



# SolarEdge

## Installation Guide

For North America  
Version 4.0

# Disclaimers

## Important Notice

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## FCC Compliance

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

## Support and Contact Information

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

- USA and Canada: 1 877 360 5292
- Worldwide: +972 073 2403118
- Fax: +1 (530) 273-2769
- Email: to [support@solaredge.us](mailto:support@solaredge.us).

Before contact, make sure to have the following information at hand:

- Inverter and power optimizer model.
- Serial number of the product in question.
- The error indicated on the inverter screen or on the SolarEdge monitoring portal, if there is such an indication.
- 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, if the site is connected.
- The inverter software version as appears in the ID status (see *ID Status* on page 66).

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# HANDLING AND SAFETY INSTRUCTIONS

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

## SAFETY SYMBOLS

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

### 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 suivie correctement, pourrait causer des blessures ou un danger de mort. Ne pas dépasser une telle note avant que les conditions requises soient totalement 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 product**. 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 suivie correctement, pourrait causer un dommage ou destruction de l'équipement. Ne pas dépasser une telle note avant que les conditions requises soient totalement 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

## WARNING



RISK OF ELECTRIC SHOCK AND FIRE. Use this inverter only with PV modules with a maximum system voltage rating of 600V or higher.

*RISQUE DE CHOC ELECTRIQUE ET D'INCENDIE. Utilisez cet onduleur seulement avec des modules PV spécifiés pour une tension de système maximum de 600V ou plus.*

## WARNING!

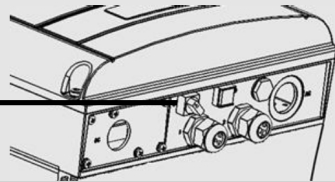


The inverter cover must be opened only after shutting off the inverter ON/OFF switch located at the bottom of the inverter. This disables the DC voltage inside the inverter. Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

*Ne pas ouvrir le couvercle de l'onduleur avant d'avoir coupé l'interrupteur situé en dessous de l'onduleur. Cela supprime les tensions CC et CA de l'onduleur. Attendre que le LCD affiche une tension sécurisée (50V). Si l'affichage LCD n'est pas visible, attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.*



Inverter ON/OFF switch  
0=OFF  
1=ON



## WARNING!



Before operating the inverter, ensure that the inverter is grounded properly.

*Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre.*

## WARNING!



Opening the inverter and repairing or testing under power must be performed only by qualified service personnel familiar with this inverter.

*L'unité ne doit être ouverte que par un technicien qualifié dans le cadre de l'installation et de la maintenance.*



**WARNING!**

The supplied Safety Switch meets all requirements for a code-compliant installation of this ungrounded system. The DC section disconnects both the positive and negative conductors.

*Le sectionneur externe (inclus) répond aux exigences de conformité pour l'installation de ce système non-relié à la terre. Le coupeur CC ouvre les conducteurs positifs et négatifs.*

**WARNING!**

The single phase 3-7.6 kW and three phase 9, 10, 20 kW must be connected to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 40 A.

The single phase 10-11.4 kW and three phase 14.4, 33.3 kW inverters must be connected only to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 60A.

*Les onduleurs monophasés 3-7.6kW et triphasés 9, 10, 20 kW doivent être connectés à un branchement AC dédié avec un disjoncteur de 40A.*

*L'onduleur monophasé 10-11.4kW et triphasés 14.4, 33.3 kW doivent être connectés à un branchement AC dédié avec un disjoncteur de 60A.*

**WARNING!**

The inverter input and output circuits are isolated from the enclosure. This system does not include an isolation transformer and should be installed with an ungrounded PV array in accordance with the requirements of NEC Articles 690.35 and 690.43 National Electric Code, ANSI/NFPA 70, 2011 (and Canadian Electrical Code, Part I, for installations in Canada).

Equipment grounding is the responsibility of the installer and must be performed in accordance with all applicable Local and National Codes.

*Les circuits d'entrée et de sortie de l'onduleur sont isolés de l'enveloppe. Ce système n'inclut pas d'isolation galvanique (transformateur) et devra être installé sans mise à la terre du champ PV et en accord avec les articles 690.35 et 690.43 du National Electric Code (NEC), ANSI/NFPA 70, 2011 (et du Code Electrique Canadien, Partie 1, pour les installations faites au Canada).*

*La mise à la terre des équipements est la responsabilité de l'installateur et doit être faite en accord avec les toutes les règles locales et nationales applicables.*

**CAUTION!**

This unit must be operated under the specified operating specifications, as described in the latest technical specification datasheet, available on the SolarEdge website at

<http://www.solaredge.us/groups/us/products/overview> .


**NOTE**

For single-phase inverters, use only copper conductors rated for a minimum of 75°C/167°F. For three-phase inverters, use only copper conductors rated for a minimum of 90°C/194°F. For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables must be used.

**NOTE**

This inverter is provided with an IMI (Isolation Monitor Interrupter) for ground fault protection.

**NOTE**

The symbol  appears at grounding points on the SolarEdge equipment. This symbol is also used in this manual.

# Chapter 1: Introducing the SolarEdge Power Harvesting System

The SolarEdge power harvesting solution maximizes the power output from any type of solar Photovoltaic (PV) installation while reducing the average cost per watt. The following sections describe each of the system's components.

## SolarEdge Power Optimizer

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The SolarEdge power optimizers are DC-DC converters connected to PV modules in order to maximize power harvesting by performing independent Maximum Power Point Tracking (MPPT) at the module level.

The power optimizers regulate the string voltage at a constant level, regardless of string length and environmental conditions.

The power optimizers include a safety voltage function that automatically reduces the output of each power optimizer to 1 Vdc in the following cases:

- During fault conditions
- The power optimizers are disconnected from the inverter
- The inverter's ON/OFF switch is turned OFF
- The Safety Switch is turned OFF
- Inverter's AC breaker is turned OFF

Each power optimizer also transmits module performance data over the DC power line to the inverter.

Two types of power optimizers are available:

- Module Add-on power optimizer – connected to one or more modules
- Smart Module embedded power optimizer – are embedded into a module

## SolarEdge Inverter with Safety Switch

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The SolarEdge inverter efficiently converts DC power from the modules into AC power that can be fed into the main AC service of the site and from there to the grid. The inverter also receives the monitoring data from each power optimizer and transmits it to a central server (the SolarEdge monitoring portal; requires Internet connection).

The Safety Switch is a manually operated switch for disconnecting the DC power of a SolarEdge system.

The Safety Switch is located below the inverter and is connected to the inverter with AC and DC wires.

## SolarEdge Monitoring Portal

The SolarEdge monitoring portal enables monitoring the technical and financial performance of one or more SolarEdge sites. It provides past and present information on the system performance both at the system and module levels.

### Supported AC Grids

The following sections show the AC grids supported by the SolarEdge inverters.

#### Grids Supported by the Single Phase Inverters

The following figure illustrates grids that are supported, and detected automatically by the default grid setting (set to Auto when setting the country and grid. Refer to *Country and Grid* on page 57). Note that for auto-detection, the neutral wire must be connected.

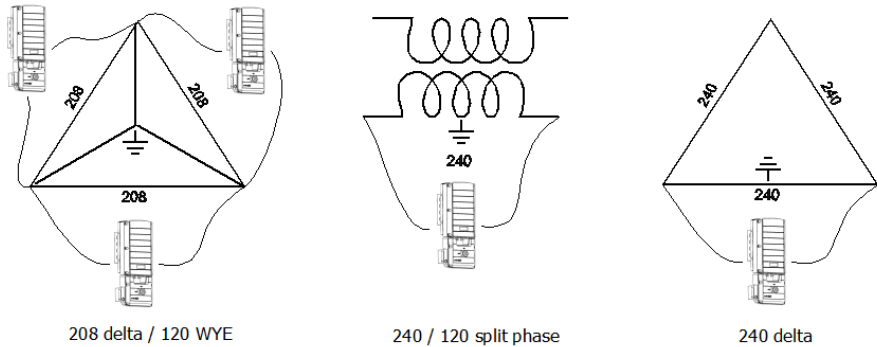


Figure 1: Auto-detected AC grids supported by SolarEdge single phase

The following figure illustrates grids that are supported, however require changing the grid settings (Refer to *Country and Grid* on page 57). Note that in some cases L1 and L2 are not interchangeable. In these places, L1 and L2 locations appear in the drawing.

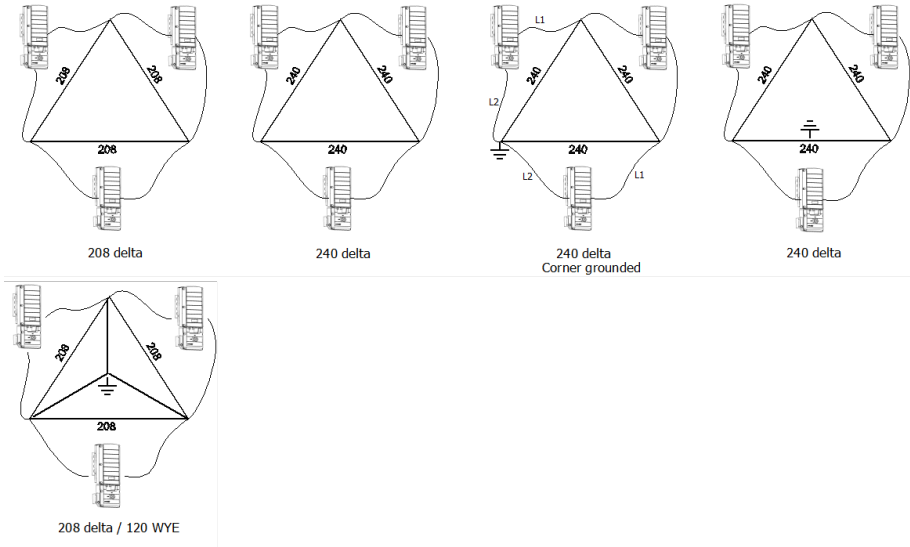


Figure 2: AC grids supported by SolarEdge single phase inverter

## Grids Supported by the Three Phase Inverters

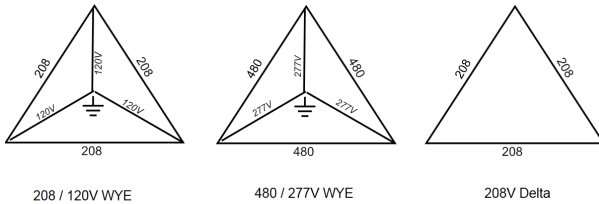


Figure 3: AC grids supported by SolarEdge three-phase inverters



**NOTE**

Three phase inverters supporting the 208V Delta grid are those indicated by fuses. Refer to *Setting the Inverter for 208V Delta Grid Support* on page 37.

## Installation Procedure

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The following is the procedure for installing and setting up a new SolarEdge site. Many of these also apply to modification of an existing site.

1. [Connecting Power Optimizers in Strings](#), page 21
2. [Recording power optimizer serial numbers \(optional\)](#), page 49
3. [Mounting the inverter](#), 28
4. [Connecting the strings and the AC to the Safety Switch](#), 33.
5. [Commissioning and activating the installation](#), page 43
6. [Connecting the inverter to the SolarEdge monitoring portal](#), page 49
7. [Configuring the inverter](#), page 50

## Installation Equipment List

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Standard tools can be used during the installation of the SolarEdge system. The following is a recommendation of the equipment needed for installation:

- Allen screwdriver for 5mm screw type for the inverter cover and Safety Switch cover
- Allen screwdriver for 5mm screw type for the inverter side screw
- Allen screwdriver for M6/M8 screw types
- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill or screwdriver and bits suitable for the surface on which the inverter will be installed and for opening the Safety Switch knockouts
- Suitable hardware for attaching the inverter mounting bracket to the surface to which it will be connected
- 1/4" or 5/16" stainless bolts, nuts, and washers for attaching the power optimizer to the racking
- Wire cutters
- Wire strippers
- Voltmeter

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

- For Ethernet:
  - CAT5/6 twisted pair Ethernet cable with RJ45 connector.
  - If using a CAT5/6 cable spool: RJ45 plug and RJ45 crimper

- For RS485:
  - Four- or six-wire shielded twisted pair cable.
  - Watchmaker precision screwdriver set

## **Inverter Transport and Storage**

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Transport the inverter in its original packaging, facing up and without exposing it to unnecessary shocks. If the original package is no longer available, use a similar box that can withstand the weight of the inverter (refer to the inverter weight in *Technical Specifications* on page 97), has a handle system and can be closed fully.

Store the inverter in a dry place where ambient temperatures are -13°F - 140°F / -25°C - +60°C .

## Chapter 2: Installing the Power Optimizers

### Safety

The following notes and warnings apply when installing the power optimizers:

**WARNING!**

When modifying an existing installation, turn OFF the inverter ON/OFF switch, the Safety Switch and the AC circuit breaker on the main AC distribution panel.

*Avant de faire ces étapes, éteignez l'onduleur monophasé en mettant sur OFF l'interrupteur ON/OFF situé au bas de l'onduleur.*

**WARNING!**

Input and output connectors are not watertight until mated. Open connectors should be mated to each other or plugged with appropriate watertight caps.

*Les connecteurs d'entrée et sortie ne sont pas étanches jusqu'à ce qu'ils soient accouplés. Les connecteurs doivent être accouplés ou fermés avec des terminaux étanches.*

**CAUTION!**

This unit must be operated according to the operating specifications in this document.

*Cette unité doit être opérée suivant les instructions trouvées dans ce document.*

**CAUTION!**

All PV modules in the same installation must be equipped with a power optimizer.

*Tous les modules de la même installation doivent être équipés d'un optimiseur de puissance.*

**CAUTION!**

Cutting the power optimizer input or output cable connector is prohibited and will void the warranty.

*Sectionner les câbles d'entrées ou de sortie de l'optimiseur est interdit et annule sa garantie.*

**CAUTION!**

Power optimizers are IP65/NEMA4 rated. Choose a mounting location where optimizers will not be submerged in water.

*Les optimiseurs de puissances sont compatibles à la norme IP65/NEMA4. Choisissez le lieu de montage tel que l'optimiseur ne puisse pas être submergé par l'eau.*



**CAUTION!**

If you intend to mount the optimizers directly to the module or module frame, first consult the module manufacturer for guidance regarding the mounting location and the impact, if any, on module warranty. Drilling holes in the module frame should be done according to the module manufacturer instructions.

*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. Le perçage de trous dans le cadre du module devra se faire suivant les instructions du fabricant.*

**CAUTION!**

Installing a SolarEdge system without ensuring compatibility of the module connectors with the optimizer connectors may be unsafe and could cause functionality problems such as ground faults, resulting in inverter shut down. In order to ensure mechanical compatibility of the SolarEdge optimizers and the modules to which they are connected:

- Use identical connectors from the same manufacturer and of the same type on both the power optimizers and on the modules; or
- Verify that the connectors are compatible in the following way:
  - The connector manufacturer should explicitly verify compatibility with the SolarEdge optimizer connector; and
  - A third-party test report by one of the listed external labs (TUV, VDE, Bureau Veritas UL, CSA, InterTek) should be obtained, verifying the compatibility of the connectors.

*Les connecteurs du module doivent être mécaniquement compatibles avec les optimiseurs de puissance. Sinon, le système SolarEdge installé peut être dangereux ou causer des problèmes fonctionnels, tels que les défauts de terre, qui peuvent provoquer un arrêt de l'onduleur. Afin d'assurer la compatibilité mécanique entre les optimiseurs de puissance SolarEdge et les modules auxquels ils sont connectés, il faut :*

- *Utiliser des connecteurs identiques du même fabricant et du même type aussi bien pour les optimiseurs de puissance que pour les modules.*
- *Vérifiez que les connecteurs sont compatibles de la manière suivante:*
  - *Le fabricant du connecteur doit explicitement vérifier la compatibilité avec le connecteur SolarEdge.*
  - *Un rapport de test de tierce partie doit être effectué par l'un des laboratoires externes indiqués ci-dessous: (TUV, VDE, Bureau Veritas UL, CSA, Intertek), qui vérifiera la compatibilité des connecteurs.*

**IMPORTANT SAFETY FEATURE**

Modules with SolarEdge power optimizers are safe. They carry only a low safety voltage before the inverter is turned ON. As long as the power optimizers are not connected to the inverter or the inverter is turned OFF, each power optimizer will output a safe voltage of 1V.

## Package Contents

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- Power optimizers
- Stainless steel grounding lock washers

## Installation Guidelines

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- This chapter refers only to the module add-on power optimizers. For module-embedded models, refer to the installations instructions supplied with the embedded module.
- The power optimizer can be placed in any orientation.
- Position the power optimizer close enough to its module so that their cables can be connected.
- To allow for heat dissipation, maintain a 2.5 cm/ 1" clearance distance between the power optimizer and other surfaces.
- The minimum and maximum string length guidelines are stated in the power optimizer datasheets.
- Refer to the SolarEdge Site Designer for string length verification. The SolarEdge Site Designer is available on the SolarEdge website at <http://www.solaredge.us/groups/support/downloads>, under Software Tools.
- Completely shaded modules may cause their power optimizers to temporarily shut down. This will not affect the performance of the other power optimizers in the string, as long as the minimum number of unshaded power optimizers connected in a string of modules is met. If under typical conditions fewer than the minimum optimizers are connected to unshaded modules, add more optimizers to the string.
- Do not leave the power optimizers connectors disconnected. Open connectors should be mated to each other.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.



### NOTE

The images contained in the following sections are for illustrative purposes only and may vary depending on product models.

## Step 1: Mounting and Grounding the Power Optimizers

1. Determine the power optimizer mounting location and use the power optimizer mounting brackets to attach the power optimizer to the support structure (See Figure 4). For optimizers supplied with module frame-specific brackets, attach the power optimizer to the module frame following the instructions included with the optimizers.
2. If required, mark the mounting hole locations and drill the hole.

### CAUTION!



Do not drill through the power optimizer or through the mounting holes. The drilling vibrations can damage the power optimizer and will void the warranty.

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

3. Attach each power optimizer to the rack using the M6 (1/4") stainless steel bolts, nuts and washers. Apply torque of 9.5 N\*m / 7 lb\*ft. For 3NA series power optimizes, SolarEdge recommends mounting the power optimizer on a rail with the smooth side facing out, so that the power optimizer body will prevent its rotation.
4. Use the following methods to ground the power optimizer<sup>1</sup>:

### WARNING!

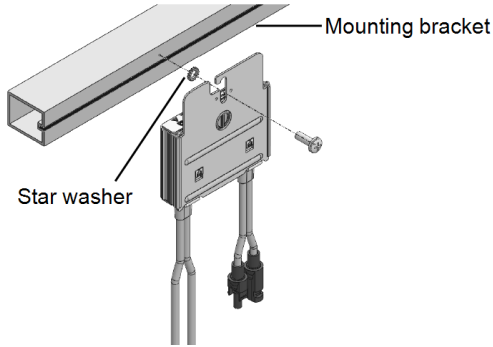


The metallic enclosure of the power optimizer must be grounded in accordance with the requirements of the local and national codes.

*L'enceinte métallique de l'optimiseur de puissance doit être mise à la terre en accord avec les réglementations locales et nationales.*

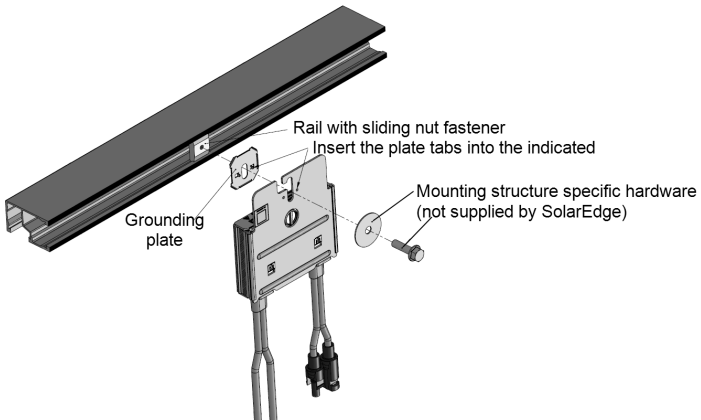
- **For mounting on a grounded metal rail :** Use the provided 5/16" stainless steel grounding star washer between the railing and the flat side of the mounting bracket. The grounding washer should break through the anodize coating of the railing to ensure low resistive connection. Apply torque of 9.5 N\*m / 7 lb\*ft.

<sup>1</sup>For a list of racking models and their appropriate grounding method, refer to [http://www.solaredge.us/files/pdfs/grounding\\_se\\_power\\_optimizers.pdf](http://www.solaredge.us/files/pdfs/grounding_se_power_optimizers.pdf).



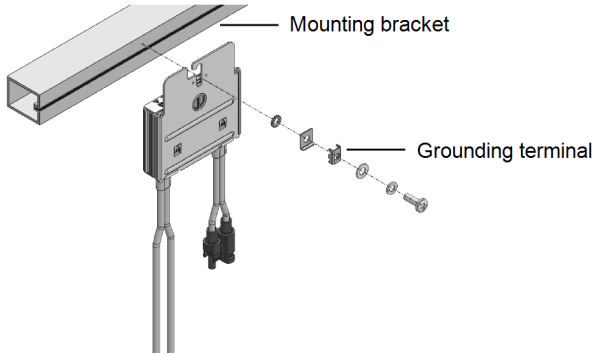
**Figure 4: Power optimizer installation and grounding using a star washer**

- **For mounting on rails with sliding nut fasteners:** Use the SolarEdge grounding plate (purchased separately) between the railing and the flat side of the mounting bracket. Apply torque of 9.5 N\*m / 7 lb\*ft.



