Single Phase Inverter with HD-Wave Technology Installation Guide

For North America
Version 1.1

Disclaimers

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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.

Revision History

Version 1.1 (July 2018)

- Update of product names
- Recommendation to mount the power optimizer in a location protected from direct sunlight
- DC Safety Unit bracket has 3 mounting holes
- Update regarding use of extension cables in power optimizer installation guidelines
- Addition of caution - installation in saline environment
- Recommendation to mount the power optimizer in a location protected from direct sunlight
- Addition of possibility to use compatible connectors from third-party manufacturers
- Power optimizer clearance - no clearance is required on the mounting bracket side
- Addition of reference to troubleshooting undetected devices application note
- Torque for grounding using the equipment grounding bus-bar: 3.4 N*M / 30 lb-in
- Setup mode: To use the LCD buttons when the inverter cover is removed, touch the white dots on the LCD button frames.
- Removed Ferrite bead on AC wires
- Addition of link to the Designer web page
- Updated warning about sealing unused power optimizer input connectors
- Output safe voltage is 1V (±0.1V)
- Addition of mounting bracket type 2
- Mechanical specifications: Addition of inverter models (10kW and 11.4kW)
- Updated the Safety section:
  - New warning: The Safety Switch meets all requirements for a code-compliant installation of this system. The DC Disconnect Switch disconnects both the positive and negative conductors.
  - New important safety feature information for inverters with automatic rapid shutdown(PVRSS)
- Overview section updated (system image , additional safety voltage initiator: Rapid Shutdown (PVRSS))
- In Supported AC Grids, added: Ground connection is required for all grids
- In Power Optimizer Installation chapter:
  - Added grounding method testing information
  - Added: circuit conductors must be sized according to NEC 690.9 when combining strings
  - Removed reference to racking models and their grounding methods
  - Removed mentioning of tracker
- In inverter Installation chapter:
  - In Inverter Interfaces - updated ON/OFF switch description, added warning regarding PVRSS
  - Added a caution about not altering the DC Safety Unit enclosure: SolarEdge does not permit opening or puncturing the Safety Switch in any location other than the pre-defined drill guide locations, or otherwise altering the construction of the enclosure, as this may compromise safety and will void the warranty.
- Connection to/from the Safety Switch:
  - AC grounding to bus-bar instead of terminal block - updated instructions and Safety Switch image
  - String fusing requirement note updated: Fuses needed for 4 strings or more (instead of 3).
  - Added conduit sealing requirement

- In Commissioning chapter:
  - Updated the activation sequence
  - Removed RS232 reference
- Rapid shutdown (PVRSS):
  - Added important safety information notes and warnings
  - For a compliant PV Rapid Shutdown installation, use no more than 30 optimizers per string.
  - Enabling PVRSS from the inverter menu is only required if the installed optimizers were manufactured before 2015, otherwise it is enabled by default.
  - Added testing PVRSS functionality after pairing
- In Configuration Menu Options:
  - Communication section:
    - Removed RS232 Conf
    - Added GSM Conf
  - Power Control section:
    - Removed Phase Balance link and info
    - Added a note about compliance with UL 1741 Supplement A.
    - Added link to P(Q) diagram application note
  - Maintenance section:
    - Added links to application notes (Upgrading the inverter using SD card; Isolation fault troubleshooting; Arc fault detection)
    - Removed Optimizer Conf
- Status Screens updates:
  - Meter status screen - added Power and Energy lines
  - Telemetry status screen - updated
  - GSM status screen - new
- Communication options - updated
- Inverter cover removal sequence - updated
- Added link to Arc Detection application note
- Troubleshooting:
  - Error codes moved to a separate document. A link was added to the manual.
  - Slave Detect and Slave List - updated
- Updated the technical specification document
- Removed Inverter Arc Detection and Interruption appendix

Support and Contact Information

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

- USA and Canada: 1 510 498 3200
- Worldwide: +972 073 2403118
- Fax: +1 (530) 273-2769
- Email: support@solaredge.us.

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

- Model and serial number of the product in question.
- The error indicated on the LCD screen or on the monitoring platform or by the LED, 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 screen.

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HANDLING AND SAFETY INSTRUCTIONS

During installation, testing and inspection, adherence to all the handling and safety instructions is mandatory. **Failure to do so may result in injury or loss of life and damage to the equipment.**

Safety Symbols Information

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.

AVERTISSEMENT!

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

CAUTION!

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

ATTENTION

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

NOTE

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

CONSIGNES DE SÉCURITÉ IMPORTANTES

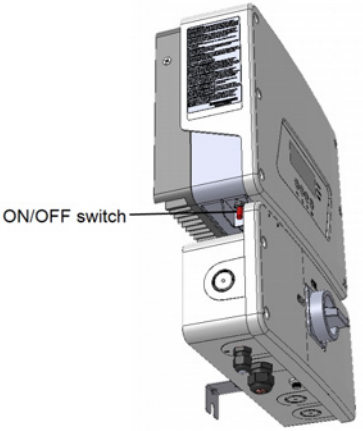
CONSERVEZ CES INSTRUCTIONS

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.

