

**solar**edge

# **SolarEdge Installation Guide**

North America Version 1.7



# Disclaimers

## Important Notice

---

Copyright © SolarEdge Inc. All rights reserved.

No part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photographic, magnetic or otherwise, without the prior written permission of SolarEdge Inc.

The material furnished in this document is believed to be accurate and reliable. However, SolarEdge assumes no responsibility for the use of this material. SolarEdge reserves the right to make changes to the material at any time and without notice. You may refer to the SolarEdge web site ([www.solaredge.com](http://www.solaredge.com)) for the most updated version.

All company and brand products and service names are trademarks or registered trademarks of their respective holders.

Patent marking notice: see [www.solaredge.us/groups/patent](http://www.solaredge.us/groups/patent)

## Exclusion of Liability

---

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

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

## FCC Compliance

---

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 queries concerning our products, please contact us:

**USA and Canada:** 1 877 360 5292

**Worldwide:** +972 73 2403118

**Fax:** +1 (530) 273-2769

**Email:** [support@solaredge.us](mailto:support@solaredge.us)

Before contacting, 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

# Table of Contents

<b>Disclaimers</b> .....	<b>1</b>
Important Notice .....	1
Exclusion of Liability.....	1
FCC Compliance .....	1
<b>Support and Contact Information</b> .....	<b>2</b>
<b>Table of Contents</b> .....	<b>3</b>
<b>Handling and Safety Instructions</b> .....	<b>6</b>
Safety Symbols.....	6
Instructions .....	7
<b>Chapter 1: Introducing the SolarEdge System</b> .....	<b>8</b>
System Overview .....	8
SolarEdge Power Optimizer.....	8
SolarEdge Inverter .....	8
SolarEdge AC/DC Safety Switch .....	8
SolarEdge Monitoring Portal .....	8
Supported AC Grids .....	9
Installation Workflow .....	10
Installation Equipment List .....	11
<b>Chapter 2: Installing the Power Optimizers</b> .....	<b>12</b>
Safety .....	12
Package Contents .....	13
Installation Guidelines .....	13
Step 1, Mounting and Grounding the Power Optimizers.....	14
Step 2, Connecting a Module to a Power Optimizer.....	15
Step 3, Connecting Power Optimizers in Strings.....	16
Step 4, Verifying Proper Power Optimizer Connection.....	16
Troubleshooting.....	17
<b>Chapter 3: Installing the Inverter</b> .....	<b>18</b>
Inverter Transport and Storage .....	18
Inverter Package Contents.....	18
Identifying the Inverter .....	18
Inverter Connectors .....	19
Mounting the Inverter .....	19
<b>Chapter 4: Installing the AC/DC Safety Switch</b> .....	<b>21</b>
AC/DC Safety Switch Package Contents.....	21
Opening Conduit Knockouts .....	22
Mounting the AC/DC Safety Switch .....	22
Connecting the Switch to the Inverter.....	23
Connecting the Strings and the AC to the AC/DC Safety Switch .....	24

Grid Connection Guidelines.....	25
Connecting the AC Grid to the AC/DC Safety Switch .....	25
Connecting the Strings to the AC/DC Switch .....	26
Closing the AC/DC Safety Switch and Inverter Covers .....	27
<b>Chapter 5: Commissioning the Installation .....</b>	<b>28</b>
Step 1, Activating the System .....	28
Step 2, Pairing Power Optimizers to the Inverter .....	29
Step 3, Verifying Proper Operation.....	30
Step 4, Reporting and Monitoring Installation Data .....	30
The SolarEdge Monitoring System .....	30
Providing Installation Information.....	31
<b>Chapter 6: User Interface .....</b>	<b>32</b>
Inverter LCD Panel and LEDs.....	32
LCD User Buttons .....	33
Setup Mode .....	34
Configuring the Inverter Using the LCD User Buttons .....	34
Configuring the Inverter Using the External LCD Light Button .....	36
Connecting a Laptop to the Inverter .....	37
Inverter Configuration Menu Options .....	37
Operational Mode - Status Screens .....	41
Initial Inverter Status Window.....	41
Main Inverter Status Window .....	42
Energy Meter Window .....	42
Telemetry Window.....	42
ID Status Window.....	42
Server Communication Status Window.....	43
IP Status Window .....	43
ZigBee Status Window.....	43
Communication Ports Status Window.....	44
<b>Chapter 7: Setting Up Communication.....</b>	<b>45</b>
Communication Connectors .....	45
Communication Types .....	45
Creating an Ethernet (LAN) Connection.....	46
Creating an RS485 Bus Connection.....	48
Creating a ZigBee Connection.....	51
Verifying the Connection .....	51
Troubleshooting Communication .....	51
<b>Appendix A: Errors and Troubleshooting .....</b>	<b>53</b>
<b>Appendix B: Technical Specifications .....</b>	<b>57</b>
Inverters .....	57
AC/DC Safety Switch .....	60
Power Optimizers .....	61

---

<b>Appendix C: Mechanical Specifications .....</b>	<b>63</b>
AC/DC Safety Switch .....	63
Power Optimizers .....	65
<b>Appendix D: Inverter Power De-rating .....</b>	<b>66</b>
<b>Appendix E: Replacing and Adding System Components.....</b>	<b>67</b>
Replacing an Inverter .....	67
Adding, Removing or Replacing Power Optimizers.....	68

# 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.

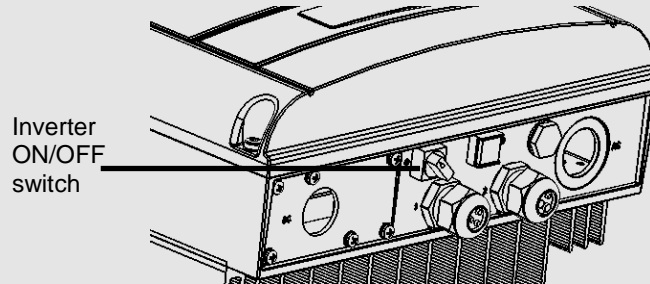


## Instructions

**WARNING!**

The cover must be opened only after shutting off the inverter ON/OFF switch located at the bottom of the inverter. This removes the DC voltage from 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 CA/CC 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.*

**WARNING!**

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

*Avant d'utiliser l'onduleur monophasé, assurez-vous que le système 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 AC/DC 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 CA/CC 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!**

This unit must be connected only to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 40 A.