**Figure 5: Power optimizer installation and grounding using a grounding plate**

- **For mounting on rails with sliding nut fasteners, or an un-grounded structure** (such as a wooden structure): Connect an equipment-grounding conductor to the grounding terminal according to the supplied instructions (the terminal should be purchased separately). The grounding terminal accepts a wire size of 6-14 AWG, and must be sized for equipment grounding per NEC 250.122 requirements. Tighten the screws connecting the power optimizer to the frame and the grounding terminal screw. Apply torque of 9.5 N\*m / 7 lb\*ft.



**Figure 6: Power optimizer grounding terminal**

5. Verify that each power optimizer is securely attached to the supporting structure or the module.



**NOTE**

Record power optimizer serial numbers and locations, as described in *Providing Installation Information* on page 49.

## Step 2: Connecting a PV Module to a Power Optimizer

- Connect the Plus (+) output connector of the module to the Plus (+) input connector of the power optimizer.
- Connect the Minus (-) output connector of the module to the Minus (-) input connector of the power optimizer.

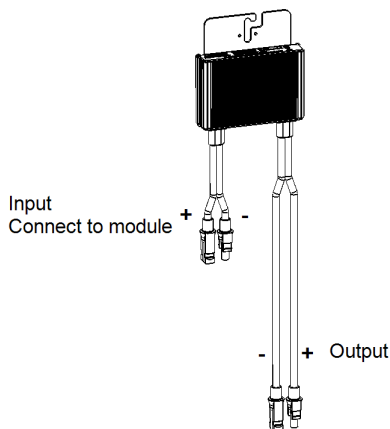


Figure 7: Power optimizer connectors



### NOTE

Images are for illustration purposes only. Refer to the label on the product to identify the plus and minus input and output connectors.

## Step 3: Connecting Power Optimizers in Strings

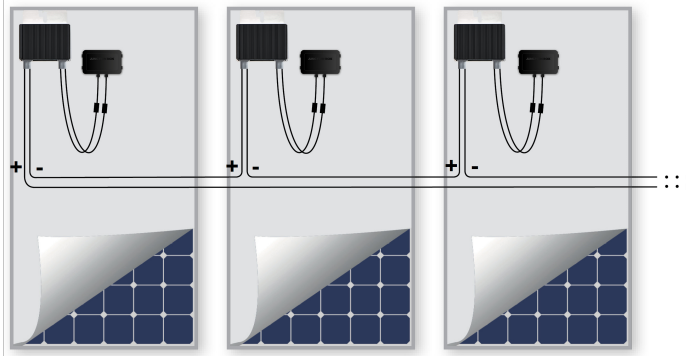
You can construct parallel strings of unequal length, that is, the number of power optimizers in each string does not have to be the same. The minimum and maximum string lengths are specified in the power optimizer datasheets. Refer to the SolarEdge Site Designer for string length verification.



### NOTE

The total cable length of the string (including power optimizers' cables) should not exceed 1000ft./300m from DC+ to DC- of the inverter. Use at least 11 AWG/ 4 mm<sup>2</sup> DC cables.

1. Connect the Minus (-) output connector of the string's first power optimizer to the Plus (+) output connector of the string's second power optimizer.
2. Connect the rest of the power optimizers in the string in the same manner.



**Figure 8: Power optimizers connected in series**

3. If you intend to monitor the installation, using the SolarEdge monitoring portal, record the physical location of each power optimizer, as described in *Providing Installation Information* on page 49.



**WARNING!**

Input and output connectors are not watertight until mated. Open connectors should be mated to each other or plugged with appropriate watertight caps.

*Les connecteurs d'entrée et sortie ne sont pas étanches jusqu'à ce qu'ils soient accouplés. Les connecteurs doivent être accouplés ou fermés avec des terminaux étanches.*

## Step 4: Verifying Proper Power Optimizer Connection

After a module is connected to a power optimizer, the power optimizer outputs a safe voltage of 1V. Therefore, the total string voltage should be equal to 1V times the number of power optimizers connected in series in the string. For example, if 10 power optimizers are connected in a string, then 10V should be produced.

- Make sure the modules are exposed to sunlight during this process; otherwise, the power optimizers may not be powered. If you use a tracker, the power optimizer will turn ON only if the tracker is tracking the sun and the module provides at least 2W.

- In SolarEdge systems, due to the introduction of power optimizers between the PV modules and the inverter, the short circuit current  $I_{SC}$  and the open circuit voltage  $V_{OC}$  hold different meanings from those in traditional systems.

For more information about the SolarEdge system's string voltage and current, refer to the  $V_{OC}$  and  $I_{SC}$  in *SolarEdge Systems Technical Note*, available on the SolarEdge website at: [http://www.solaredge.us/files/pdfs/isc\\_and\\_voc\\_in\\_solaredge\\_sytems\\_technical\\_note.pdf](http://www.solaredge.us/files/pdfs/isc_and_voc_in_solaredge_sytems_technical_note.pdf)

► **To verify proper power optimizers connection:**

Measure the voltage of each string individually before connecting it to the other strings or to the inverter. Verify correct polarity by measuring the string polarity with a voltmeter. Use a voltmeter with at least 0.1V measurement accuracy.

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 94.



## Chapter 3: Installing the Inverter

Install the inverter either before or after the modules and power optimizers have been installed.

### NOTE

For single-phase 3-7.6kW inverters, use only copper conductors rated for a minimum of 75°C/167°F.



For single phase 10-11.4kW inverters and for three-phase inverters, use only copper conductors rated for a minimum of 90°C/194°F.

For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables and components must be used.

## Inverter Package Contents

- One SolarEdge inverter
- One mounting bracket
- Two Allen screws for fastening the inverter to the mounting bracket
- This installation guide
- Quick installation guide
- Inverter activation instructions (may include an activation card)

## Identifying the Inverter

Refer to the sticker on the inverter that specifies its **Serial Number** and its **Electrical Ratings**. Provide the serial number when contacting SolarEdge support. The serial number is also required when opening a new site in the SolarEdge monitoring portal.

In the following sections, unless otherwise indicated, instructions apply to both single-phase and three-phase inverters, though only one graphical example may be presented.

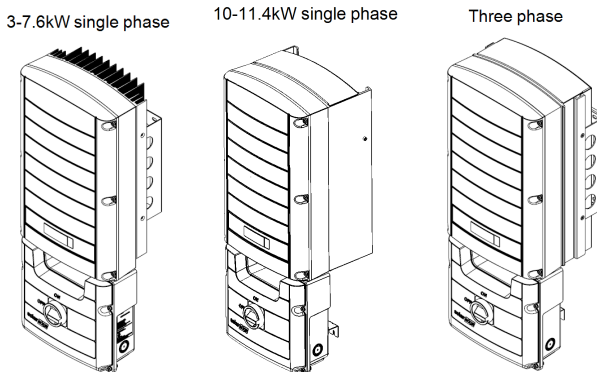
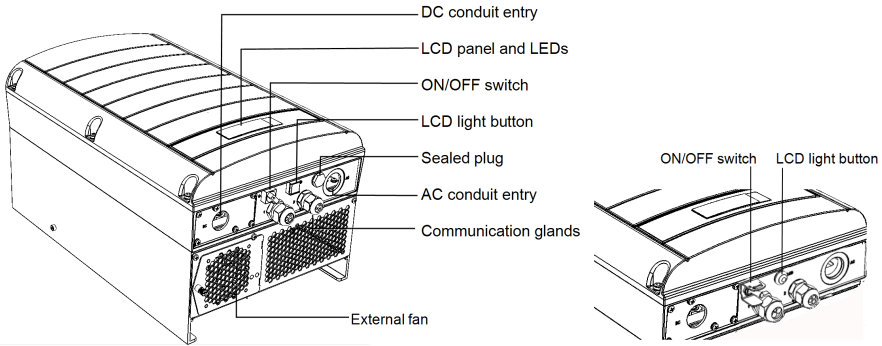


Figure 9: Single phase and three phase inverters

## Inverter Interfaces

The following figure shows the inverter connectors and components, located at the bottom of the inverter. The ON/OFF switch and the LCD light button may vary depending on the inverter model:

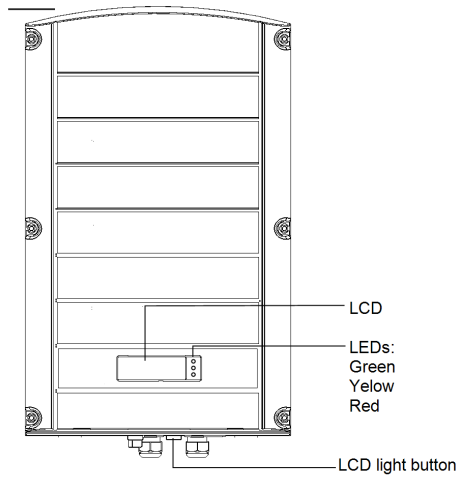


**Figure 10: Inverter Interfaces**

- **LCD panel:** displays inverter information and configuration parameters
- **LCD LEDs:** Three LEDs indicate the following inverter statuses:

Color	Description	Functionality
Green	Power production	<p><b>On</b> - The inverter is producing power. <b>Blinking</b> - Standby mode. The inverter is in Standby mode until its working voltage is reached. The inverter then enters Production mode and produces power.</p> <p><b>Off</b> - The inverter is not producing power. This may be during Night mode, when the inverter ON/OFF switch is OFF or when an error occurs.</p>
Yellow	Module communication and inverter shutdown	<p><b>Blinking:</b></p> <ul style="list-style-type: none"> <li>○ Monitoring information is being received from a power optimizer.</li> <li>○ The inverter is being shut down.</li> </ul>
Red	Fault	<p><b>On</b> - There is an error. Refer to <i>Errors and Troubleshooting</i> on page 83 for more information.</p> <p><b>Blinking</b> - The inverter is being shut down.</p>

All LEDs turn on while the inverter is being configured.



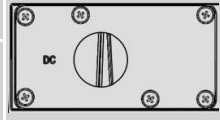
**Figure 11: Inverter front view**

- **AC and DC conduit entries:** Connection points of the Safety Switch.

**CAUTION!**

Do not remove the six screws on the DC conduit metal panel as it may harm the inverter sealing and void the warranty.

*Ces vis ne doivent pas être retirées. Les enlever est susceptible d'endommager l'étanchéité de l'onduleur et annuler la validité de la garantie.*



- **ON/OFF switch:** Turning this switch ON starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid. Turning it OFF reduces the power optimizer voltage to a low safety voltage and inhibits exportation of power. When this switch is OFF, the inverter control circuitry remains powered up.
- **LCD light button:** Pressing this button lights up the LCD for 30 seconds. In addition, you can press this button to access configuration menu options, as described *Configuring the Inverter Using the LCD Light Button* on page 55.
- **Two communication glands,** for connection of inverter communication options. Each gland has three openings. Refer to *Setting Up Communication* on page 71 for more information.

## Opening Conduit Knockouts

This step may be performed after mounting the inverter.

1. Move the Safety Switch and the inverter ON/OFF switch to OFF.

### NOTE

When the Safety Switch is OFF (for example during maintenance) it may be locked to prevent safety hazard:

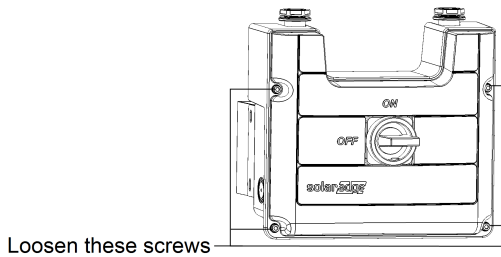
1. Move the Safety Switch to the Lock position.
2. Insert the lock through the knob opening and lock.



Lock here

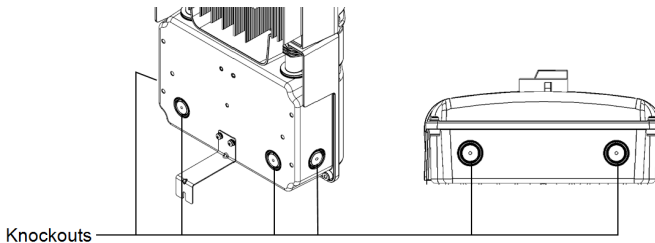


2. Loosen the screws on the front cover of the Safety Switch, as shown below:



**Figure 12: Opening the Safety Switch cover**

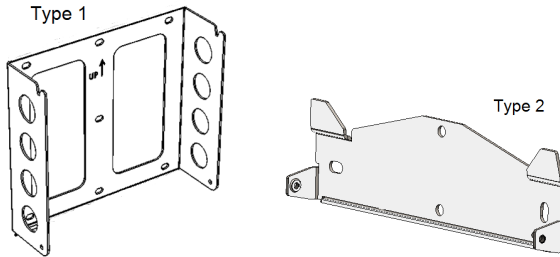
3. Remove the Safety Switch cover.
4. Open the AC and DC conduit knockouts: The switch has knockouts located at the bottom, back and sides of the enclosure, each with two sizes:  $\frac{3}{4}$ " and 1". Open the necessary pair according to the conduits used in the installation, taking care not to interfere with any of the internal components. A Unibit drill may be used.



**Figure 13: Safety Switch knockouts**

## Mounting the Inverter

The inverter is supplied with one of the following two types of mounting brackets. The mounting steps in the next sections refer to these types.



**Figure 14: Mounting bracket types**

### NOTE



Make sure the mounting surface or structure can support the weight of the inverter and bracket, and make sure that it spans the width of the bracket.

### CAUTION!



**HEAVY OBJECT.** To avoid muscle strain or back injury, use proper lifting techniques, and if required - a lifting aid when removing or replacing.

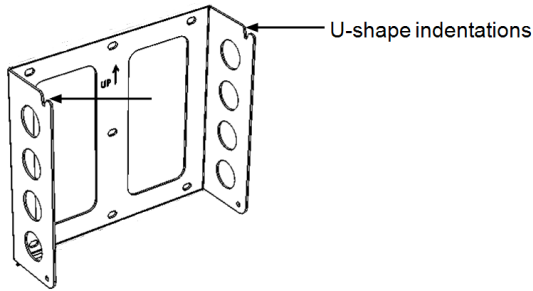
*Objet lourd. Pour éviter la fatigue musculaire ou des blessures au dos, utilisez des techniques de levage appropriées et, si nécessaire - un auxiliaire de levage lors du retrait ou du remplacement.*

1. Determine the inverter mounting location, on a wall, stud framing or pole, as follows:
  - To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:
    - 8" (20 cm) to the top of the inverter
    - At least 4" (10 cm) to the bottom of the inverter; if conduit entry to the Safety Switch will be from the bottom leave sufficient clearance for the conduits as well.
    - 4" (10 cm) to the right and left of the inverter. For easy access to the fans (single phase 10-11.4 kW and the three phase inverters), you may leave larger clearance.
    - When installing inverters one above of the other, leave at least 16" (40 cm) between inverters.

- When installing inverters side by side, follow these clearance specifications:

	Single Phase Inverters	Three Phase Inverters
Locations where the yearly average high temperature is below 25° C/77° F	20 cm / 8" between inverters	20 cm / 8" between inverters
Locations where the yearly average high temperature is above 25° C/77° F	20 cm / 8" between inverters	40 cm / 16" between inverters

- Position the mounting bracket against the wall/pole and mark the drilling hole locations (refer to *Mechanical Specifications* on page 109 for inverter and mounting bracket dimensions):
  - For Type 1 - Ensure that the U-shaped indentations are facing up and the “UP” marking is correctly oriented, as shown below:



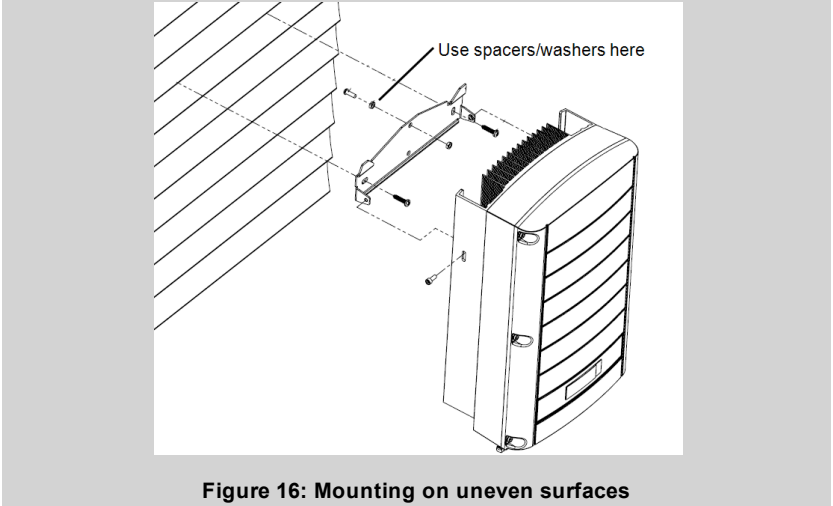
**Figure 15: Bracket with U-shaped indentations facing up**

- For Type 2 – Ensure that the flat side of the bracket is at the bottom, as in *Figure 14*.
  - Use at least two bracket holes. Additional holes can be used to fix the bracket. Determine which and how many holes to use according to mounting surface type and material.
2. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.

**NOTE**

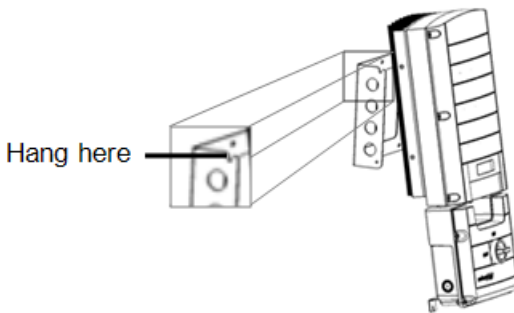


When mounting an inverter with Type 2 bracket on an uneven surface, you may use spacers/washers behind the top mounting hole of the bracket (see *Figure 16*). Depending on the angle, use the appropriate size and number of spacers so that the bracket is perpendicular to the ground. Recommended: a stainless steel 3/4" long screw, with a 1/4" socket button head, two jam nuts and three washers.



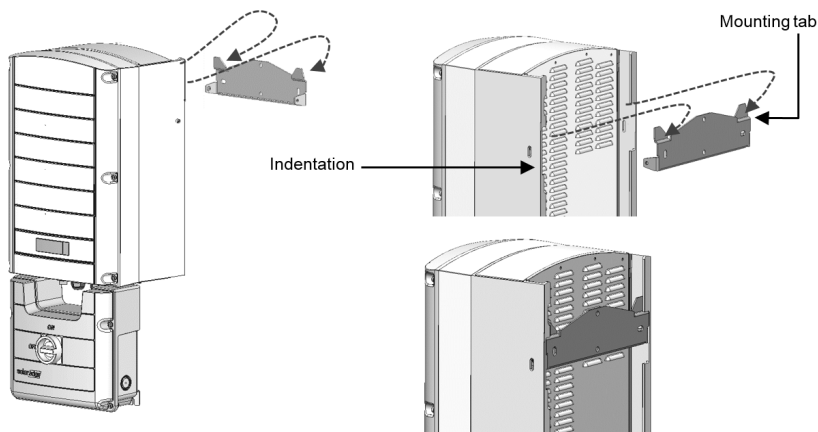
**Figure 16: Mounting on uneven surfaces**

3. Hang the inverter on the bracket (see *Figure 17* and *Figure 18*): Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place. Do not lift holding the Safety Switch as it may be damaged.
  - For Type 1 - Use the screws at the top of the inverter, as shown below. Let the inverter lay flat against the wall or pole.



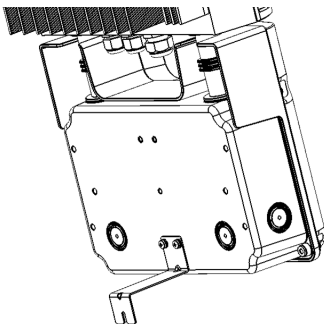
**Figure 17: Hanging the inverter on the bracket - Type 1**

- For Type 2 - Align the two indentations in the inverter enclosure with the two triangular mounting tabs of the bracket, and lower the inverter until it rests on the bracket evenly.



**Figure 18: Hanging the inverter on the bracket - Type 2**

4. Optionally, secure the Safety Switch bracket to the wall:
  - Mark the location of the bracket screw for the Safety Switch and drill the hole.