AVERTISSEMENT!

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.



WARNING!

Before operating the inverter, ensure that the inverter is grounded properly. This product must be connected to a grounded, metal, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the product.

AVERTISSEMENT!

Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre. Ce produit doit être raccordé à un système de câblage fixe, métallique, l'équipement-le conducteur de mise à la terre doit être exécuté avec les conducteurs de circuit et raccordé à l'équipement borne de mise à la terre ou de plomb sur le produit.

WARNING!

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

AVERTISSEMENT!

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

WARNING!

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

AVERTISSEMENT!

Le sectionneur externe (inclus) repond aux exigences de conformité pour l'installation de ce système . Le coupeur CC ouvre les conducteurs positifs et négatifs.

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.

AVERTISSEMENT!

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.

WARNING!

The inverter must be connected to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 50A.

AVERTISSEMENT!

Les onduleurs monophasé doivent être connectés à un branchement AC dédié avec un disjoncteur de 50A.

CAUTION!

This unit must be operated according to the technical specification datasheet provided with the unit.

ATTENTION!

Cette unité doit être utilisée selon les spécifications de fonctionnement, comme décrit dans la dernière fiche technique des spécifications.

CAUTION!

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

ATTENTION

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.

NOTE

Use only copper conductors rated for a minimum of 75°C/ 167°F.

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.

NOTE

A SolarEdge inverter may be installed in a site with a generator, however must not operate at the same time as the generator. Operating an inverter and a generator simultaneously will void the warranty. SolarEdge requires installing a physical or electronic interlock, which will prevent the generator and inverter from operating simultaneously. Interlock procurement, installation, maintenance and support are the responsibility of the installer. Damage to the inverter due to incorrect interlock installation or use of an interlock that is incompatible with the SolarEdge system will render the SolarEdge warranty invalid.

IMPORTANT SAFETY INFORMATION

To perform Rapid Shutdown, shut down AC power to the inverter. This can be done by turning off the AC breaker in the main service panel, which is an approved AC disconnect as described in the NEC.

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.

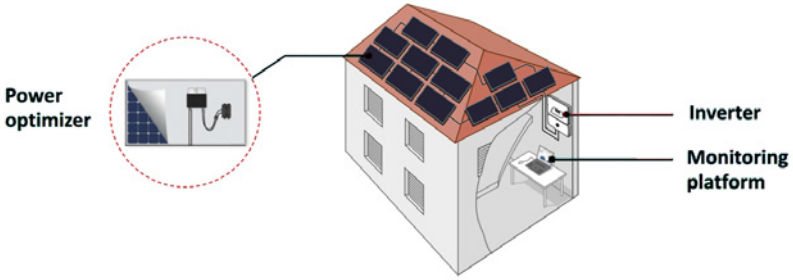


Figure 1: The SolarEdge power harvesting system components

Power Optimizer

The 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 ON/OFF switch is turned OFF
- The safety switch on the DC Safety Unit is turned OFF
- The inverter AC breaker is turned OFF
- The Rapid Shutdown (PVRSS) is initiated by one of the following methods:
    - Inverter AC breaker is turned OFF, or AC to the inverter is disconnected by another method (intentionally or as result of a fault)
    - Inverter ON/OFF switch is turned OFF
    - The DC Safety Unit 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 modules - the power optimizer is 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 platform; requires Internet connection).

Monitoring Platform

The monitoring platform 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 figures illustrate grids that are supported by SolarEdge single phase inverters. Refer to *Country and Grid* on page 41).

Ground connection is required for all grids, as described in *Connecting the AC Grid to the Safety Switch* on page 29.

Note that in some cases L1 and L2 are not interchangeable. In these places, L1 and L2 locations appear in the drawing.

