé en mettant sur OFF l'interrupteur ON/OFF situé au bas de l'onduleur et l'interrupteur DC de l'armoire principale. Tous les onduleurs sur un site d'installation doivent être etteints de la même manière. Cette étape est requise afin de verifier que la Powerbox produira une tension de sortie de securité de 1V durant l'installation.

AOB

The **AOB** connects to a single PV module via its two inputs (a plus and a minus).

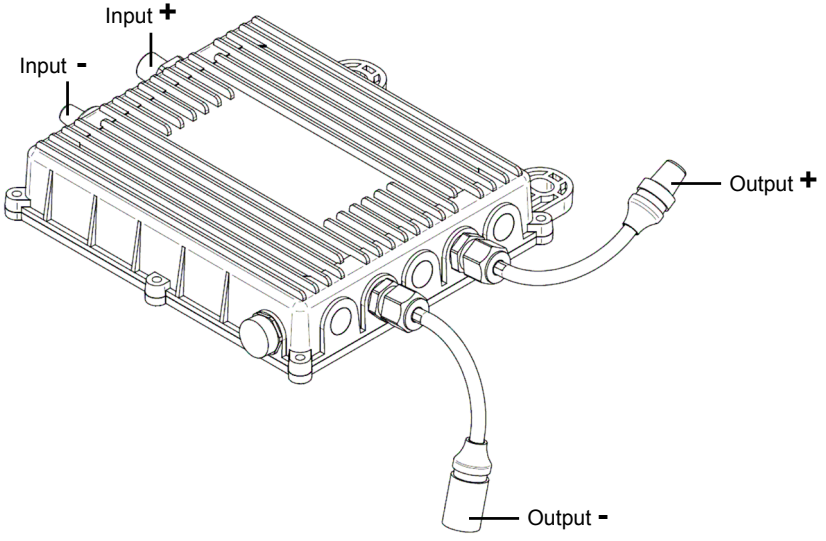


Figure 5: AOB

▶ To connect the AOB PowerBox to the PV modules:

WARNING:

Verify that you have identified the inputs and outputs correctly. Do not connect PV modules to PowerBox outputs.

Verifiez que vous avez identifié les entrées et sorties correctement. Ne connectez pas de modules PV à la sortie de la PowerBox.

NOTE:

The PowerBox has reverse polarity protection. Even so, you must still verify the correct polarity by checking the PV module's polarity with a voltmeter. Some module manufacturers may use connector polarity that is different from that used by SolarEdge PowerBox inputs.

In an AOB PowerBox, input connectors are on the box and output connectors are at the end of wires, as shown in the figure above.

TFI

The TFI PowerBox can connect to up to four PV modules via its MC3 inputs. The TFI PowerBox has four pairs of inputs (each pair comprises one Plus (+) and one Minus (-) connector) and two outputs (one Plus (+) and one Minus (-)), as shown below.

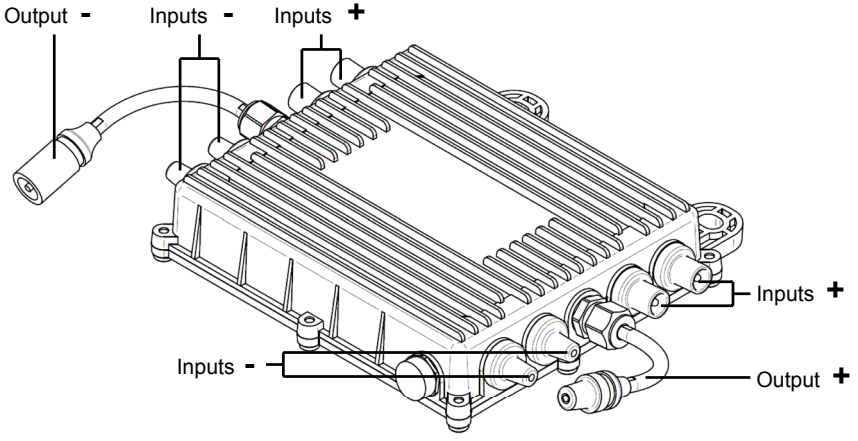


Figure 6: TFI

IMPORTANT SAFETY FEATURE:

After a PV module(s) is connected to the PowerBox, the PowerBox outputs a safe voltage of 1 V. We suggest verifying this output for the first few PowerBoxes that you connect in order to verify their proper connection. Take note that if you use a tracker, the PowerBox will turn ON only if the tracker is tracking the sun and at least 2 W of power are provided by the PV module.

▶ To connect the TFI PowerBox to the PV modules:

- The input connectors are shown in Figure 6. The output connectors are in the middle of each side.
- Each of the inputs to the TFI PowerBox are connected in parallel. In many cases parallel connection of more than two modules requires fusing each module.

CAUTION:

The TFI PowerBox can be ordered with an internal fuse on each input. If you are required to fuse the parallel modules, then make sure that you have ordered the PowerBox with the correct fuse rating.

La PowerBox TFI peut être commandée avec un fusible interne sur chaque entrée. Si vous devez placer un fusible sur les modules parallèles, verifiez que vous avez commandé la PowerBox avec les bons fusibles.

CAUTION:

Verify that you have identified the inputs and outputs correctly. Do not connect PV modules to PowerBox outputs.

Verifiez que vous avez identifié les entrées et sorties correctement. Ne connectez pas de modules PV à la sortie de la PowerBox.

NOTE:

The PowerBox has reverse polarity protection. Even so, you must still verify the correct polarity by checking the PV module's polarity by using a voltmeter. Some PV module manufacturers may use connector polarity that is different from that used by SolarEdge PowerBox inputs.

- Each of the four pairs of connectors on the TFI PowerBox are provided sealed. If you connect less than four modules to each PowerBox, you can leave the unused connectors sealed (as is) instead of plugging them.
- The Plus (+) and Minus (-) input connectors on the TFI PowerBox are not specifically paired, meaning you can connect a PV module to any Plus (+) input connector and Minus (-) input connector.

Step 3, Connecting PowerBoxes in Strings

NOTE:

This is the first step for handling PowerBoxes, which are supplied embedded into a PV module.

PowerBoxes must be connected in series in order to construct strings.

IMPORTANT NOTE:

SolarEdge PowerBoxes are energized by the PV modules to which they are connected. String length must not be less than eight PowerBoxes or the entire string may shut down. (Please refer to the PowerBox datasheets for the exact minimum and maximum number of PowerBoxes permitted in a string.)

NOTE:

Completely shaded PV modules may cause the affected PowerBoxes to temporarily shut down. This will not affect the performance of the other PowerBoxes in the string, as long as the minimum string length requirement is met when taking into account the lighted panels only.

Constructing Strings

The following describes how to connect PowerBoxes in strings.

▶ To connect PowerBoxes in a string:

WARNING:

The SolarEdge inverter is a transformer-less and ungrounded. When adding wires to the installation (for wire extension or home runs for example) use one of the following:

- Non-metallic, jacketed, multi-conductor cables.
- Conductors installed in raceways.
- Conductors listed and identified as Photovoltaic (PV) wire installed as exposed, single conductors.

L'onduleur SolarEdge est sans transformateur et sans mise à la terre. Quand on rajoute des cables (pour extension ou retour de cable a l'onduleur par exemple), utilisez l'un des cas suivants:

- Cables non metalliques, gainés, multi conducteurs
- Conducteurs installés dans des raceways.
- Conducteurs catalogués et identifiés comme des fils photovoltaïques (PV) installés en extérieur, à conducteur unique.

IMPORTANT SAFETY FEATURE:

The output wires of each PowerBox are 90°C, 10AWG, UL rated PV wire. Connecting one PowerBox to the next using these wires without any added protection complies with NEC 690.35(d).

- Approximately 8 to 25 PowerBoxes can be serially connected in a string. Please refer to the PowerBox datasheets for the exact minimum and maximum number of PowerBoxes permitted in a string.

NOTE:

If a string is too short, it may not operate. If a string is too long, the string performance may be reduced.

IMPORTANT SAFETY FEATURE:

PV modules embedded with a SolarEdge PowerBox are safe. They carry only a low safety voltage before the Single Phase Inverter is turned on.

IMPORTANT SAFETY FEATURE:

As long as the PowerBoxes are unconnected to the inverter and the inverter is OFF, the PowerBoxes will output a safe 1V voltage during installation.

- The full string can either be directly connected to the inverter or connected in parallel to another strings and then together they are connected to the inverter.
- You can construct and connect in parallel strings of unequal length, meaning the number of PowerBoxes in each string does not have to be the same.
- The PowerBox output cables are labeled + and – .
- Connect the Plus (+) connector of the output wire of the first PowerBox in the string to the Minus (-) connector of the second PowerBox in the string. Repeat this step for each PowerBox in the string. This procedure is similar to the standard procedure for connecting PV modules.

WARNING!

Make sure that the Plus (+) and the Minus (-) connector cables are firmly and totally inserted.

Veillez à ce que les câbles de connexion Plus (+) et Moins (-) sont insérés fermement et jusqu'au bout.

Verifying Proper PowerBox Connection

The following describes how to verify that the PowerBoxes are properly connected in the string.

► To verify proper PowerBox connection:

- Make sure the PV modules are exposed to sunlight during this process. Otherwise, the PowerBoxes may not be on.
- Verify each string individually before connecting it to the other strings or to the inverter.
- Each PowerBox connected to a PV module initially produces a safe voltage of 1 V. A string with properly connected PowerBoxes should produce 1 V per PowerBox in the string. For example, if 10 PowerBoxes are connected in a string, then 10 V should be produced. Use a voltmeter with at least 0.1V measurement accuracy to verify that the total voltage produced is in accordance with the number of PowerBoxes in the string.
  - If 0 V is measured for the string, check for a disconnection of the outputs of one of the PowerBoxes.
  - If the voltage is lower than the quantity of PowerBoxes (for example, 9 V when 10 PowerBoxes are connected), verify whether one or more of the PowerBoxes are not connected, meaning they were skipped during the string connection process. If they are all connected, verify whether one or more of the PV modules is not connected properly to its PowerBox.
  - If the voltage is too high, then apply the CAUTION below.

CAUTION:

If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE!!

Please note that a deviation of up to 2V for a full string is considered normal.

A voltage that is higher than the quantity of PowerBoxes may be caused by one of the following reasons:

- An extra PowerBox is connected in the string.
- The output of a PV module may be connected in the string instead of the output of a PowerBox.
- A malfunction of one of the PowerBoxes.
- Perform the following if the total string voltage is too high:
- Verify that only PowerBoxes are connected in the string and that no PV module outputs are connected without a PowerBox.
- Disconnect the wires that connect the PowerBoxes in the string.
- Measure that there is 1V safety voltage for each individual PowerBox in order to locate the PowerBox that does not output the proper voltage.
- If a malfunctioning PowerBox is located, check its connections, polarity, module and voltage.
- If a malfunction cannot be bypassed or resolved, skip the malfunctioning PowerBox, thus connecting a shorter string.
- Do not continue before finding the problem and removing the malfuntioning PowerBox.

Si la tension mesurée est trop élevée, l'installation pourrait ne pas avoir de basse tension de sécurité. PROGRESSEZ AVEC PRUDENCE!!

Notez qu'une déviation de jusqu'à 2V pour une chaine complete est considérée comme normale.

Une tension qui est supérieure au nombre de Powerbox dans la chaine peut se produire pour les raisons suivantes:

- Une Powerbox supplémentaire est connectée dans la chaine
- La sortie d'un module est connectée à la chaine au lieu de la sortie d'une Powerbox
- Une malfonction d'une Powerbox.
- Procédez comme suit si la tension de chaine est trop haute:
- Vérifier que seulement des Powerbox sont connectées à la chaine et que pas un seul module soit connecté directement à la chaine.
- Débrancher les cables qui connectent les Powerbox à la chaine.
- Mesurez que la sortie de chaque Powerbox génère un seul Volt de tension afin de localiser la Powerbox qui ne génère pas la bonne tension.
- Si une Powerbox défectueuse est identifiée, vérifier ses connections, sa polarité, le module et la tension.
- Si une Powerbox défectueuse ne peut pas être courtcircuitée ou réparée, sautez la Powerbox et connectez une chaine plus courte.
- Ne pas continuer avant d'avoir trouvé le problème et retiré la Powerbox défectueuse.

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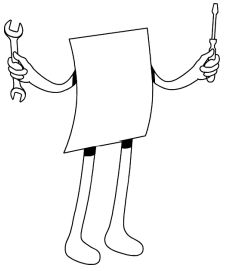


Chapter 4

Installing the Inverter

About This Chapter

This chapter describes the process of installing and connecting a SolarEdge Single Phase Inverter. The Single Phase Inverter can be installed either before or after the PV modules and PowerBoxes have been installed. The models covered in this guide are the SE3300, SE4000, SE5000 and SE6000.

This chapter contains the following sections:

Introducing the SolarEdge Inverter

This process involves attaching the inverter mounting bracket to a wall or pole and then mounting the Single Phase Inverter onto it.

Heat Dissipation

One of the principal problems of inverters is the heat they produce. The Single Phase Inverter employs a passive cooling solution. It has no moving parts (such as fans) and is hermetically sealed according to IP65/NEMA 3R (rainproof) standards. The Single Phase Inverter dissipates heat through the heat sink fins on its back and the airflow that is generated around them.

The heat producing elements of the Single Phase Inverter are located against the back of the chassis and are attached to the heat sink, which is a grid of fins that provides a large heat dissipation surface.

The Single Phase Inverter's heat sink is placed against a wall or pole. Air rises as it is heated by the inverter. The space created by the heat sink fins along the back of the chassis enables airflow from beneath the chassis along its back and out from the top of the chassis, as shown below:

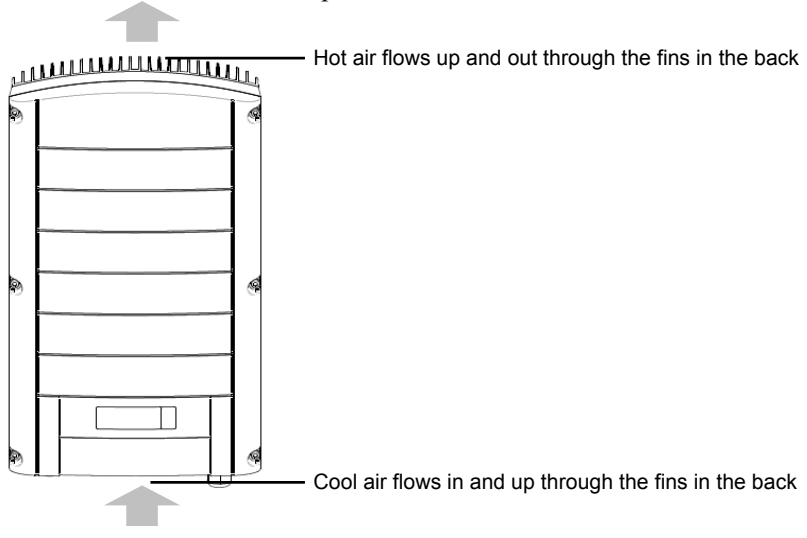


Figure 7: Heat Dissipation

Chassis Clearance

This heat dissipation solution requires the following clearance areas between the Single Phase Inverter chassis and all types of obstructions, such as wires and walls:

- 8” (20 cm) to the top and bottom of the chassis
- 4” (10 cm) to the right and left of the chassis

NOTE:

If more than one Single Phase Inverters are installed side by side, the distances between them must exceed 4" (10 cm).