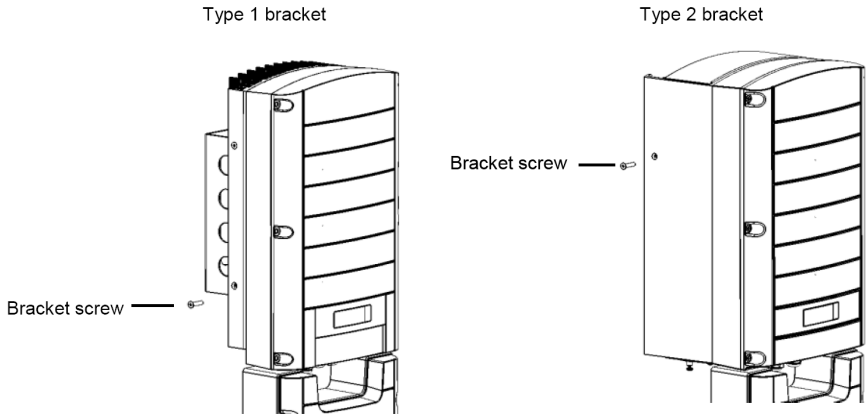


**Figure 19: Safety Switch bracket**

- Fasten the bracket using a standard bolt.  
Verify that the bracket is firmly attached to the mounting surface.



5. Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket. Tighten the screws with a torque of 4.0 N\*m / 2.9 lb.\*ft.



**Figure 20: Inserting the bracket screws**

## Chapter 4: Connecting the AC and the Strings to the Safety Switch

The Safety Switch disconnects all ungrounded DC conductors of the circuit to which it is connected in compliance with the National Electric Code, and specifically NEC690.35, which addresses ungrounded PV arrays. The Safety Switch is rated to the maximum operating conditions of the inverter.

The Safety Switches are equipped with different types of terminal blocks.

Safety Switches with a built-in Revenue Grade Meter (RGM) are available as well.

The following figures illustrate several of the available Safety Switches.

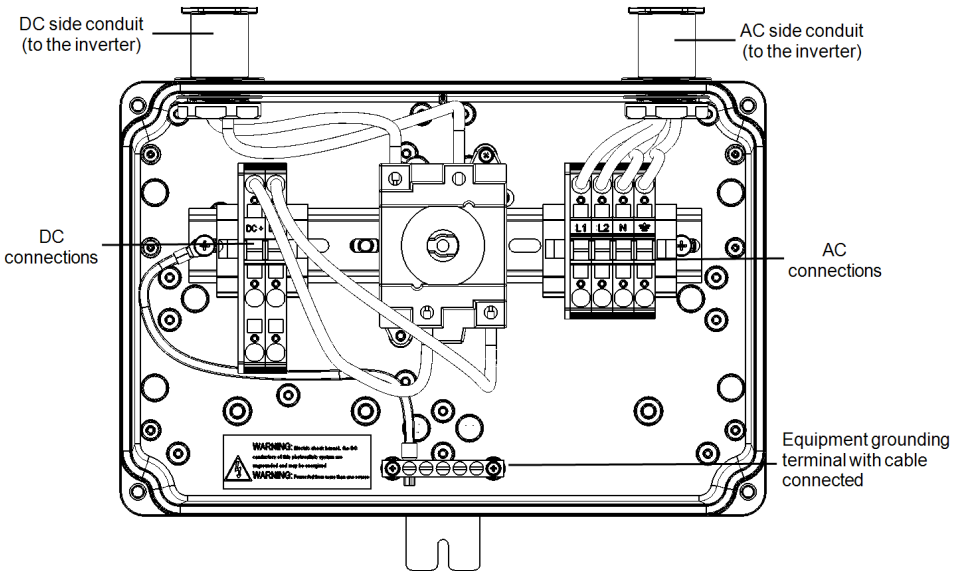


Figure 21: Inside the DC Safety Switch for single phase 3-7.6kW inverters

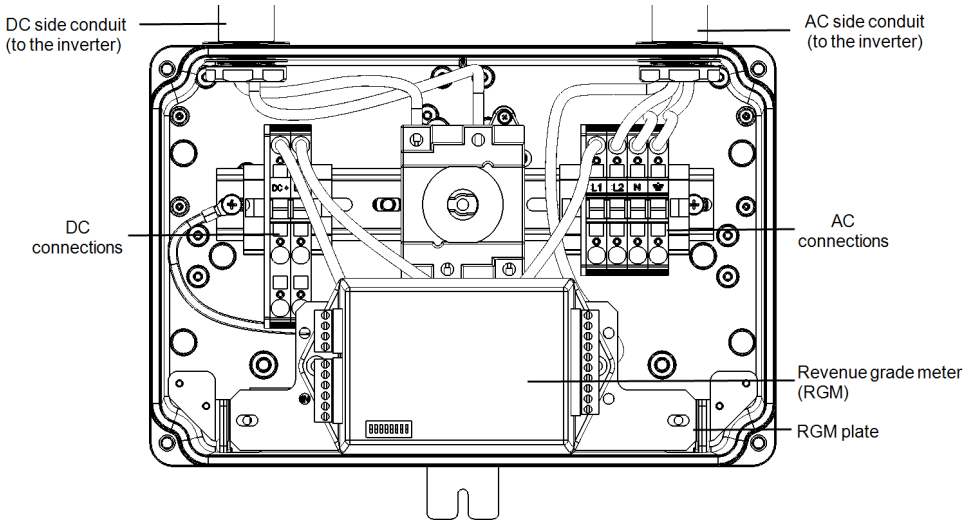


Figure 22: Inside the DC Safety Switch for single phase 3-7.6kW inverters with a built-in revenue grade meter (RGM; optional)

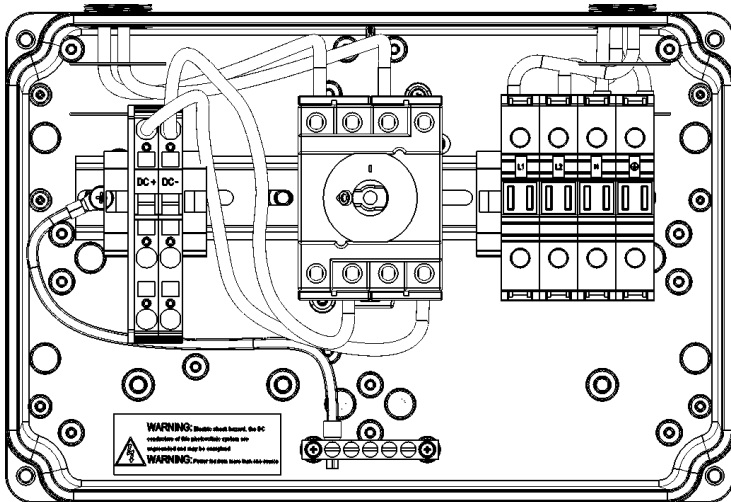


Figure 23: Inside the DC Safety Switch for single phase 10-11.4 kW inverter

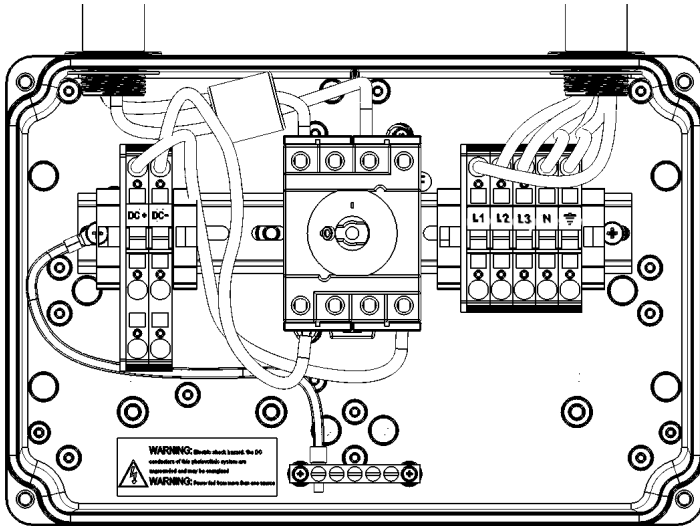


Figure 24: Inside the DC Safety Switch for three phase inverters (9kW, 10kW, 20kW)

## Grid Connection Guidelines

### NOTE



Three phase inverters require neutral connection at all times (only WYE type grids with neutral connection are supported).

- In single phase inverters connected to corner grounded grids, connect the L2 terminal to the grounded conductor. When connecting to other grids, L1 and L2 are interchangeable.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.
- When connecting multiple single phase inverters in an installation connected to a three-phase grid, phase balancing may be required by the utility or grid operator. Phase balancing is supported in the SolarEdge inverters. For detailed information, refer to the *SolarEdge Phase Balancing Connection Guide*, available on the SolarEdge website at [http://www.solaredge.us/files/pdfs/phase\\_balancing\\_connection\\_guide.pdf](http://www.solaredge.us/files/pdfs/phase_balancing_connection_guide.pdf).

### NOTE



- The conduits, hubs and fittings must be suited for field wiring systems.
- For three-phase inverters where opposite polarity DC conductors are routed in the same conduit, 1000V rated cables must be used.
- For single-phase inverters, use only copper conductors rated for a minimum of 75°C.
- For three-phase inverters, use only copper conductors rated for a minimum of 90°C.
- The hubs and other fittings must comply with UL514B.
- Use the conduit and wiring appropriate for the installation location per the NEC. Outdoor installations must use components that are rated NEMA 3R or higher.
- For more wiring information refer to the *SolarEdge Recommended AC Wiring Application Note*, available on the SolarEdge website at <http://www.solaredge.us/files/pdfs/application-note-recommended-wiring.pdf>

## Setting the Inverter for 208V Delta Grid Support

SolarEdge inverters that support the 208V Delta grid are equipped with two fuse holders and a fuse. The position of the fuse configures the AC grid connection: WYE (4-wire) or Delta (3-wire) grid connection. By default, the fuse is located in the WYE fuse holder of the inverter, and in the Delta fuse holder there is a plastic dummy fuse.

To set the inverter for Delta grid connection, you must move the fuse from the WYE fuse holder, marked as Y GRID, to the Delta fuse holder, marked as  $\Delta$  GRID (see *Figure 25*).



### CAUTION!

The only supported Delta grid is the 208V L-L grid. Connecting the inverter to other Delta grids may damage the inverter and will void the warranty.

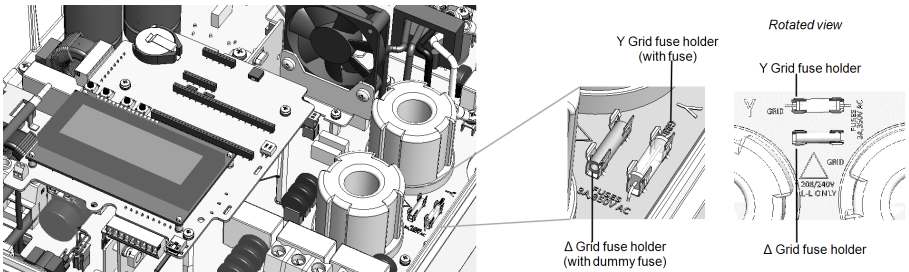
### ► To set the inverter for 208V Delta grid connection:



### NOTE

Perform this procedure before connecting the inverter Safety Switch to the AC grid.

1. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.
2. Identify the fuse locations and the markings as described in *Figure 25*



**Figure 25: Fuse locations and markings**

3. Remove the dummy fuse from the Delta grid fuse holder and set it aside.
4. Move the fuse from the WYE grid fuse holder to the Delta grid fuse holder.
5. Place the dummy fuse in the WYE grid fuse holder.

## Connecting the AC Grid to the Safety Switch

This procedure varies depending on the inverter type (single or three phase). Make sure you follow the procedure applicable to your equipment.

If the Safety Switch has a pre-assembled RGM (see Figure 21), flip the RGM plate downwards before making the connections.

### ► To connect the AC grid to the Safety Switch – single phase 3-7.6kW inverters:

1. Remove the spring-clamp terminal instructions from inside the switch.
2. Strip 05/16" (8mm) of the AC wire insulation.
3. Insert the AC conduit into the AC-side knockout that was opened.

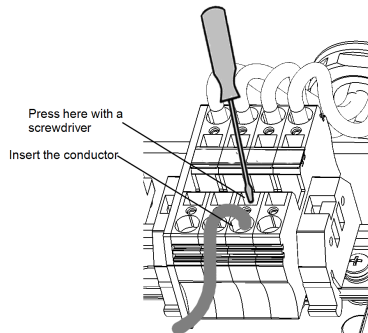
#### NOTE



Connect the equipment grounding before connecting the AC wires to the AC terminal block.

*Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.*

4. Connect the wires to the appropriate terminal blocks according to the labels on the terminal blocks (N, Gnd, L1 and L2).
5. Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals:
  - The screwdriver blade should fit freely in the terminal opening. Too large a blade can crack the plastic housing.
  - Insert the screwdriver and press the release mechanism and open the clamp.
  - Insert the wire into the round opening and remove the screwdriver – the wire is automatically clamped.



**Figure 26: AC Spring-clamp terminal example - single phase 3-7.6kW inverter**

6. Verify that there are no unconnected wires.

► **To connect the AC grid to the Safety Switch – single phase 10-11.4kW inverters:**

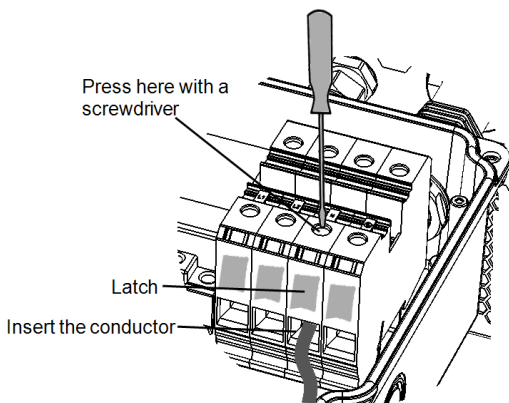
1. Remove the spring-clamp terminal instructions from inside the switch.
2. Strip  $1\frac{3}{8}$ " (35mm) of the AC wire insulation.
3. Insert the AC conduit into the AC-side knockout that was opened.

**NOTE**

Connect the equipment grounding before connecting the AC wires to the AC terminal block.

*Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.*

4. Connect the wires to the appropriate terminal blocks according to the labels on the terminal blocks (N, Gnd, L1 and L2).
5. Use a  $13/64$ " (5mm) straight flat-blade screwdriver to connect the wires to the terminals:
  - Insert the screwdriver into the top opening and rotate it counterclockwise to activate the clamp mechanism. The side latch holds the clamp in the open position.
  - Insert the wire into the side opening as deep as possible.
  - Slightly rotate the screwdriver counter-clockwise to release the latch.
  - Remove the screwdriver – the wire is safely clamped.



**Figure 27: AC Spring-clamp terminal examples - single phase 7.6-11.4kW inverters**

6. Verify that there are no unconnected wires.



► **To connect the AC grid to the Safety Switch – three phase inverters:**

1. Strip 05/16" (8mm) of the AC wire insulation.
2. Insert the AC conduit into the AC-side knockout that was opened.

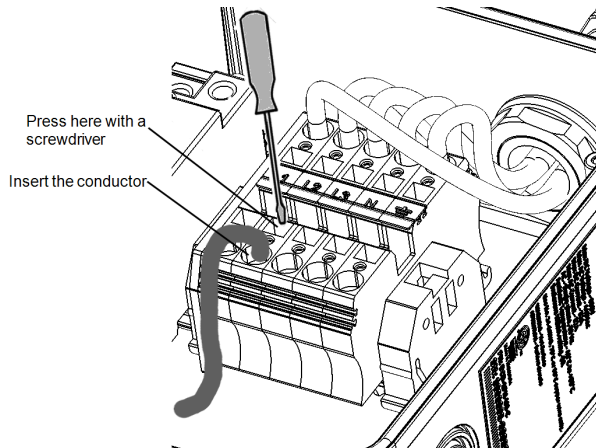
**NOTE**

Connect the equipment grounding before connecting the AC wires to the AC.

*Veillez à relier le conducteur de PE (la terre) avant de connecter les fils CA au bornier CA.*

3. Connect the wires as follows:

- Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals (See Figure 28).
- The screwdriver blade should fit freely in the terminal opening. Too large a blade can crack the plastic housing.
- Insert the screwdriver, press the release mechanism and open the clamp.
- Insert the wire into the round opening and remove the screwdriver – the wire is automatically clamped.



**Figure 28: DC Spring-clamp terminal – three phase inverter**

## Connecting the Strings to the Safety Switch

Strings may be connected in parallel to the two DC input pairs of the switch. If more than two strings are required, they can be connected in parallel using an external combiner box before connecting to the switch. When connecting multiple strings, it is recommended to run separate circuits to the Safety Switch or to position the combiner box near the switch. This simplifies commissioning by allowing testing and servicing near the inverter.

### ► To connect the strings to the safety switch:

1. Strip 5/16" (8 mm) of the DC wire insulation.
2. Insert the DC conduit into the DC-side knockout that was opened.
3. Equipment grounding: Connect the DC equipment ground conductor to the equipment grounding terminal block in the Safety Switch.

#### NOTE



Functional Electrical Earthing of DC-side negative or positive is prohibited because the inverter has no transformer. Earthing of module frames and mounting equipment (equipotential bonding) is required per NEC.

4. Connect the DC wires:

#### CAUTION!



Ensure that the Plus (+) wire is connected to the + terminal and that the Minus (-) wire is connected to the Minus (-) terminal connector.

*Veillez à ce que le câble Plus (+) soit connecté au terminal + et que le câble - soit connecté au connecteur terminal.*

#### NOTE



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

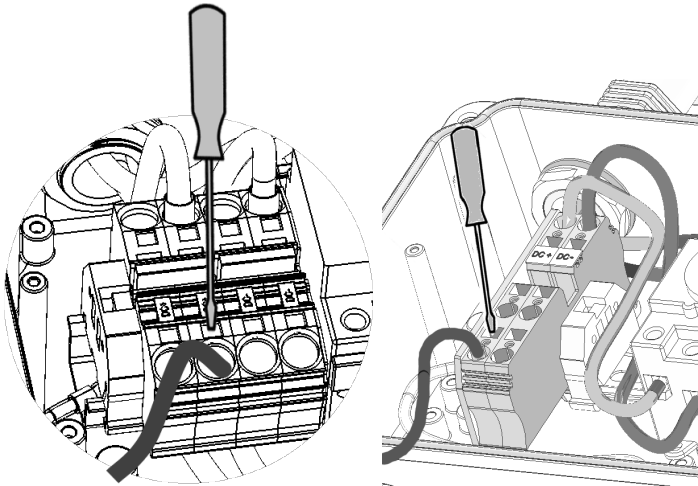
#### NOTE



SolarEdge's fixed input voltage architecture enables the parallel strings to be of different lengths. Therefore, they do not need to have the same number of power optimizers, as long as the length of each string is within the permitted range.

- *For single phase 3-7.6kW inverters* - Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks, according to the labels on the terminals. Use a standard straight-bladed screwdriver to connect the wires to the spring-clamp terminals, as described for the AC connection of single phase 3-7.6kW inverters (*connect the AC grid to the Safety Switch – single phase 3-7.6kW inverters: on page 38*).

- For single phase 10-11.4kW inverters - Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks, according to the labels on the terminals:
  - Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals. The screwdriver blade should fit freely in the terminal opening. Too large a blade can crack the plastic housing.
  - Insert the screwdriver and firmly tilt it to press the release mechanism and open the clamp.
  - Insert the wire into the top opening (see *Figure 29*).
  - Remove the screwdriver – the wire is automatically clamped.



**Figure 29: DC Spring-clamp terminal examples - single phase 10-11.4 kW inverter**

- For three phase inverters – Do one of the following:
    - Safety switch version *without terminal blocks on the DC side* - Connect the DC wires from the PV installation to the DC+ and DC- terminals of the switch, according to the labels in the Safety Switch.
    - Safety switch version *with terminal blocks on the DC side* - Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks (see also *Figure 29*).
5. If the Safety Switch has a pre-assembled RGM, flip the RGM plate upwards to its original position.
  6. Close the Safety Switch cover: Attach the switch cover and secure it by tightening the four screws with a torque of 1.2 N\*m / 0.9 ft.\*lb.

## Chapter 5: Commissioning the Installation

This chapter describes how to activate the system, pair the power optimizers to the inverter and verify the proper functioning of the system.

### Step 1: Activating the System

1. Verify that the ON/OFF switch is OFF.
2. Turn ON the AC breaker.
3. Move the Safety Switch to the ON position.
4. If not already removed, remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

**WARNING!**

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

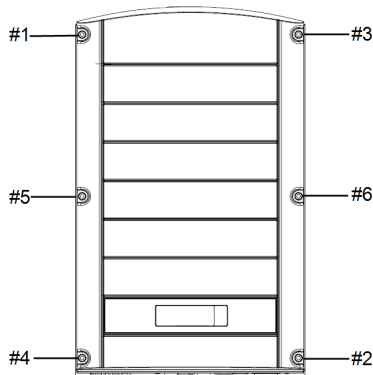
*RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.*

5. Activate the inverter according to the activation instructions supplied in the inverter package:
  - a. Verify card S/N matches inverter S/N.
  - b. Insert the card into slot marked "CARD" on the communication board.
  - c. Turn AC ON.
  - d. LCD shows: Running Script... → Done!
  - e. If LCD shows: Script error, contact SolarEdge Support.
6. Verify that the inverter is configured to the proper country: Press the LCD light button until reaching the ID status screen:

```
ID: ##### ##  
DSP1/2:1.0210/1.0034  
CPU:0003.14xx  
Country:USA1
```

7. If required, perform the following additional steps:
  - Country settings or inverter configuration using the internal LCD user buttons – refer to *Country and Grid* on page 57.
  - Communication options connection – refer to *Setting Up Communication* on page 71.