*Cet appareil doit être connecté uniquement à un circuit de dérivation dédié avec un coefficient dispositif de protection contre les surintensités (TPOC) maximal de 40 A.*

**NOTE:**

Use only copper conductors rated for a minimum of 90 °C.

# Chapter 1: Introducing the SolarEdge System

## System Overview

---

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 the system components.

### SolarEdge Power Optimizer

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

The power optimizers keep the string voltage fixed, regardless of string length and of environmental conditions. Each power optimizer directly transmits its module's performance data over the DC power line.

Two types of power optimizers are available:

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

### SolarEdge Inverter

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 server; requires Internet connection).

### SolarEdge AC/DC Safety Switch

The SolarEdge AC/DC Safety Switch is a manually operated switch for disconnecting the AC and DC power of a SolarEdge inverter.

An AC/DC Safety Switch is installed below each inverter and is connected to the inverter with AC and DC wires.

### SolarEdge Monitoring Portal

The SolarEdge monitoring portal enables you to monitor the technical and financial performance of one or more SolarEdge sites. It provides information about present and past performance of each module individually and about the system as a whole.

## Supported AC Grids

The following figure shows the AC grids supported by the SolarEdge inverter. Inverters framed with a border and that have their Neutral line connected can be set to Auto in setting the country and grid (refer to *Country and Grid* on page 37).