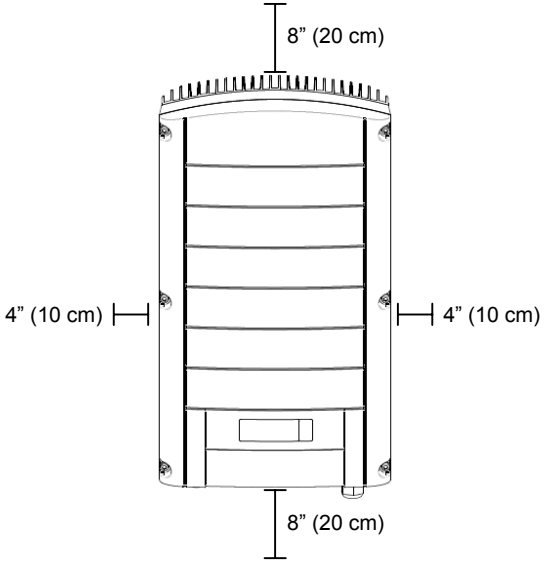


Figure 8: Chassis Clearance

Cooling Airflow

Any plastic tunneling used to isolate the DC and AC wiring must be positioned so that it does not obstruct the airflow from the bottom of the chassis.

All Single Phase Inverter connectors are located at the bottom of its chassis. The DC and AC wiring coming out of the bottom of the chassis is typically encased and isolated in a tunneling plastic sleeve. It is mandatory that this plastic tunneling does not obstruct the airflow from the bottom of the chassis. Therefore, this tunneling cannot be attached to the wall or pole directly underneath the chassis. It must be stabilized away from the bottom of the chassis to permit free airflow, as shown below:

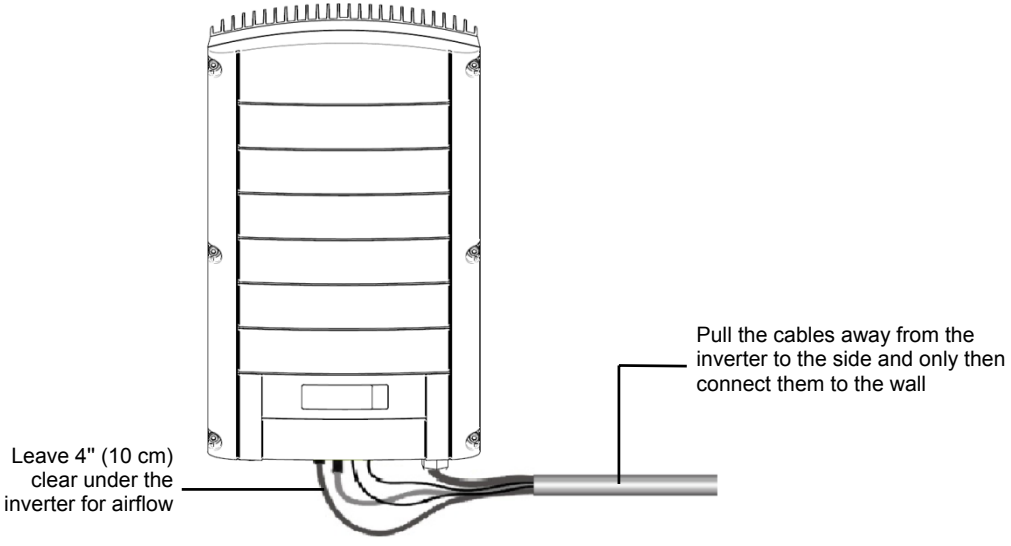
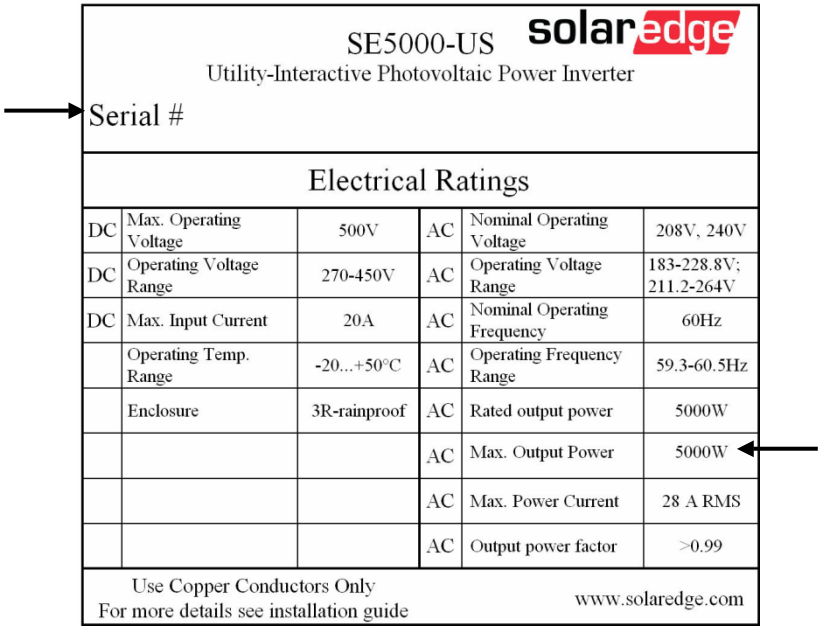


Figure 9: Cooling Airflow

You may refer to the *Connecting the Single Phase Inverter* section on page 52 for more information about connecting the Single Phase Inverter.

Identifying the Inverter

Refer to the sticker on the side of the inverter that specifies its **Serial #** and its **Electrical Ratings** including its **Max Output Power**.



SE5000-US

Utility-Interactive Photovoltaic Power Inverter

Serial #

Electrical Ratings

DC	Max. Operating Voltage	500V	AC	Nominal Operating Voltage	208V, 240V
DC	Operating Voltage Range	270-450V	AC	Operating Voltage Range	183-228.8V; 211.2-264V
DC	Max. Input Current	20A	AC	Nominal Operating Frequency	60Hz
	Operating Temp. Range	-20...+50°C	AC	Operating Frequency Range	59.3-60.5Hz
	Enclosure	3R-rainproof	AC	Rated output power	5000W
			AC	Max. Output Power	5000W
			AC	Max. Power Current	28 A RMS
			AC	Output power factor	>0.99

Use Copper Conductors Only
For more details see installation guide

www.solaredge.com

The inverter serial number is also indicated on the enclosed warranty card. Please provide the serial number when contacting the SolarEdge support line. The serial number is also required when requesting to open a new site in the SolarEdge Monitoring Portal.

Mounting the Inverter

CAUTION:

Make sure that you have read the previous sections in this chapter before starting the mounting process that is described below.

Veillez à lire les sections précédentes de ce chapitre avant de commencer le processus de montage qui est décrit ci-dessous.

The Single Phase Inverter installation package provides the Single Phase Inverter and the mounting bracket that is required to connect it to the wall. Standard tools (not provided) can be used during its installation.

▶ To mount the Single Phase Inverter:

1. Attach the provided bracket to a wall or pole, as follows:
   - Ensure that the U-shaped part of the bracket is positioned on the top, as shown below:

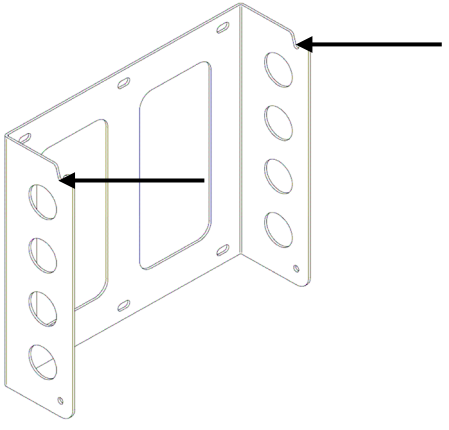


Figure 10: Positioning the U-shaped Part of the Bracket

   - When mounting on a wall, bolt the four outer-most holes of the bracket.

     Other holes may be used to stabilize the bracket or when the outer-most holes cannot be used.
   - When mounting on a pole, bolt the suitable inner holes of the bracket.
2. Verify that the bracket is firmly attached to the wall or pole.

3 The chassis comes with two screw holes on the top.

These screws enable you to hang the chassis onto the right and left U-shaped part at the top of the bracket. Hold the Single Phase Inverter with the LCD on the bottom and facing you and hang it on the bracket, as shown below:

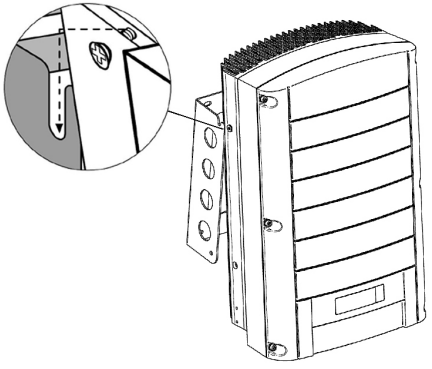


Figure 11: Hanging the Inverter on the Bracket

CAUTION:

Do not rest the connectors at the bottom of the inverter on the ground at any time, as it may damage them. If you need to rest the chassis on the ground, lay it on its back, front or side, not on its bottom.

A aucun moment ne posez les connecteurs inférieurs de l'onduleur sur le sol de peur de les endommager. Si vous avez besoin de poser le chassis sur le sol, couchez le sur son dos, sur sa face ou son coté, pas sur son bas.

4 Let the chassis lay flat against the wall or pole. Then, screw two screws into the right and left sides of the bottom of the bracket. The screws go through the outer heat sink fin on either side into the bracket, as shown below:

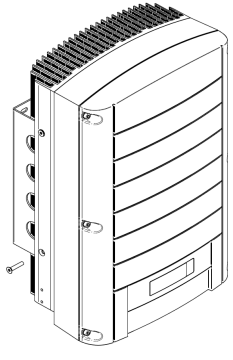


Figure 12: Inserting the Screws into the Bottom Heat Sink Fins

Connecting the Inverter

Inverter Connection Overview

The main task of connecting the Single Phase Inverter involves connecting the Single Phase Inverter to the DC input from the PowerBox strings and to the AC output.

WARNING!

A 32A_{AC} fuse or circuit breaker are required at the connection point of the Single Phase Inverter to the grid.

A 32AAC, des fusibles ou des coupeurs sont nécéssaires au point de connection de l'onduleur monophasé avec le reseau.

WARNING!

It is essential to connect the PE (ground) wiring before connecting the AC Line and Neutral wires.

Il est essentiel de connecter le câble PE (la terre) avant de connecter les lignes AC et Neutre.

WARNING!

Grounding of the DC side is prohibited because the Single Phase Inverter has no transformer.

Mise à la terre du coté DC est interdit car l'onduleur monophasé n'a pas de transformateur.

AC Grids Supported

The following figures show the AC grids supported by the SolarEdge single-phase inverter:

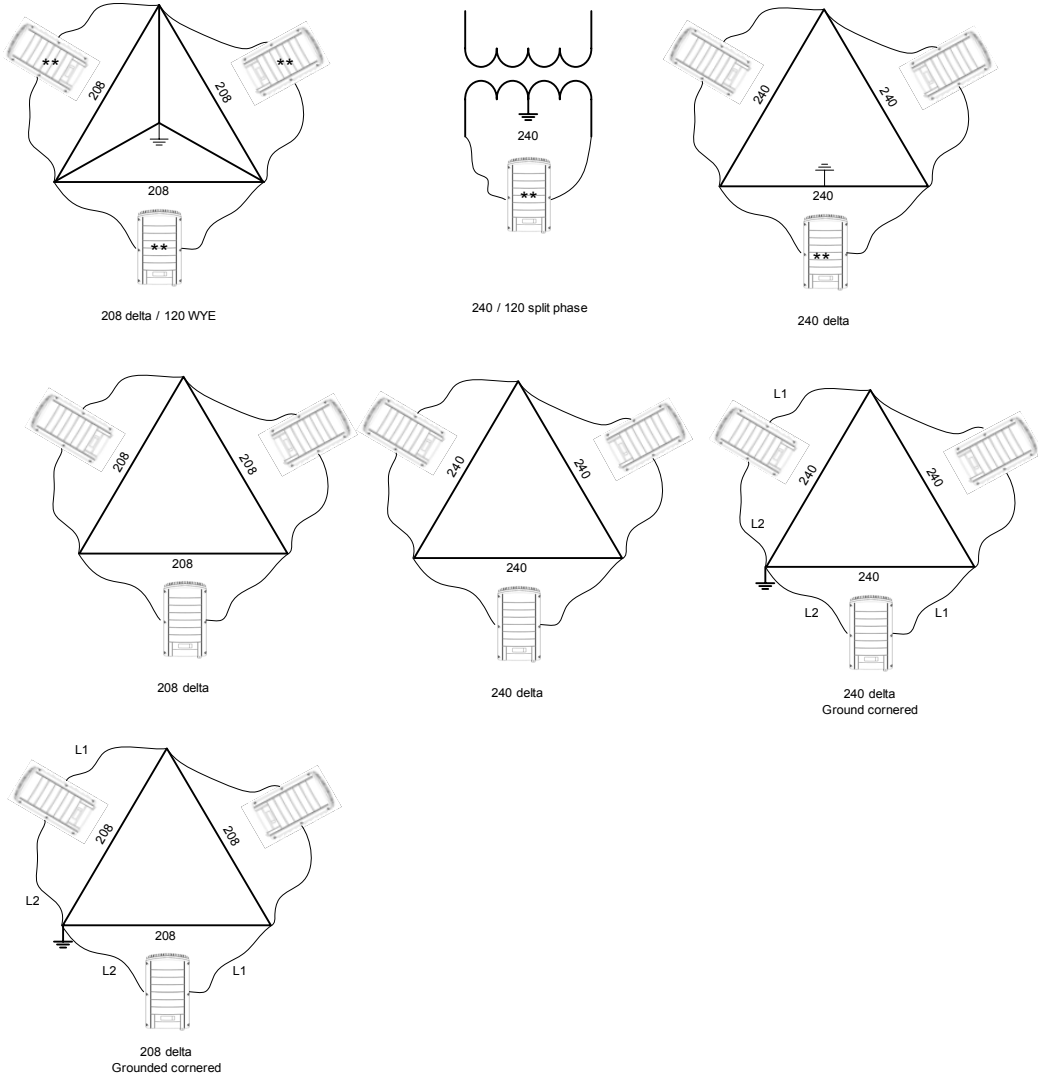


Figure 13: AC Grids Supported by the SolarEdge Single-Phase Inverter

NOTE:

Inverters that are maked in the diagram above with two asterisks (**) and that have their Neutral line connected can be set with the **Auto Detect Grid** option. In this case, there is no requirement to configure them to a specific grid voltage.

Inverters that are connected to corner grounded grids have a specific polarity between L1 and L2 that should be retained. For all other grids, L1 and L2 are interchangable.