8. Close the inverter cover by tightening the screws with a torque of 9.0 N\*m/ 6.6 lb\*ft. For proper sealing, first tighten the corner screws and then the two central screws. The following figure illustrates recommended order:



**Figure 30: Tightening order of the screws**

9. Turn ON the Safety Switch. If an additional external DC switch is installed between the power optimizers and the inverter(s) then turn it ON.

A status screen similar to the following appears on the LCD panel:

Vac [V]	Vdc [V]	Pac [w]
240.7	14.1	0.0
P_OK: 000/000	<S_OK>	
	OFF	

10. Verify that the following information appears on the LCD panel:
- **P\_OK:** Appears only upon first telemetry reception from the power optimizers. Indicates connection to the power optimizers and that at least one power optimizer is sending monitoring data. If P\_OK does not appear, check the power optimizer, string and DC input connections.
  - **000/000:** Appears only upon first telemetry reception from the power optimizers. Indicates the number of power optimizers that have been paired to this inverter. At this stage, the number should be 000, since no power optimizers have been paired.
  - **S\_OK:** the connection to the SolarEdge monitoring portal is successful (should appear only if the inverter is connected to the server). If S\_OK is not displayed and the inverter is connected to the server, refer to *Errors and Troubleshooting* on page 83.
  - **Vac [V]:** the grid AC output voltage. Verify the correct value.

- **Vdc [V]:** The DC input voltage of the longest string connected to the inverter. There should be a safety voltage of 1V for each power optimizer in the string.

**NOTE**

A measurement error on the inverter LCD of  $\pm 3$  V is acceptable.

- **Pac [w]:** the AC output power (should be **0.0** since the inverter is OFF).
- **OFF:** the inverter ON/OFF switch is in the OFF position.

## **Step 2: Pairing Power Optimizers to the Inverter**

Once all connections are made, all the power optimizers must be logically paired to their inverter. The power optimizers do not start producing power until they are paired with an inverter. This step describes how to assign each inverter to the power optimizers from which it will produce power.

Perform this step when the modules are exposed to sunlight. If the string length is changed or a power optimizer is replaced, repeat the pairing process.

1. Press and hold down the inverter LCD Light button for about **10 seconds**. The following message is displayed:

```
Keep holding button
for pairing, release
to enter menu...
Remaining:      3 sec
```

Keep holding for 5 seconds until the following is displayed:

```
Pairing

Turn Switch To On
```

2. Turn the inverter ON/OFF switch to ON within 5 seconds. If you wait longer than 5 seconds the inverter exits the pairing mode. The following message is displayed indicating that the inverter is performing the pairing:

```
Pairing

Remaining [sec]:180
```

- Wait for the completion of the pairing (remaining seconds is 0). If pairing fails, an error is displayed. In this case, repeat the pairing steps, and refer to *Power Optimizer Troubleshooting* on page 94. If the problem persists, contact SolarEdge Support. When pairing succeeds, the following message is displayed:

```
Pairing
Pairing Completed
```

- The system startup process begins:
- Since the inverter is ON, the power optimizers start producing power and the inverter starts converting AC.

**NOTE**

When you turn ON the inverter ON/OFF switch, the DC cables carry a high voltage and the power optimizers no longer output a safe 1V output.



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

- When the inverter starts converting power after the initial connection to the AC, the inverter enters Standby mode until its working voltage is reached. This mode is indicated by the flickering green inverter LED.
- While the inverter is in Standby mode, it monitors the grid and verifies correct grid voltage and frequency. The following message is displayed:

```
Waking Up...
Remaining: 051 Sec
```

The countdown indicates the seconds remaining until entering the Production mode. This time is in accordance with local regulations and is typically between three to five minutes.

When countdown is complete, the inverter enters Production mode and produces power. The steadily lit green inverter LED indicates this mode.

- For *single phase inverters only* - scroll to the **Maintenance** menu and select **Optimizer Conf.** → **Set Rapid Shutdown** → **Enable**.

```
Set Rapid Shutdown
Exit
```

## Step 3: Verifying Proper Operation

After the wake-up time is over, a status screen similar to the following appears on the inverter LCD panel:

```
Vac [v]  Vdc [v]  Pac [w]
240.7   371.9   2349.3
P_OK:   XXX/YYY  <S_OK>
                   ON
```

1. Verify the following:
  - The green inverter LED is steadily lit.
  - The ON/OFF indicator on the LCD panel reads **ON**.
  - **P\_OK: XXX/YYY**: There is a connection to the power optimizers and at least one power optimizer is sending monitoring data. Optimizers send telemetries in a frequency of up to 10 minutes. Initially after pairing, both XXX and YYY values show 000 and the values increase as paired power optimizers are reported.



### NOTE

It may take up to 20 minutes for all power optimizers to transmit their telemetries and to be counted on the LCD screen.

- **S\_OK** appears, if the inverter is connected to the SolarEdge monitoring portal.
  - **Vac [V]** specifies the measured grid AC output voltage.
  - **Vdc [v]** : Specifies the DC input voltage, which should equal the sum of the output voltagess of all modules (and should be within the operating range of the inverter).
  - **Pac [W]** specifies the total AC output power produced.
2. Take note of the serial # on the inverter label using the detachable 2D barcode sticker on each device. 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.

Your SolarEdge power harvesting system is now operational.



## Step 4: Reporting and Monitoring Installation Data

### NOTE



This step requires connecting one of the communication options. Refer to *Setting Up Communication* on page 71.

### The SolarEdge Monitoring System

The SolarEdge monitoring portal enables accessing SolarEdge site information, including up-to-date information viewed in a physical or logical view. The monitoring portal is described in detail in the *SolarEdge Monitoring Portal User Guide*, available on the SolarEdge website at <http://www.solaredge.us/files/pdfs/solaredge-monitoring-portal-user-guide.pdf>. The SolarEdge monitoring portal can display logical and physical layouts of the installed system, as follows:

- **Logical Layout:** Shows a schematic logical layout of the components in the system, such as: inverters, strings and modules, as well as their electrical connectivity. This view enables you to see which modules 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 system, such as: inverters, strings and modules, as well as their electrical connectivity. This view enables a bird's eye view of the actual location of a system component.

Using the portal, you can:

- View the latest performance of specific components.
- Find under-performing components, such as modules, by comparing their performance to that of other components of the same type.
- Pinpoint the location of alerted components using the physical layout.
- See how components are connected to each other.
- Pair power optimizers remotely.

To display a logical layout, insert the inverter serial number in the new site created in the application. When the communication between the inverter and the monitoring server is established, the logical layout will be displayed.

To display a physical layout, you need to map the locations of the installed power optimizers. To generate a physical mapping, use either the iPhone Site Mapper application or a mapping template, which should be filled out using the detachable stickers (see *Providing Installation Information*, below).

The logical and physical mapping can be used for debugging a problem using the SolarEdge monitoring portal.

If you do not report the physical and logical mapping of the installed power optimizers to SolarEdge, the SolarEdge monitoring portal will show the logical layout indicating which power optimizers are connected to which inverter, but will not show strings or the physical location of power optimizers.

The inverter may be connected to the SolarEdge monitoring portal via LAN or via an external modem connected to the inverter's RS232 connector. Alternatively, you can connect the inverter to another inverter that is already connected to the server, in a master-slave configuration. Refer to *Setting Up Communication* on page 71 .

## Providing Installation Information

### Paper Template

Fill out the Physical Layout Template (downloadable from the SolarEdge site) using the detachable 2D barcode stickers on each power optimizer. Once the form is completed, scan it and upload the scanned file to the SolarEdge monitoring portal during site registration. For an example paper template, refer to <http://www.solaredge.us/files/pdfs/physical-layout-template.pdf>.

### Site Mapper

Use the SolarEdge Site Mapper smartphone application to scan the power optimizer and inverter 2D barcodes. The application creates an XML file that can be uploaded to the SolarEdge monitoring portal during site registration. The SolarEdge Site Mapper can be downloaded from the application stores.

For detailed information, refer to the *SolarEdge Site Mapper Software Guide* or to the *Site Mapper* demo movie, available on the SolarEdge website at <http://www.solaredge.us/groups/installer-tools/site-mapper>.

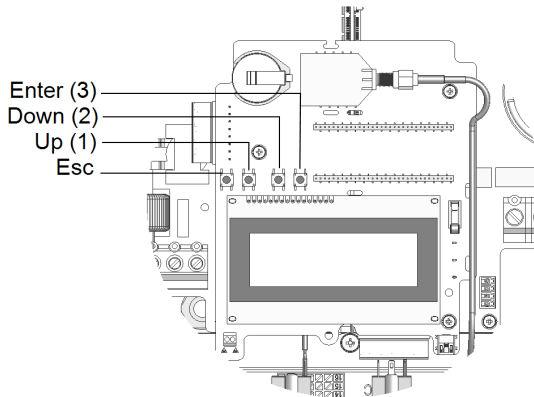
### Creating a Site in the SolarEdge Monitoring Portal

Create the site in the monitoring portal using the registration form available at <http://www.solaredge.us/groups/site-registration> . Fill out all required information in the form, which includes information about your installation, as well as details about its logical and physical mapping.

## Chapter 6: User Interface

### LCD User Buttons

Four buttons are located inside the inverter above the LCD panel and are used for controlling the LCD menus, as shown below:



**Figure 31: LCD Internal menu buttons**

Use the four user buttons to control the LCD panel menus:

- **Esc:** Moves the cursor (>) to the beginning of the currently displayed parameter; goes to the previous menu, and cancels a value change with a long press (until **Aborted** is displayed).
- **Up (1)** and **Down (2):** Moves the cursor from one menu option to another, moves among the characters of a displayed parameter, and toggles between possible characters when setting a value.
- **Enter (3):** Selects a menu option and accepts a value change with a long press (until **Applied** is displayed).

Use the three rightmost buttons for entering **123** when entering the Setup mode password **12312312**.

The LCD screen displays status information of the system and various menus for configuration options. The LCD panel and buttons are used during the following processes:

- **Operational mode:** The LCD panel allows checking for proper system operation. Refer to *Status Screens - Operational Mode* on page 64 for a description of this option. Use the LCD light button to toggle through the informative displays.
- **Setup mode:** Upon installation, the installer may perform basic configuration, as described in *Inverter Configuration – Setup Mode* on page 51.

- **Error messages:** In the event of a problem, an error message may be displayed on the LCD panel. For more information, refer to *Errors and Troubleshooting* on page 83 and *Inverter Configuration – Setup Mode* on page 51

## Inverter Configuration – Setup Mode

You can configure the inverter using one of the following:

- [The internal LCD user buttons](#). When using this option, the inverter cover is removed.
- [The external LCD light button](#). When using this option, removing the inverter cover is not required. This option of configuration includes a less detailed configuration menu.

### Configuring the Inverter Using the Internal LCD User Buttons

After inverter installation, a field technician may perform basic system configuration. Configuration is done when the inverter is in Setup mode.

#### ► To enter Setup mode:

1. Turn the inverter ON/OFF switch to OFF(AC remains ON).

#### WARNING!



If the inverter was operating properly (power was produced by the power optimizers), the following message is displayed.

DC VOLTAGE NOT SAFE  
DO NOT DISCONNECT VDC: 72.0

This message is displayed until the DC voltage is safe (50V). Do not open the cover until the voltage is safe or until at least five minutes have passed.

*La tension de sécurité par défaut 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.*

2. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it..

#### WARNING!



ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

*RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.*

3. Press the Enter button for at least 5 seconds. The following message is displayed:

```
Please enter  
Password  
*****
```

4. Use the three rightmost internal LCD user buttons to type in the following password: **12312312**. The following message is displayed:

```
Country <USA+>  
Language <Eng>  
Communication  
Power Control  
Display  
Maintenance  
Information
```

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 2 minutes.

The following shows a hierarchical tree of the menu options, which are described in *Configuration Menu Options* on page 57. Actual menus may vary from shown depending on the firmware version of the inverter.

Main menu:

```
Country <USA+>  
Language <Eng>  
Communication  
Power Control  
Display  
Maintenance  
Information
```

Country:

```
USA+
```

Language:

```
English
German
Spanish
French
Italian
```

Communication<sup>1</sup>

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
Wi-Fi Conf<N/A>
RS232 Conf
Cellular
GPIO Conf <MTR>
```

Power Control <sup>2</sup>:

```
Grid Control <En>
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Wakeup Conf.
Phase Balance <Dis>
P (f)
Advanced
Load Defaults
```

---

<sup>1</sup>If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A>.

<sup>2</sup>Phase Balance is applicable to single phase inverters only.

Display:

```
Temperature <C>  
LCD On Time <30>  
TLM On Time <15>
```

Maintenance:

```
Date and Time  
Reset Counters  
Factory Reset  
SW Upgrade SD-Card  
AFCI <En>  
Diagnostics  
Manual AFCI Test  
Standby Mode  
Grid Protection  
Optimizer Conf.
```

Information:

```
Versions  
Error Log  
Warning log  
Hardware IDs
```

## Configuring the Inverter Using the LCD Light Button

Use the LCD light button for communication setup and for displaying the Error log and Warning Log without having to open the Inverter cover. There are fewer menus available when using this configuration option; however, the functionality of these menus is the same as when using the internal LCD user buttons.

1. Turn the inverter ON/OFF switch to OFF.
2. Press and hold down the LCD light button until the following message is displayed:

```
Keep holding button
for pairing, release
to enter menu...
Remaining:      3 sec
```

Releasing the button displays the following menu:

```
Optimizer pairing
Language <eng>
Communication
Maintenance
Information
Exit
```

3. Short-press (one second) to scroll down to the next menu option, and long-press (three seconds) to select the item. You can use the **Exit** option in these menus to move up one menu level or to exit the Setup mode from the main menu.



The following shows a hierarchical tree of the menu options that appear when using the LCD light button:

Main menu:

```
Optimizer pairing
Language <eng>
Communication
Maintenance
Information
Exit
```

Language:

```
English
German
Spanish
French
Italian
Exit
```

Communication<sup>1</sup>:

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
Wi-Fi Conf<N/A>
GPIO Conf <MTR>
RS232 Conf
Cellular
Exit
```

---

<sup>1</sup>If Wi-Fi is connected, the ZigBee Conf menu is not displayed, and vice versa.

**Information:**

```
Versions
Error Log
Warning log
HW IDs
Exit
```

**Maintenance:**

```
Date and Time
Reset Counters
Factory Reset
SW Upgrade SD-Card
AFCI <En>
Manual AFCI Test
Diagnostics
Standby Mode
Optimizer Conf.
Grid Protection
Exit
```

The options presented in these menus are described in the next section.

## Configuration Menu Options

This section describes how to use the LCD menus for configuring the inverter. Configuration is only available when the inverter ON/OFF switch is OFF. Use either the internal LCD user buttons or the external LCD light button to move between and select menu options.

### Country and Grid

Configuring the country and grid is available using the internal user buttons only.

1. Select the **Country** option to specify the country in which the inverter is installed and the grid to which it is connected. 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 complies with the country grid code and functions properly with that country grids.

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

A list of countries is displayed. If no country is configured, the value is <**NONE**>.

**NOTE**

If an inverter is not configured to any country, it will not produce energy, and the following message will be displayed on the LCD:

No Country Selected

A plus sign (+) near the country indicates that another menu will be displayed after selection.

- When selecting **Auto** (single phase only), the inverter automatically detects the used grid: 208VAC or 240VAC. When using single phase inverters, refer to *Supported AC Grids* on page 11 to determine if the Auto option may be used.
- When selecting an option with **No Neutral** or **No N**, connection to Neutral line is not required. For any other option, you must connect the Neutral line.
- When connecting to the 480/277V grid, select the 277V setting.

2. Confirm your country selection in the confirmation screen: Toggle to **YES** and press **Enter**.

## Language

1. Select the **Language** option to set the language in which the LCD should display.
2. Confirm your language selection in the confirmation screen: Toggle to **YES** and press **Enter**.

## Communication

1. Select the **Communication** option to define and configure:
  - The communication option used by the inverter to communicate with the SolarEdge monitoring portal
  - The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as electricity meters or loggers.

2. Select **Server** to set which communication method is used to communicate between devices and the SolarEdge monitoring portal. Refer to *Setting Up Communication* on page 71 for a full description of these communication options.

**NOTE**

The Server menu shows only the communication options installed in the inverter.

The following shows a hierarchical tree of the menu options in the **Communication** menu.

For detailed information about all the configuration options, refer to the *Communication Options Application Note*, available on the SolarEdge website at

[http://www.solaredge.us/files/pdfs/solaredge-communication\\_options\\_application\\_note\\_v2\\_250\\_and\\_above.pdf](http://www.solaredge.us/files/pdfs/solaredge-communication_options_application_note_v2_250_and_above.pdf).

Communication<sup>1</sup>:

```
Server <LAN>
LAN Conf
RS485-1 Conf <S>
ZigBee Conf <S>
Wi-Fi Conf <N/A>
RS232 Conf
Cellular
GPIO Conf <MTR>
```

Server:

```
LAN
RS485
Zigbee
Cellular
RS232
None
```

<sup>1</sup>If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A> and their menus are not accessible.

## LAN Conf:

```
IP Config
Set DHCP <en>
Set IP
Set Mask
Set Gateway
Set DNS
Set Server Addr
Set Server Port
```

## RS485-1 Conf:

```
Device Type<SE>
Protocol<M>
Device ID<1>
Slave Detect<#>
Slave List <#>
```

## ZigBee Conf. (enabled only if the ZigBee internal module is connected):

```
Device Type<SE>
Protocol<MP>
Device ID<1>
PAN ID
Scan Channel
Load ZB Defaults
Profile<ZB2007>
```

## RS232 Conf:

```
Device Type<SE>
Protocol<GSM>
Set APN
Set Modem Type
Set User Name
Set Password
```

## GPIO Conf:

```
Device Type <RRCR>
```

## Power Control

For detailed information about active and reactive power control options refer to the *Power Control Application Note*, available on the SolarEdge website at [http://www.solaredge.us/files/pdfs/application\\_note\\_power\\_control\\_configuration.pdf](http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf).

```
Grid Control <En>
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Wakeup Conf.
Phase Balance <Dis>
P (f)
Advanced
Load Defaults
```

### NOTE



Phase Balance is applicable to single phase inverters only. For detailed information, refer to the SolarEdge *Phase Balancing Manual*, available on the SolarEdge website at [http://www.solaredge.us/files/pdfs/phase\\_balancing\\_connection\\_guide.pdf](http://www.solaredge.us/files/pdfs/phase_balancing_connection_guide.pdf)

The Grid Control option is disabled by default. Enabling it opens additional options in the menu, as shown on page 53.

## Display

Select **Display** to set the following:

```
Temperature <C>
LCD On Time <30>
TLM On Time <15>
```

- **Temperature:** Select Celsius or Fahrenheit units.
- **LCD On Time <30>:** The number of seconds that the LCD backlight is ON after pressing the LCD light button. Set a value within the range of 10-120 seconds.
- **TLM On Time <15>:** The number of minutes that the LCD backlight is ON while viewing the Telemetry window. Set a value within the range of 1-120 minutes.

## Maintenance

Select **Maintenance** to set the following options:

```
Date and Time
Reset Counters
Factory Reset
SW Upgrade SD-Card
AFCI <En>
Diagnostics
Manual AFCI Test
Standby Mode
Grid Protection
Optimizer Conf.
```

- **Date and Time:** Set the internal real-time clock. If connected to the SolarEdge monitoring portal, the date and time are set automatically and only time zone should be set.
- **Reset Counters:** Resets the accumulated energy counters that are sent to the SolarEdge monitoring portal
- **Factory Reset:** Performs a general reset to the default device settings.
- **SW Upgrade SD Card:** Perform a software upgrade using an SD card.
- **Diagnostics:** Displays the Isolation Status screen. Refer to [http://www.solaredge.us/files/pdfs/application\\_note\\_isolation\\_fault\\_troubleshooting.pdf](http://www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf).
- **AFCI:** Enables or disables arc-fault self-test. Refer to *Inverter Arc Detection and Interruption* on page 123.
- **Manual AFCI Test:** Accessible from the LCD Light button menus only. Starts a self-test for arc detection. Refer to *Inverter Arc Detection and Interruption* on page 123.
- **Grid Protection:** Available in specific countries. Enables viewing and setting grid protection values. Refer to [http://www.solaredge.com/files/pdfs/viewing\\_grid\\_protection\\_values.pdf](http://www.solaredge.com/files/pdfs/viewing_grid_protection_values.pdf).
- **Optimizer Conf.:** Accessible from the LCD Light button menus only. Enables the Rapid Shutdown feature when a kit is installed in the inverter.

## Information

Select **Information** to display the following options:

```
Versions
Error Log
Warning log
Hardware IDs
```

- **Versions:** Displays inverter firmware versions:
  - **ID:** The inverter ID.
  - **DSP 1/2:** The DSP digital control board firmware version
  - **CPU:** The communication board firmware version



### NOTE

Please have these numbers ready when you contact SolarEdge Support.