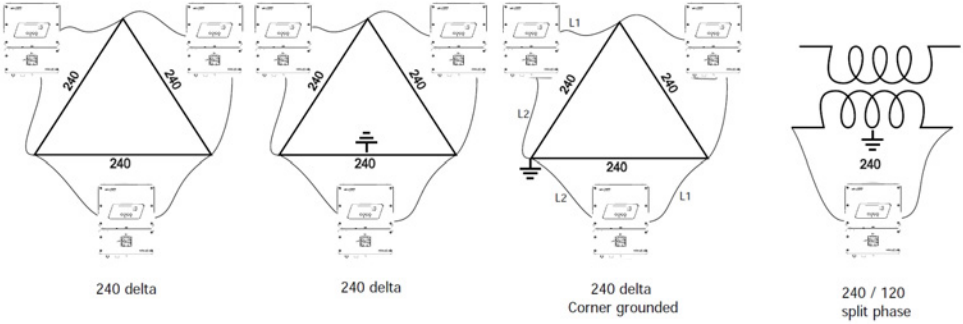


Figure 2: 240V AC grids supported by SolarEdge single phase inverter

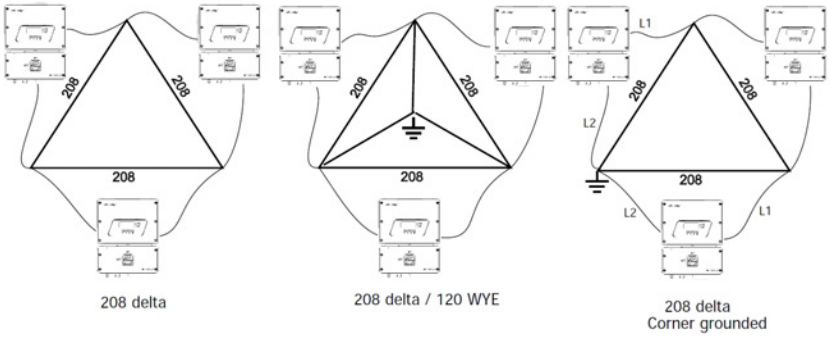


Figure 3: 208V AC grids supported by SolarEdge single phase inverter[1]

[1] 208V AC grids are only supported by some inverter models. Refer to the specification supplied with the inverter.

Installation Procedure

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 36.
3. Mounting the inverter, Page 25.
4. Connecting the AC and the String to the DC Safety Unit, page 29.
5. Commissioning and activating the installation, page 32.
6. Connecting the inverter to the monitoring platform, page 37.
7. Configuring the inverter, page 38.

Installation Equipment List

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 3mm screw type for the inverter cover, side screws, and Safety Switch cover.
- 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 drill guides
- Appropriate mounting hardware (for example: stainless bolts, nuts, and washers) for attaching:
  - the inverter mounting bracket to the mounting surface
  - the power optimizer to the racking (not required for smart modules)
- 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

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 the specification datasheet provided with the unit), 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. Some of the following may not be applicable to smart modules:

WARNING!

The metallic enclosure of the power optimizer must be grounded in accordance with the product's listing and local and national codes.

AVERTISSEMENT!

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

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.

AVERTISSEMENT!

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

CAUTION!

Power optimizers are IP68/NEMA6P rated. Choose a mounting location where optimizers will not be submerged in water.

ATTENTION!

Les optimiseurs de puissances sont compatibles à la norme IP68/NEMA6P. Choisissez le lieu de montage tel que l'optimiseur ne puisse pas être submergé par l'eau.

CAUTION!

This unit must be operated according to the operating specifications provided with the unit.

ATTENTION!

Cette unité doit être opérée suivant les instructions trouvées dans le manuel fourni avec le produit.

CAUTION!

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

ATTENTION!

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

CAUTION!

All PV modules must be connected to a power optimizer.

ATTENTION!

Tous les modules doivent être connectés à un optimiseur de puissance.

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.

ATTENTION!

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. To ensure mechanical compatibility of the power optimizers' connectors with the PV modules' connectors 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 module 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.

ATTENTION!

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:.

- *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

- Power optimizers
- Stainless steel grounding lock washers

Installation Guidelines

- Frame-mounted power optimizers are mounted directly on the module frame , regardless of racking system (rail-less or with rails). For installation of frame-mounted power optimizers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The steps in this chapter refer to module add-on power optimizers. For smart modules, start from *Step 3: Connecting Power Optimizers in Strings* on page 21 . Also refer to the documentation supplied with the smart modules.
- The power optimizer can be placed in any orientation.

- If connecting more modules than optimizer inputs in parallel, use a branch cable. Some commercial power optimizer models have a dual input.
- Position the power optimizer close enough to its module so that their cables can be connected.
- Make sure to use power optimizers that have the required output conductor length:
  - Minimize the use of extensions between power optimizers.
  - You can use extension cables between rows and from the end of string to the inverter.
  - *Do not* use extension cables between the modules and the power optimizers, or between two power optimizers within a string.
- The minimum and maximum string length guidelines are stated in the power optimizer datasheets. Refer to the Designer for string length verification. The Designer is available on the SolarEdge website at http://www.solaredge.us/products/installer-tools/site-designer#/.
- 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.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.
- To allow for heat dissipation, maintain a 2.5 cm / 1" clearance distance between the power optimizer and other surfaces, on all sides except the mounting bracket side.