Connecting the Single Phase Inverter

Connectors and Cables

The following shows the Single Phase Inverter connectors:

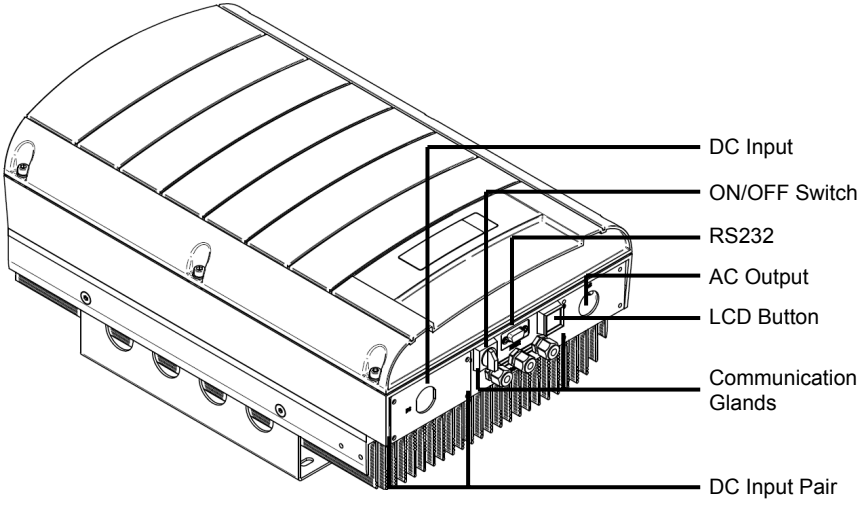


Figure 14: Single Phase Inverter Connectors

The following describes each connector, the wire requirements and gauge of its associated cable. All the Single Phase Inverter connectors are located at the bottom of the inverter, as described below:

- **ON/OFF Switch:** Turning this switch ON, powers up the Single Phase Inverter and starts the operation of the PowerBoxes. Turning it OFF, turns the inverter off and reduces the PowerBox voltage to a low safety voltage.
- **LCD Button:** Pressing this button lights up the LCD for 30 seconds. When you turn ON the Single Phase Inverter, the LCD light turns on automatically for 30 seconds and shows the current Vin and Vout. Sequential pressing of the button toggles between the different LCD screens. You may refer to the *Configuring the Inverter Using the SolarEdge Configuration Tool* section on page 107 for a description of the messages that appear on the LCD.
- **RS232 Connector:**
  - Provides a configuration, control and management connection to a locally connected PC or laptop. You may refer to the *Configuring the Inverter Using the SolarEdge Configuration Tool* section on page 107 for information about connecting and configuring the RS232.
  - The RS232 can also be used to connect the inverter to an external modem for connection to the SolarEdge Monitoring Portal. You may refer to *Chapter 7, Setting Up Communication* on page 73 for a description of how to set up this communication option to the SolarEdge Monitoring server.

  You may refer to the *SolarEdge Monitoring Portal User Guide* for more information about the monitoring capacities.
- **Other Communication Options (Ethernet (LAN), RS485 or ZigBee):** Three other types of communication options can be used to connect the inverter to the SolarEdge Monitoring Portal. They are installed through the three cable glands. You may refer to *Chapter 7, Setting Up Communication* on page 73 for a description of how to set up these communication options to the SolarEdge Monitoring server.

- **AC and DC Conduits:** Conduits must be Rainproof and size 3/4".
- **AC and DC Internal Wiring:** Each of the AC wires (Line1, Line2, Neutral and GND) and DC wires (DC+ and DC-) must be a copper wire with a cross-section of AWG10-AWG6 (8–16 mm^2).

Connecting the Single Phase Inverter

The first part of the procedure for connecting the Single Phase Inverter is performed with the inverter cover open. It involves feeding the AC cable though the AC cable gland and connecting its wires to the relevant terminals inside the chassis, as described below. The second stage involves connecting the appropriate cables to the connectors, as described on page 55.

Opening the Cover

This section describes how to open the cover in order to connect cables to terminals.

▶ To connect AC wires to internal Single Phase Inverter terminals:

1. Turn OFF the AC on the AC wires to be connected to the inverter by disconnecting the circuit breakers on the main circuit board.
2. Turn off the ON/OFF switch at the bottom of the inverter.
3. Turn off the DC switch on the main circuit board, if one exists.
4. If the inverter was on prior to disconnecting the switch, then wait at least five minutes before opening the cover of the inverter.

WARNING!

Do not open the cover of the Single Phase Inverter before you turn OFF the ON/OFF switch at the bottom of the inverter and the DC switch of the main circuit board.

Ne pas ouvrir le couvercle de l'onduleur monophasé avant de mettre l'interrupteur ON/OFF au bas de l'onduleur sur la position OFF et de fermer l'interrupteur DC de l'armoire principale.

WARNING!

Verify that the ON/OFF switch at the bottom of the inverter is OFF.
Vérifier que l'interrupteur ON/OFF au bas de l'onduleur est sur OFF.

5 Unscrew the Allen screws on the cover of the chassis (on its front) and lift the cover up.

6 The inverter assembly is connected to the chassis cover by a green and yellow grounding cable.

WARNING!

The cover grounding cable may be removed after the cover is removed. However, the cover grounding cable **MUST** be reconnected before reassembly of the cover.

Le cable de mise à la terre du couvercle peut être enleve après que le couvercle soit démonté. Cependant, le câble de mise à la terre du couvercle DOIT être reconnecté avant de remonter le couvercle.

7 **Connecting the AC Wires:** Strip off the isolation and expose the three wires in the AC cable, as follows:

The lengths of the wires to strip are as follows:

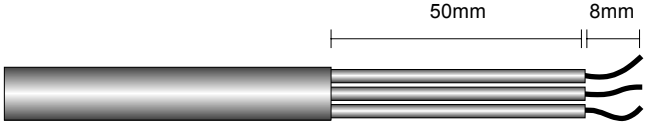


Figure 15: Wire Lengths to Strip

- Strip 8 mm (1/3") for contact.
- Individual cable length 50 mm (2").

WARNING!

Make sure to connect the equipment grounding first.
Veillez à relier le conducteur de PE (la terre) d'abord.

8 Insert the cable through the AC cable gland on the right and connect the wires to the appropriate terminal connectors according to their labels: GND, L1 and L2. Optionally, N, as well.

Make sure to connect the GND conductor first.

- Line 1 (L1), which is typically red
- Line 2 (L2), which is typically black
- Neutral (N) which is typically white
- You may also optionally connect the Neutral wire for monitoring split phase balance. Connect N wire to left-most terminal shown.
- Equipment grounding conductors, ⏚ can be bare, green or green with yellow stripe.

The AC equipment grounding is to be connected to the terminal block that is directly connected to the chassis, as shown below:

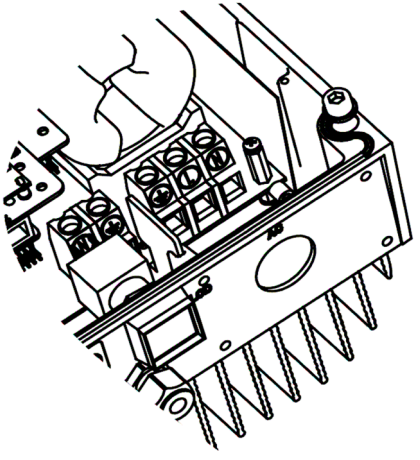


Figure 16: Inserting the Cable Through the AC Cable Gland

9 Tighten the screws of each wire terminal according to the following torque. The tightening moment is 1.2-1.5 Nm.(0.88-1.1 pound-foot).

10 Verify that there are no whiskers in each terminal connector and that the unused ports of the terminals are sealed.

Connecting Cables to the Single Phase Inverter Chassis

► To connect DC cables to the Single Phase Inverter:

1 Connect the DC connectors from the photovoltaic installation to the DC+ and DC- connectors as indicated.
Two strings may be connected in parallel to both DC inputs of the inverter. They are simply wired together in the terminal block inside.

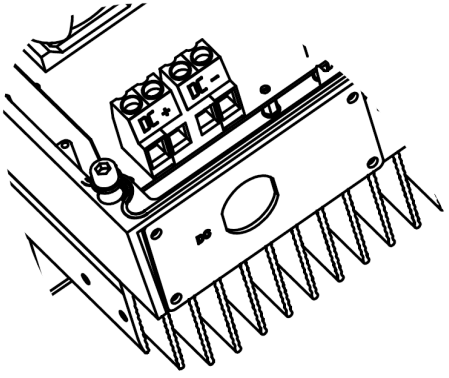


Figure 17: Connecting the DC Cables to the Inverter

2 Connect the DC equipment grounding to the terminal block directly connected to the chassis.

If more than two strings are required, they can be connected in parallel in an external combiner box before connecting a unified DC connection to the inverter.

NOTE:
If more than two strings are connected each should be properly fused on both DC+ and DC- according to NEC690.35(B).

NOTE:
Due to the SolarEdge architecture, the parallel strings may be of different lengths and therefore do not necessarily need to be connected to an identical number of PowerBoxes.

The lengths of the wires to strip are as follows:

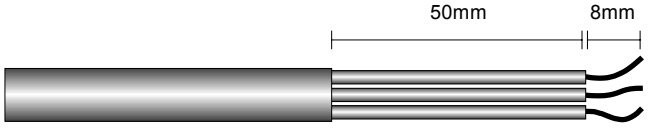


Figure 18: Wire Lengths to Strip

- Strip 8 mm (1/3") to enable contact
- Each cable length is 50 mm (2")

3 Insert the cable through the DC conduit opening on the left and connect the wires to the appropriate terminal connectors according the labels on them: DC + and DC -.

CAUTION:

Ensure that the + wire is connected to the + terminal connector and that the - wire is connected to the - terminal connector.

Veillez à ce que le câble + soit connecté au connecteur terminal + et que le câble - soit connecté au connecteur terminal.

4 Tighten the screws of each wire terminal according to the following torque. The tightening moment for the terminals is 1.2-1.5 Nm.(0.88-1.1 pound-foot).

Completing the Single Phase Inverter Installation

After completing all connections, the **inverter must be configured to the proper country**. The inverter may be configured according to the site's requirements using the inverter's internal buttons or by using the SolarEdge Configuration Tool connected to an RS232 port. For more information, you may refer to the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.

If you plan to use the SolarEdge Monitoring Portal to access SolarEdge site information, you may need to add a physical connection to the proper communication option. Connecting the inverter to the SolarEdge Monitoring Server via a LAN, an external modem connected to an RS232 port, an RS485 bus or a ZigBee modem is described in *Chapter 7*, *Setting Up Communication* on page 73.

Closing the Cover

► To close the cover:

1 Shut the chassis cover and secure it by tightening the screws.

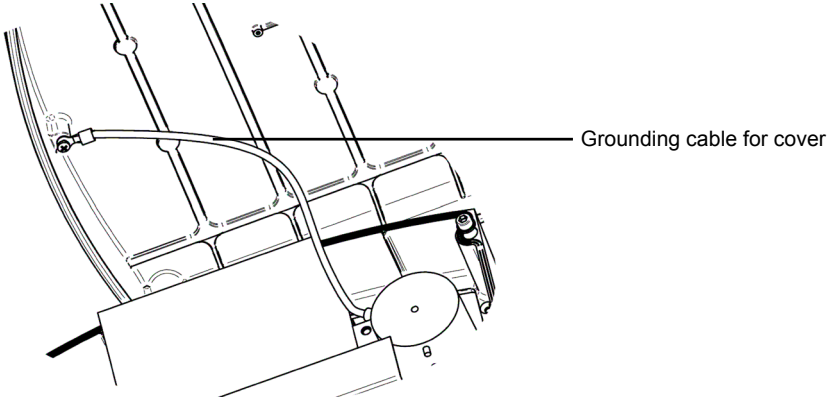


Figure 19: Chassis Grounding Wire Conection

2 Make sure to return the chassis grounding wire if it was removed.

3 For proper sealing, first tighten the corner screws and then the two central screws. The recommended order can be seen in the following figure:

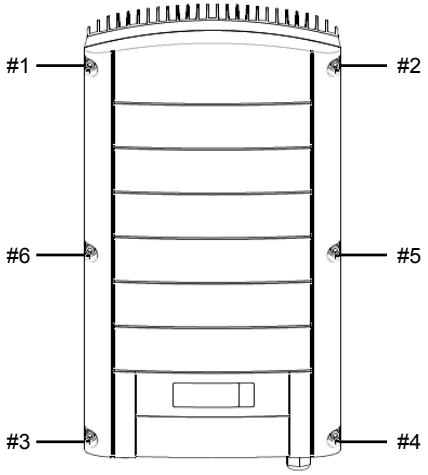
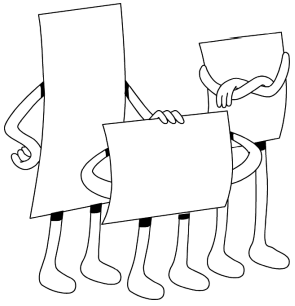


Figure 20: Tightening the Screws



Chapter 5

Commissioning the Installation

About This Chapter

At this stage, as described in the previous chapters, the PV modules have been connected to the PowerBoxes, the PowerBoxes have been serially connected in strings and the strings have been connected in parallel to the inverter.

This chapter describes how to activate the system, commission the PowerBoxes and verify the proper functioning of the system.

NOTE:
Keep this manual accessible and preferably near the inverter.

Commissioning – Workflow

The following workflow describes how to activate the system, commission the installation and verify the proper functioning of the system.

- **Step 1, Activating the System,** page 60
- **Step 2, Pairing PowerBoxes to the Inverter,** page 62
- **Step 3, Verifying Proper Operation,** page 64
- **Step 4, Reporting Installation Data,** page 65

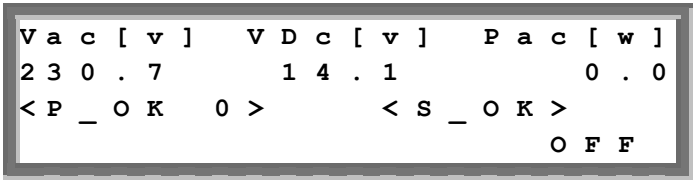
Step 1, Activating the System

This section describes how to perform the initial activation stages of the SolarEdge system.

These stages are preformed after the inverter and PowerBoxes have been installed and the PowerBoxes have been connected to the inverter.

► To activate the SolarEdge installation:

1. Power OFF the Single Phase Inverter by turning off the ON/OFF switch at the bottom of the inverter and the DC switch of the main circuit board (if exists).
2. Turn on the AC to the inverter.
3. If the site is installed with an external DC switch between the PowerBoxes and the inverter(s), then turn it ON. A message similar to the following message appears on the inverter's LCD panel:



4. Verify that **P_OK** appears, which indicates a connection to the PowerBoxes, and that at least one PowerBox is sending monitoring data. The number 0 indicates that no PowerBox has been paired to this inverter. If you are re-pairing the PowerBoxes and inverters, the number indicates the number of PowerBoxes that have been paired in the past. If **P_OK** does not appear, check the PowerBox, strings and DC input connections.
5. If the inverter is connected to the SolarEdge Monitoring server, verify that **S_OK** appears. This denotes that the connection to the server is successful. Refer to page 86 for information about connecting the inverter to the server and for troubleshooting information.
6. Verify that the **Vac [v]** on the LCD panel specifies the grid's correct AC output voltage, in Volts.

7 Verify that the **Vdc [v]** on the LCD panel specifies the DC input voltage, in Volts. There should be a safety voltage of 1 V for each PowerBox connected to the inverter.

NOTE:

A measurement error on the inverter LCD of ±3 V is OK.

NOTE:

If the LCD panel shows 0 V:

- Verify that the PV modules are are not shaded or otherwise obstructed.
- Check for proper PowerBox, string and DC input connection.
- Verify the correct polarity of the DC input connection.

8 Verify that **Pac [w]** on the LCD Panel specifies **0** as the AC output power, in Watts. This is because the inverter is still off.

WARNING!

Verify that the ON/OFF indicator on the LCD panel, described above, reads OFF.

Vérifiez que l'indicateur ON/OFF sur le panneau d'affichage LCD décrit ci-dessus lit OFF.