- **Error Log:** Displays the last five errors.
- **Warning Log:** Displays the last five warnings.
- **Hardware IDs:** Displays the following HW serial numbers (if exist, and connected to the inverter):
  - **ID:** the inverter's ID
  - **RGM1:** A preassembled RGM or any external RGM (with lower Modbus ID)
  - **RGM2:** A second external RGM (with the higher Modbus ID)
  - **ZB:** Zigbee MAC address
  - **Cell:** MEID (CDMA) or IMEI (GSM)



## Status Screens - Operational Mode

During normal operation pressing the external LCD light button turns on the LCD backlight. Additional presses display the following screens one after the other.

### Initial Status

```
Vac [V]  Vdc [V]  Pac [W]
240.7    371.9    2349.3
P_OK:   XXX/YYY  <S_OK>
                        ON
```

- **Vac [V]:** The AC output voltage
- **Vdc [V]:** The DC input voltage
- **Pac [W]:** The AC output power
- **P\_OK: XXX/YYY:** There is a connection to the power optimizers and at least one power optimizer is sending monitoring data. XXX is the number of power optimizers for which telemetries have been received in the last two hours. YYY is the number of paired power optimizers identified during the most recent pairing process. If XXX and YYY are not equal, there may be a problem in one or more power optimizers.
- **S\_OK:** The connection to the SolarEdge monitoring portal is successful (appears only if the inverter is connected to the server).
- **ON/OFF:** Indicates the position of the inverter ON/OFF switch.

### Main Inverter Status

```
Vac [V]  Vdc [V]  Pac [W]
240.7    371.9    3210.0
Fac [Hz]  OPs_Ok
Temp 50.0  11  28.2
```

- **Vac [V]:** The AC output voltage.
- **Vdc [V]:** The DC input voltage.
- **Pac [W]:** The AC output power.
- **Fac [Hz]:** The AC output frequency.
- **OPs\_Ok:** Number of optimizers sending telemetries (indicating that they are paired)
- **Temp [C or F]:** The inverter heat sink temperature

## Energy Meter Status

Displays the total energy produced during the last day, month, year and since inverter installation.

```
Day [ Wh ] :      0 . 0
Month [ KWh ] :   0 . 0
Year [ KWh ] :    0 . 0
Total [ KWh ] :   0 . 0
```

If a revenue grade meter is preassembled in the inverter, the following status screen, showing the total energy reading, is displayed instead of the above screen:

```
Revenue Grade Meter
Status: <OK>
<Error Message>
Total [ Wh ] : XXXXXXXX
```

- **Status:** Displays OK if the meter is communicating with the communication board.
- **<Error message>:** If an internal meter error is displayed here, contact SolarEdge Support.
- **Total (Wh):** The energy read by the meter. The value displayed in this line depends on the meter type connected to the inverter and its location:
  - If a bidirectional meter is connected at the consumption point, this value is the consumed energy.
  - If the meter is installed at the production connection point, this value is the energy produced by the site.
  - If the meter is installed at the grid connection point, this value is the energy fed into the grid.

If the inverter is connected to the SolarEdge server, this value will also be displayed in the monitoring portal.



### NOTE

This data is accumulated according to an internal real-time clock.

## Telemetry Status

This window displays the last power optimizer telemetry received. The display changes as each power optimizer sends its telemetry.

In order to verify proper installation, the installer may view the Telemetry window for some time in order to observe the power optimizers' report process.

```
Module: 000C1ED9-03
Energy [Wh]: 0 Vdc_O
[V]: 40.5 Vdc_I
[V]: 29.5
```

- **Module#:** Power optimizer serial number
- **Energy:** power optimizer energy
- **Vdc\_O:** Power optimizer output voltage
- **Vdc\_I:** Power optimizer input voltage (module voltage)

## ID Status

This window displays the inverter software version and the country to which the inverter is configured.

```
ID: ##### ##
DSP1/2: 1.0210/1.0034
CPU: 0003.14xx
Country: USA1
```

- **ID:** The inverter ID.
- **DSP 1/2:** The DSP digital control board firmware version
- **CPU:** The communication board firmware version
- **Country:** the current country setting

## Server Communication Status

```
Server: LAN <S_OK>
Status: <OK>
xxxxxxx
<ERROR MESSAGE>
```

- **Server:** The method of connection to the SolarEdge monitoring portal.
- **S\_OK:** The connection to the SolarEdge monitoring portal is successful (should appear only if the inverter is connected to the server).
- **Status:** Displays OK if the inverter established successful connection and communication with the specified server port/device (LAN, RS485 or ZigBee module).
- **xxxxxxxx:** Eight-bit Ethernet communication connection status: A string of 1s and 0s is displayed. 1 indicates OK, 0 indicates an error. For a list of the possible errors and how to troubleshoot them, refer to *Troubleshooting Communication - S\_OK is Not Displayed* on page 83 .
- **Error message,** according to failure. Refer to *Errors and Troubleshooting* on page 83.

## IP Status

This window describes the Ethernet configuration: IP, Mask, Gateway and MAC address (Media Access Control) of the Inverter.

```
IP 192.168.2.119
MSK 255.255.255.0
GW 192.168.2.1
MAC 0-27-02-00-39-36
```

## ZigBee Status

This window describes the ZigBee configuration:

```
PAN : XXXXX
CH : XX / XXXX  RSSI : <L>
MID : XXXX  XX
```

- **RSSI:** The receive signal strength indication of the closest ZigBee in the system. L = low, M = medium, H = high and (-) = no signal.
- **PAN ID:** The ZigBee transceiver PAN ID
- **Ch.:** The ZigBee transceiver channel
- **ID:** The ZigBee transceiver ID
- **MID:** The Master ID of the coordinator (master) ZigBee module. This field is shown only in devices with router (slave) ZigBee modules, and after a successful ZigBee association. If a ZigBee module is not connected, a **No ZigBee** message is displayed instead of the **MID** field.

## Cellular Status

```
Server:Cell <S_OK>
Status: <OK> Sig:5
<Error message>
```

- **Server:** The method of communication to the SolarEdge monitoring portal. Should display Cell.
- **Status:** Displays OK if the inverter established a successful physical connection to the Cellular modem.
- **S\_OK:** The last communication to the SolarEdge monitoring portal was successful (appears if the inverter is connected to the portal).
- **Sig:** The signal strength, received from the cellular modem. A value between 0-5, (0 = no signal, 5 = excellent signal).
- **Error message** per communication connection status failure

## Communication Ports Status

```
Dev Prot ##
RS485-1<SE><S > <-->
ZigBee <SE><MPS><-->
```

- **##:** The total number of slaves detected on the specific port
- **Dev:** The type of device that was configured to a specific port (based on the port's functionality), as follows:
  - **SE:** SolarEdge device (default)
  - **DM:** Revenue meter
  - **LGR:** Non-SolarEdge logger
- **PROT:** The protocol type to which the port is set:
  - For a SolarEdge device:
    - **S:** SolarEdge slave
    - **M:** SolarEdge master
    - **P2P:** ZigBee point-to-point
    - **MPM:** ZigBee multipoint master (for the SolarEdge ZigBee home gateway)
    - **MPS:** ZigBee multipoint slave (for a ZigBee router module)

- For electricity meters, refer to the *application note - Connecting an Electricity Meter to SolarEdge Devices* at <http://www.solaredge.us/files/pdfs/connecting-revenue-grade-meter-to-solaredge-devices.pdf>.
- **SS:** SunSpec - for a non-SolarEdge logger

## Fan Status

This window is applicable to Three Phase Inverters and Single Phase 10 - 11.4 kW inverters and provides information about the status of the inverter external and internal fans:

```
Fan Status :  
Fan1: Not Working  
Fan2: Operating
```

or

```
Fan Status :  
Int: Not Working  
Ext: Operating
```

Each fan can have one of the following statuses:

- **Operating:** Fan OK
- **Not Working:** This status may indicate a system error and not necessarily a faulty fan. Turning AC OFF and ON again may clear this status. If the status does not change, replace the fan.

For more information, refer to *External Fan Maintenance and Replacement* on page 116

## Power Control Status

Available from communication board (CPU) firmware version 2.7xx/3.7xx and later.

```
PWR CTRL: REMOTE  
PWR Limit: 10.04 kW  
CosPhi: 0.9  
Power Prod: 7000W
```

- **PWR CTRL:** The power control status:
  - **REMOTE** - Communication with the RRCR or smart energy manager is confirmed/validated.

- **LOCAL** - The power is controlled locally (e.g. by a fixed limit), or this inverter limits the PV power production to its relative portion of the feed-in power limit, as a result of disconnected communication with the smart energy manager. If this status appears, check the communication to the smart energy manager or the communication to the meter.
- **PWR Limit:** The inverter maximum output power set by one of the power limiting options:
  - RRCR
  - Smart energy manager (Feed-in limitation)
  - P(f)
  - Q(U)
- **Cos Phi:** The ratio between active to reactive power
- **Power Prod:** The power produced by the inverter

For more information, refer to the following application notes:

- *Power Control Application Note*, available on the SolarEdge website at [http://www.solaredge.us/files/pdfs/application\\_note\\_power\\_control\\_configuration.pdf](http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf)
- *Feed-in Limitation Application Note*, available on the SolarEdge website at [http://www.solaredge.us/files/pdfs/products/feed-in\\_limitation\\_application\\_note.pdf](http://www.solaredge.us/files/pdfs/products/feed-in_limitation_application_note.pdf)

## Chapter 7: Setting Up Communication

Power optimizers send information to the inverter via the DC power lines (the PV output circuit). The information is sent from the inverter to the SolarEdge monitoring portal through the Internet. In order to send the data from the inverter, a communication connection must be set up, as described in this chapter. Communication setup is not required for power harvesting, however is needed for using the SolarEdge monitoring portal.

This chapter describes setting up communication between multiple inverters for a master/slave configuration.



### CAUTION!

When connecting the communication cables, make sure that the ON/OFF switch at the bottom of the inverter is turned OFF, and the AC is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF switch is OFF, and the AC is turned ON.

## Communication Types

- **Ethernet:** used for a LAN connection
- **RS485:** used for the connection of multiple SolarEdge devices on the same bus in a master-slave configuration. RS485 type can also be used as an interface to external non-SolarEdge devices, such as revenue meters and data loggers.
- **ZigBee:** Optional wireless communication (purchased separately).
- **Cellular:** Optional cellular wireless connection (purchased separately).

Only communication products offered by SolarEdge are supported.

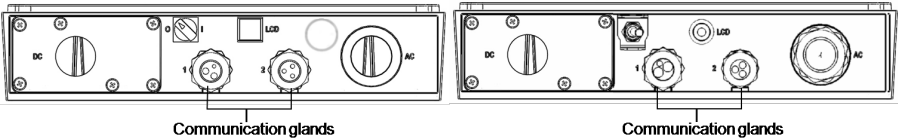
Always connect the communication options when the inverter is OFF.



## Communication Connectors

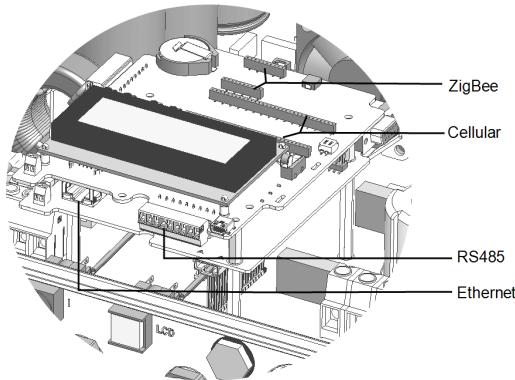
Two communication glands are used for connection of the various communication options. Each gland has three openings. The table below describes the functionality of each opening. Unused openings should remain sealed.

Gland#	Opening	Functionality	Cable Size (diameter)
1 (PG16)	One small	External antenna cable	2-4 mm
	Two large	Ethernet connection (CAT5/6), ZigBee, CDMA	4.5-7 mm
2 (PG13.5)	All three	RS485, power reduction	2.5-5 mm



**Figure 32: Communication Glands**

The communication board has a standard RJ45 terminal block for Ethernet connection, a 9-pin terminal block for RS485 connection, as shown below:



**Figure 33: Internal connectors**

## Removing the Inverter Cover

---

Use the following procedure for cover removal for communication connection purposes.

1. Turn the Safety Switch to OFF.
2. Turn the inverter ON/OFF switch to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel. Wait 5 minutes for the capacitors to discharge.
4. Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

### CAUTION!



When removing the cover, make sure not to damage internal components.

SolarEdge will not be held responsible for any components damaged as a result of incautious cover removal.

*Lors du retrait du couvercle, assurez-vous de ne pas endommager les composants internes. SolarEdge ne peut être tenue pour responsable des composants endommagés à la suite d'une imprudence dans le retrait du couvercle.*

## Creating an Ethernet (LAN) Connection

This communication option enables using an Ethernet connection to connect the inverter to the monitoring portal through a LAN.

Ethernet cable specifications:

- Cable type – CAT5/CAT6
- Maximum distance between the inverter and the router – 100 m/ 330 ft.

### NOTE



If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommended to use external surge protection devices. For details refer to: [http://www.solaredge.us/files/pdfs/lightning\\_surge\\_protection.pdf](http://www.solaredge.us/files/pdfs/lightning_surge_protection.pdf). If grounded metal conduit are used for routing the communication wires, there is no need for a lightning protection device.

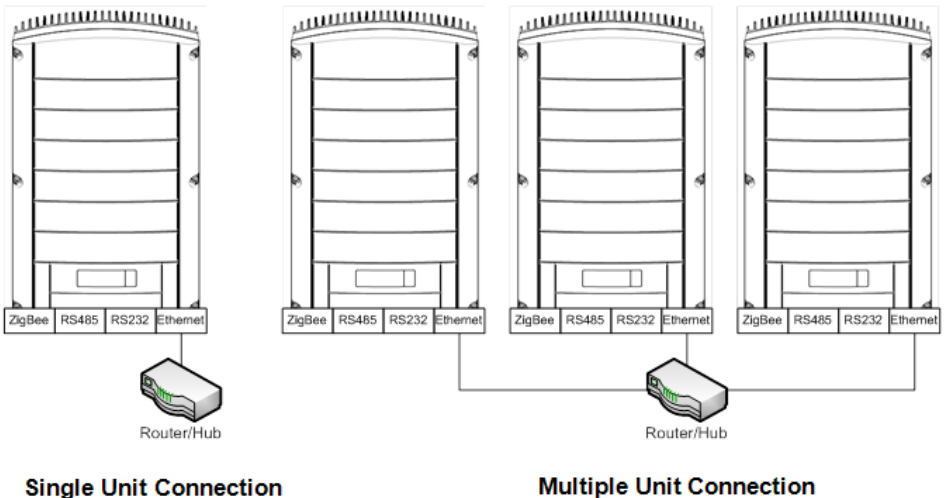


Figure 34: Example of Ethernet connection

► **To connect the Ethernet cable:**

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 73.
2. Open the communication gland #1.

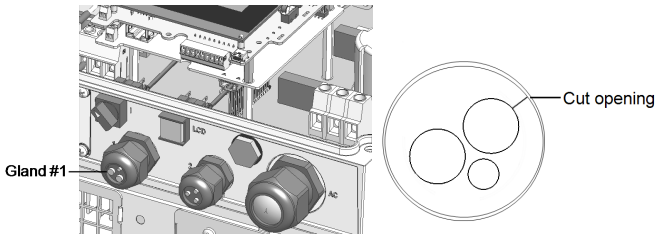
**CAUTION!**



The gland includes a rubber waterproof fitting, which should be used to ensure proper sealing.

*Le cote interne du gland contient une rondelle qui doit être utilisée pour une bonne étanchéité.*

3. Remove the plastic seal from the large opening that has a cut in the rubber fitting .
4. Remove the rubber fitting from the gland and insert the CAT5/6 cable through the gland and through the gland opening in the inverter .
5. Push the cable into the cut opening of the rubber fitting.

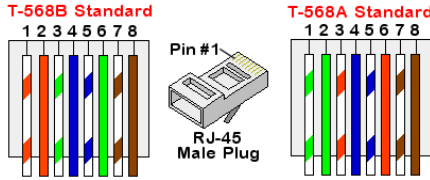


**Figure 35: Cable glands and rubber fitting**

CAT5/6 standard cables have eight wires (four twisted pairs), as shown in the diagram below. Wire colors may differ from one cable to another. You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding.

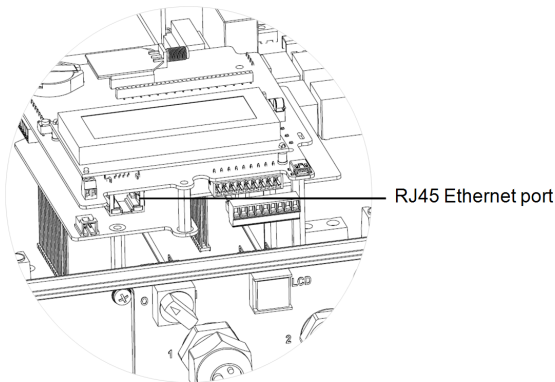
RJ45 Pin #	Wire Color <sup>1</sup>		10Base-T Signal 100Base-TX Signal
	T568B	T568A	
1	White/Orange	White/Green	Transmit+
2	Orange	Green	Transmit-
3	White/Green	White/Orange	Receive+
4	Blue	Blue	Reserved
5	White/Blue	White/Blue	Reserved
6	Green	Orange	Received-
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved

<sup>1</sup>The inverter connection does not support RX/TX polarity change. Supporting crossover Ethernet cables depends on the switch capabilities.



**Figure 36: Standard cable wiring**

6. Use a pre-terminated cable to connect via gland #1 to the RJ45 plug on the inverter's communication board or, if using a spool of cable, connect as follows:
  - a. Insert the cable through gland #1.
  - b. Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
  - c. Insert the eight wires into an RJ45 connector, as described in *Figure 36*
  - d. Use a crimping tool to crimp the connector.
  - e. Connect the Ethernet connector to the RJ45 port on the communication board.



**Figure 37: The RJ45 Ethernet connection**

7. For the switch/router side, use a pre-terminated cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above (*Figure 36*).
8. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the SolarEdge monitoring portal.

9. The inverter is configured by default to LAN. If reconfiguration is required:
  - a. Make sure the ON/OFF switch is OFF.
  - b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
  - c. Turn ON the Safety Switch.

**WARNING!**

ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

*RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.*

- d. Use the internal user buttons to configure the connection, as described in *Communication* on page 58

**NOTE**

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

- Destination Address: prod.solaredge.com
- TCP Port: 22222 (for incoming and outgoing data)

10. Verify the connection, as described in *Verifying the Connection* on page 82.

## Creating an RS485 Bus Connection

The RS485 option enables creating a bus of connected inverters, consisting of up to 31 slave inverters and 1 master inverter. Using this option, inverters are connected to each other in a bus (chain), via their RS485 connectors. The first and last inverters in the chain must be terminated.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
- Wire cross-section area: 0.2- 1 mm<sup>2</sup>/ 24-18 AWG (a CAT5 cable may be used)
- Maximum nodes: 32
- Maximum distance between first and last devices: 1 km /3300 ft.

**NOTE**

If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommend to use external surge protection devices. For details refer to: [http://www.solaredge.us/files/pdfs/lightning\\_surge\\_protection.pdf](http://www.solaredge.us/files/pdfs/lightning_surge_protection.pdf). If grounded metal conduit are used for routing the communication wires, there is no need for a lightning protection device.



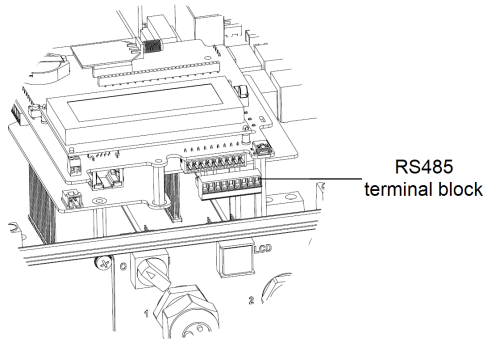
**NOTE**

If a revenue grade meter is connected to your inverter, it uses the RS485 port and therefore an RS485 communication bus cannot be created.

The following sections describe how to physically connect the RS485 bus and how to configure the bus.

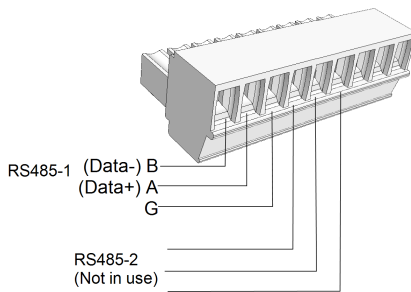
► **To connect the RS485 communication bus:**

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 73
2. Remove the seal from one of the openings in communication gland #2 and insert the wire through the opening.
3. Pull out the 9-pin RS485/RS232 terminal block connector, as shown below:



**Figure 38: The RS485 terminal block**

4. Loosen the screws of pins A(+), B(-), and G on the left of the RS485 terminal block.

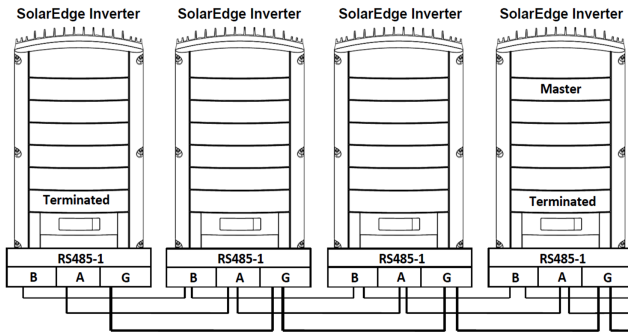


**Figure 39: RS485/RS232 terminal block**

5. Insert the wire ends into the **G**, **A** and **B** pins shown above. Use Four- or six-wire twisted pair cable for this connection. You can use any color wire for each of the **A**, **B** and **G** connections, as long as the same color wire is used for all A pins, the same color for all B

pins and the same color for all G pins.