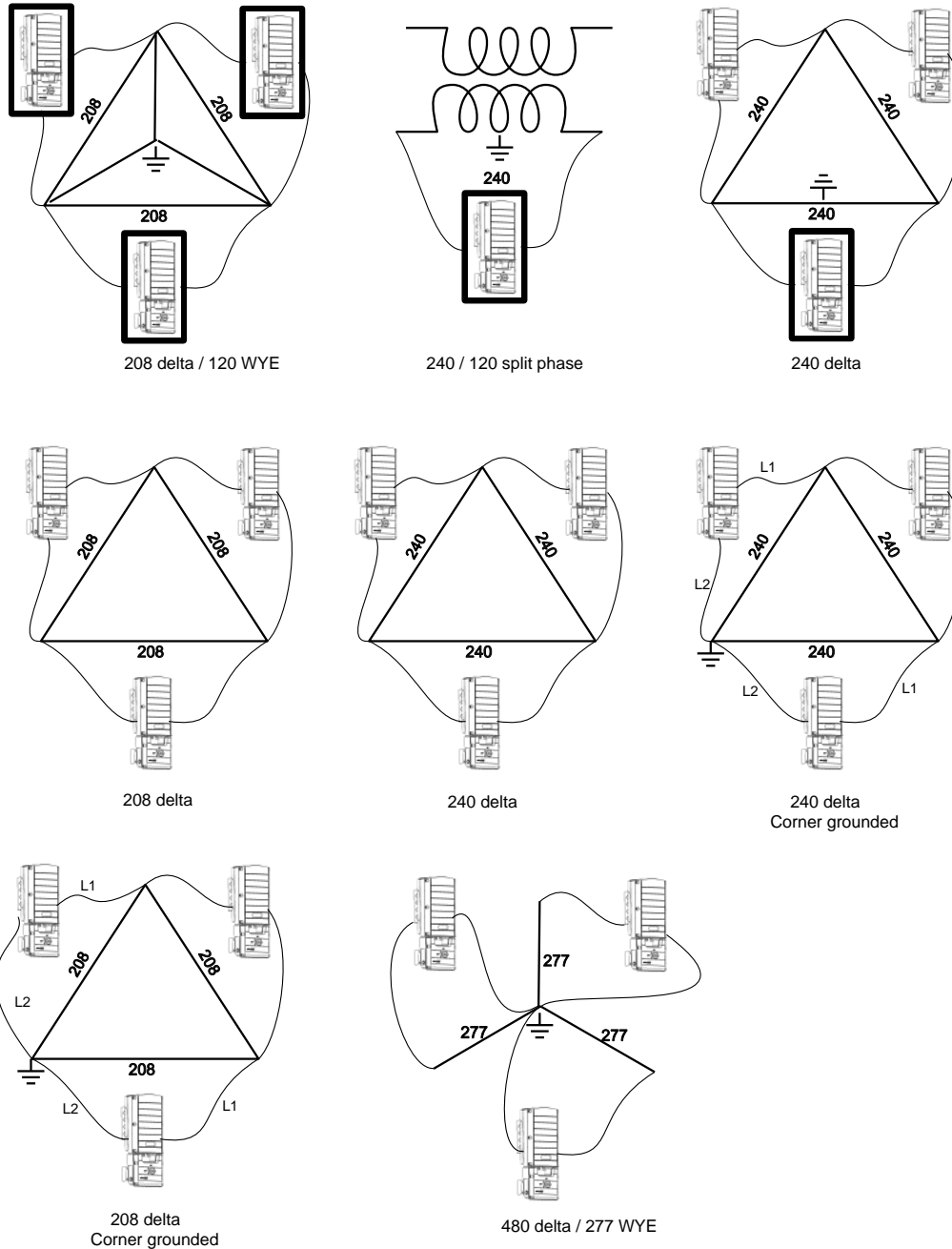


Figure 1: AC Grids Supported by the SolarEdge Inverter



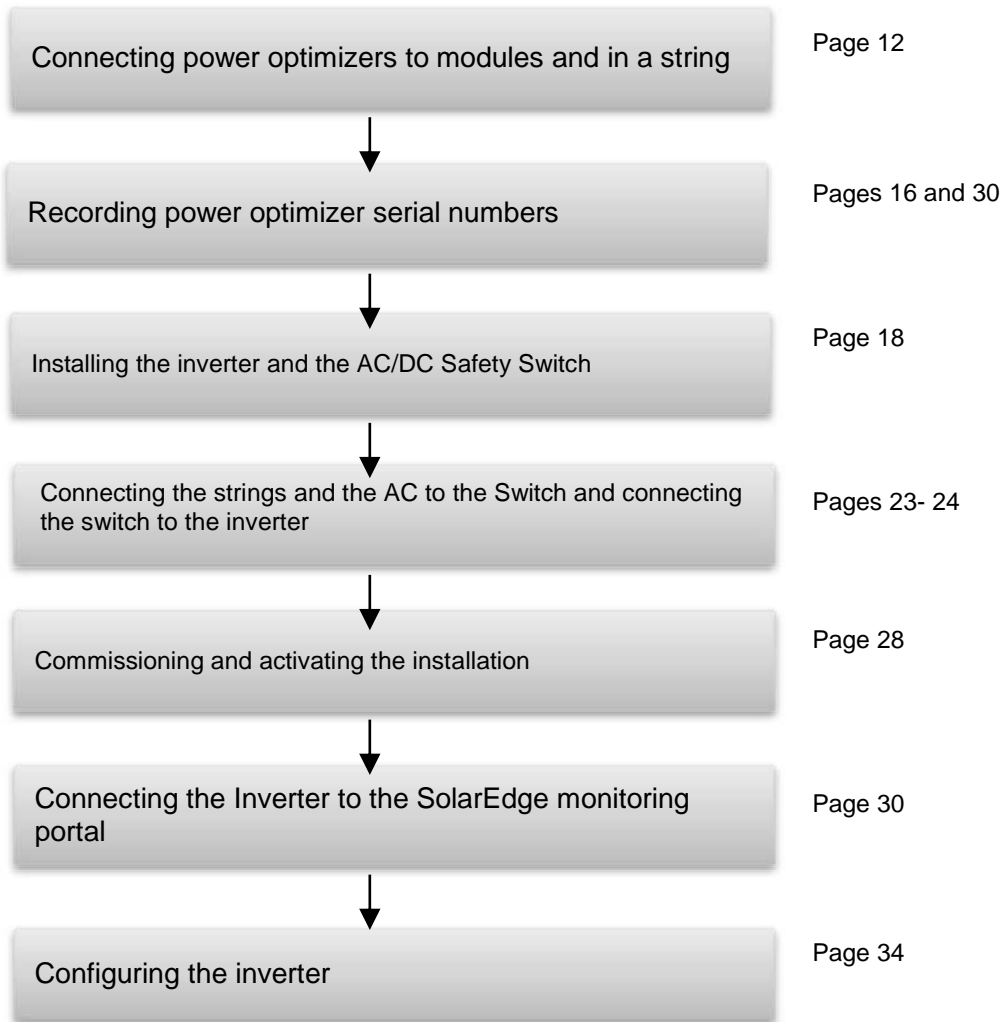
**NOTE:**

When connected to the 277 Vac grid, the inverter will cease exportation of power when the utility connection rises above 294Vac, but will not indicate a fault until the utility connection rises above 305 Vac.

## Installation Workflow

---

The following is the workflow for installing and setting up a new SolarEdge site. Most of these procedures can also be used for modifying an existing site.



## Installation Equipment List

---

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

- Allen screwdriver for 1/4" or 5/16" screw types
- Standard flat head screwdriver
- Flat Head screwdriver for P25 screws (watchmaker's screwdriver)
- Screwdriver for 3/4" metal lock nut
- Electrical screwdriver (tester)
- Drilling machine and bits suitable for the surface on which the inverter will be installed and for opening the AC/DC Safety Switch knockouts
- Suitable screws for attaching the inverter mounting bracket to the surface to which it will be connected
- 1/4" or 5/16" screws, springs and washers for attaching the power optimizer to the racking
- Wire cutters
- Wire strippers
- Voltmeter
- DC current clamp-on meter

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

- For Ethernet: CAT5/6 twisted pair Ethernet cable
- For RS485: Four- or six-wire twisted pair

# 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 AC/DC Safety Switch and the AC switch of the main circuit board.

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

**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:**

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

Unused connectors must be sealed. Exposed connectors may be unsafe or create functional problems and will void the warranty. Do not leave the optimizers exposed to water unless the connectors are sealed, either by mating or by plugging with appropriate plugs (not provided).

*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.*

*Les connecteurs non-utilisés doivent être scellés avec des bouchons (non-fournis). Laisser des connecteurs exposés peut être dangereux ou peut créer des problèmes fonctionnels lors de l'installation et par conséquent ne seront pas couverts par la garantie.*

**CAUTION:**

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

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

**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 OFF, each power optimizer will output a safe 1V voltage.

## Package Contents

- Power Optimizers
- Washers

## Installation Guidelines

- This chapter refers only to the module add-on power optimizers and not to the module-embedded models.
- 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 1" (2.5 cm) clearance distance between the power optimizer and other objects.

- String length must be eight power optimizers or more, or the entire string may shut down. (For maximum string length, refer to the power optimizer datasheets in *Appendix B: Technical Specifications* on page 57).

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 eight power optimizers are connected to unshaded modules. If under typical conditions fewer than eight optimizers will be connected to unshaded modules, add more optimizers to the string.

## Step 1, Mounting and Grounding the Power Optimizers

- 1 Use the power optimizer mounting brackets to attach the power optimizer to the racking, as described below. For optimizers supplied with frame-specific brackets, attach the power optimizer to the module frame.
- 2 Determine the power optimizer mounting location..
- 3 If required, mark all mounting hole locations and drill the holes.



### 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.*

- 4 Attach each power optimizer to the rack using the 5/16" or 1/4" screws and washers.
- 5 Use the following methods to ground the power optimizer:



### WARNING:

The metallic enclosure of the power optimizer must have equipment grounding.

*L'enceinte métallique de la optimiseur de puissance doit être mise à la terre*

- **For mounting on a grounded rail:** Use the provided 5/16" stainless steel star washer between the railing and the flat side of the mounting bracket. The star 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.

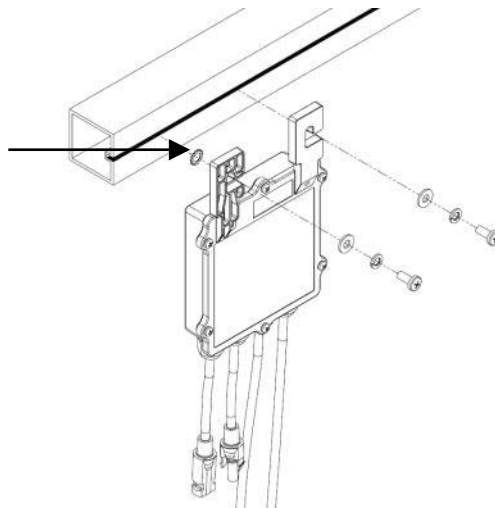


Figure 2: Power Optimizer Grounding Using the Star Washer



- **For mounting on an un-grounded structure** (such as a wooden structure): Connect an equipment-grounding conductor to the grounding terminal (sold separately). The grounding terminal accepts a wire size of 6-14 AWG and must be sized for equipment per NEC 250.122. Tighten the screws connecting the power optimizer to the rack and the grounding terminal screw with a torque of 9.5 N\*m / 7 lb\*ft.