Step 2, Pairing PowerBoxes to the Inverter

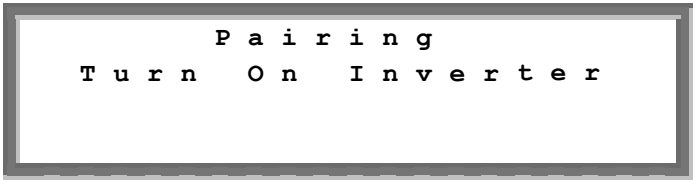
After all connections are made, all the PowerBoxes must be logically paired to their inverter before they can start working with it. This step describes how to pair PowerBoxes to the inverter, meaning to assign each inverter to the PowerBoxes from which it will produce power.

NOTE:

The PowerBox does not start producing power until it is paired with an inverter.

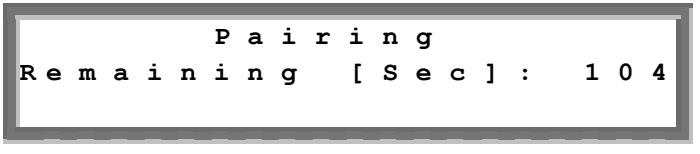
► To pair the PowerBoxes to the inverter:

1. Turn the ON/OFF switch at the bottom of the inverter to off. Press the inverter's LCD Light button for **15 seconds**. The following screen is displayed:



2. Turn on the inverter ON/OFF switch at the bottom of the inverter within five seconds. If you do not turn ON the inverter ON/OFF switch within five seconds, the inverter then exits pairing mode.

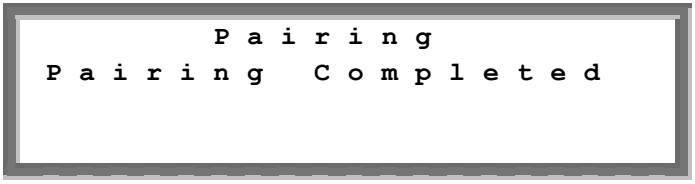
   The following screen is then displayed indicating that the inverter is performing the process of pairing and is assigning PowerBoxes to the inverter.



   This message displays a count down of the seconds until it completes the pairing process.

If pairing fails, an error is displayed. This error appears only if the above steps were not followed. If an error appears, then follow the pairing steps again.

After commissioning succeeds, the following message is displayed:



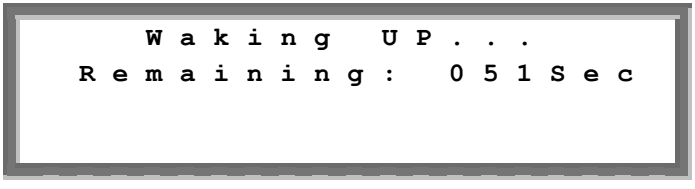
3 Since at this stage the ON/OFF switch at the bottom of the inverter is ON, the PowerBoxes start producing power and the inverter starts converting AC.

WARNING!

After you turn ON the ON/OFF switch of the Single Phase Inverter, the DC cables carry a high voltage and the PowerBoxes no longer output a safe 1 V output.

Après avoir mis l'interrupteur ON/OFF de l'onduleur monophasé sur ON, les câbles DC portent une haute tension et les Powerbox ne génèrent plus la tension de sécurité de 1V.

If the inverter starts converting after the initial connection to the AC, the inverter then goes into Standby mode until enough power is generated (the inverter LED flickers green). While the inverter is in Standby mode, the following message is displayed:

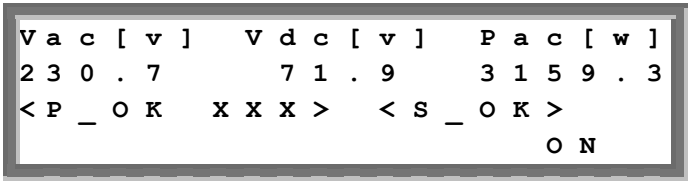


During this time, the inverter monitors the grid and verifies correct grid voltage and frequency. This message indicates how many seconds remain until the inverter will be in Production mode. This amount of time is in accordance with the regulations of each country, and is typically between three to five minutes.

The inverter then automatically goes to Production mode and produces power (the inverter LED is steady green).

Step 3, Verifying Proper Operation

After the proper wake-up delay time is over, the following message appears on the inverter's LCD panel:



To verify proper operation:

1. Verify that the inverter LED is steady green.
2. Verify that the ON/OFF indicator on the LCD panel, described above, reads **ON**.
3. Verify that **P_OK** appears to indicate a connection to the PowerBoxes. Also, verify that **S_OK** appears, if the inverter is connected to the SolarEdge Monitoring Server.
4. Verify that the total number of PowerBoxes connected to the inverter appears next to the **P_OK** indicator on the LCD panel. If this number is too low, then it may mean that one or more of the PowerBoxes are not connected properly or the pairing process may have not been completely successful. For example due to complete shading of one of the modules or insufficient sunlight during the pairing process.

NOTE:

It can take up to 15 minutes for all PowerBoxes to transmit their telemetries and to be counted on the LCD screen.

5. Verify that the **Vac [v]** on the LCD panel specifies the grid's correct AC output voltage in Volts.

6 Verify that the **Vdc [v]** on the LCD panel specifies the DC input voltage in Volts, which should be between 250 V and 450 V.

7 Verify that **Pac [w]** on the LCD Panel specifies the **total** AC output power produced, in Watts.

NOTE:

Take note of the serial # on the inverter's sticker and on its warranty card. This information is used in the SolarEdge Monitoring Portal to identify this inverter and is needed to open a new site in the monitoring portal.

Congratulations! Your SolarEdge power harvesting system is now operational.

Step 4, Reporting Installation Data

The SolarEdge Monitoring Portal can be used to access SolarEdge site information, as described in the *SolarEdge Monitoring Portal User Guide*.

After a site is opened in the SolarEdge Monitoring Server, you can access all the monitored data about that site.

To register a new site, fill in the online form at http:/www.solaredge.com/groups/site-registration.

The serial number(s) of the inverter(s) must be specified in order to open a new site.

The SolarEdge Monitoring Server also enables you to display a logical and physical schematic layout of the installed PowerBoxes, as follows:

- **Logical Layout:** Shows a schematic logical layout of the components in the fields, meaning inverters, clusters, strings and panels and their electrical connectivity. This view enables you to see a logical view of which panels are connected in each string, which strings are connected to each inverter and so on.
- **Physical Layout:** Shows a schematic physical layout of the components in the fields, meaning inverters, clusters, strings and panels and their electrical connectivity. This view enables you to see a **physical bird's eye view** of the installation site showing which panels are connected in each string, which strings are connected to each inverter and so on.

This window enables you to:

- View the latest performance of specific components.
- Find underperforming components, such as panels, by comparing their performance to that of other components of the same type.
- Pinpoint the location of alerted components.
- See how components are connected to each other.

In order to enable the SolarEdge Monitoring Portal to show the strings and physical location of PowerBoxes, you may first report the physical and logical mapping of the installed PowerBoxes by mail, email or fax to SolarEdge. SolarEdge will then upload this information to the SolarEdge Monitoring Server.

IMPORTANT NOTE:

Even if you do not report the physical and logical mapping of the installed PowerBoxes to SolarEdge, the SolarEdge Monitoring Portal will still show the logical layout indicating which PowerBoxes are connected to which inverters. However, it will not show strings or the physical location of PowerBoxes.

This process prepares the SolarEdge Monitoring Portal for receiving up-to-date information from the installation site and for displaying it in a physical or logical view.

The inverter may be connected to the SolarEdge Monitoring Server via a LAN or an external modem connected to the RS232 port. Alternatively, you can connect the inverter to another inverter that is already connected to the server. The inverter-to-inverter connection is made by an RS485 bus or a ZigBee modem. This connection enables the inverters to send the latest data collected from the PowerBoxes and inverters to the SolarEdge Monitoring Server.

If the inverter is properly connected to the internet, as described in the *Step 3, Verifying Proper Operation* section on page 64, then the **S_OK** appears in the inverter's LCD screen.

Providing Installation Information

The following information may be sent to SolarEdge by mail, email or fax:

- **Installation Name:** The name by which you want this installation to appear in your personal site list in the SolarEdge Monitoring Portal.
- **Installation Location (City, State, Country):** This information is required if you want the SolarEdge Monitoring Portal to show the local weather data, the local PV feed-tariff or the local electricity tariff.
- **Inverter Serial Number(s) at the Site:** Each inverter's serial number is printed on a sticker on the side of the inverter, on the inverter warranty card and on the inverter box. Each inverter's sticker has a detachable tab on which the inverter's serial number is printed. You can remove this tab and stick it on a piece of paper. The PowerBoxes also have a sticker with a detachable tab on which the PowerBox's serial number is printed.

  An easy way to report all the inverters' and PowerBoxes' serial numbers to SolarEdge is to collect all the inverters' and PowerBoxes' stickers, stick them on the same piece of paper and then fax this paper to SolarEdge.

If you wish, you can also supply the following information.

- **Logical Mapping:** Showing which PowerBox is located in which string and in which order. You can specify the logical mapping of the strings and PowerBoxes, as follows:
  P.Inverter_number.String_number.PowerBox_number.
  For example, the third PowerBox connected to a PowerBox in the second string in the #4 inverter in the installation is represented as **P.4.2.3**.
- **Physical Mapping:** Showing a physical map (a drawing) of the location of each PowerBox in the installation.

The logical and physical mapping can be used in the future for debugging a problem using the SolarEdge Monitoring Portal.

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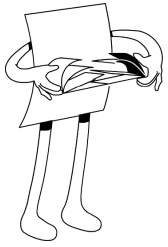

Chapter 6

Replacing and Adding System Components

About This Chapter

This chapter describes how to replace or add various SolarEdge system components after the initial installation.

Modifying an Existing Installation

This section describes how to modify an existing installation that has been operating properly for a while.

► To modify an existing installation:

1 Shut down the inverter by turning OFF its ON/OFF switch and the DC switch of the main circuit board. The inverter goes into Shutdown mode and displays the following message:

```
DC  VOLTAGE  NOT  SAFE!
 DO  NOT  DISCONNECT!
    VDC:       72.0
```

This message is displayed until the DC is safe. The default safety voltage is 50 V.

WARNING!

Do not touch the DC power connections until the DC voltage is at a safe level. Doing so may cause personal damage, damage to the device and/or danger of fire.

Ne pas touchez les connecteurs de courrant DC jusqu'à ce que la tension DC soit tombée àun niveau sécurisé. Y touchez pourrait engendrer un dommage aux personnes, un dommage à l'appareil ou un risque d'incendie.

2. Switch off the AC to the inverter.

WARNING!

If you cannot see the inverter panel, or there is a malfuntion indicated on the LCD panel, then switch off the AC to the inverter and wait five minutes for the input capacity of the inverter to discharge.

Si vous ne pouvez pas voir le panneau d'affichage de l'onduleur, ou qu'il y a un mauvais fonctionnement affiché au panneau LCD, coupez alors le courrant AC à l'onduleur et attendez cinq minutes que la capacité d'entrée de l'onduleur se décharge.

3. You can now add or remove PowerBoxes, add or remove strings, change connections of PowerBoxes or strings or replace the inverter.
4. Perform the *Commissioning – Workflow*, as described on page 59.

NOTE:

If you are permanantly dismantaling the installation or part of it, make sure to use the disposal method dictated by the regulations of the country in which the inverters are installed.

To move one or more PowerBoxes from one inverter to another in the same site:

1. Turn both inverters OFF, as described above.
2. Connect each PowerBox to the strings of the other inverter.
3. Perform the *Commissioning – Workflow*, as described on page 59, on the inverter to which a PowerBox was added and only then perform the *Commissioning – Workflow* on the inverter from which a PowerBox was removed.

CAUTION:

Commissioning must first be performed on the inverter to which PowerBoxes were added, and only then on the inverter from which PowerBoxes were removed. Otherwise, the inverter to which PowerBoxes were added may be damaged.

La mise en marche doit se faire d'abord avec l'onduleur auquel les Powerbox ont été rajoutées, et seulement ensuite avec celui duquel les Powerbox ont été enlevées. SInon, l'onduleur auquel les Powerbox ont été rajoutées peut être endommagé.

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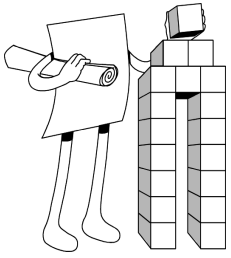


Chapter 7

Setting Up Communication

About This Chapter

This chapter describes how to install and set up communication between the inverter and the SolarEdge Monitoring Server.

This chapter contains the following sections:

Communication Dataflow

The SolarEdge site information can be accessed remotely using the SolarEdge Monitoring Portal, as described in the *SolarEdge Monitoring Portal User Guide*.

In order to transfer monitoring data from a SolarEdge site to the SolarEdge Monitoring Portal, a communication connection must be set up, as described in this chapter. Communication setup is not required for power harvesting and is needed only when using the monitoring portal.

PowerBoxes send information to the SolarEdge Inverter via DC lines. No added wires or configuration are required for this purpose. The inverter sends this information to the SolarEdge Monitoring Server through the Internet. The sections below describe how to set up this connection.

Communication Types

The following types of communication can be used to transfer the monitored information from the inverter to the SolarEdge Monitoring Server:

- **RS232 (UART):** page 76, This communication option is provided in all inverters by default. It is used to connect to any external modem that has an RS232 port.
- **Ethernet:** page 78, Enables the connection of the inverter directly to a LAN.
- **RS485:** page 81, Enables the connection of multiple inverters through the same bus, such that connecting only one inverter to the Internet is sufficient to provide communication services to all the inverters on the bus.
- **ZigBee:** page 85, Enables you to wirelessly connect one or more inverters to an external ZigBee modem so that there is no need to physically wire the inverters to the Internet.

Ethernet and RS485 are connected to a connector inside the inverter. The location of the connectors is indicated in the following figure:

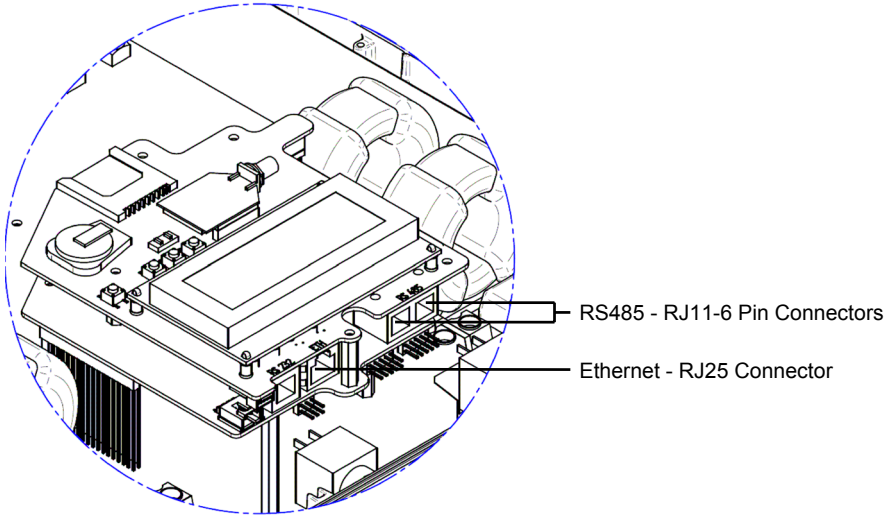


Figure 21: Ethernet and RS485 Connectors

NOTE:

Except for RS232, communication options are optional and can be ordered when ordering the inverter.