- For creating an RS485 bus - connect all B, A and G pins in all inverters. The following figure shows this connection schema:



**Figure 40: Connecting the inverters in a chain**

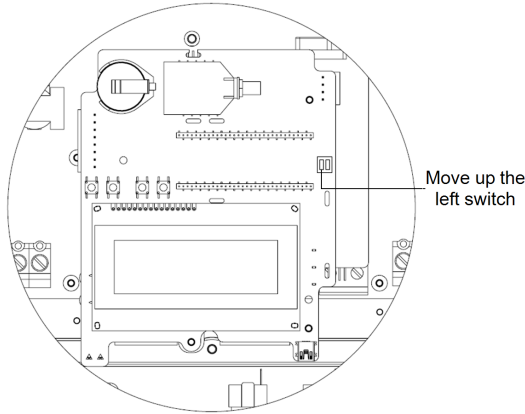


#### NOTE

Do not cross-connect B, A and G wires. Do not insert wires into RS485- 2 pins.

- Tighten the terminal block screws.
- Check that the wires are fully inserted and cannot be pulled out easily.
- Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.
- Terminate the first and last SolarEdge device (inverter/SMI/Control and communication gateway, etc.) in the chain by switching a termination DIP-switch inside the inverter to ON (move the switch up). The switch is located on the communication board and is marked **SW7**.





**Figure 41: RS485 termination switch**



**NOTE**

Only the first and last SolarEdge devices in the chain should be terminated. The other inverters in the chain should have the termination switch OFF (down position).

► **To connect to the monitoring portal:**

1. Designate a single inverter as the connection point between the RS485 bus and the SolarEdge monitoring portal. This inverter will serve as the master inverter.
2. Connect the master to the SolarEdge monitoring portal via the LAN or ZigBee communication option.

► **To configure the RS485 communication bus:**

All inverters are configured by default as slaves. If reconfiguration is required:

1. Turn ON the Safety Switch.
2. Make sure the ON/OFF switch is OFF.
3. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.

**WARNING!**



**ELECTRICAL SHOCK HAZARD.** Do not touch uninsulated wires when the inverter cover is removed.

*RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.*

4. Use the user buttons to configure the connection. To set the inverter designated as master, select the following in the LCD menus:

- Communication → Server → **LAN, ZigBee, or CDMA**
- RS485-1 Conf. → Device Type → **SolarEdge**
- RS485-1 Conf. → Protocol → **Master**
- RS485-1 Conf. → **Slave Detect**

The system starts automatic detection of the SolarEdge slave inverters connected to the master inverter. The inverter should report the correct number of slaves. If it does not, verify the connections and terminations.

5. Verify the connection of the master to the SolarEdge monitoring portal, as described in *Verifying the Connection* on page 82.

## Creating a Wireless ZigBee Connection

---

This communication option enables using a ZigBee connection to connect one or several devices to the SolarEdge monitoring portal.

The ZigBee device is provided with a user manual, which should be reviewed prior to connection. It is available on the SolarEdge website at <http://www.solaredge.us/groups/products/communication> (under ZigBee).

## Creating a Cellular Connection

---

This communication option enables using a cellular CDMA connection for connecting the device to the SolarEdge monitoring portal.

The cellular kit can be purchased separately and assembled during system installation. The kit is provided with a user manual, which should be reviewed prior to connection. It is available on the SolarEdge website at <http://www.solaredge.us/groups/products/communication> (under Cellular).

## Verifying the Connection

After connecting and configuring a communication option, perform the following steps to check that the connection to the monitoring server has been successfully established.

1. Close the inverter cover: Attach the inverter cover and secure it by tightening the screws with a torque of 9.0 N\*m/ 6.6 lb.\*ft. For proper sealing, first tighten the corner screws and then the two central screws (see also *Figure 30*).
2. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel and turning on the Safety Switch.
3. Wait for the inverter to connect to the SolarEdge monitoring portal. This may take up to two minutes.

A status screen similar to the following appears on the LCD panel:

```
V a c [ V ]   V d c [ V ]   P a c [ w ]
2 4 0 . 7     1 4 . 1     0 . 0
P _ O K :   0 0 0 / 0 0 0   < S _ O K >
                                O F F
```

**S\_OK**: Indicates that the connection to the SolarEdge monitoring portal is successful. If S\_OK is not displayed, refer to *Errors and Troubleshooting on page 83*.

# Appendix A: Errors and Troubleshooting

This appendix describes the error messages that appear on the LCD panel when an error occurs, and how to troubleshoot them.

## Troubleshooting Communication - S\_OK is Not Displayed

If S\_OK is not displayed, perform the following:

### Troubleshooting Ethernet Communication

When Ethernet communication is used, the **Server Communication Status** window can be used to identify the location of the error:

```

Server:LAN    <S_OK>
Status:      <OK>
             xxxxxxxx
<ERROR MESSAGE>
    
```

xxxxxxx is a string of 1s and 0s showing an eight-bit communication connection status. 1 indicates OK and 0 indicates an error. The possible errors and their troubleshooting are detailed in the following table:

Bit Location	Error Message	Error Description	Troubleshooting
1st	LAN Disconnected	An Ethernet physical cable connection fault: The Ethernet link or physical Ethernet cable are not connected properly	Check the cable pin-out assignment and cable connection. Refer to <i>Creating an Ethernet (LAN) Connection</i> on page 74
2nd	DHCP Failed, or Invalid DHCP Config	The inverter failed to get a valid IP address from the DHCP server, or The DHCP/static IP settings in the inverter are not the same as those of the router.	Check the router and inverter configuration. Consult your network IT.
3rd	Gateway Ping Failed	The connection to the router is not available: Ping to the first local switch/router failed (LAN error)	Check the physical connection to the switch/router. Check that the link LED at the router/switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection.

Bit Location	Error Message	Error Description	Troubleshooting
4th	G Server Ping Failed	The connection to the Internet is not available: Ping to google.com failed	Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider.
5th	Server x Ping Failed	Ping to redundant server #x failed	Check the SolarEdge server address, under <b>LAN Conf</b> submenu: Address: prod.solaredge.com Port: 22222
6th			
7th			
8th	Tcp Connect. Failed	The connection to the SolarEdge server was not established: Communication with the server failed	Check with your network administrator whether a firewall or another device is blocking transmission.

## Troubleshooting RS485 Communication

1. If the message **Master Not Found** appears, the master device is not responsive or the RS485 cable is not connected. Check the connections to the master device and fix if required.
2. If after slave detection the number of slaves reported in the master is smaller than the actual number of slaves, you can use the slave list<sup>1</sup> to identify missing slaves and troubleshoot connectivity problems, as described below.

► **To show the slave list on the master device:**

1. After slave detection, if slaves were detected, an additional menu is displayed in the RS485-X Conf. menu: **Slave List**.

If the number of detected slaves does not match the number of slaves connected to the master, use the slave list to check for missing slaves, and check their connection.

```
Device Type<SE>
Protocol<M>
Device ID<1>
Slave Detect<#>
Slave List <#>
```

2. Select **Slave List**. A list showing serial numbers of the detected slaves is displayed. For example:

```
5 0 0 0 F E 0 1 - 4 F
5 0 0 0 F E 0 2 - 5 0
.
.
```

---

<sup>1</sup>Available from CPU version 3.14xx and later.

- To view the details of a detected slave device, select its serial number entry. The following information is displayed:

```
ID: 5000FE01-4F
Last Communication
17/02/2015
14:24:01
```

- ID:** the device serial number
- Last Communication:** the date and time (dd:mm:yy 24h) the device last communicated with the master device. If this device is detected for the first time after the master wakeup, **N/A** appears for this information.

## Additional Troubleshooting

- Check that the modem or hub/router is functioning properly.
- Check that the connection to the internal connector on the communication board is properly done.
- Check that the selected communication option is properly configured.
- Use a method independent of the SolarEdge device to check whether the network and modem are operating properly. For example, connect a laptop to the Ethernet router and connect to the Internet.
- Check whether a firewall or another type of network filter is blocking communication.
- For ZigBee troubleshooting, refer to the ZigBee installation manuals.

## Error Codes

The error messages include an error number and a description, and have the following format:

```
Error code XXX
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXX
```

An error message is displayed for 30 seconds, after which the inverter waits the necessary reconnection time and then restarts. During this time, the LCD displays the Waking Up message and the remaining time to reconnection.

The error code numbers may differ depending on the inverter type (single phase or three phase) as described in the table below.

**WARNING!**

All Warnings and Cautions in this manual should be adhered to while troubleshooting an error.

*Tous les avertissements et précautions mentionnés dans ce manuel doivent être aussi appliqués en cas de dépannage.*

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
N/A	1-4	Fan # Failure	One of the fans is not working	Check the fan status screen (. If required, replace the fan (a replacement kit is available from SolarEdge).
4, 5, 8, 12, 18-23, 39, 42, 45	45, 48, 50-53, 94, 108-111, 113	SW Error	Internal software error	If the fault persists, contact SolarEdge Support.
N/A	112	Wrong AC connection	The lines connections to the inverter are incorrect, for example: AC line 1 from the grid is connected to line 2 at the inverter so there is no 120deg between L2 to L1 and L3 to L2 at the inverter side.	Switch between L1 and L2 or L2 and L3 connections
9, 13	N/A	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 the fault persists: <ul style="list-style-type: none"> <li>○ Check the AC connection to the inverter</li> <li>○ Check with the grid operator if a large surge source or irregular load exists near the site.</li> <li>○ If the grid does not have problems contact SolarEdge support.</li> </ul>
10, 37, 38	76, 77, 90	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.



Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
				<div data-bbox="1098 191 1484 221" style="background-color: black; color: white; padding: 2px;"><b>WARNING!</b></div> <div data-bbox="1013 266 1082 339" style="text-align: center;"> </div> <div data-bbox="1098 232 1452 316" style="background-color: #cccccc; padding: 5px;"> <p>ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.</p> </div> <div data-bbox="1098 333 1465 417" style="background-color: #cccccc; padding: 5px;"> <p><i>RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.</i></p> </div> <p>Only a qualified technician should handle this problem, and only after taking proper precautions.</p> <ol style="list-style-type: none"> <li>1. Turn the inverter ON/OFF switch to OFF.</li> <li>2. Wait five minutes for the input capacitors to discharge.</li> <li>3. Disconnect the AC breaker.</li> <li>4. Disconnect the DC inputs.</li> <li>5. Connect each DC string separately, turn the AC and the inverter ON/OFF switch to ON, until the error appears for the faulty string.             <ul style="list-style-type: none"> <li>○ Do not connect strings with a grounding fault to the inverter.</li> <li>○ For further documentation about possible ground current error sources and solutions, contact SolarEdge Support.</li> <li>○ A certified installer must fix the faulty string before connecting it to the inverter.</li> </ul> </li> </ol>

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
14	58/59/60	AC Voltage Too High (Line 1/2/3)	AC voltage surge. The internal hardware that measures AC voltage has measured substantially high sudden output voltage	<p>If the fault persists:</p> <ul style="list-style-type: none"> <li>○ Check the AC connection to inverter.</li> <li>○ Verify that the inverter is set to the correct country.</li> <li>○ Check with the grid operator if a large surge source or irregular load exists near the site.</li> <li>○ Verify that the output wire size matches the distance between the inverter and the location of the grid connection.</li> <li>○ Use a larger gauge wire for the AC output.</li> <li>○ Refer to the <i>AC Wiring Application Note</i>, available on the SolarEdge website at <a href="http://www.solaredge.us/files/pdfs/application-note-recommended-wiring.pdf">http://www.solaredge.us/files/pdfs/application-note-recommended-wiring.pdf</a></li> </ul>
15	102	DC Voltage Too High	DC overvoltage. The input DC voltage exceeds the maximum supported level.	<p>The SolarEdge system normally eliminates DC overvoltage errors: When DC overvoltage is detected, the inverter shuts off the power optimizers and restarts. If the fault persists:</p> <ul style="list-style-type: none"> <li>○ Turn OFF the inverter ON/OFF switch. If after five minutes, the LCD panel does not show a low safety voltage (1V per optimizer), check which string is malfunctioning and recheck its connections to the inverter.</li> <li>○ Proceed according to <i>Power Optimizer Troubleshooting</i> on page 94</li> <li>○ Re-commission all inverters in the site, as described in <i>Commissioning the Installation</i> on page 43</li> </ul>

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
16	123	Hardware Error	Internal hardware error	If the fault persists, contact SolarEdge Support.
17	104	Temperature Too High	Over temperature	If the fault persists: <ul style="list-style-type: none"> <li>Verify that proper clearances exist around the inverter.</li> <li>Make sure that the heat-sink fins are clear of dirt and obstacles.</li> <li>Reinstall in a cooler location.</li> </ul>
24	N/A	Faulty Temp. Sensor	Broken or unconnected Temperature sensor	If the fault persists, contact SolarEdge Support.
25	121	Isolation Fault	PV Isolation fault. The inverter has detected the PV solar array is not properly isolated from ground earth. The isolation is checked each time the inverter starts up.	If the fault persists: <ul style="list-style-type: none"> <li>Check the PV installation for isolation problems and ground leakage.</li> <li>Only a certified PV installer must fix the faulty string before connecting it to the inverter.</li> <li>Refer to <a href="http://www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf">www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf</a></li> </ul>
26	122	Faulty AC Relay	The AC relay failed during wake-up tests.	If the fault persists: <ul style="list-style-type: none"> <li>Disconnect inverter from AC grid.</li> <li>Contact SolarEdge Support.</li> </ul>
27, 153	95, 106, 120, 125, 126	Hardware Error	Internal hardware error.	If the fault persists, contact SolarEdge support.
28	N/A	RCD Sensor Error	The RCD measurement has failed during the wake-up test phase.	If the fault persists, contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
29-30	N/A	Phase Balance Error	The monitoring hardware that checks the balance of each phase (L1-N and L2-N) has exceeded allowed limit.	<ul style="list-style-type: none"> <li>○ Check the grid connection.</li> <li>○ Check the GND wire connection.</li> <li>○ Check the L1, L2 and Neutral wire connections.</li> <li>○ Verify symmetric load between L1 and L2.</li> <li>○ Consult the local grid authority.</li> </ul>
31, 33	64/65/66	AC Voltage Too High (Line 1/2/3)	Grid voltage is above the limit permitted in this country.	<ul style="list-style-type: none"> <li>○ Verify that the inverter is set to the correct country.</li> <li>○ Turn OFF the inverters in the site and verify AC grid voltage.</li> <li>○ If the inverter is located far from the connection point to the grid, use a larger gauge AC wire.</li> <li>○ Consult the grid operator.</li> <li>○ If permitted by local authorities, use the SolarEdge Configuration Tool to change the settings.</li> </ul>
32, 41	61/62/63, 67/68/69	AC Voltage Too Low	Grid voltage is below the limit permitted in this country.	<ul style="list-style-type: none"> <li>○ Verify that the inverter is set to the correct country.</li> <li>○ Consult the grid operator.</li> <li>○ If permitted by local authorities, use the SolarEdge Configuration Tool to change the settings.</li> </ul>
34	79/80/81	AC Freq Too High (Line 1/2/3)	Grid frequency is above the limit permitted in this country.	Handle this in the same manner as error 32.
35	82/83/84	AC Freq Too Low (Line 1/2/3)	Grid frequency is below the limit permitted in this country.	Handle this in the same manner as error 32.
36	72/74/75	DC Injection (Line 1/2/3)	DC feed detected on the AC output.	If the fault persists, contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
40	N/A	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.
43	N/A	Internal HW Error	Internal hardware error.	If the fault persists, contact SolarEdge support.
44	44	No Country Selected	The inverter is not configured to any country.	Select the country, as described in <i>Country and Grid</i> on page 57.
46		Phase Unbalance		Change the <b>Phase Balance</b> option in the Inverter's LCD menu to <b>Disable</b> . Refer to <i>Power Control</i> on page 61, and to the <i>SolarEdge Phase Balancing Manual</i> , available on the SolarEdge website at <a href="http://www.solaredge.us/files/pdfs/phase_balancing_connection_guide.pdf">http://www.solaredge.us/files/pdfs/phase_balancing_connection_guide.pdf</a>
N/A	103, 119	UDC Min / DC Voltage Too Low	The input DC voltage is below the minimum level that is supported.	Turn the inverter OFF and then ON. If this fault persists, contact SolarEdge support.
N/A	49	Communication Error	Internal software error.	If this fault persists, contact SolarEdge support.
N/A	78	Grid Sync Error	Grid voltage or frequency is unstable.	If this fault persists, contact SolarEdge support.
N/A	91/92/93 (TZ L1/L2/L3),	AC Over Current Line	Grid error.	If this fault persists, contact SolarEdge support.

Error # Single Phase	Error # Three Phase	LCD Message	Description	Troubleshooting
	96/97/98 (Iac L1/L2/L3 Max).	1/2/3		
N/A	99-101	AC Voltage Too High Line 1/2/3	Grid error.	Turn the inverter OFF and then ON. If this fault persists, contact SolarEdge support.
N/A	105	Temperature Too Low	Under temperature.	If this fault persists, reinstall the inverter in a warmer place.
N/A	124	Ground Current – RCD	Internal hardware error.	If this fault persists, contact SolarEdge support.
150, 151	150, 151	Arc Fault Detected	An arc was detected on the DC side.	Refer to <i>Inverter Arc Detection and Interruption</i> on page 123.
152	152	Arc detector self-test failed	The arc detector is checked every time the inverter starts up. The internal hardware that measures arcs failed during wake-up tests.	Refer to <i>Inverter Arc Detection and Interruption</i> on page 123.

## Power Optimizer Troubleshooting

If the inverter status screen indicates that not all power optimizers are paired or not all are reporting (P\_OK xxx/yyy, and x<y), those optimizers can be identified through the LCD. Refer to <http://www.solaredge.com/files/pdfs/products/inverters/non-responding-power-optimizers.pdf>

Problem	Possible Cause	Possible Solution
String voltage is 0V	Output of one or more power optimizers is disconnected	Connect all power optimizer outputs
String voltage not 0V but lower than number of optimizers	One or more of the power optimizers are not connected in the string	Connect all power optimizers
	One or more of the modules are not connected properly to their power optimizer inputs	Connect the modules to the optimizer inputs
	Wrong polarity connection on one of the strings	Check polarity of the string output using a voltmeter and correct if needed.

Problem	Possible Cause	Possible Solution
<p>String voltage is higher than the number of optimizers</p> <p><b>WARNING!</b></p> <p>If the measured voltage is too high, the installation may not have a safe low voltage. <b>PROCEED WITH CARE!</b> A deviation of <math>\pm 1\%</math> per string is reasonable.</p> <p><i>Si la tension mesurée est trop haute, la tension basse de sécurité pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION. Une déviation de <math>\pm 1\%</math> par string est raisonnable.</i></p>	<p>One or more extra power optimizer are connected in the string</p>	<p>Check if an extra power optimizer is connected in the string. If not – proceed to next solution.</p>
	<p>A module is connected directly to the string, without a power optimizer.</p>	<p>Verify that only power optimizers are connected in the string and that no module outputs are connected without a power optimizer. If the problem persists, proceed to the next step.</p>
	<p>A malfunction of one of the power optimizers</p>	<ul style="list-style-type: none"> <li>○ Disconnect the wires that connect the power optimizers in the string.</li> <li>○ Measure the output voltage of each power optimizer in order to locate the power optimizer that does not output the 1V safety voltage. If a malfunctioning power optimizer is located, check its connections, polarity, module, and voltage.</li> <li>○ Do not continue before finding the problem and replacing the malfunctioning power optimizer. If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string.</li> </ul>



Problem	Possible Cause	Possible Solution
	SafeDC mode was previously disabled using the SolarEdge Key	Enable the SafeDC using the SolarEdge Key.
Pairing to the inverter failed	The power optimizers are shaded	If you connected the inverter to the SolarEdge monitoring portal using one of the communication options, you can perform pairing remotely. Before leaving the site, make sure that the inverter ON/OFF switch is ON and S_OK indication appears on the LCD to indicate connection to the monitoring portal.