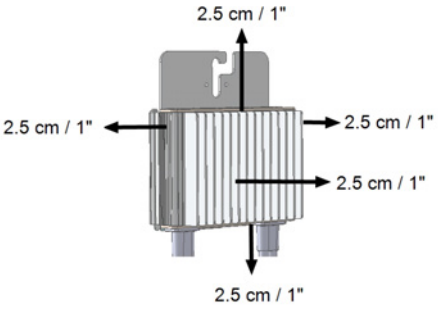


Figure 4: Power optimizer clearance

NOTE

The images contained herein are for illustrative purposes only and may vary depending on product models.

Step 1: Mounting and Grounding the Power Optimizers

For each of the power optimizers[1]:

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 5*). It is recommended to mount the poweroptimizer in a location protected from direct sunlight. For frame-mounted power optimizers follow the instructions supplied with the optimizers, or refer to https://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
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.

ATTENTION!

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 M6 (1/4") stainless steel bolts, nuts and washers or other appropriate mounting hardware. 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[2] to ground the power optimizer:

WARNING!

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

AVERTISSEMENT!

L'enceinte métallique de l'optimiseur de puissance doit être mise à la terre en accord avec les régulations 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. See *Figure 5*.

[1] Not applicable to smart modules.

[2] These methods have been evaluated by a nationally recognized testing laboratory as part of the optimizer evaluation. The SolarEdge-supplied grounding lug kit has been evaluated only for use with SolarEdge power optimizers. It is not intended or listed to be used as a general purpose grounding lug with other electrical equipment.

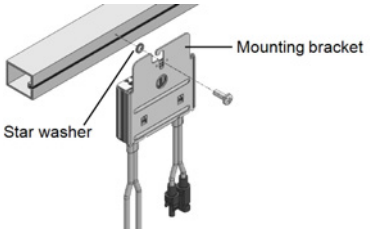


Figure 5: Power optimizer installation and grounding using a star washer

- **For mounting on rails with sliding nut fasteners**: If the star washer cannot be used, use the SolarEdge grounding plate (purchased separately) between the railing and the flat side of the mounting bracket. Use mounting specific hardware as needed. Apply torque of 9.5 N*m / 7 lb*ft. See *Figure 6*

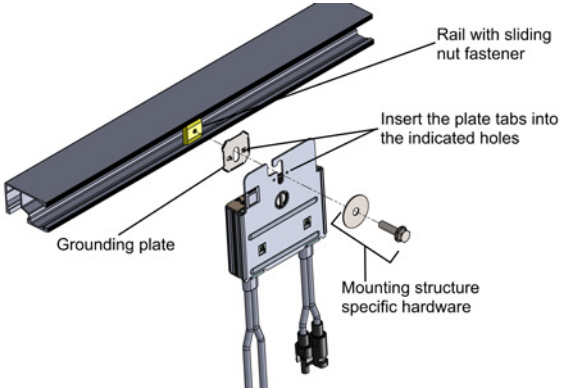


Figure 6: Power optimizer installation and grounding using a grounding plate

- **For mounting on un-grounded structures** (such as a wooden structure): If the star washer or the plate cannot be used, use the SolarEdge grounding lug (purchased separately) with an equipment-grounding conductor according to the supplied instructions. 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. See *Figure 7*

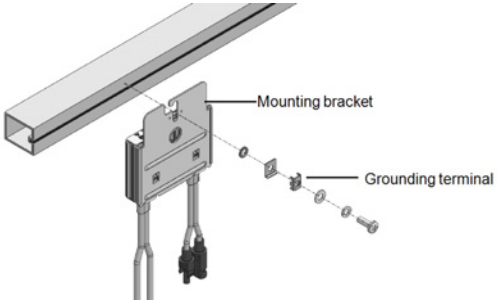


Figure 7: Power optimizer grounding terminal

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

6. Record power optimizer serial numbers and locations, as described in *Reporting and Monitoring Installation Data* on page 35.

Step 2: Connecting a PV Module to a Power Optimizer

NOTE

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

For each of the poweroptimizers:

- 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.

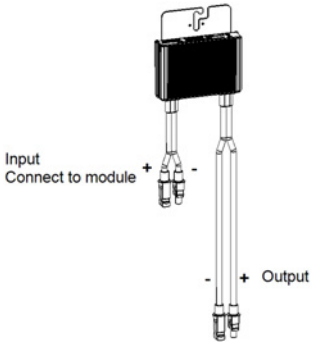


Figure 8: Power optimizer connectors

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 Designer for string length verification.

NOTE

- Use at least 11 AWG/ 4 mm² DC cables.
- The total cable length of the string (excluding power optimizers' cables) should not exceed 1000ft./300 m from DC+ to DC- of the inverter.

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.

WARNING!

If using a dual-input power optimizer and some inputs are not used, seal the unused input connectors with the supplied pair of seals.