Creating an RS232 (UART) Connection

This communication option is provided in all inverters by default. It enables you to connect the inverter via any standard modem (not supplied by SolarEdge) that has an RS232 input.

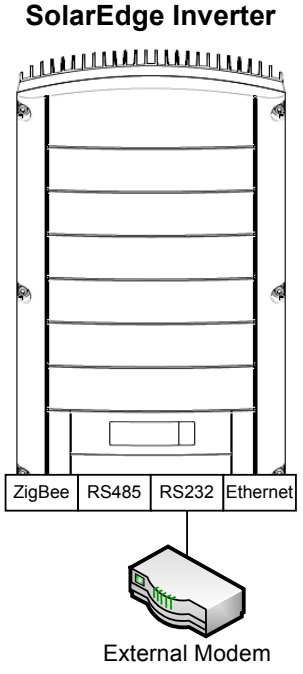


Figure 22: Example of RS232 Connection

NOTE:

When connecting via RS232, make sure to use a shielded connector so as not to interfere with other devices in the vicinity.

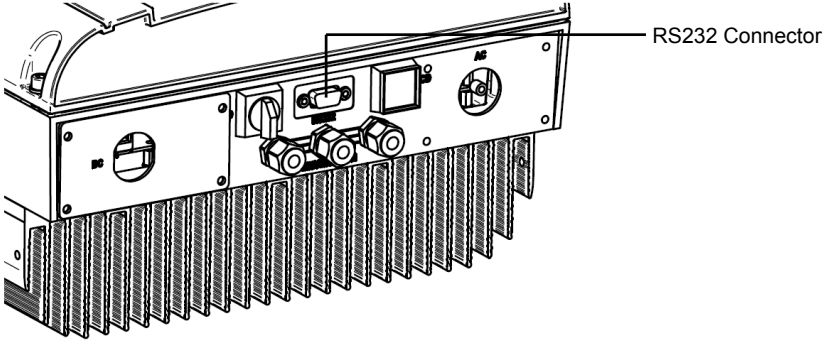


Figure 23: RS232 Connector

IMPORTANT SAFETY FEATURE:

The RS232 conector on the bottom of the inverter is safe to touch during normal operation of the Single Phase Inverter.

To configure RS232 communication to the SolarEdge Monitoring Server:

1. Using the user buttons, select the **5.1.2 RS232** option under the **Communication ➔ Server** menu (**5.1**), as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.
2. Configure the external modem to forward all RS232 communication to/from the SolarEdge Monitoring Server. The address of the SolarEdge Monitoring Server is **prod.solaredge.com** port 22222. Use the modem's configuration option to configure its RS232 connection, as follows:
   - **Baud Rate:** 115200
   - **Data Bits:** 8
   - **Parity:** None
   - **Stop bits:** 1
   - **Flow Control:** None
3. Connect the modem to the inverter through the RS232 connector, which is the nine-pin connector on the bottom of the inverter. There is no need to open the inverter cover.

To verify the connection, you may refer to the *Verifying the Connection* section on page 86.

Creating an Ethernet (LAN) Connection

This communication option enables you to use an Ethernet connection to connect the inverter to a LAN.

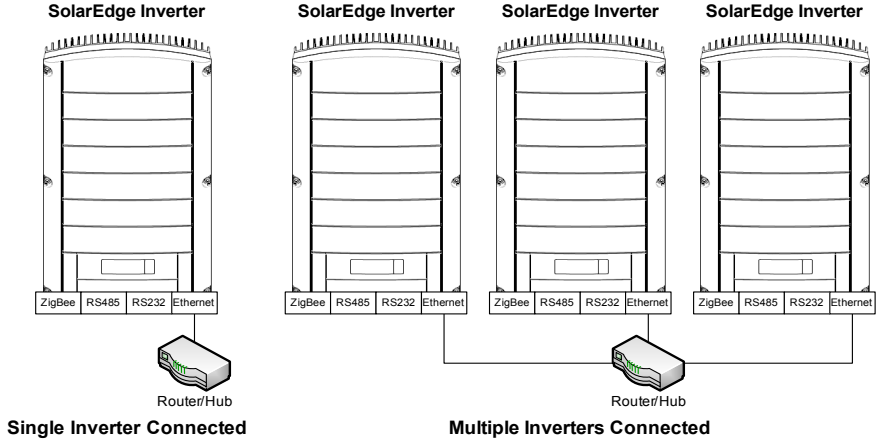


Figure 24: Example of Ethernet Connection

► To connect the Ethernet communication to the SolarEdge Monitoring server:

1. Open the cover of the inverter, as described on page 52.
2. Using the user buttons, choose the **5.1.1 LAN** option under the **Communication ➔ Server** menu (**5.1**) , as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.
3. Configure the **LAN** options under the **Communication** menu (DHCP [**5.2.2**] and IP [**5.2.1**] configurations), as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.

4 Connect the Ethernet cable to the RJ45 plug on board in the inverter, as follows:

- Insert the Ethernet wire via one of the small cable glands on the bottom of the inverter. **If required, remove the existing plug**. The inverter glands come pre-sealed from the factory. Removing the sealing is needed to insert the cable.

CAUTION:

If a gland is opened and not used, then make sure to reseal it. Otherwise, it may affect the inverter's functionality.

Si le gland est ouvert et inutilisé, veillez alors à le reboucher. Sinon, cela pourrait affecter le fonctionnement de l'onduleur.

CAUTION:

The internal side of the gland includes an o-ring, which should be used to ensure proper sealing.

La partie intérieure du gland contient une rondelle qui doit être utilisée pour assurer une bonne étanchéïté.

- Remove the cable's external isolation using the crimping tool and expose the wires. Standard cables have 8 wires (4 twisted pairs). For Ethernet communication, 4 wires (2 twisted pairs) are used.

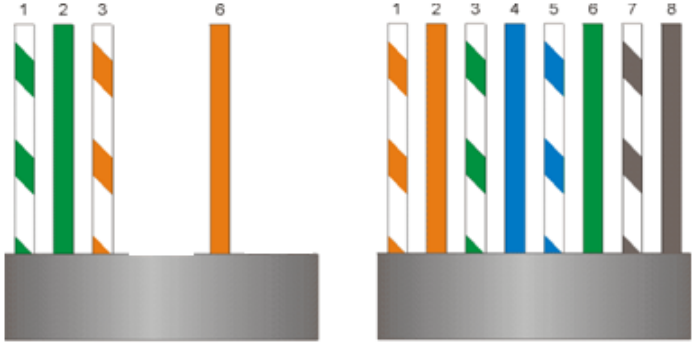


Figure 25: Preparing Connector Wiring

Only wires numbered 1, 2, 3 and 6 in the diagram on the left above should be connected. To make crimping easier, wires numbered 3, 6, 7 and 8 do not need to be connected.

- Insert the 4 wires into the RJ45 connector. Make sure to use pins 1, 2, 3 and 6.

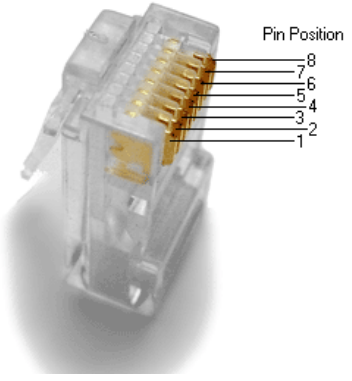


Figure 26: Inserting Wires into the RJ45 Connector

Use the Ethernet crimper to crimp the wires.

- Connect the Ethernet connector to the RJ45 plug on board in the inverter, as shown in Figure 21.

5 Close the inverter cover, as described on page 57.

6 Connect the other end of the Ethernet cable to the RJ45 plug of the Ethernet hub or router. You can connect more than one inverter to the same hub or to different hubs, as required. Each inverter sends its monitored data independently to the SolarEdge Monitoring server. All connections are initiated from the inverter so that no port forwarding is required.

7 Look at the Inverter and verify that the green LED at the side of the Ethernet receptacle is lit. This LED indicates that the Inverter is physically connected to the router.

8 Verify the connection, as described in the *Verifying the Connection* section on page 86.

NOTE:

If your network has a firewall, then you may need to configure it to enable the connection to the following address:

- Destination Address: prod.solaredge.com
- **Port;** 22222

Creating an RS485 Bus Connection

The RS485 option enables you to create a bus of connected inverters (consisting of up to 30 Slave inverters and 1 Master inverter). Using this option, inverters are connected to each other in a chain, meaning the first inverter in the chain is connected to the next inverter in the chain via its RS485 connector. The first inverter in the chain and the last inverter in the chain must be terminated.

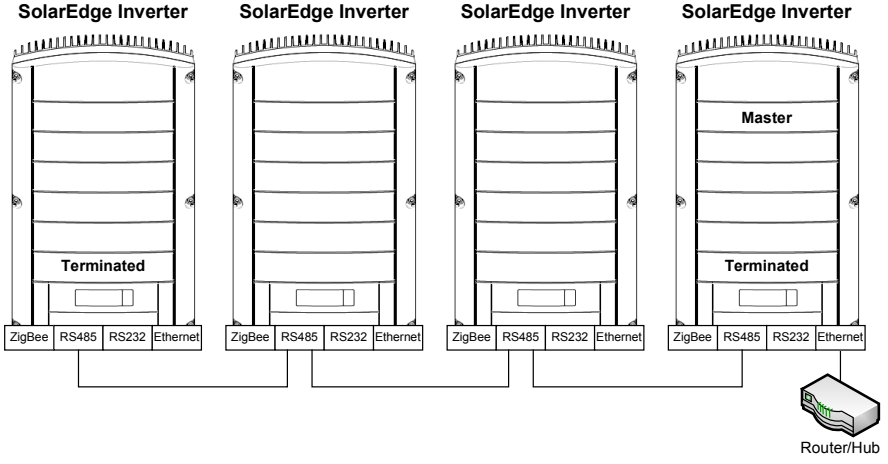


Figure 27: Example of RS485 Bus Connection

Each inverter must be connected according to the instructions below.

► To connect the RS485 communication bus:

1. Open the cover of the inverter, as described on page 52.
2. Using the user buttons, select the **5.1.3 RS485** option under the **Communication ➔ Server** menu (**5.1**), as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.

NOTE:

By default, all inverters are Slaves. Slaves can be configured to connect via RS485 automatically from the RS485 Master menu (**5.3.1.3** in the Master), instead of as described in Step **2** above.

3 The RS485 bus uses a - 4wire telephone cable and a six-wire RJ11 connecter (also known as RJ25). Insert the wire via one of the small cable glands. The glands come pre-sealed from the factory. Removing the sealing is required in order to insert the cable.

CAUTION:

If a gland is opened and not used, be sure to reseal it. Otherwise, it may affect the inverter's functionality.

Si le gland est ouvert et inutilisé, veillez alors à le reboucher. Sinon, cela pourrait affecter le fonctionnement de l'onduleur.

4 After inserting the wire, crimp a connector using a standard telephone wire crimper. Two pins (numbered 2 and 3) must be connected. The two wires must both belong to the same twisted pair, which is usually indicated by similar colored wire.

In addition, a grounding wire that is connected to pin number 6 must also be connected. For this purpose, you can use any remaining wire of the telephone cable and connect it to pin 6 of the connector. The wiring on the next inverter should be the same.

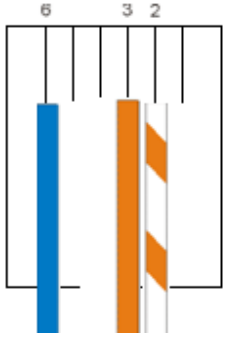


Figure 28: Crimping the Wires

5 Connect the RS485 cable connector to either of the RS485 plugs on boards in the inverter.

6 Connect the other end of the RS485 cable of the first inverter through the gland to the RS485 connector on the board of the next inverter in the chain, as described above.

7 You can use both RS485 connectors to wire up to two inverters – one to the left and one to the right.

8 The two inverters at the ends of the chain (meaning the first inverter and the last inverter) must be terminated by switching a termination dip-switch inside the inverter to ON. The switch is marked SW6 and it is the switch closest to the ESC button, as shown below:

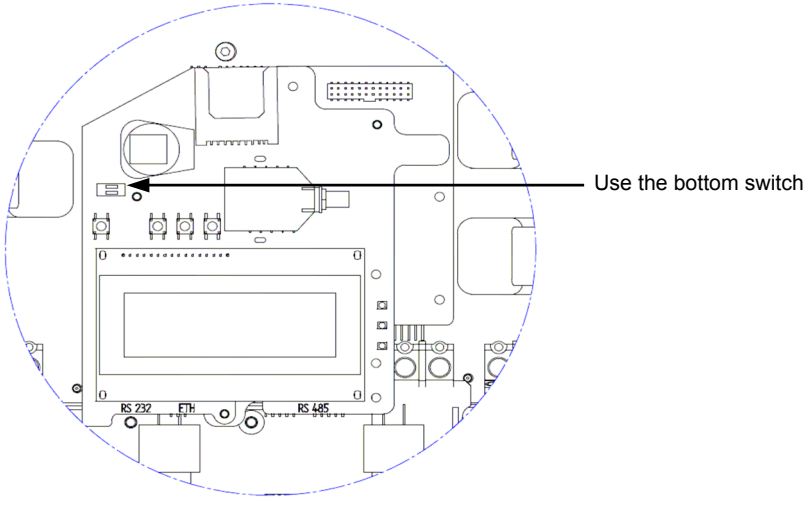


Figure 29: RS485 Termination Switch

NOTE:

Only the two the inverters at the ends of the chain should be terminated for best performance. The other inverters in the chain should have the termination switch OFF.

9 Choose a single inverter to be the connection point between the RS485 bus and the SolarEdge Monitoring Server.

10 Connect the Master, as described above, to the SolarEdge Monitoring Server via either Ethernet, as described in the *Configuring an Ethernet (LAN) Connection* section on page 78, or RS232, as described in the *Configuring an RS232 (UART) Connection* section on page 76. Ensure that you select either the Ethernet (**5.1.1**) or RS232 (**5.1.2**) option under the **Communication ➔ Server** menu (**5.1**), as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.

- On the Master inverter under the **5. Communication** menu, configure the **5.3 RS485** option of the inverter to MASTER, as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.
- Select the **5.3.3 Slave Detect** + option to initiate automatic detection of the Slave inverters that are connected to this Master inverter. This verifies that they are configured as Slaves.
- The Master should report the correct number of slaves. If it does not, verify the connections and terminations as described above.

11 Verify the connection of the Master to the SolarEdge Server, as described in the *Verifying the Connection* section on page 86.

Creating a ZigBee Connection

ZigBee is a wireless technology that enables you to wirelessly connect one or more inverters to an external ZigBee modem. This communication option does not require any physical wiring of the inverter to the modem in order to connect to the SolarEdge Monitoring Server. The external modem can be any ZigBee modem that can be configured as a coordinator on the ZigBee network.

Up to 32 inverters may be connected to a single ZigBee modem. The ZigBee modem must be configured to be a coordinator (master).

ZigBee operates as a mesh network so that each ZigBee modem operates as a repeater for its neighboring ZigBee modem. Therefore, the position of each ZigBee modem need not be within range of the coordinator. It only must be within range of its neighboring ZigBee modem, which acts as a repeater.

► To configure ZigBee communication to the SolarEdge Monitoring Server:

1. Under the **5. Communication** menu, configure the **5.4 ZigBee** option, as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.
2. Use the **5.4.1 Pan ID** option to configure a unique Pan ID for each inverter in the ZigBee network.
3. Use the **5.4.2 Scan Channels** option to configure the Scan Channel for the ZigBee connection. All the inverters must be configured to the same channel.