## Appendix B: Technical Specifications

### Single Phase 3-7.6kW Inverters

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	Units
<b>OUTPUT</b>						
Nominal AC power output	3000	3800	5000	6000	7600	VA
Maximum AC power output	3300	4150	5400 @208 5450 @240	6000	8350	VA
AC Output Voltage Min.-Nom.-Max. <sup>1</sup> 183-208-229 Vac	-	-	+	-	-	
AC Output Voltage Min.-Nom.-Max. <sup>1</sup> 211-240-264 Vac	+	+	+	+	+	
AC frequency min-nom-max <sup>1</sup>	59.3 – 60 – 60.5 (with HI country setting: 57 – 60 – 60.5)					Hz
Max. output fault current and duration @208V	---	---	26 / 20	---	---	A / ms
Max. output fault current and duration @240V	14 / 20	17.5 / 20	23 / 20	27.5 / 20	40 / 20	A / ms
Max. continuous output current	12.5	16	24 @208V 21 @240V	25	32	A
Max. output overcurrent protection	40					A
Power factor range	1 (adjustable from -0.95 to +0.95)					
GFDI threshold	1					A
Total harmonic distortion	<3%					

<sup>1</sup>For other regional settings, please contact SolarEdge support.

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	Units
Utility monitoring, islanding protection, country configurable thresholds	Yes					
<b>INPUT</b>						
Maximum DC power (Module STC)	4050	5100	6750	8100	10250	W
Transformer-less, ungrounded	Yes					
Maximum input voltage	500					Vdc
Nominal DC input voltage	350 @240V		325 @208V / 350 @240V	350 @240V		
Maximum input current <sup>1</sup>	9.5	13	16.5 @208V 15.5 @240V	18	23	Adc
Maximum input short circuit current	45					Adc
Maximum input source back-feed current	0					A
Reverse-polarity protection	Yes					
Ground-fault isolation detection	600 kΩ Sensitivity					
Maximum inverter efficiency	97.7	98.2	98.3	98.3	98	%
CEC weighted efficiency	97.5	98	97.5 @208V 98 @240V	97.5	97.5	%
Night time power consumption	<2.5					W
<b>ADDITIONAL FEATURES</b>						
Supported communication interfaces	RS485, Ethernet, ZigBee (optional), cellular (optional)					

<sup>1</sup>A higher current source may be used; the inverter will limit its input current to the values stated.

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	Units
Revenue Grade Data, ANSI C12.1	Optional <sup>1</sup>					
Rapid Shutdown – NEC 2014 690.12	Functionality enabled when SolarEdge rapid shutdown kit is installed <sup>2</sup>					
<b>STANDARD COMPLIANCE</b>						
Safety	UL1741, UL1699B, UL1998, CSA 22.2					
Grid connection standards	IEEE1547					
Emissions	FCC part15 class B					
RoHS	Yes					
<b>INSTALLATION SPECIFICATIONS</b>						
AC output conduit size / AWG range	¾" minimum / 16-6 AWG					
DC input conduit size / # of strings / AWG range	¾" minimum / 1-2 strings / 16-6 AWG					
Dimensions (H x W x D)	21 x 12.5 x 7.2 / 540 x 315 x 184					in/mm
Dimensions (H x W x D) with Safety Switch	30.5 x 12.5 x 7.2 / 775 x 315 x 184					in/mm
Weight	44.7 / 20.2		47.7/21.7			lb/kg
Weight with Safety Switch	51.2/ 23.2		54.7/24.7			lb/kg

<sup>1</sup>Revenue grade inverter P/N: SExxxxA-US000NNR2 (for SE7600 inverter: US002NNR2)

<sup>2</sup>Rapid shutdown kit P/N: SE1000-RSD-S1

	SE3000A-US	SE3800A-US	SE5000A-US	SE6000A-US	SE7600A-US	Units
Cooling	Natural Convection				Natural convection and internal fan (user replaceable)	
Noise (typical)	<25				<50	dBA
Minimum and maximum operating temperature range <sup>1</sup>	-13 to +140 / -25 to +60 (-40 to +60 version available <sup>2</sup> )					°F/°C
Storage temperature range	-13 to +140/ -25 to +60					°F/°C
Protection rating	NEMA 3R					

Recommended OCPD size per grid (you may use a larger size than that recommended but never above 40A):

Inverter	208 VAC	240 VAC
SE3000A-US	---	20 A
SE3800A-US	---	20 A
SE5000A-US	30 A	30 A
SE6000A-US	---	35 A or 40 A
SE7600-US	---	40 A

<sup>1</sup> SolarEdge's 5kW and 6kW inverters operate at full power and full currents up to a temperature of 120°F/50°C. The inverters may be used above this temperature with reduced ratings. For more information, refer to <http://www.solaredge.com/files/pdfs/se-temperature-derating-note-na.pdf>.

<sup>2</sup> -40 version P/N: SExxxxA-US000NNU4 (for SE76000 inverter: SE7600A-US002NNU4)

## Single Phase 10-11.4kW Inverters

	SE10000A-US	SE11400A-US	Units
<b>OUTPUT</b>			
Nominal AC power output	9980 @ 208V 10000 @240V	11400	VA
Maximum AC power output	10800 @ 208V 10950 @240V	12000	VA
AC Output Voltage Min.-Nom.-Max. <sup>1</sup> 183 - 208 - 229 Vac	+	-	
AC Output Voltage Min.-Nom.-Max. <sup>1</sup> 211 - 240 - 264 Vac	+	+	
AC frequency min-nom-max <sup>1</sup>	59.3 - 60 - 60.5 (with HI country setting 57 - 60 - 60.5)		Hz
Max. output fault current and duration @208V	48 / 20	-	A / ms
Max. output fault current and duration @240V	42 / 20	48 / 20	A / ms
Max. continuous output current	48@208V 42@240V	47.5	A
Max. output overcurrent protection	60		A
Power factor	1 (adjustable)		
GFDI threshold	1		A
Utility monitoring, islanding protection, country configurable set points	Yes		

<sup>1</sup>For other regional settings please contact SolarEdge support.

INPUT	SE10000A-US	SE11400A-US	Units
Maximum DC power (Module STC)	13500	15350	W
Transformer-less, ungrounded	Yes		
Maximum input voltage	500		Vdc
Nominal DC input voltage	325 @ 208V / 350@ 240V		Vdc
Maximum input current <sup>1</sup>	33 @ 208V 30.5 @ 240V	34.5	Adc
Maximum input short circuit current	45		Adc
Maximum input source back-feed current	0		A
Reverse-polarity protection	Yes		
Ground-fault isolation detection	600kΩ Sensitivity		
Maximum inverter efficiency	98		%
CEC weighted efficiency	97@208 97.5@240	97.5	%
Night-time power consumption	< 4		W
<b>ADDITIONAL FEATURES</b>			
Supported communication interfaces	RS485, Ethernet, ZigBee (optional), CDMA (optional)		
Revenue Grade Data, ANSI C12.1	Optional <sup>2</sup>		

<sup>1</sup>A higher current source may be used; the inverter will limit its input current to the values stated.

<sup>2</sup>Revenue grade inverter P/N: SExxxxA-USxxxxR2

	SE1000A-US	SE11400A-US	Units
Rapid Shutdown – NEC 2014 690.12	Functionality enabled when SolarEdge rapid shutdown kit is installed <sup>1</sup>		
<b>STANDARD COMPLIANCE</b>			
Safety	UL1741, UL1699B, UL1998, CSA 22.2		
Grid connection standards	IEEE1547		
Emissions	FCC part15 class B		
ROHS	Yes		
<b>INSTALLATION SPECIFICATIONS</b>			
AC output conduit size / AWG range	3/4" minimum / 8-3 AWG		
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 14-6 AWG		
Dimensions (HxWxD)	21 x 12.5 x 10.5 / 540 x 315 x 260		in/mm
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 10.5 / 775 x 315 x 260		in/mm
Weight	82 / 37		lb/kg
Weight with Safety Switch	88.4 / 40.1		lb/kg
Cooling	Fans (user replaceable)		
Noise (typical)	< 50		dBA
Minimum and maximum operating temperature range	-13 to +140 / -25 to +60 (-40 to +60 version available <sup>2</sup> )		°F/°C
Storage temperature range	-13 to +140 / -25 to +60		°F/°C
Protection rating	NEMA 3R		

<sup>1</sup>Rapid shutdown kit P/N: SE1000-RSD-S1

<sup>2</sup>-40 version P/N: SExxxxA-US000NNU4



Recommended OCPD size per grid (you may use a larger size than that recommended but never above 60A):

Inverter	208 VAC	240 VAC
SE10000-US	60 A	60 A
SE11400-US	---	60 A

## Three Phase Inverters

	SE9KUS	SE10KUS	SE20KUS	Units
<b>OUTPUT</b>				
Rated AC power output	9000	10000	20000	VA
Maximum AC power output	9000	10000	20000	VA
AC Output Line Connections	4-wire WYE (L1-L2-L3-N) plus PE or 3 wire Delta	4-wire WYE (L1-L2-L3-N) plus PE	4-wire WYE (L1-L2-L3-N) plus PE	
AC output voltage minimum-nominal-maximum (L-N) <sup>1</sup>	105-120-132.5	244-277-305	244-277-305	Vac
AC output voltage minimum-nominal-maximum (L-L) <sup>1</sup>	183-208-229	422.5-480-529	422.5-480-529	Vac
AC frequency min-nom-max <sup>1</sup>	59.3 - 60 - 60.5 (with HI country setting 57 - 60 - 60.5)			Hz
Max. continuous output current (per Phase)	25	12	24	A
Max. output fault current and duration	26 / 20	12 / 20	24 / 20	A / mS
Max. back-feed current	0			A
Power factor range	1 (adjustable from -0.8 to +0.8)			
GFDI threshold	1			A

<sup>1</sup>For other regional settings please contact SolarEdge Support.

	SE9KUS	SE10KUS	SE20KUS	Units
Total harmonic distortion	<3%			
Utility monitoring, islanding protection, country configurable set points	Yes			
<b>INPUT</b>				
Maximum DC power	12150	13500	27000	W
Transformer-less, ungrounded	Yes			
Maximum input voltage DC to Gnd	250	490	490	Vdc
Maximum input voltage DC+ to DC-	500	980	980	Vdc
Nominal input voltage DC to Gnd	200	425	425	Vdc
Nominal input voltage DC+ to DC-	400	850	850	Vdc
Maximum input current <sup>1</sup>	26.5	13.5	26.5	Adc
Maximum short circuit current				Adc
Reverse-polarity protection	Yes			
Ground-fault isolation detection	1MΩ Sensitivity			
Maximum inverter efficiency	97.1	98.2	98.1	%
CEC weighted efficiency	96.5	98	98	%
Night-time power consumption	<3	<3	<3	W
<b>ADDITIONAL FEATURES</b>				
Supported communication interfaces	RS485, Ethernet, ZigBee (optional)			
Rapid Shutdown – NEC 2014 690.12	With SolarEdge rapid shutdown kit installed <sup>2</sup>			

<sup>1</sup>A higher current source may be used; the inverter will limit its input current to the values stated.

<sup>2</sup>Rapid shutdown kit P/N: Contact SolarEdge Support.

	SE9KUS	SE10KUS	SE20KUS	Units
<b>STANDARD COMPLIANCE</b>				
Safety	UL1741, UL1699B, UL1998, CSA 22.2, NEC2014 (sec. 690.12)			
Grid connection standards	IEEE1547			
Emissions	FCC part15 class B			
RoHS	Yes			
<b>INSTALLATION SPECIFICATIONS</b>				
AC output conduit size / AWG range	3/4" minimum / 12-6 AWG			
DC input conduit size / # of inputs/ AWG range	3/4" minimum / 2 pairs/ 12-6 AWG	3/4" minimum / 2 pairs/ 12-6 AWG	3/4" minimum / 2 pairs / 12-6 AWG	
Dimensions (HxWxD)	21 x 12.5 x 10.5 / 540 x 315 x 260			in/mm
Dimensions with Safety Switch (HxWxD)	30.5 x 12.5 x 10.5 / 775 x 315 x 260			in/mm
Weight	73.2 / 33.2	73.2 / 33.2	73.2 / 33.2	lb/kg
Weight with Safety Switch	79.7 / 36.2	79.7 / 36.2	79.7 / 36.2	lb/kg
Cooling	Fans (user replaceable)			
Noise (typical)	< 50	< 50	< 50	dBA
Operating temperature range <sup>1</sup>	-13 to +140 / -25 to +60 (CAN version <sup>2</sup> -40 to +60)			°F/°C
Protection rating	NEMA3R			

<sup>1</sup>SolarEdge's 9kW and 20kW inverters operate at full power and full currents up to a temperature of 117°F/47°C. The inverters may be used above this temperature with reduced ratings.

<sup>2</sup>CAN P/Ns are eligible for the Ontario FIT and microFIT.

Recommended OCPD size per grid :

Inverter	208 VAC	480 VAC
SE9KUS*	35A	---
SE10KUS*	---	15A
SE20KUS*	---	30A

\* You may use a larger size than recommended but never above 40A.

## Default Trip Limits and Times According to IEEE1547



### NOTE

The inverters are equipped with adjustable utility protective function set-points, and can be aggregated above 30kW on a single Point of Common Connection. The default settings are in compliance with IEEE1547. Utility authorization is required to change these set-points.

Voltage Range (% of Base Voltage)	Max. Clearing Time (Sec)
$V < 50\%$	0.16
$50\% < V < 88\%$	2.00
$88\% < V < 120$	1.00
$V > 120\%$	0.16
Frequency Range (Hz)	Max. Clearing Time (Sec)
$> 60.5$	0.16
$< 59.3$ (Hawaii – 57)	0.16

## Safety Switch

Specifications	Single Phase 3 - 7.6 kW	Single Phase 10 - 11.4 kW	Three Phase	Unit
Maximum DC voltage	600	500		Vdc
Maximum DC current	32	40	32	Adc
Nominal AC voltage	208/240		208/480	Vac
Maximum AC current	32	50	32	Aac
Ambient temperature	-40 to 149 / -40 to +65	-40 to 140 / -40 to +60		°F /°C
Weight	5.29 / 2.4	6.6 / 3.0		lb/kg

## Appendix C: Mechanical Specifications

The following figures provide dimensions of the mounting brackets for the single and three phase inverters.

- Type 1 mounting bracket weighs 2.87 lbs. / 1.3 kg.
- Type 2 mounting bracket weighs 0/9 lb. / 0.4 kg

### Single Phase 3-6 kW Inverter and Mounting Bracket Type 1

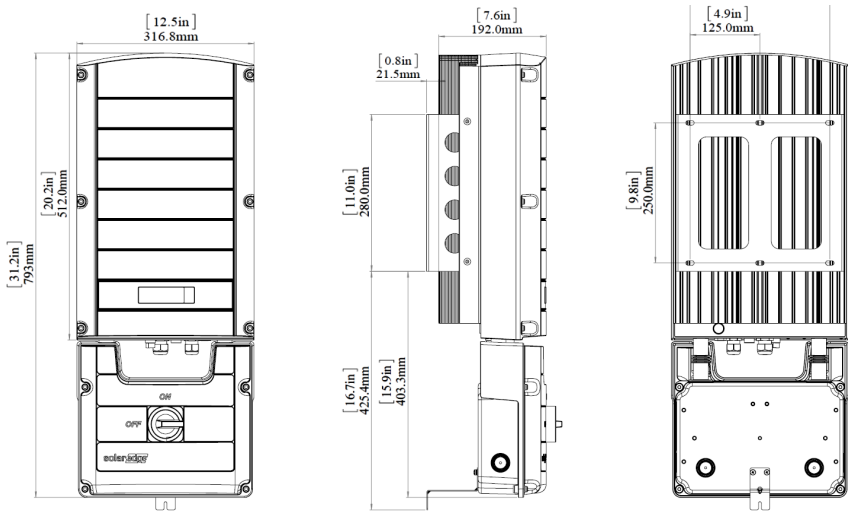


Figure 42: Single phase 3-6 kW inverter with brackets - front, side and rear views

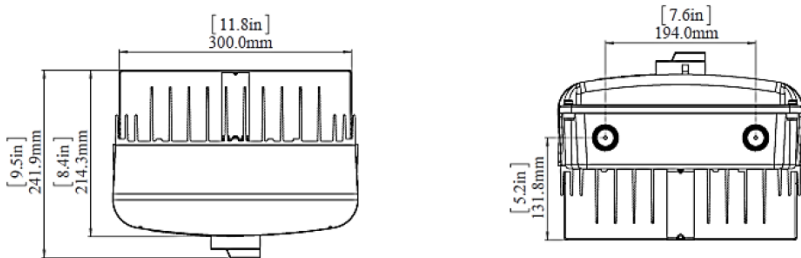


Figure 43: Single phase inverter 3-6 kW with brackets - top and bottom views

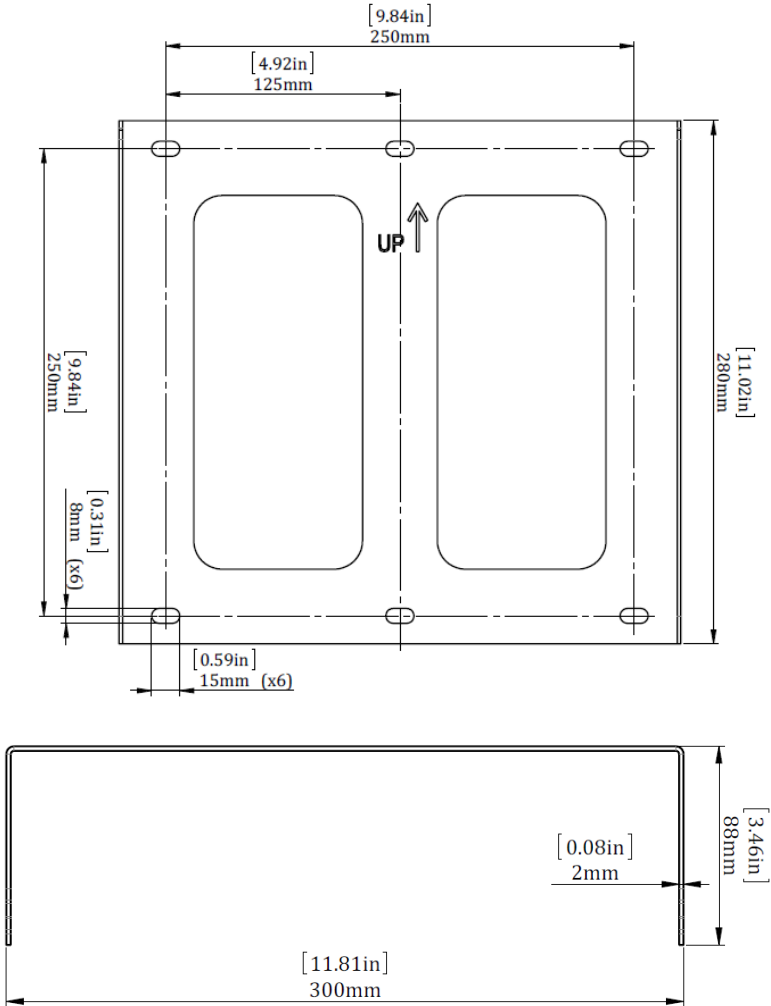


Figure 44: Single phase 3-6 kW inverter mounting bracket

# Single Phase 3-7.6 kW Inverter and Mounting Bracket Type 2

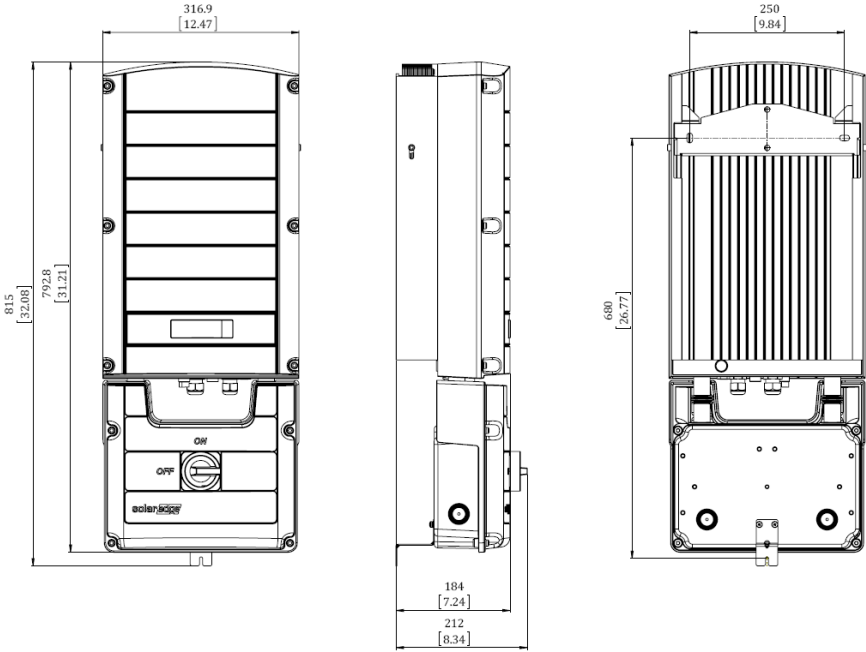


Figure 45: Single phase 3-7.6 kW inverter with brackets - front, side and rear views