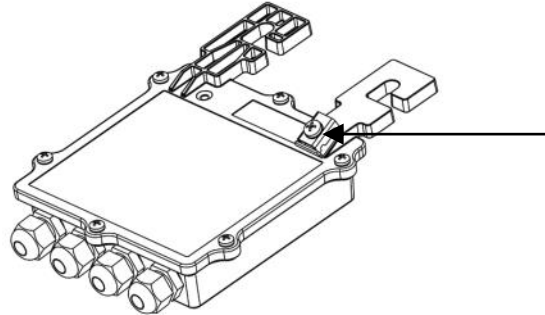


Figure 3: Power Optimizer Grounding Terminal

- 6 Verify that each power optimizer is securely attached.



**NOTE:**

Record power optimizer serial numbers and locations, as described in *Providing Installation Information* on page 31.

## Step 2, Connecting a Module to a Power Optimizer

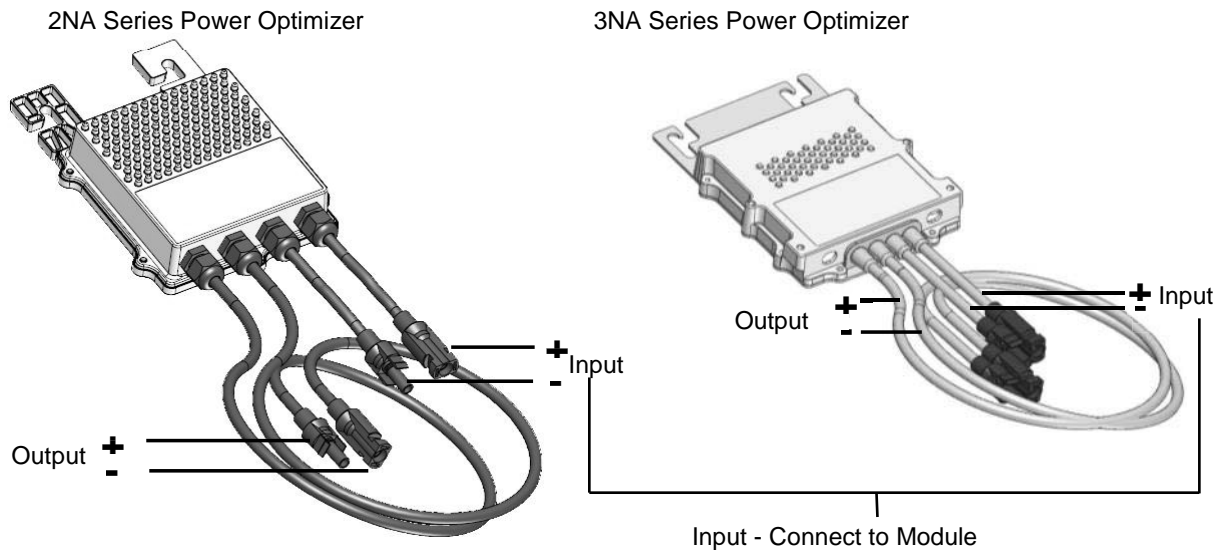


Figure 4: Power Optimizer Connectors

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



**WARNING!**

Verify that you have identified the inputs correctly. The power optimizer input cables are the short ones. Do not connect modules to power optimizer outputs.

*Vérifiez que vous avez identifié les entrées et sorties correctement. Ne pas connecter des modules aux sorties des optimiseurs de puissance.*

## 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 *Appendix B: Technical Specifications* on page 61. Refer to the SolarEdge Site Designer for string length verification.

- 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 way.
- 3 Verify correct polarity by measuring the string polarity with a voltmeter.

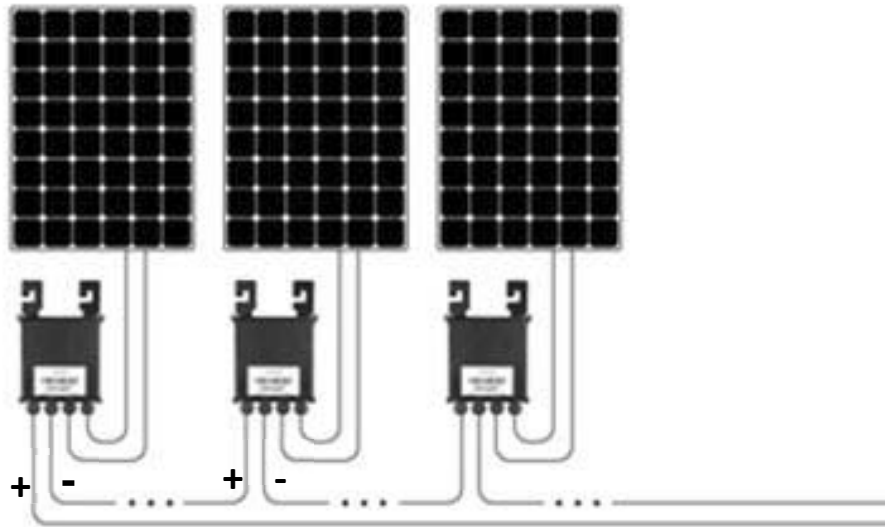


Figure 5: Power Optimizers Connected in Series

## 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.

- 1 Measure the voltage of each string individually before connecting it to the other strings or to the AC/DC Safety Switch.
- 2 Use a voltmeter with at least 0.1V measurement accuracy.
- 3 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 at least 2W are provided by the module.