NOTE:

If the inverters do not succeed to communicate with each other on a specific channel, then we recommend that you consider setting them all to a different channel.

4. Select the **5.4.3 Apply Settings** option to apply these settings.

5 Configure the external modem to be the coordinator on the network. The external modem must also be configured to forward all ZigBee communication from the inverters to/from the SolarEdge Monitoring Server. The address of the SolarEdge Monitoring Server is **prod.solaredge.com** port **22222**.

To verify the connection, you may refer to the *Verifying the Connection* section on page 86.

Verifying the Connection

► To verify the connection:

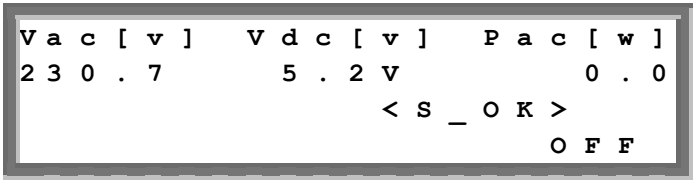
1 Verify that the DC circuit breaker is OFF.

2 Verify that the inverter's ON/OFF switch is still OFF.

3 Turn ON the AC to the inverter by using the circuit breakers on the main circuit board.

4 Wait for the inverter to connect to the SolarEdge Monitoring Server. This may take up to two minutes.

5 Verify that the LCD panel displays a window similar to the following:



- **S_OK:** Verify that **S_OK** appears on the panel to indicate a functioning connection to the SolarEdge Monitoring Server, which was validated during the last two minutes.

NOTE:

If the **S_OK** indication is not displayed, then perform the following:

- Use another method (unrelated to the SolarEdge Inverter) to check whether the network and modem are operating properly. For example, connect a laptop to the Ethernet modem and connect to the Internet.
- Check whether a firewall or another device is blocking transmission.
- Check the configuration of the inverter.

Troubleshooting Communication

To troubleshoot a communication problem:

1. Check that the modem or hub/router is functioning properly.
2. Check that the connection to the internal connector on the inverter board is performed properly through its gland at its bottom.
3. Check that the selected communication option (RS232, Ethernet [LAN], RS485 or ZigBee) is configuring properly using the inverter's LCD panel.
4. Check whether a firewall or another type of network filter is blocking communication.
5. If you are using a ZigBee connection and there is interference on the channel being used, then change the channel.

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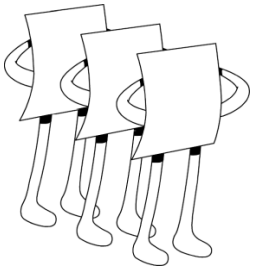


Chapter 8

Inverter User Interface

About This Chapter

This chapter describes how to configure the inverter and how to identify its status.

This chapter contains the following sections:

Inverter LCD Panel and LEDs

The front of the Single Phase Inverter has a small LCD panel and three LEDs, as shown below:

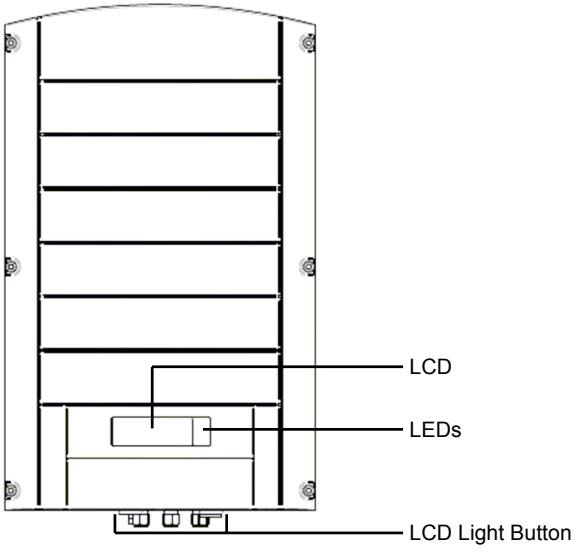


Figure 30: Single Phase Inverter – Front

The LCD panel has three LED indicators, as follows:

- **Power Production (Green):** Indicates whether the inverter is producing power or not, as follows:
  - **On:** The inverter is producing power.
  - **Blinking:** The inverter is in Standby mode, meaning it is preparing to produce power. The inverter is in Standby mode until enough power is generated. The inverter then automatically goes to Production mode and produces power.
  - **Off:** The inverter is not producing power. This may be during Night mode, when the ON/OFF switch is OFF or when an error occurs.

- **Module Communication (Yellow):** This LED blinks quickly each time monitoring information is received from a PowerBox. In addition this LED blinks while the inverter is being shut down.
- **Fault (Red):** Indicates that an error has occurred. You may refer to the *Appendix A, Errors and Troubleshooting* on page 111 for more information. In addition, this LED blinks while the inverter is being shut down.

All LEDs are on while the inverter is being configured using the buttons inside the inverter.

Inverter LCD Panel and User Buttons

The following describes the various stages and times of day that you may use the LCD panel and user buttons:

- **Normal operation:** The LCD panel allows the user to check that the inverter is working properly. You may refer to the *Normal Operation* section on page 92 for a description of this window. Use the LCD button to toggle through the informative displays.
- **Inverter startup:** After the inverter is turned on and begins producing power, the LCD panel displays the inverter's status in the *Main Inverter Status* window that shows the total voltage and power, as described in the *Main Inverter Status Window* section on page 93.
- **Inverter shutting down:** The inverter automatically goes into Night mode and turns off the LCD when it is no longer supplied power by at least one string of minimum length.

- **After installation of the inverter:** The field technician must perform basic configuration of the inverter, as described in the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96.
- **Error messages:** In the event of a problem, an error message may be displayed on the LCD panel. You may refer to *Appendix A, Errors and Troubleshooting* on page 111 and the *Configuring the Inverter Using the LCD Panel and User Buttons* section on page 96 for more information.

Normal Operation

Pressing the inverter's LCD light button located on its bottom turns on the LCD's backlight and displays the messages on the LCD panel.

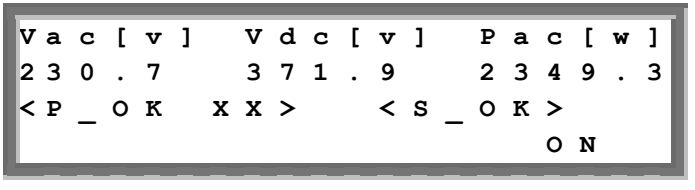
The backlight is displayed for 30 seconds. This length of time is configurable, as described on page 101.

The following screens appear, one after the other, when you press the LCD light button:

- **Initial Inverter Status Window,** below
- **Main Inverter Status Window,** page 93
- **Energy Meter Window,** page 94
- **Telemetry Window,** page 94

You can toggle between these windows by clicking the LCD light button.

Initial Inverter Status Window

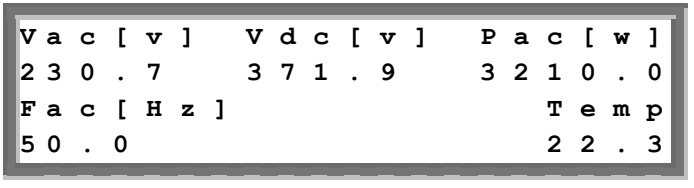


- **Vac [v]:** Specifies the AC output voltage, in Volts.
- **Vdc [v]:** Specifies the DC input voltage, in Volts.
- **Pac [w]:** Specifies the AC output power, in Watts.

- **P_OK XX:** Indicates a functioning DC line-communication connection to the SolarEdge PowerBoxes, which indicates that telemetry information was received within the last 10 minutes. XX is the number of paired PowerBoxes for which telemetries have been received by the inverter in the last 30 minutes.
- **S_OK:** Indicates a functioning connection to the SolarEdge Monitoring Server, which was validated during the last two minutes. This connection is not mandatory for power generation.
- **ON/OFF:** Indicates the position of the inverter ON/OFF Switch.

Main Inverter Status Window

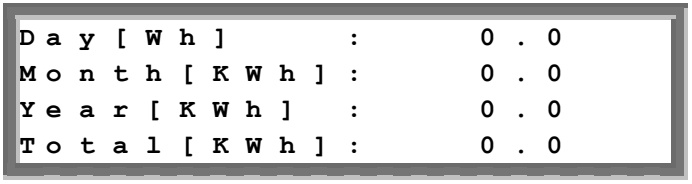
After you press the inverter's LCD light button to display the window shown above, you can press it again to display the *Inverter Main Status* window. This is the most informative window during the normal course of events, because it provides a quick overview of power, voltage and temperature, as described below:



- **Vac [v]:** Specifies the AC output voltage, in Volts, and is an average over the last five seconds.
- **Vdc [v]:** Specifies the DC input voltage, in Volts, and is an average over the last five seconds.
- **Pac [w]:** Specifies the AC output power, in Watts.
- **Fac [Hz]:** Specifies the AC output frequency, in Hz.
- **Temp [C/F]:** Temperature, in Celsius or Fahrenheit, according to selection.

Energy Meter Window

After you press the inverter's LCD light button to display the window shown above, you can press it again to display the *Inverter Energy Meter* window. This window displays the total energy produced during the last day, month and year of the inverter, as described below:



NOTE:

The production data is accumulated according to an internal real-time clock. If the inverter is connected to the SolarEdge Monitoring Server, it will automatically set the clock's time. If not, you may use the SolarEdge Configuration Tool to set the clock setting.

- **Day:** Specifies the accumulated energy [Wh] since this morning
- **Month:** Specifies the accumulated energy [Wh] during this month, since the first of the month
- **Year:** Specifies the accumulated energy [Wh] during this year, since the first of January
- **Total:** Specifies the accumulated energy [Wh] since system installation

Telemetry Window

After you press the inverter's LCD light button to display the window shown above, you can press it again to display the *Inverter Telemetry* window. This window displays the telemetry of the last PowerBox to report its telemetry to the inverter, as described below.

The display changes as each PowerBox sends its telemetry information. Each PowerBox sends its telemetry once within each 15-minute period.

NOTE:

This window is unique in that its backlight is ON by default for 15 minutes after you press the LCD light button (and not 30 seconds like other windows). This length of time can be configured, as described on page 101.

NOTE:

In order to verify proper installation, a technician may want to view the *Telemetry* window for some time in order to see that all PowerBoxes report their telemetries.

```
Module #        : M3256
Energy [Wh]     :    0.0
Vdc_O [V]       :   69.5
Vdc_I [V]       :   29.5
```

- **Module:** Displays the module number. If the connection to the SolarEdge Monitoring Server has not yet been established or a site has not yet been defined in the Server, the module # that is displayed is the letter **M** followed by the last four digits of the module's serial number.

  If logical mapping is configured on the SolarEdge Monitoring Server for this SolarEdge site (meaning that the string location of each PowerBox is configured on the SolarEdge Monitoring Server) and the connection to the server is active, then the module # is determined by its logical location in the installation, as follows:

  P.String_number.PowerBox_number.

  For example, the third PowerBox connected to a PowerBox in the second string is represented as **P.2.3**.

- **Energy [Wh]:** Specifies the PV module's power, in Watt/hour.
- **Vdc_O[V]:** Specifies the PowerBox's output voltage, in Volts.
- **Vdc_I[V]:** Specifies the PowerBox's input voltage, in Volts.

Clicking the LCD light button again redisplays the *Initial Inverter Status* window, as described on page 92.

Configuring the Inverter Using the LCD Panel and User Buttons

After installation of the inverter, a field technician can verify and perform basic configuration of the inverter. This section describes the various LCD messages and possible configurations using the user buttons.

IMPORTANT NOTE:

The inverter and its LCD panel start operation after at least one string of PowerBoxes is exposed to sunlight. Until then, the inverter is in Night mode and no LCD functions will work. The PowerBoxes do not need to be producing power during this time (they are in Safety mode if the ON/OFF switch is OFF), but at least one string must be connected to the inverter in order to enable its operation.

NOTE:

This process can also be performed using the SolarEdge configuration tool by connecting a PC or laptop to the inverter via its RS232 management port. This tool is described in the *SolarEdge Configuration Tool User Guide*.

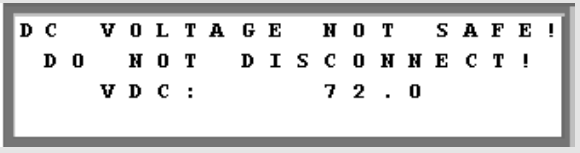
To configure the inverter:

1. Verify that the inverter's ON/OFF switch is OFF.
2. Press the LCD Light button once to turn ON the backlight.

WARNING!

If the inverter worked properly before this action, the following message is displayed

Si l'onduleur fonctionnait proprement avant cette opération, le message suivant est affiché:



This message is displayed until the DC is safe.

The default safety voltage is 50 V.

Do not open the cover or open DC conectocrs until the voltage is indicated as safe or until at least five minutes have passed.

Ce message est affiché jusqu'à ce que la tension DC soit sécurisée.

La tension de sécurité par défault est de 50V.

Ne pas ouvrir le couvercle ou les connecteurs DC jusqu'à ce que la tension soit affichée comme sécurisé ou jusqu'à ce que cinq minutes au moins se soient écoulées.

3 The following configuration procedures are performed with the inverter cover open. Open the cover, as described in the *Opening the Cover* section on page 52.

Four buttons for controlling the LCD panel menus are then accessible, as shown below:

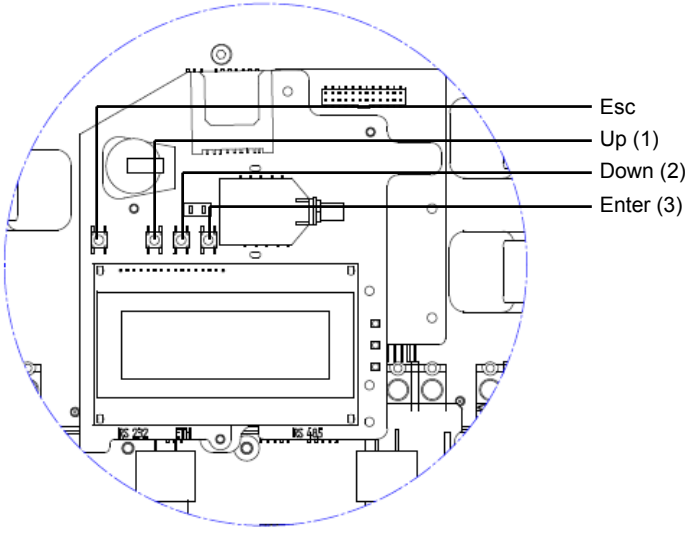
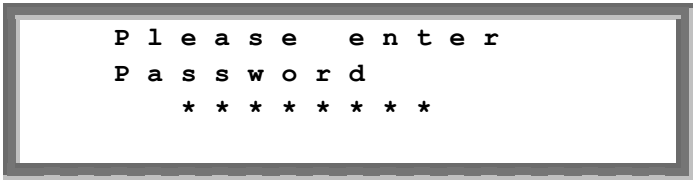


Figure 31: LCD Panel Menu Buttons

- **Esc:** Goes to the beginning of the currently entered parameter or to the previous menu.
- **Up (1):** Goes up one option in a menu.
- **Down (2):** Goes down one option in a menu.
- **Enter (3):** Confirms the entry or selection of a parameter.

4 Press the **Enter** button for at least five seconds. The following message is displayed:



The inverter is now in Setup mode and all its LEDs are lit. The inverter automatically exits Setup mode if no buttons are pressed for more than two minutes.