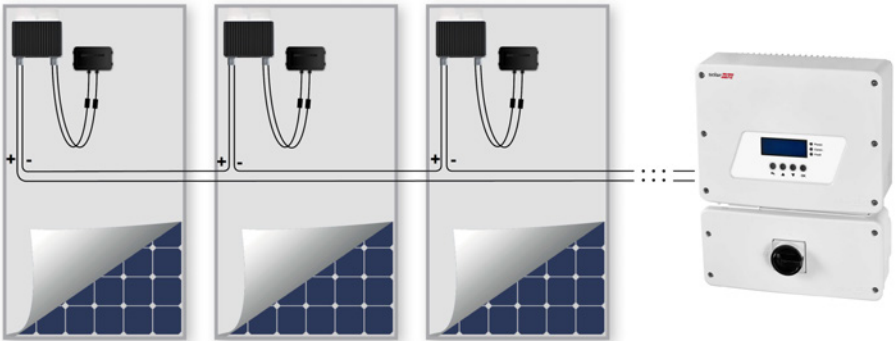


Figure 9: Power optimizers connected in series

3. If you intend to monitor the installation, using the monitoring platform, record the physical location of each power optimizer, as described in *Providing Installation Information* on page 36.

Step 4: Verifying Proper Power Optimizer Connection

When a module is connected to a power optimizer, the power optimizer outputs a safe voltage of 1V (±0.1V). Therefore, the total string voltage should equal 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 PV modules are exposed to sunlight during this process. The power optimizer will only turn ON if the PV module provides at least 2W.

In SolarEdge systems, due to the introduction of poweroptimizers 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_systems_technical_note.pdf.

To verify proper power optimizer 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.

NOTE

Since the inverter is not yet operating, you may measure the string voltage and verify correct polarity on the DC wires inside the Connection Unit.

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 68.

Chapter 3: Installing the Inverter

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

NOTE

Use only copper conductors rated for a minimum of 75°C/ 167°F.

Inverter Package Contents

- One inverter
- Mounting bracket kit
- DC Safety Unit sealing cover
- Installation guide (with activation card and instructions)
- For built-in wireless communication, antenna and mounting bracket

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 monitoring platform.

Inverter Interfaces

The following figure shows the inverter connectors and interfaces.

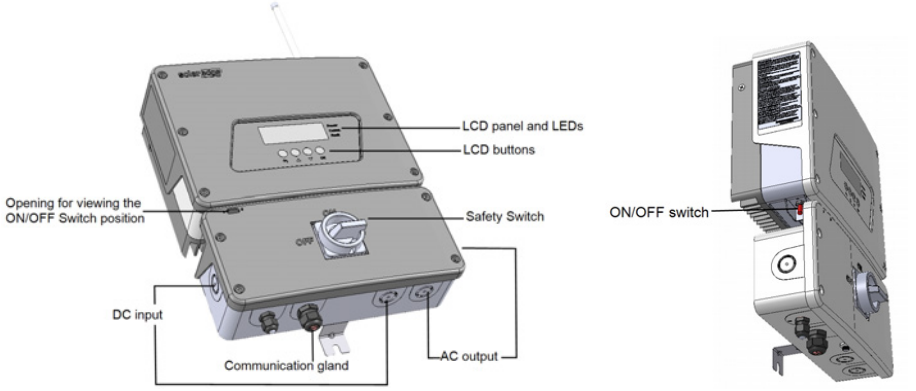


Figure 10: Inverter Interfaces

- **AC output**: For connection of the AC grid
- **DC input**: For connection of the PV installation
- **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 buttons**: Used for accessing configuration menu options and displaying status screens, as described in *Configuring the Inverter* on page 38. Pressing these buttons produces beeping sounds and lights up the LCD for 30 seconds.

- **Communication gland**: For connection of inverter communication options. Refer to *Setting Up Communication* on page 52 for more information.
- **Drain valve**: Drains any moisture that may be accumulated in the unit.
- **LCD panel**: Displays inverter information and configuration parameters
- **LCD LEDs**: Three LEDs located to the right of the LCD indicate the following inverter statuses:

Color	Description	Functionality
Green	Power production	**On** - The inverter is producing power. **Blinking** - Standby mode. The inverter is in Standby mode until its working voltage is reached. The inverter then enters Production mode and produces power. **Off** - 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.
Yellow	Communication and inverter shutdown	**Blinking**: ○ Monitoring information is being received from a power optimizer. ○ The inverter is being shut down.
Red	Fault	**On** - There is an error. Refer to *Errors and Troubleshooting* on page 62 for more information. **Blinking** - The inverter is being shut down.
All LEDs turn on while the inverter is being configured.		

Opening Conduit Drill Guides

This step may be performed before or after mounting the inverter.