## Troubleshooting

---

### String voltage is 0V

Cause: Output of one or more power optimizers is disconnected

Solution: Connect all power optimizer outputs

### String voltage not 0V but lower than no. of optimizers

Possible causes:

- One or more of the power optimizers are not connected in the string  
Solution: Connect all power optimizers
- One or more of the modules are not connected properly to their power optimizer inputs  
Solution: Connect the modules to the optimizer inputs

### String voltage higher than no. of optimizers



#### **WARNING!**

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

A deviation of  $\pm 1\%$  per string is reasonable.

*Si la tension mesurée est trop haute, la tension basse de sécurité pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION.*

*Une déviation de  $\pm 1\%$  par string est raisonnable.*

Possible causes:

- An extra power optimizer is connected in the string  
Solution: Check if an extra power optimizer is connected in the string. If not – proceed to next solution.
- A module is connected directly to the string, without a power optimizer.  
Solution: 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.
- A malfunction of one of the power optimizers  
Solution:
  - Disconnect the wires that connect the power optimizers in the string.
  - 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.
  - If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string.
  - Do not continue before finding the problem and replacing the malfunctioning power optimizer.

## Chapter 3: Installing the Inverter

The inverter can be installed either before or after the modules and power optimizers have been installed.

**CAUTION:**

Do not rest the connectors at the bottom of the inverter on the ground, as it may damage them. To rest the inverter on the ground, lay it on its back, front or side.

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

**NOTE:**

Use only copper conductors rated for a minimum of 90 °C.

### Inverter Transport and Storage

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 which can withstand the weight of the inverter (refer to the inverter weight in *Appendix B: Technical Specifications* on page 60), has a handle system and can be closed fully.

Store the inverter in a dry place where ambient temperatures are -25°C - +60°C / -13°F - 149°F.

### Inverter Package Contents

- One SolarEdge inverter
- One mounting bracket
- Two flat head screws for fastening the inverter to the mounting bracket
- This installation guide
- Quick installation guide
- Inverter activation instructions (may include SD card)
- Universal PV connector unlocking tool

### 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.

## Inverter Connectors

The following shows the inverter connectors, located at the bottom of the inverter:

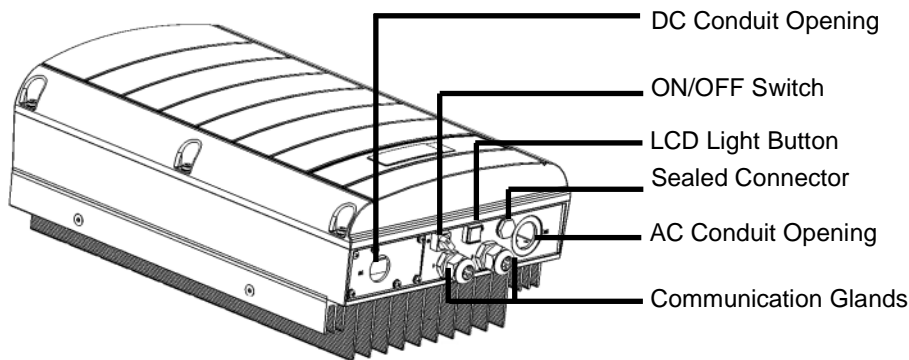


Figure 6: Inverter Connectors

The following describes each connector:

- **AC and DC Conduit Openings:** For connection of the AC/DC 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.

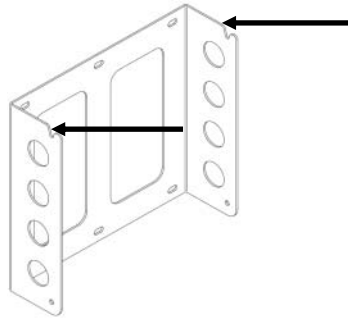
*Ces vis ne doivent pas être retirées. Les enlever est susceptible d'endommager l'étanchéité de l'onduleur et annuler la validité de la garantie.*

- **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 on page 36.
- Two **communication glands**, each 20mm in diameter, for connection of inverter communication options. Each gland has three openings. Refer to *Chapter 7: Setting Up Communication* on page 45 for more information.

## Mounting the Inverter

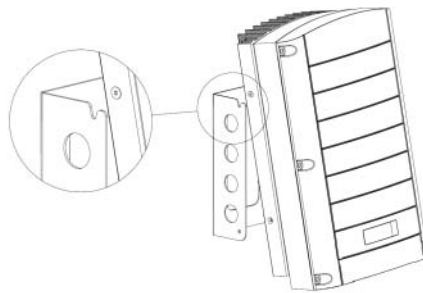
- 1 Determine the inverter mounting location, on a wall or pole, as follows:
  - To allow for heat dissipation, maintain the following clearance areas between the inverter and other objects:
    - 8" (20 cm) to the top of the inverter
    - At least 15" (38 cm) to the bottom of the inverter, for the AC/DC Safety Switch; if conduit entry to the 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

- Position the mounting bracket against the wall/pole and mark the drilling hole locations:
  - Ensure that the U-shaped indentations are facing up, as shown below:



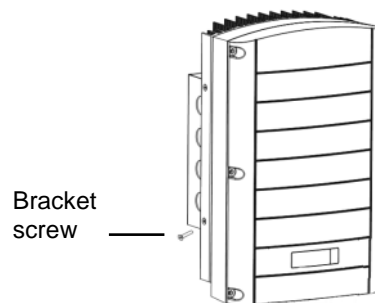
**Figure 7: Bracket with U-shaped Indentations Facing Up**

- 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 connect the bracket. Verify that the bracket is firmly attached to the mounting surface.
  - 3** Hang the inverter on the bracket using the screws at the top of the inverter, as shown below. Let the inverter lay flat against the wall or pole.



**Figure 8: Hanging the Inverter on the Bracket**

- 4** Insert the two supplied screws through the outer heat sink fin on either side of the inverter and into the bracket. Tighten the screws with a torque of 3.9 N\*m / 2.8 lb\*ft.



**Figure 9: Inserting the Screws into the Outer Heat Sink Fins**

- 5** Open the inverter cover's six Allen screws and carefully lift the cover towards you 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.

*Après ouverture du couvercle, assurez vous de ne pas endommager des composants internes. SolarEdge ne pourra être tenue responsable pour un dommage d'un composant résultant de l'ouverture du couvercle.*

## Chapter 4: Installing the AC/DC Safety Switch

### Switch

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

Two switches are available, with part numbers: DCD-1ph-US-B and DCD-1ph-US-C. The specifications of these switches are described in *Appendix B: Technical Specifications* on page 60. The two switches are identical in functionality and can be used interchangeably. Unless otherwise indicated, instructions apply to both types of switches.