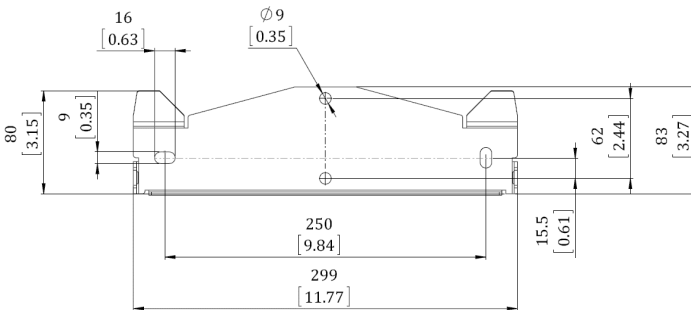


Figure 46: Inverter mounting bracket – Type 2



# Single Phase 10-11.4 kW Inverter and Mounting Bracket Type 2

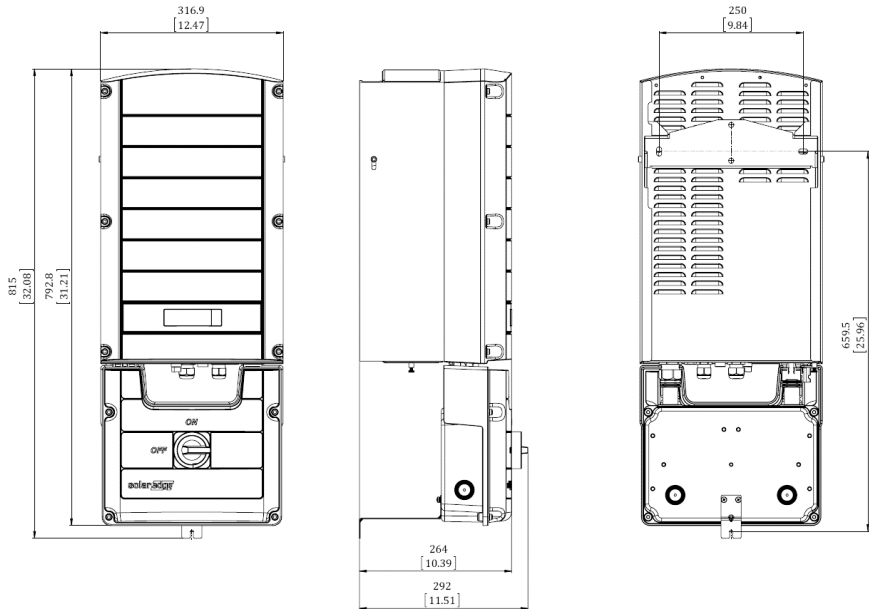


Figure 47: Single phase 10-11.4kW inverter with brackets - front, side and rear views

# Three Phase Inverter and Mounting Bracket Type 1

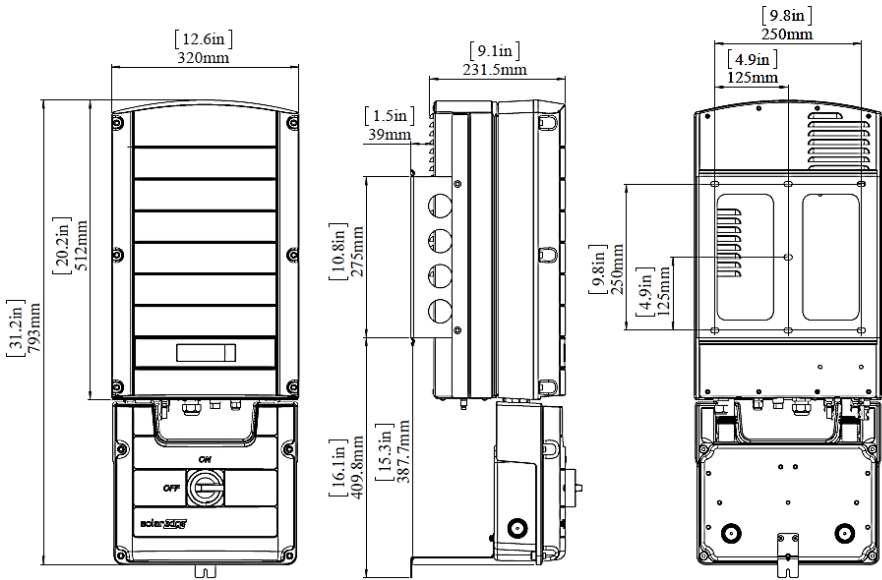


Figure 48: Three phase inverter with brackets – front, side and rear views

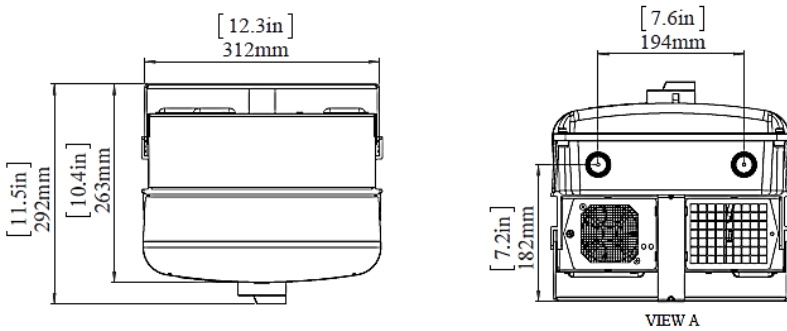


Figure 49: Three phase inverter with brackets – top and bottom views

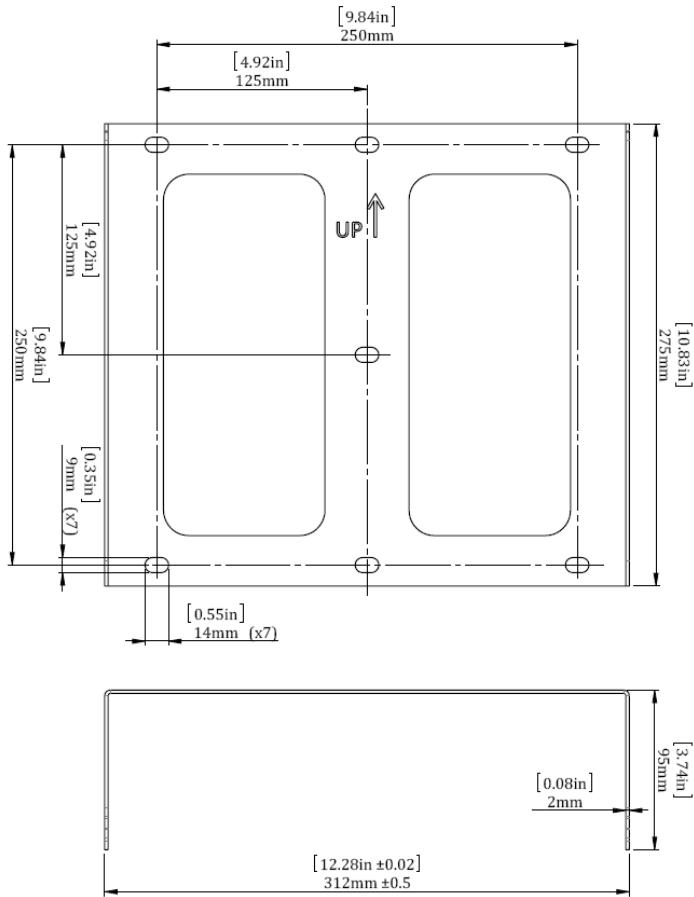


Figure 50: Three phase inverter mounting bracket

## Three Phase Inverter and Mounting Bracket Type 2

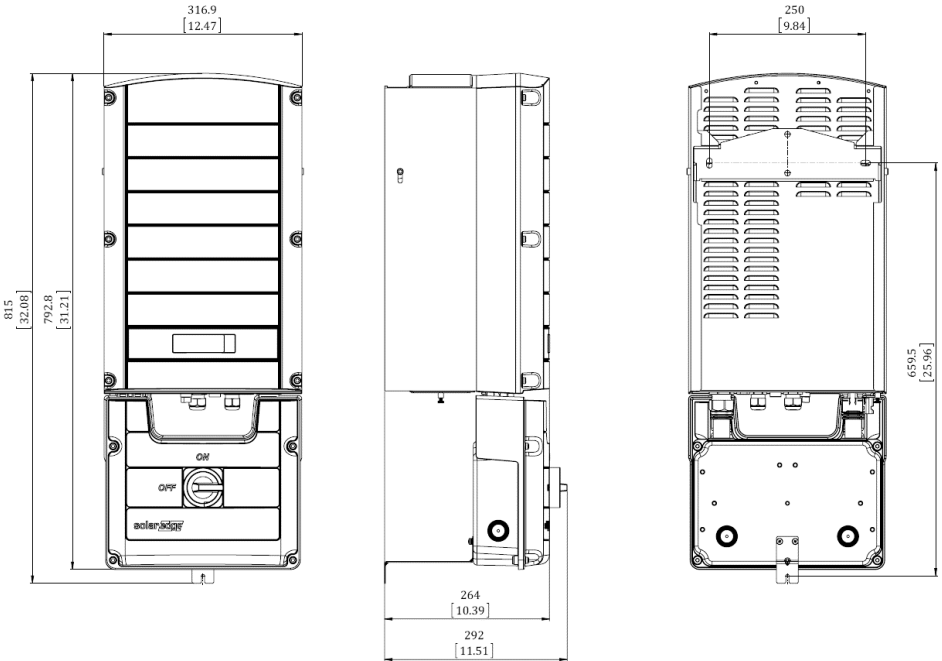


Figure 51: Three phase inverter with brackets - front, side and rear views

## Appendix D: External Fan Maintenance and Replacement

The three phase and single phase 10-11.4kW inverters have two fans: one is internal and requires a SolarEdge technician to replace and the other is accessible from the outside of the inverter.

The fans are referred to as “Fan 1” and “Fan 2”:

- In three phase inverters - Fan 1 is internal, Fan 2 is external
- In single phase 10-11.4kW inverters - Fan 1 is external, Fan 2 is internal
- In single phase 7.6kW inverter has one internal fan, referred to as Fan 1.

A fan replacement kit is available from SolarEdge.

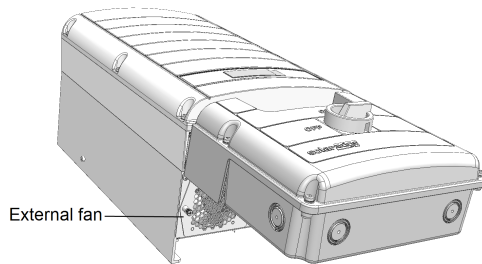


Figure 52: Inverter external fan

### Fan Maintenance

1. At least once a year, open the fan screen and clean the accumulated dust using a brush.
2. Check the Fan Status screen on the LCD (refer to *Fan Status* on page 69).
3. If one of the following occurs, replace the fan as described below:
  - When the fan stops operating
  - Fan status is **Not Working**; Before replacing the fan, turn the inverter AC OFF and ON and check if the status is cleared
  - The following Error is displayed:
    - In Three Phase inverters: **Fan 2 Failure**
    - In single Phase 10-11.4 kW inverters: **Fan 1 Failure**

### External Fan Replacement

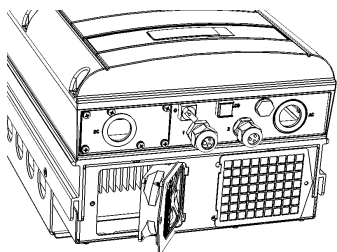
1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

**WARNING!**

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

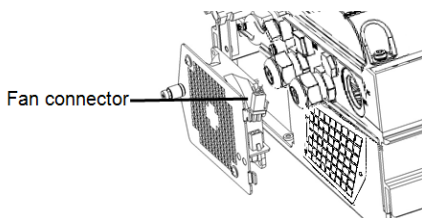
*Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the distribution panel.
3. Use a Philips screwdriver to unfasten the single screw of the fan cover.
4. Open the fan door.



**Figure 53: Fan door open**

5. Disconnect the fan connector and remove the fan.



**Figure 54: Fan connector**

6. Connect the fan connector to the new fan.
7. Close the fan door and fasten the cover screw.
8. Check the *Fan Status* on page 69.

# Appendix E: Replacing and Adding System Components

**NOTE**

If you are permanently disassembling the installation or part of it, make sure to use the disposal methods dictated by local regulations.

## Replacing an Inverter

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

**WARNING!**

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

*Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the distribution panel.
3. Open the inverter cover as described in *Removing the Inverter Cover* on page 73.
4. Disconnect the DC and AC wires from the inverter. If there are ferrite beads on the DC and AC wires in the inverter, open the beads and set them aside.
5. Unscrew the two conduit nuts in the inverter securing the Safety Switch to the inverter.
6. Remove the screws securing the inverter to the mounting bracket and remove the inverter from the mounting bracket.

**NOTE**

If you remove the old inverter and do not immediately install a new one, then:

- Lock the Safety Switch in the OFF position using a lock on the switch.
- Use insulation tape to isolate each of the AC and DC wires.
- Seal the open conduits using duct tape.

7. Place the new inverter on the mounting bracket; insert the screws securing the inverter to the mounting bracket.
8. Screw the two conduit nuts in the inverter securing the Safety Switch to the inverter.
9. Connect the DC and AC wires to the inverter. Refer to *Connecting the Safety Switch to the Inverter* on page 120.

10. If ferrite beads were removed from the DC and AC wires, place them on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.
11. Close the inverter cover.
12. Perform the commissioning steps as described in *Commissioning the Installation* on page 43 *Commissioning the Installation* on page 43.

## Replacing the Safety Switch

### Mounting a New Safety Switch

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

#### WARNING!



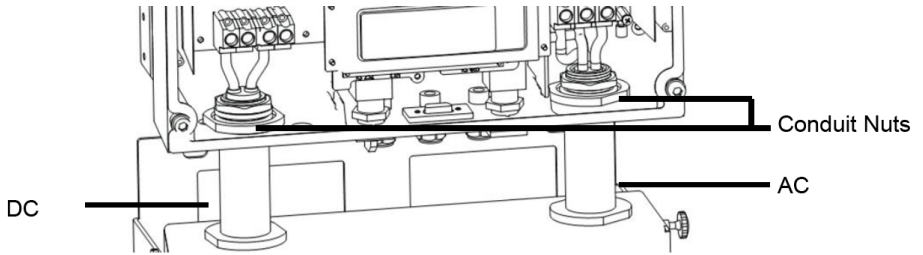
If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

*Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the distribution panel.
3. Open the inverter cover.
4. Disconnect the DC and AC wires from the inverter. If there are ferrite beads on the DC and AC wires in the inverter, open and set them aside.
5. Unscrew the two conduit nuts in the inverter securing the Safety Switch to the inverter.
6. Open the Safety Switch cover and disconnect the external DC and AC wires. Unscrew the two conduit nuts securing the Safety Switch to the external conduits.
7. Remove the Safety Switch with its mounting bracket from the wall.
8. Open the conduit knockouts of the new Safety Switch (refer to *Opening Conduit Knockouts* on page 27).



- Position the new Safety Switch below the inverter and from the inside of the inverter grab the AC and DC wires extending from the switch conduits, as shown below:

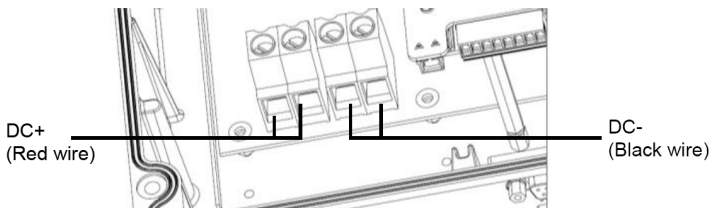


**Figure 55: Inserting the AC and DC conduits**

- Attach the safety switch with its bracket to the wall and slightly close the screws. Do not over tighten.
- Securely screw the two conduit nuts onto the conduit ends in the inverter.
- Connect the DC and AC wires to the inverter. Refer to *Connecting the Safety Switch to the Inverter*, below.
- If ferrite beads were removed from the DC and AC wires, place them on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.
- Connect the external DC and AC wires to the Safety Switch. Refer to *Connecting the AC and the Strings to the Safety Switch* on page 33.

## Connecting the Safety Switch to the Inverter

- Connect the DC, as follows:
  - Connect the red wire to any of the DC+ terminals in the inverter.
  - Connect the black wire to any of the DC- terminals in the inverter.



**Figure 56: Single phase 3-7.6kW inverter DC terminals**

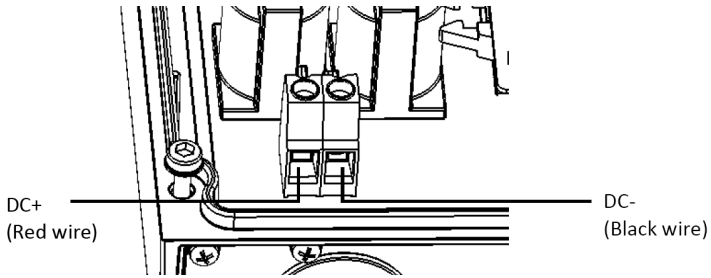


Figure 57: Single phase 10-11.4 kW inverter DC terminals

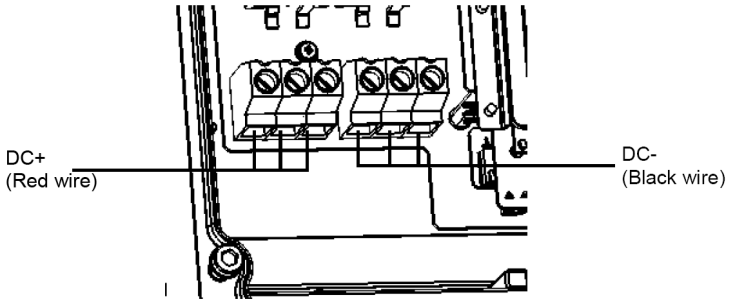


Figure 58: Three phase inverter DC terminals

2. Connect the wires according to the labels on the AC terminal blocks, as follows:

Single Phase Inverter		<p>Figure 59: Single phase inverter AC terminals</p>
Wire color	Connect to terminal	
White	N	
Green/yellow	Ground	
Red	L1	
Black	L2	

Three Phase Inverter	
Wire color/label	Connect to terminal
Black / L1	L1
Black / L2	L2
Black / L3	L3 (feeds the internal power supply)
Green/yellow	Ground
White	N

**Figure 60: Three phase inverter AC terminals**

3. Tighten the screws of each terminal with a torque of 1.2-1.5 N\*m / 0.88-1.1 lb.\*ft.
4. Verify that there are no unconnected wires at the output of the Safety Switch and that the unused terminal screws are tightened.

## Adding, Removing, or Replacing Power Optimizers

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

**WARNING!**



If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

*Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the main distribution panel.
3. Disconnect and connect the necessary power optimizers.
4. Perform pairing and other procedures described in *Commissioning the Installation* on page 43 on all inverters to which power optimizers were added or from which power optimizers were removed.
5. In the monitoring portal, replace the serial number of the removed power optimizer with serial number of the newly installed power optimizer.

## Appendix F: Inverter Arc Detection and Interruption

The arc detection option may be disabled by default. It must be enabled when UL1699B compliance is required. When enabled, the inverter performs an automatic self-test for arc fault each time the inverter wakes-up or is switched ON.

► **To enable/disable arc detection:**

1. Use the LCD light button to enter Setup mode (refer to *Configuring the Inverter Using the LCD Light Button* on page 55).
2. Short-press the LCD light button to reach the **Maintenance** menu.
3. Select **AFCI** → **Enable** or **Disable**.

► **To manually test the arc detection functionality:**

1. Make sure the inverter ON/OFF switch is turned ON.
2. Use the LCD light button to select **Maintenance** → **Manual AFCI Test**.
  - If the test is successful, the following message is displayed:

```
Manual Test PASS
```

The inverter production is then interrupted (as if a real arc detection has occurred), and the following error message is displayed (numbered either 150 or 151):

```
Error 151  
Arc Fault Detected
```

Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then to ON. The inverter performs an arc detection self-test and starts normal operation.

- If the test fails, contact SolarEdge support.

► **To troubleshoot arc-fault failures:**

The inverter continuously performs arc detection while producing power. If an electric arc occurred in the PV system, the inverter detects it and stops producing power. The following error message is displayed (numbered either 150 or 151):

```
Error 151  
Arc Fault Detected
```

If this message is displayed:

1. Turn the inverter ON/OFF switch to OFF.
2. Check all PV strings for the correct open-circuit voltage:
  - Inspect all connections and cables between the power optimizers in the strings: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
  - Inspect all connections and cables between the PV modules and the power optimizers: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
  - Verify that the strings are firmly attached to the Safety Switch terminal blocks.
3. Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then ON. The inverter performs an arc detection self-test and starts normal operation.

► **To troubleshoot self-test failures:**

If the self-test fails, the inverter displays an error message indicating that the arc detector hardware failed during wake-up tests:

```
Error 152  
AFCI  
self-test failed
```

The inverter transmits an error message to the monitoring portal, and continuously repeats the arc detection self-test until it is successful.

If the problem persists, contact SolarEdge support.

If you have technical queries concerning our products, please contact our support through SolarEdge service portal:

<http://www.solaredge.com/groups/support/services>

USA and Canada: + 1 (0) 877 360 529 2  
Worldwide: + 972 (0) 73 240 311 8  
Fax: + 1 (0) 530 273 276 9  
Email to: [support@solaredge.us](mailto:support@solaredge.us)

[www.solaredge.us](http://www.solaredge.us)

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