To open conduit drill guides:

1. Move the DC Safety Unit 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.

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

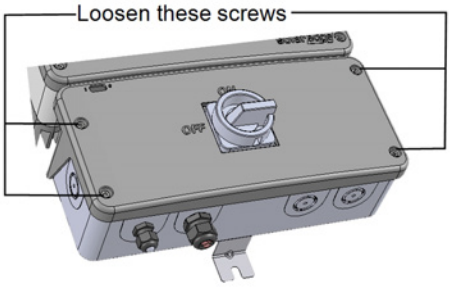


Figure 11: Opening the Safety Switch cover

3. Remove the Safety Switch cover.
4. Open the required AC and DC conduit drill guides according to the conduits used in the installation: The drill guides are located at the bottom and sides of the enclosure, each with two sizes: ¾" and 1". Open the required drill guides, taking care not to interfere with any of the internal components. It is recommended to use a Unibit drill.

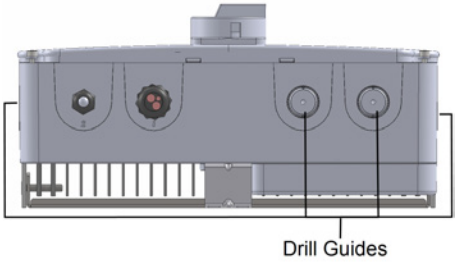


Figure 12: Safety Switch drill guides

NOTE

Unused conduit openings and glands should be sealed with appropriate seals.

Mounting the Inverter

The mounting brackets kit includes the following parts:

- Two brackets for mounting on a wall/ pole (screws not included)
- Two screws with washers for fastening the inverter brackets to the wall brackets.

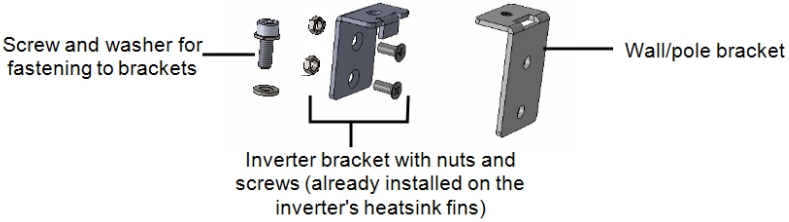


Figure 13: Mounting brackets and screws

NOTE

Make sure the mounting surface or structure can support the weight of the inverter.

CAUTION!

SolarEdge inverters can be installed at a minimum distance of 50 m/ 164 ft from the shoreline of an ocean or other saline environment, as long as there are no direct salt water splashes on the inverter.

AVERTISSEMENT!

Les onduleurs SolarEdge peuvent être installés à une distance minimum de 50m de la ligne d'eau de l'océan ou autre environnement salin, tant qu'il n'y a pas d'éclaboussements d'eau salée directs sur l'onduleur.

1. Determine the inverter mounting location, on a wall, stud framing or pole. It is recommended to mount the inverter in a location protected from direct sunlight.
2. To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:
   - If installing a single inverter:
     - 8" (20 cm) from the top of the inverter.
     - At least 4" (10 cm) from 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) from the right and left of the inverter.
   - If installing multiple inverters:
     - When installing inverters one above of the other, leave at least 12" (30 cm) between inverters.
3. The inverter brackets are attached to the designated heatsink fins ready for wall mounting. For installation on a pole, remove the two brackets and attach them to the central heatsink fin one below the other (do not over tighten so the bracket height can be adjusted).

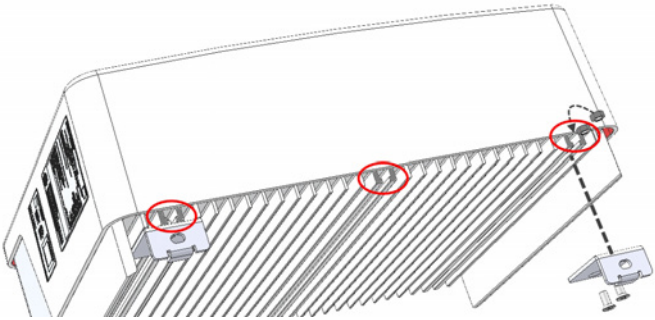


Figure 14: Mounting the inverter brackets

4. Position the wall mounting brackets against the wall/ pole and mark the drilling hole locations (refer to *Mechanical Specifications* on page 70 for inverter and mounting bracket dimensions).
5. Drill the holes and mount the brackets. Verify that the brackets are firmly attached to the mounting surface.

6. Hang the inverter on the bracket: 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. Lower the inverter so that the notches on the inverter brackets are inserted in the holes of the wall brackets, as shown below.