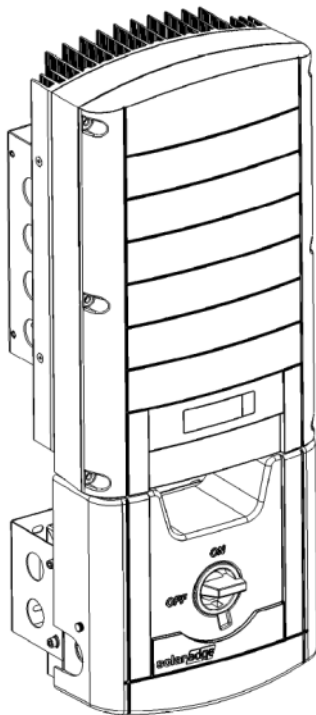


Figure 10: DCD-1ph-US-B Safety Switch

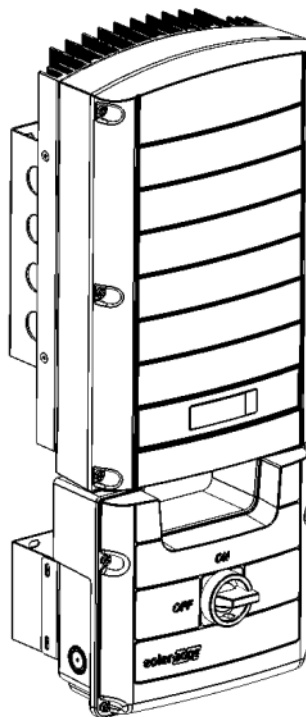


Figure 11: DCD-1ph-US-C Safety Switch

### AC/DC Safety Switch Package Contents

- AC/DC Safety Switch
- In DCD-1ph-US-B package - front cover of the AC/DC Safety Switch
- AC/DC Safety Switch mounting bracket
- Template for marking the bracket mounting holes on the mounting surface
- Four flat head screws for fastening the AC/DC Safety Switch to the bracket

## Opening Conduit Knockouts

- 1 Move the switch to the OFF position.
- 2 Loosen the screws on the front cover of the AC/DC Safety Switch, as shown below:

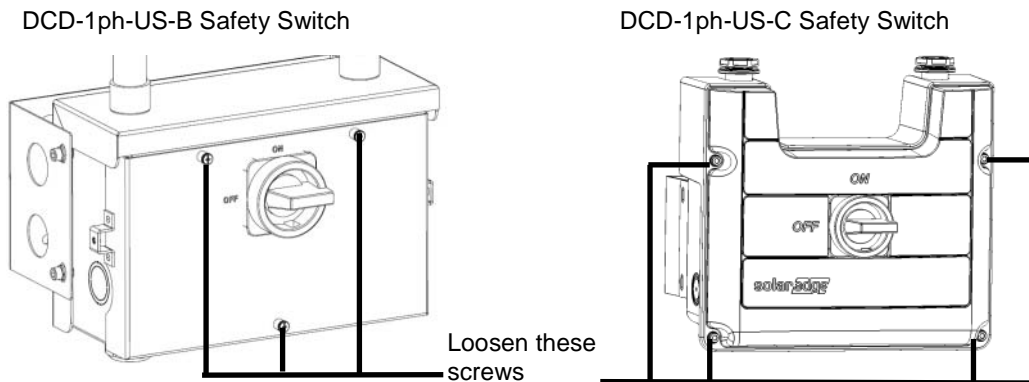


Figure 12: Opening the AC/DC Safety Switch Cover

- 3 Remove the AC/DC 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. For DCD-1ph-US-C Safety Switch, a Unibit drill may be used.

## Mounting the AC/DC Safety Switch

- 1 Use the supplied template to mark the drilling hole positions: Align the top of the paper with the bottom of the inverter mounting bracket and mark the drilling locations.

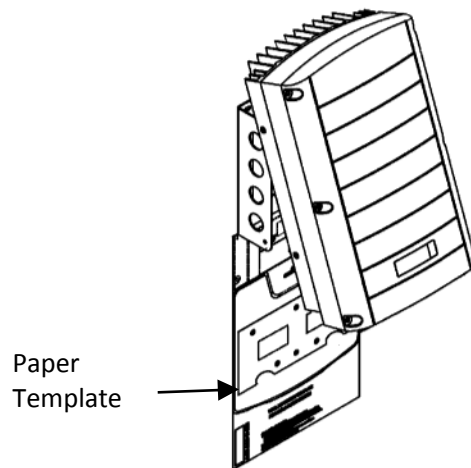
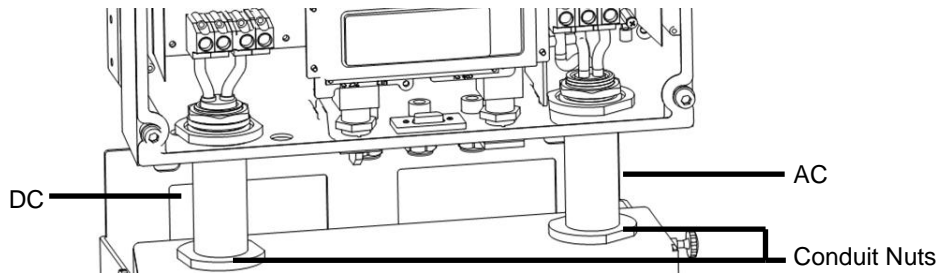


Figure 13: Template Position

- Use at least two bracket holes. Additional holes can be used to stabilize the bracket. Determine which and how many holes to use according to mounting surface type and material.
- 2 Drill the holes and connect the bracket. Verify that the bracket is firmly attached to the mounting surface.
  - 3 Unscrew the two nuts at the conduit ends.