5 Use the three right-most buttons inside the inverter (the **UP-1**, **Down-2** and **Enter-3** buttons), shown above, to type in the following default password: **12312312**. Inverter passwords are eight digits long, each digit being between 1 and 3. The following message is displayed:

```
*1.  Country   <GER>
 2.  Language  <eng>
 3.  Temperature  <C>
 4.  Display
 5.  Communication
 6.  Counters
```

Configure each of these menu options. Each menu option is described below.

Use the **Up** and **Down** buttons inside the inverter to move the asterisk (*) to the relevant menu option and then press the **Enter** button to select it.

Use the three rightmost buttons to type in a number if required.

6 Select the **1. Country** option to specify the country in which the inverter is installed. This parameter may arrive pre-configured. If so, verify that it is set to the proper country.

WARNING!

The inverter must be configured to the proper country in order to ensure that it functions properly with that country's grids.

L'onduleur doit être configuré pour le pays approprié afin d'assurer un fonctionnement convenable avec le réseau de ce pays.

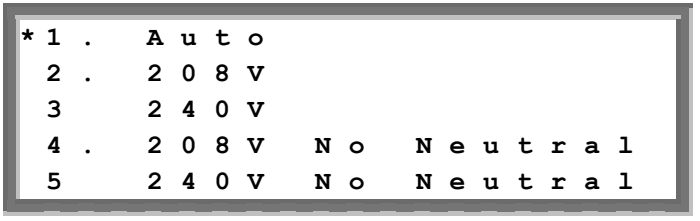
NOTE:

If an inverter is not configured to any country, then it does not turn ON.

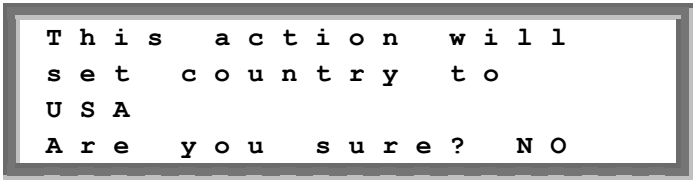
If no country is configured, its value is **<NONE>**. A list of countries is displayed, as shown below:

```
*1.  USA+
 2.  Spain
 3.  France
 4.  Greece+
```

A + near the country indicates that another menu will be displayed after selection. The following is an example of the parameters that appear after USA+ is selected.



After selecting the country, you are asked to confirm your selection in the confirmation screen, as shown below:



Toggle to **YES** and press **Enter** to confirm.

The following describes the options in this window:

If the **No Neutral** option is **not** selected, you must connect the Neutral line. The Neutral line is used to verify the phase balance between L1-N and L2-N.

Auto: This setting requires the Neutral line to be connected. When this option is selected, the inverter automatically detects whether a 208VAC or a 240VAC grid is used. Refer to

Figure 13 to which grids can be automatically configured.

- **208V:** This setting requires the Neutral line to be connected and indicates the use of a 208V Delta grid.
- **240V:** This setting requires the connection of the Neutral line and indicates the use of a 240V split phase grid or a 240V Delta grid.
- **208V No Neutral:** Indicates the use of a 208V grid between L1 and L2 with no need for a neutral connection
- **240V No Neutral:** Indicates the use of a 240V grid between L1 and L2 with no need for a neutral connection.

7 Select the **2. Language** option to select the language in which the LCD panel should display. The inverter may arrive pre-configured to the local language.

8 Select the **3. Temperature** option to select the units in which the temperature is displayed, as shown below:

The display shows either **<C>** or **<F>** according to whether **Celsius** or **Fahrenheit** was selected. The default is **Celsius**.

9 Select the **4. Display** option to display the following three options:

- **4.1 LCD On Time <30>:** Specifies the number of seconds that the LCD panel backlight is ON after the LCD light button is pressed. **<30>** represents the default value of 30 seconds.
- **4.2 TLM On Time <15>:** Specifies the number of minutes that the LCD panel backlight is ON while viewing the *Telemetry* window. The default is every **15** minutes.
- **SW Version:** Displays version information describing various firmware inverter processors, as follows:

```
ID    :   0 0 0 0 0 0 0 F
DSP1  Ver:         1.    88
DSP2  Ver:         0.    81
CPU   Ver:         1.4727
```

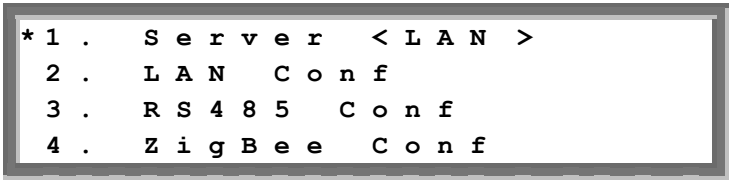
  - **ID:** Displays the inverter ID, which should be the same as on the inverter. You may refer to the *Identifying the Inverter* section on page 45 for more details.

    The next three numbers represent the firmware versions of various processors.

NOTE:

Please have these numbers ready when you contact SolarEdge support.

10 Select the **5. Communication** option to define and configure the communication option used by the inverter to communicate with the SolarEdge Monitoring Server.



- Select option **5.1. Server** to select which communication method is used to communicate between this inverter and the SolarEdge Monitoring Portal.
- Select options **5.1.1**, **5.1.2, 5.1.3** or **5.1.4** to configure the communication method to the SolarEdge Monitoring Portal. Refer to *Chapter 7, Setting Up Communication* on page 73 for a full description of these communication options:
  - **5.1.1:** Select this option to specify an Ethernet connection, as described on page 78.
  - **5.1.2:** Select this option to specify an RS232 connection, as described on page 76.
  - **5.1.3:** Select this option to specify an RS485 connection**,** as described on page 81. All slaves on the network will be configured to this. The Master is configured to one of the two previous options.
  - **5.1.4:** Select this option to specify a ZigBee connection, as described on page 85.

You can also select the **5.1.5 None** option if no server communication is required.

NOTE:

This menu shows only the actual communication options installed in the inverter, based on the ordering options selected. If a communication option is not installed in the inverter, the relevant number does not appear in the menu.

5.2 LAN Conf

After you select the **5.2 LAN Conf** option, another menu is displayed for configuring the connection, as follows:

```
 1 .  I P  C o n f i g
*2 .  S e t  D H C P  < E n >
 3 .  S e t  I P
 4 .  S e t  M a s k
 5 .  S e t  G a t e w a y
 6 .  S e t  D N A
 7 .  S e t  S e r v e r  A d d r
 8 .  S e t  S e r v e r  P o r t
```

5.2.1 IP Config: Displays the current IP configuration of the inverter, as shown below. If DHCP is used, this screen reflects the parameters retrieved from the DHCP server. If manual settings are used, the screen shows the last manually input configurations.

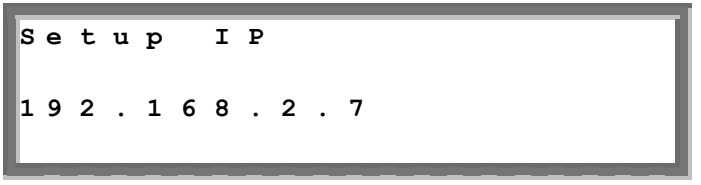
```
I P     0 . 0 . 0 . 0
M S K   2 3 4 . 2 5 5 . 2 5 5 . 0
G W     1 9 2 . 1 6 8 . 0 . 1
D N S   0 . 0 . 0 . 0
```

5.2.2 Set DHCP <En>: If the LAN connection between the inverter and the SolarEdge Monitoring Server has a DHCP server, enable this option by setting it to **Enable**. If this option is enabled, then the DHCP server automatically configures the IP, Subnet Mask, Gateway and DNS. If not, then you must use menu options **3**, **4**, **5** and **6**, described below, to manually configure the connection.

5.2.3 Set IP: Enables you to set the IP of the inverter according to the LAN settings:

- Use the **Up** and **Down** buttons to adjust the value of each IP address octet.
- Press the **Enter** button to move to the next IP address octet.
- A long press of the **Esc** button aborts entry of this parameter and returns to the menu.

- A long press of the **Enter** button commits the entered value.



5.2.4 Set Mask: Specifies the subnet mask of the inverter according to the LAN settings.

5.2.5 Set Gateway: Enables you to set the gateway address of the inverter according to the LAN settings.

5.2.6 Set DNS: Enables you to set the DNS of the inverter according to the LAN settings.

5.2.7 Set Server Addr: Specifies the IP address of the SolarEdge Monitoring Server. This option is predefined in the inverter to specify the SolarEdge Monitoring Server IP address and does not normally need configuration.

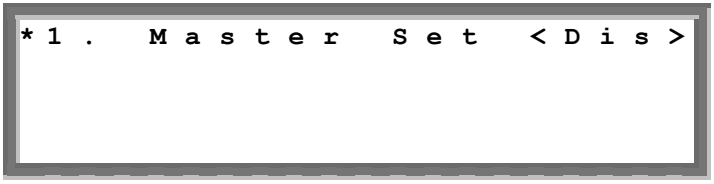
5.2.8 Set Server Port: Specifies the port through which to connect to the SolarEdge Monitoring Server. This option is predefined in the inverter to specify the SolarEdge Monitoring Server IP port and normally does not need configuration.

NOTE:

If your LAN has a firewall, you must verify that the address and port configured in **Set Server Addr** (5.2.6) and the **Set Server Port** (5.2.7) fields are not blocked.

5.3 RS485 Conf

This menu allows you to configure a chain of inverters via the RS485 port. After you select the **5.3 RS485** option, the following message is displayed:



Each inverter is defined by default as a Slave. In an RS485 network, you must define one inverter as the Master.

For all the Slave inverters, you must configure the RS485 as the server gateway option in menu **5.1**.

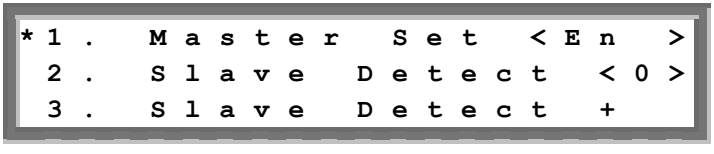
The Master inverter outputs the data from all inverters to the server via one of the other communication options (Ethernet or RS232) and also acts as a Master on the RS485 bus. To configure the Master, select the **5.3.1 Master Set** option to define the inverter as a Master.

WARNING!

Make sure that only one inverter is defined as a Master or the network may not function properly.

Veillez à ce qu'un seul onduleur ne soit défini comme Maître de peur que le réseau ne fonctionne pas convenablement.

If you have defined this inverter as a Master, the following is displayed:



Select the **5.3.1.2 Slave Detect** option to initiate automatic detection of the Slave inverters connected to this Master inverter. The number next to the option is the number of inverters that have been detected.

NOTES:

If not all inverters are detected, verify the RS485 connections of the inverters, as follows:

- Use the SolarEdge configuration tool to see a list of the inverters that have been detected.
- Identify the inverters that have not been detected.
- Verify the physical RS485 conections of the unidentified inverters.
- Verify that the unidentified inverters are set to Slave.
- Rediscover all Slaves again by Reselecting the Slave Detect option.

The **5.3.1.3 Slave Detect +** option is similar to menu option **5.3.1.2**, but in addition, it also configures all the Slaves to output monitoring data via the RS485. In general, this is the option to use unless you want one of the Slaves not to output monitoring data via the RS485 network.

5.4 ZigBee Conf

After you select the **5.4. ZigBee Conf** option, the following menu is displayed:

```
*1.  PAN ID
 2.  Scan Channel
 3.  ApplY Settings
```

- **5.4.1 Pan ID:** Enter the external ZigBee modem PAN ID, in hex.
- **5.4.2 Scan Channels:** Enter the external modem network channel, in hex.
- **5.43 Apply Settings:** Select this option after you have set the values of the two options described above.

11 Select the **6. Counters** option to reset all telemetry counters that are displayed in the *Energy Meter* window, which is described in the *Energy Meter Window* section on page 94.

```
This action will
Reset all counters

Please Select: NO
```

Configuring the Inverter Using the SolarEdge Configuration Tool

Two options are provided for configuring the system:

- Using the LCD panel, as described in this guide.
- Using the SolarEdge configuration tool, which provides a standard Windows GUI. This tool can be accessed by connecting a computer or laptop to the inverter through the RS232 connector.

  This tool provides several additional options than are not accessible using the LCD manual, such as enabling a firmware upgrade of the inverter and retrieving a list of the serial numbers of the PowerBoxes connected to the inverter for quickly verifying that all PowerBoxes have been installed properly. You may refer to the *SolarEdge Configuration Tool Software Guide*.

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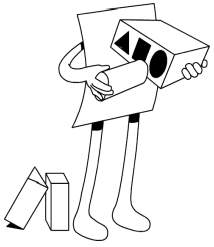

Chapter 9

Transport and Storage

About This Chapter

This chapter describes how to transport and store a SolarEdge Inverter.

Single Phase Inverter Transport

Ideally, the Single Phase Inverter should be transported in its original packaging, facing up and without exposing the Single Phase Inverter to unnecessary shocks. If the original package is no longer available, a similar box can be used which can withstand the weight of the Single Phase Inverter (25 kg), has a handle system and can be closed fully.

Single Phase Inverter Storage

Store the Single Phase Inverter in a dry place where ambient temperatures are always between -25°C and +60°C.

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Appendix A

Errors and Troubleshooting

About This Appendix

The inverter LCD panel displays a message when an error occurs.

This appendix lists the error messages that may appear on the inverter's LCD panel, describes their meaning and describes how to troubleshoot each one.

Each message may comprise up to two lines of 20 characters each. The following shows the format of an error message on the inverter LCD panel:

```
Error  code  XXX

XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX
```

Each error message is displayed for 30 seconds. If the error no longer exists, the inverter displays the Waking Up message.

The following table lists the error messages that appear on the inverter and describes how to troubleshoot each one.

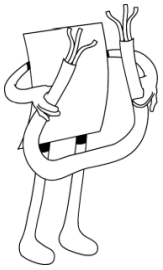
Error #	LCD Message	Description	Troubleshooting
9	AC Current Surge	The internal hardware that measures AC current has measured substantially high output currents. This may occur because of changes in the AC voltage or a switching load near the site.	If this fault persists: ▪ Check the AC connection to the inverter. ▪ Ask the grid operator whether a large surge source or irregular load exists near the site.
10	Ground Current - RCD	Ground current surge. The internal hardware that measures ground fault has measured substantially high ground currents.	Ground faults may occur due to insufficient insulation to the ground. **DO NOT TOUCH UN-INSULATED WIRES!** **EXTREME CARE MUST BE TAKEN WHEN TROUBLESHOOTING THIS** ERROR**.** **THE RISK OF ELECTROCUTION EXISTS!** ▪ Only a qualified technician should handle this problem, and only after taking proper precautions. ▪ Shut OFF the inverter by turning the ON/OFF switch at the bottom of the inverter OFF and disconnecting the AC switch. ▪ Wait five minutes for the input capacitors to discharge. ▪ Disconnect the DC inputs. ▪ For each DC string, measure the DC voltage between DC- and GND and DC+ and GND with a 1Kohm resistor in parallel to the volt meter. If a voltage higher than 2 V is measured, then the fault is in this string. ▪ Do not connect strings with a grounding fault to the inverter. ▪ A certified PV installer must fix the faulty string before connecting it to the inverter.