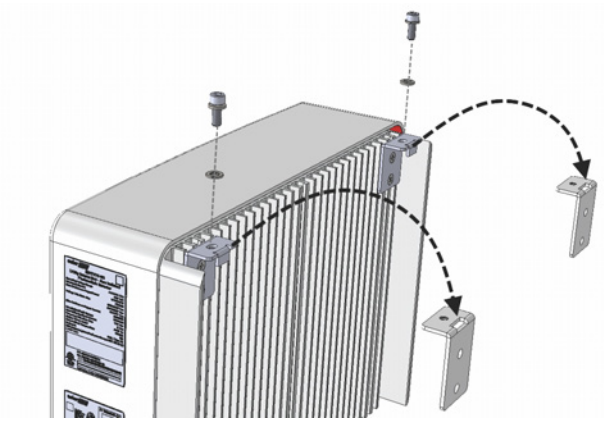


Figure 15: Hanging the inverter on the bracket

7. Optionally, secure the DC Safety Unit bracket to the wall/pole, using 1-3 screws:

NOTE

In case of inverter replacement with the DC Safety Unit still mounted, it is recommended to use all 3 holes.

a. Mark the location of the bracket screw for the Safety Switch, and optionally the two additional bracket holes.

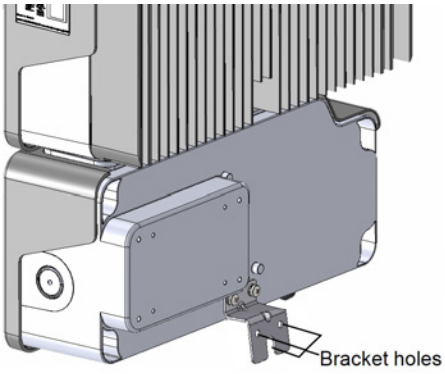


Figure 16: Safety Switch bracket

b. Remove the inverter from the wall/ pole.

c. Drill the hole for the Safety Switch bracket.

d. Hang the inverter on the mounted brackets.

e. Fasten the Safety Switch bracket using a standard bolt.

8. Insert the screws at the top of the inverter brackets and fasten the brackets together.
9. Verify that all the brackets are firmly attached to the mounting surface.

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 following figure illustrates the Safety Switch.

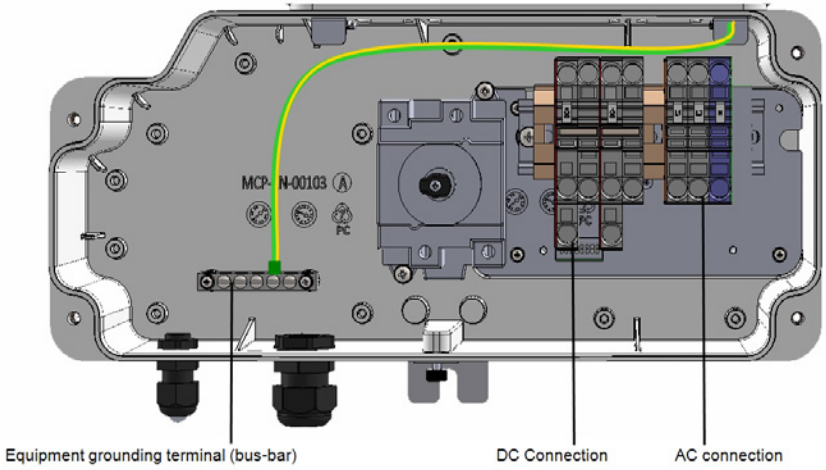


Figure 17: Inside the Safety Switch

Grid Connection Guidelines

- 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.
- 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.

NOTE

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 Safety Switch

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 drill guide 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, ⏚, 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.

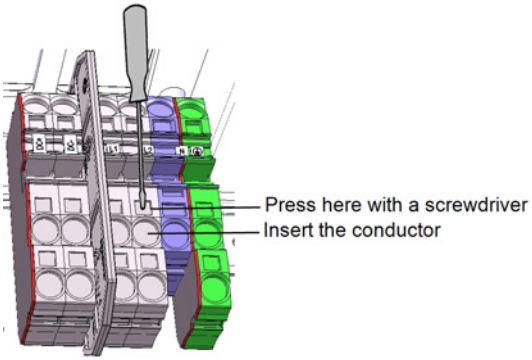


Figure 18: AC Connection

6. Verify that there are no unconnected wires.

Connecting the Strings to the DC Safety Unit

You can connect systems with multiple DC strings in parallel to the DC input terminals of the DC Safety Unit. Inverters may have a different number of pairs of DC input terminals, depending on the inverter power rating. If more strings are required, they can be connected in parallel using an external combiner box before connecting to the DC Safety Unit. When connecting multiple strings, it is recommended to run separate circuits to the DC Safety Unit or to position the combiner box near the DC Safety Unit. This simplifies commissioning by allowing testing and servicing near the inverter.

NOTE

Use 16-6AWG, 75-90°C copper wires only.