- 4** Position the 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:

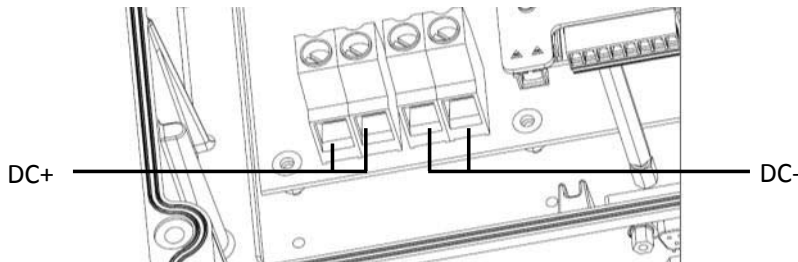


**Figure 14: Inserting the AC and DC Conduits**

- 5** Attach the safety switch to its bracket using the four supplied screws and slightly close the screws. Do not tighten the screws.
- 6** Securely screw the two conduit nuts onto the conduit ends in the inverter.
- 7** Securely tighten the four bracket screws with a torque of 9 N\*m/ 6.6 lb\*ft.

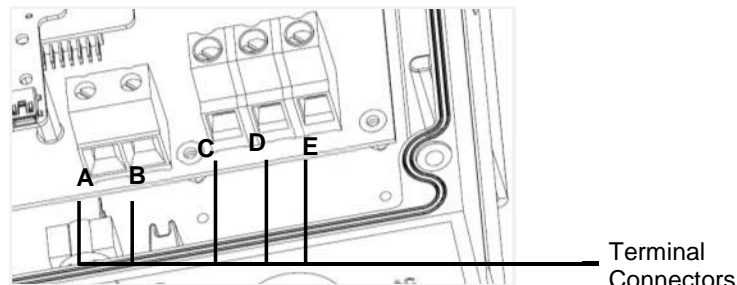
## Connecting the Switch to the Inverter

- 1** Connect the DC, as follows:
- Connect the red wire to the DC+ terminal in the inverter.
  - Connect the black wire to the DC- terminal in the inverter.



**Figure 15: Inverter DC Terminals**

- 2** Connect the AC, as follows:
- Connect the white wire to the B terminal in the inverter.
  - Connect the green/yellow wire to the C terminal in the inverter.
  - Connect the red wire to the D terminal in the inverter.
  - Connect the black wire to the E terminal in the inverter.



**Figure 16: Inverter AC Terminal Blocks**

- 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 AC/DC Safety Switch and that the unused terminal screws are tightened.

# Connecting the Strings and the AC to the AC/DC Safety Switch

The AC/DC Safety Switch connections are shown below:

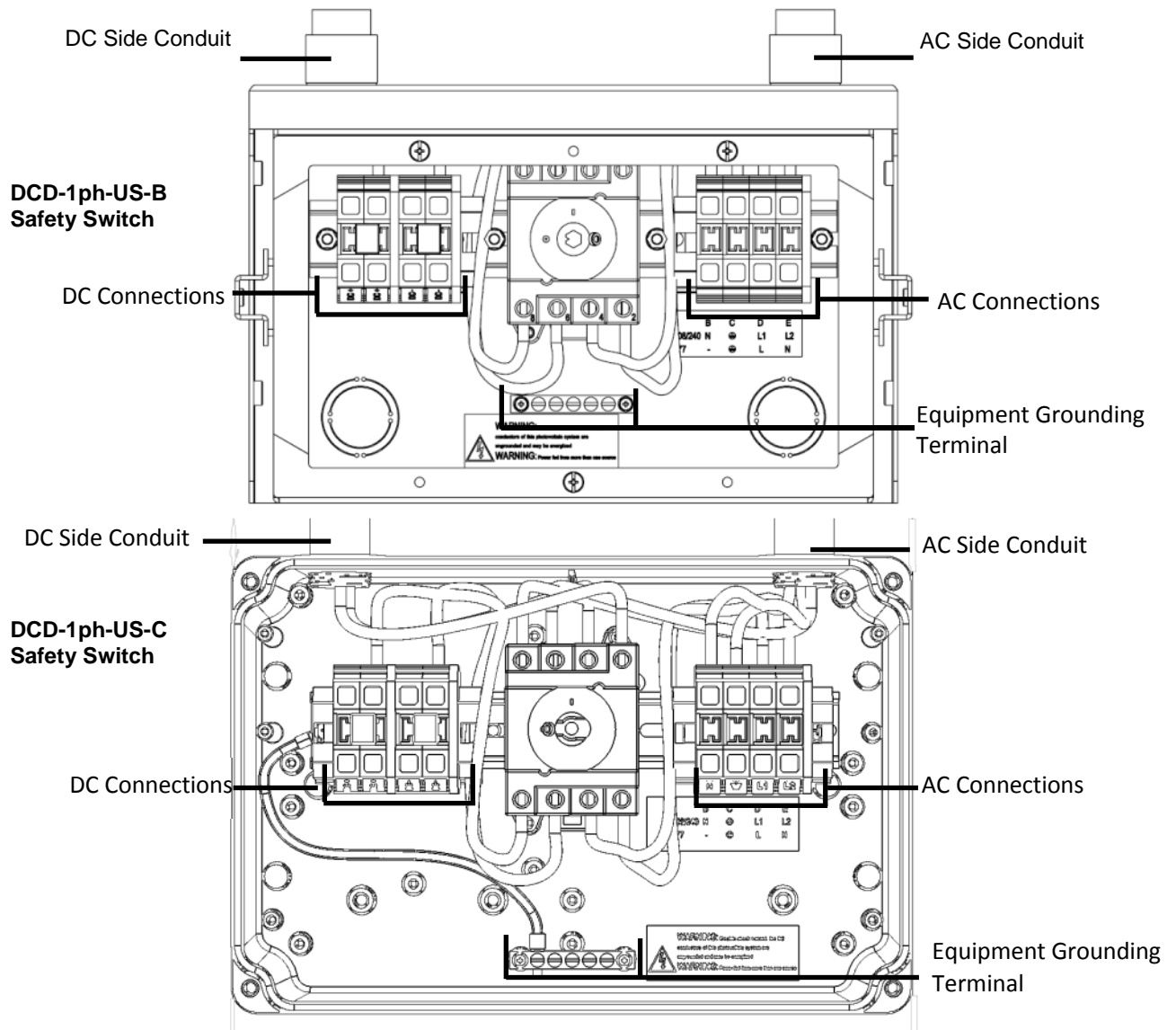


Figure 17: Inside the AC/DC Safety Switch

## Grid Connection Guidelines

- In inverters connected to corner grounded grids, connect the L2 terminal to the grounded conductor. When connecting to other grids, L1 and L2 are interchangeable.
- When connecting multiple 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 Manual*, available on the SolarEdge website at [http://www.solaredge.com/files/pdfs/phase\\_balancing\\_connection\\_guide.pdf](http://www.solaredge.com/files/pdfs/phase_balancing_connection_guide.pdf).