Error #	LCD Message	Description	Troubleshooting
13	AC Current Surge	AC current surge. The internal hardware that measures AC current has measured substantially high output currents. This may occur because of changes in the AC voltage or a switching load near the installation site.	If this fault persists: ▪ Check the AC connection to inverter. ▪ Ask the grid operator whether a large surge source or irregular load exists near the installation site. ▪ If the grid does not have problems contact SolarEdge support.
14	AC Voltage Too High	AC voltage surge. The internal hardware that measures AC voltage has measured substantially high **instantaneous** output voltage.	If this fault persists: ▪ Check the AC connection to inverter. ▪ Ask the grid operator whether a large surge source or irregular load exists near the site. ▪ Verify that the output wire size matches the distance between the inverter and the location of the grid connection. ▪ Use a larger gauge wire for the AC output.
15	DC Voltage Too High	DC overvoltage. The input DC voltage exceeds the maximum level that is supported.	The SolarEdge system should normally eliminate DC overvoltage errors. When DC overvoltage is detected, the inverter shuts off the PowerBoxes and restarts the inverter. If the problem persists, then: ▪ Turn OFF the ON/OFF switch at the bottom of the inverter. After at least five minutes, the LCD panel should show a low safety voltage equal to1V *string length. If not, check which string is malfunctioning and recheck its connections to the inverter. ▪ Verify that no PV modules are connected directly to the inverter without a PowerBox. ▪ Recommission all inverters in the site, as described in *Chapter 5*, *Commissioning the Installation* on page 59.
16	Hardware Error	Internal hardware error.	If the problem persists, contact SolarEdge support.

Error #	LCD Message	Description	Troubleshooting
17	Temperature Too High	Over temperature.	If the problem persists, then: ▪ Verify that proper ventilation clearance exists around the inverter, as described in the *Chassis Clearance* section on page 43. ▪ Make sure that the heat-sink fins are clear of dirt and obstacles. ▪ Check whether the inverter is installed in an area that is too hot. ▪ Reinstall in a cooler location.
24	Faulty Temp. Sensor	Broken or unconnected Temperature sensor.	If the problem persists, contact SolarEdge support.
25	Isolation Fault	PV Isolation fault. The inverter has detected the PV solar generator is not properly isolated from ground earth. The isolation is checked every time before the inverter starts operation.	If the problem persists: ▪ Check the PV installation for isolation problems and ground leakage. ▪ Only a certified PV installer must fix the faulty string before connecting it to the inverter.
26	Faulty AC Relay	The AC relay failed during wake-up tests.	If the problem persists: ▪ Disconnect inverter from AC grid. ▪ Contact SolarEdge support.
27	Hardware Error	Internal hardware error.	If the problem persists, contact SolarEdge support.
28	RCD Sensor Error	The RCD measurement mechanism has failed during the wake-up test phase.	If the problem persists, contact SolarEdge support.
29-30	Phase Balance Error	The monitoring hardware that checks the balance of each phase (L1-N and L2-N) has exceeded its limit. This error is checked only in the USA.	▪ Check the grid connection. ▪ Check the GND wire connection. ▪ Check the L1, L2 and Neutral wire connections. ▪ Verify symmetric load between L1 and L2. ▪ Consult the local grid authority.

Error #	LCD Message	Description	Troubleshooting
31	AC Voltage Too High	Grid voltage is above the limit permitted in this country.	▪ Turn off the inverters in the site and verify AC grid voltage. ▪ If the inverter is located far from the connection point to the grid, then use a wider gauge AC wire. ▪ Consult the grid operator. ▪ If you are permitted by the local authorities, then use the SolarEdge Configuration Tool to change the range. Refer to the *SolarEdge Installation Tool User Guide* for mode detail.
32	AC Voltage Too Low	Grid Voltage is below the limit permitted in this country.	▪ Consult the grid operator. ▪ If you are permitted by the local authorities, then use the SolarEdge Configuration Tool to change the settings. Refer to the *SolarEdge Installation Tool User Guide* for more detail.
33	AC Voltage Too High	Grid voltage is above the limit permitted in this country.	▪ Handle this in the same manner as error 31.
34	AC Freq Too High	Grid frequency is above the limit permitted in this country.	▪ Consult the grid operator. ▪ If you are permitted by the local authorities, then use the SolarEdge Configuration Tool to change the settings. Refer to the *SolarEdge Installation Tool User Guide* for more detail.
35	AC Freq Too Low	Grid frequency is below the limit permitted in this country.	▪ Consult the grid operator. ▪ If you are permitted by the local authorities, then use the SolarEdge Configuration Tool to change the settings. Refer to the *SolarEdge Installation Tool User Guide* for more detail.
36	DC Injection	DC feed detected on the AC output.	▪ If the problem persists, contact SolarEdge support.
37-38	Ground Current - RCD	Ground current surge. The internal hardware that measures ground fault has measured substantially high ground currents.	Handle this in the same manner as error 10.

Error #	LCD Message	Description	Troubleshooting
40	Islanding	AC grid voltage malfunctions. The inverter has shut off due to islanding.	When AC voltage returns the inverter should restart after some time (time depends on country grid connection codes) If the problem persists, then consult with the grid operator whether frequent AC disruptions have occurred at the site.
41	AC Voltage Too Low	Grid voltage is below the limit permitted. This error is checked only in the USA.	Handle this in the same manner as error 32.
43	Internal HW Error	Internal hardware error.	If the problem persists, contact SolarEdge support.
44	No Country Selected	The inverter is not configured to any country.	Select the country, as described on page 99.
4, 5, 8, 12, 18-23, 39, 42, 45	SW Error	Internal software error.	If this fault persists, contact SolarEdge support.



Appendix B

Technical Specifications

About This Appendix

The table in this appendix provides the technical specifications of the SolarEdge system components.

Single Phase Inverters

	SE3300US	SE4000US	SE5000US	SE6000US	
Output					
Rated AC Power Output	3300	4000	5000	6000	W
Maximum AC Power Output	3300	4000	5000	6000	W
AC Output Voltage (nominal)	208 / 240				Vac
AC Output Voltage Range	183 – 228.8 / 211.2 – 264				Vac
AC Frequency (Nominal)	60				Hz
AC Frequency Range	59.3 – 60.5				Hz
Maximum Continuous Output Current 208V grid 240V grid	 16 14	 20 17	 24 21	 29 25	A
Total Harmonic Distortion (THD) at Maximum Power	< 3				%
Power Factor	> 0.99				
GFDI	1				A
Maximum DC Injection	130				mA
Input					
Recommended MAXIMUM DC POWER (MODULE STC) (*)	35000	4200	5300	6200	W
Transformer-less, Ungrounded	Yes				
Maximum Input Voltage	500				Vdc
Nominal DC Input Voltage	350				Vdc
Maximum Input Current	13	16	20	23	Adc
Reverse-Polarity Protection	Yes				
Ground-fault Isolation Detection	600 kΩ sensitivity				
Maximum Inverter Efficiency	97.6				%
European Weighted Efficiency	97.2	97.3	97.2	97.1	%
CEC Weighted Efficiency	97 @ 208V 97.5 @ 240V				%
Nighttime Power Consumption	< 2.5				W

	SE3300US	SE4000US	SE5000US	SE6000US	
Standard Compliance					
Safety	UL1741, IEC-62103 (EN50178), Draft IEC-62109				
Grid Connection Standards	NEC, VDE 0126-1.1, AS-4777, RD-1663, DK 5940, IEEE1547				
Emissions	FCC part15 class B, IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12				
WEEE, RoHS	Yes				
Installation Specifications					
AC Output	¾" Metal Conduit				
DC Input	¾" Metal Conduit				
Dimensions (W x L x H)	27.5 x 12.5 x 7.5				in
Weight	52				lb
Cooling	Natural Convection				
Operating Temperature Range	-10 - +120				*F
Protection Rating	NEMA 3R - Rainproof				

* Higher input DC power may be installed; analyze yearly AC performance.

Thin Film PowerBox

Input		
Rated Total Input DC Power	350	W
Number of Input Panels (Parallel Connection)	2 - 4	
Absolute Maximum Input Voltage	100	Vdc
Maximum Current per Input	2 / 3	Adc
Fuse Inputs	Optional	
MPPT Operating Range	10 - 95	Vdc
Reverse-Polarity Protection	Yes	
Maximum Efficiency	98.6	%
European Weighted Efficiency	97.8	%

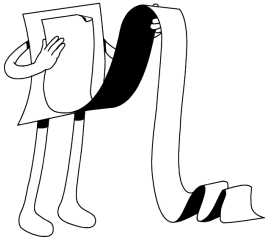
CEC Weighted Efficiency	97.7	%
Inductive Lightning Protection	1 / 3	m / ft
Nighttime Power Consumption	0	W
Output During Operation (Inverter is Operating)		
Maximum Output Current	15	A
Operating Output Voltage	5 - 60	V
Total Maximum String Voltage (Controlled by Inverter) - US and EU 1-ph	600	V
Total Maximum String Voltage (Controlled by Inverter) - EU 3-ph	1000	V
Output During Standby (Inverter is Disconnected or Off)		
Safety Output Voltage per PowerBox	1	Vdc
PV System Design		
String Limitations - EU, 1ph System	8 - 25	PowerBoxes
String Limitations - EU, 3ph System	10 - 50	PowerBoxes
String Limitations - US	8 - 25	PowerBoxes
Parallel Strings of Different Lengths or Orientations	Yes	
Standard Compliance		
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3	
Safety	UL1741, IEC-62103 (class II safety), IEC61730	
Material	UL-94 (5-VA), UV Resistant	
WEEE, RoHS	Yes	
Installation Specifications		
Dimensions (W x L x H)	149.5 x 142 x 27.2 / 5.9 x 5.6 x 1.1	mm / in
Weight	800 / 1.8	g / lb
Operating Temperature Range	-40 - +65 / -40 - +150	˚C / ˚F
Protection Rating	IP65 Outdoor Use / NEMA 3R	
Relative Humidity	0 - 100	%

Add-On PowerBox

Input		
Rated Input DC Power	250	W
Absolute Maximum Input Voltage	60 (*)	Vdc
MPPT Operating Range	5 - 60	Vdc
Maximum Input Current	10	Adc
Reverse-Polarity Protection	Yes	
Maximum Efficiency	98.6	%
European Weighted Efficiency	97.8	%
CEC Weighted Efficiency	97.7	%
Inductive Lightning Protection	1 / 3	m / ft
Nighttime Power Consumption	0	W
Output During Operation (Inverter is Operating)		
Maximum Output Current	15	A
Operating Output Voltage	5 - 60	V
Total Maximum String Voltage (Controlled by Inverter) - US and EU 1-ph	600	V
Total Maximum String Voltage (Controlled by Inverter) - EU 3-ph	1000	V
Output During Standby (Inverter is Disconnected or Off)		
Safety Output Voltage per PowerBox	1	Vdc
PV System Design		
String Limitations - EU, 1ph System	8 - 25	Modules
String Limitations - EU, 3ph System	10 - 50	Modules
String Limitations - US	8 - 25	Modules
Parallel Strings of Different Lengths or Orientations	Yes	

Standard Compliance		
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3	
Safety	UL1741, IEC-62103 (class II safety), IEC61730	
Material	UL-94 (5-VA), UV Resistant	
WEEE, RoHS	Yes	
Installation Specifications		
Dimensions (W x L x H)	149.5 x 142 x 27.2 / 5.9 x 5.6 x 1.1	mm / in
Weight	800 / 1.8	g / lb
Operating Temperature Range	-40 - +65 / -40 - +150	˚C / ˚F
Protection Rating	IP65 Outdoor Use / NEMA 3R	
Relative Humidity	0 - 100	%

(*) TFI version up to 100V



Appendix C

PowerBox Mechanical Specifications

About This Appendix

This appendix presents the mechanical specifications for the SolarEdge PowerBoxes.

Use 5/16" screws and washers to secure the PowerBox to the racking.

Use a 5/16" stainless steel star-washer (provided) between the PowerBox and the racking to ensure proper equipment grounding. SolarEdge does not provide additional screws, nuts or washers because the required sizes and lengths vary for different racks.

CAUTION:

Before installing directly on the module or module frame, first consult the module manufacturer for information about the proper positioning and its impact on the module warranty.

Avant d'installer directement sur le module ou sur le cadre du module, consultez d'abord le fabricant pour information sur la meilleure manière de la positionner et son impact sur la garantie du module.

- Mark all mounting hole locations.
- Each PowerBox must be attached to the rack using both mounting holes.
- Drill the holes.

CAUTION!

Do not drill through the PowerBox or through the mounting holes. The high vibrations created by the drill can damage the PowerBox

Ne pas percer à travers la Powerbox ou ses trous de fixation. Les vibrations qui en résulteraient peuvent endommager la Powerbox.

Add-On Solution PowerBox

The following figure shows the mechanical specifications for the AOB PowerBox:

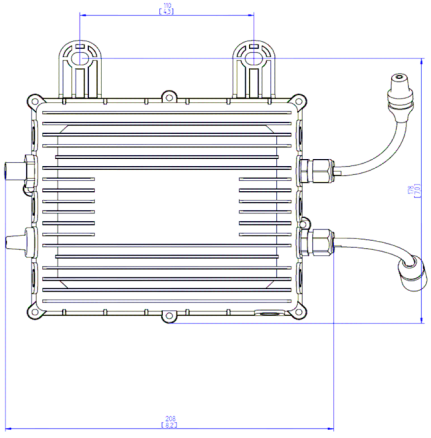


Figure 32: AOB PowerBox Mechanical Specifications

Thin-Film Solution PowerBox

The following figure shows the mechanical specifications for the TFI PowerBox:

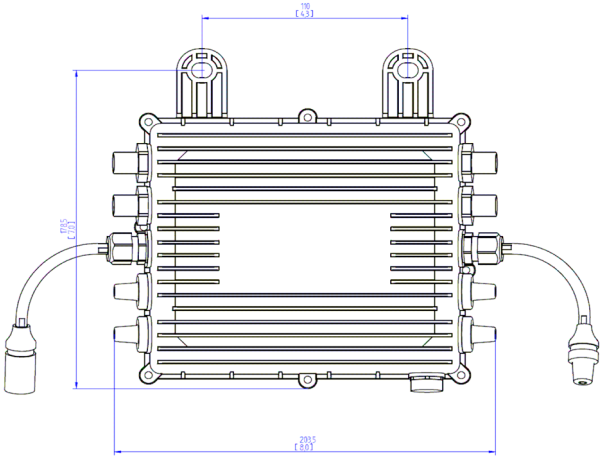
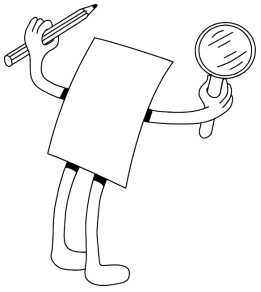


Figure 33: TFI PowerBox Mechanical Specifications



Appendix D

Additional Documentation

About This Appendix

This appendix describes where additional information and manuals can be accessed.

For more information, datasheets, user guides and the most up-to-date certifications for various products in different countries, please visit the SolarEdge web site: www.solaredge.com

The following additional manuals can be found on the site:

- *SolarEdge Monitoring Portal User Guide*
- *SolarEdge Configuration Tool Software Guide*
- *SolarEdge Add-on PowerBox Mounting Guide for Schott Solar Modules*

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If you have technical problems concerning our products, please contact us:

USA & Worldwide Support Line: +1.650.319.8843
Germany: +49.89.23513100
France: +33.(0)970.465.662
Israel: +972.73.2403118
Fax: +972.73.2403117
Email to: support@solaredge.com

www.solaredge.com

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