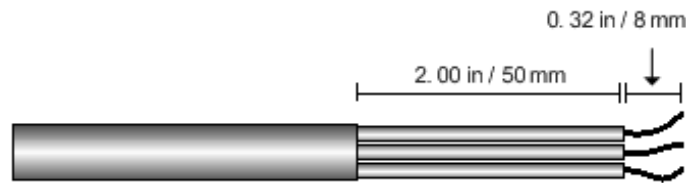


**NOTES:**

- The conduits, hubs and fittings must be suited for field wiring systems.
- 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>

## Connecting the AC Grid to the AC/DC Safety Switch

- 1 If supplied, remove the spring-clamp terminal instructions from inside the switch.
- 2 Strip 50 mm / 2" of the external cable insulation and strip 8 mm / 0.32" of the internal wire insulation.



**Figure 18: Insulation Stripping – AC**

- 3 Insert the AC conduit into the AC-side knockout that was opened.



**WARNING!**

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 connectors, using the label located in the switch. Connect the grounding wire first.

	B	C	D	E
208/240	N	⊕	L1	L2
277	-	⊕	L	N

**Figure 19: AC/DC Safety Switch AC Terminal Block Label**

- 5 Use a standard straight-bladed 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 tilt it to press the release mechanism and open the clamp.

- Insert the wire 15mm / 0.6" deep into the side opening.
- Remove the screwdriver – the wire is automatically clamped.

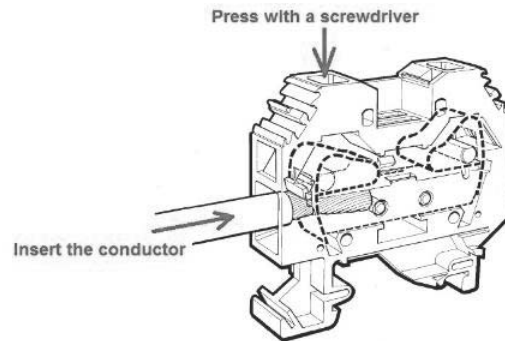


Figure 20: Spring-clamp Terminal

- 6 Verify that there are no unconnected wires.

## Connecting the Strings to the AC/DC Switch

- 1 Strip 50 mm / 2" of the external cable insulation and strip 8 mm / 0.32" of the internal wire insulation.

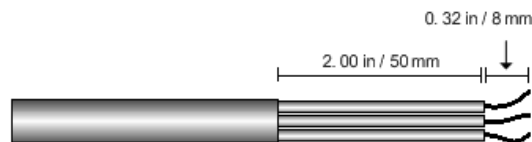


Figure 21: Wire Lengths to Strip – DC

- 2 Insert the DC conduit into the DC-side knockout that was opened.
- 3 Connect the DC equipment ground conductor to the equipment grounding terminal block.



### 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 from the PV installation to the DC+ and DC- terminals, 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.

Two 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 in an external combiner box before connecting to the switch.



### CAUTION:

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

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



### 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.

## Closing the AC/DC Safety Switch and Inverter Covers

- 1 Attach the switch cover and secure it by tightening the screws with a torque of 1.2 N\*m / 0.88 ft\*lb:
  - For DCD-1ph-US-B: Use three screws.
  - For DCD-1ph-US-C: Use four screws.
- 2 For DCD-1ph-US-B: Attach the decorative plastic cover using the three screws.

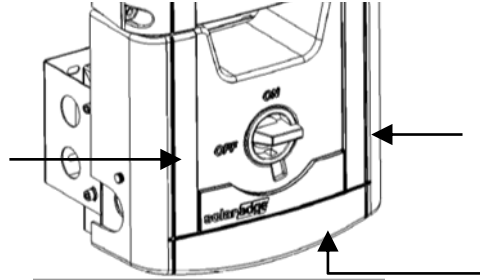


Figure 22: Closing the DCD-1ph-US-B switch Decorative Cover

- 3 Move the switch to the ON position.



### NOTE:

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

1. Move the AC/DC Safety Switch to the OFF position
2. Insert the lock through the knob opening and lock.



- 4 Verify that the inverter is configured to the proper country, as described on page 37.
- 5 If additional country setting or inverter configuration using the internal LCD user buttons is necessary or if connecting communication options, perform them according to *Chapter 7: Setting Up Communication*, before proceeding with the next step.
- 6 Attach the inverter cover and secure it by tightening the screws with a torque of 3.9 N\*m/ 2.9 lb\*ft. For proper sealing, first tighten the corner screws and then the two central screws. The recommended order can be seen in the following figure:

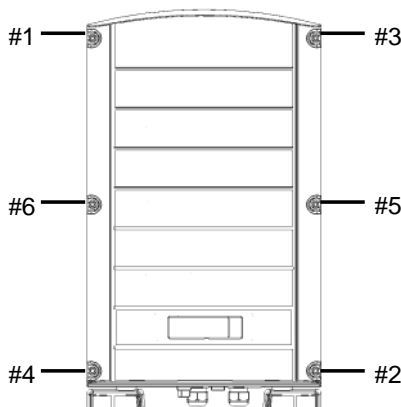


Figure 23: Tightening Order of the Screws

Proceed with *Chapter 5: Commissioning the Installation* on page 28.

# Chapter 5: Commissioning the Installation

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

## Step 1, Activating the System

- 1 Verify that the inverter ON/OFF switch is OFF.
- 2 Activate the inverter according to the activation instructions supplied with the inverter.
- 3 Turn ON the AC breaker.
- 4 Turn ON the AC/DC Safety Switch. If an additional external DC switch is installed between the power optimizers and the inverter(s) then turn it ON.

A message similar to the following appears on the inverter 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
```

- 5 Verify that the following information appears on the LCD panel:
  - **P\_OK**: there is a connection to the power optimizers and 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**: 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 server 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 *Verifying the Connection* on page 51 for troubleshooting.
  - **Vac [V]** - the grid's 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.