To connect the strings to the DC Safety Unit:

1. Equipment grounding: Connect the DC equipment ground conductor to the equipment grounding terminal block in the DC Safety Unit.

NOTE

Functional Electrical Earthing of DC-side negative or positive is prohibited because the inverter has no transformer. Equipment grounding of exposed conductive surfaces in the array is required per the NEC.

2. Insert the DC conduit into the DC-side opening on the DC Safety Unit (left side at the bottom of the DC Safety Unit).
3. Connect the DC wires to the DC+ and DC- terminal blocks, according to the labels on the terminals, connect two wires (DC+ and DC-) per string:
   a. 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.
   b. Insert the screwdriver and firmly tilt it to press the release mechanism and open the clamp.
   c. Insert the wire into the top opening.
   d. Remove the screwdriver – the wire is automatically clamped.

CAUTION!

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

ATTENTION!

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

NOTE

For systems with four PV strings per unit or more, fuses may need to be installed in both the positive and negative conductors as required by NEC Article 690.9. For more information, refer to the Technical Note “String Fusing Requirements in SolarEdge Systems” at http://www.solaredge.com/files/pdfs/string_fusing_requirements.pdf.

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.

5. Close the DC Safety Unit cover: Attach the switch cover and secure it by tightening the four screws with a torque of 1.2 0.9 ft.*lb.
6. Ensure proper conduit sealing; inspect the entire conduit run and use standard conduit sealants to avoid water penetration.

Chapter 5: Commissioning the Installation

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

Step 1: Activating the System

1. Verify that the inverter ON/OFF switch is OFF.
2. 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.

AVERTISSEMENT!

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

3. Activate the inverter:
   a. Verify that the card S/N matches the inverter S/N.
   b. Insert the card into the slot marked "**CARD**" on the communication board.
   c. Turn AC ON.
   d. LCD shows: `Running Script...` → `Done!`

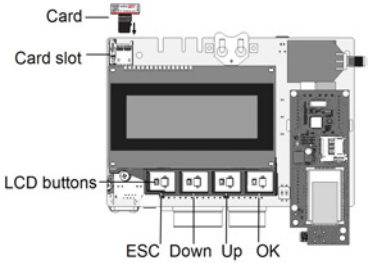


Figure 19: Communication board and activation card

If LCD shows: `Failed`:

- Turn AC OFF and ON (reset), and repeat the activation process.
- Use the activation code that appears on the certification inverter label to manually activate the inverter.
- If the problem persists, contact SolarEdge Support.

NOTE

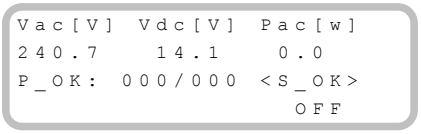
You can use the activation code that appears on the certification inverter label to activate the inverter in case of a script error or a missing activation card.

4. Verify that the inverter is configured to the proper country: Press the up or down buttons until reaching the ID status screen:

```
DSP1/2:1.0210/1.0034
CPU:0003.19xx
Country:USA1
```

5. If required, perform any additional connections before closing the inverter cover (for example: Communication options connection – refer to *Setting Up Communication* on page 52
6. Close the inverter cover by tightening the screws with a torque of 3.0 N*m/ 2.2 lb*ft.
7. 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:



8. Verify that the following information appears on the LCD panel:

   - **P_OK**: Appears only upon pairing process completion and first telemetry reception from the power optimizers. Indicates connection to the power optimizers and that at least one power optimizer is sending monitoring data.
   - **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.
   - **S_OK**: the connection to the SolarEdge monitoring platform 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 62.
   - **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 ±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. 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. Perform pairing: Press and hold down the inverter LCD OK 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
   ```

3. 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 68. 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.

WARNING!

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.

AVERTISSEMENT!

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 Wakeup mode until its working voltage is reached. This mode is indicated by the flickering green inverter LED.

While the inverter is in Wakeup 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.

Step 3: Verifying Proper Activation

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.
- **S_OK** appears, if the inverter is connected to the SolarEdge monitoring platform.
- **Vac [V]** specifies the measured grid AC output voltage.
- **Vdc [v]** specifies the DC input voltage, which should be approximately the inverter DC voltage (model dependent; refer to the inverter datasheet)
- **Pac [W]** specifies the AC output power produced.

2. Take note of the serial number on the inverter label using the detachable 2D barcode sticker on each device. This information is used in the SolarEdge monitoring platform to identify this inverter.

Your SolarEdge power harvesting system is now operational.

Reporting and Monitoring Installation Data

NOTE

This step requires connecting one of the communication options. Refer to *Setting Up Communication* on page 52.

The Monitoring System

The monitoring platform enables accessing site information, including up-to-date information viewed in a physical or logical view. The monitoring platform is described in detail in the *Monitoring Platform User Guide*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/solaredge-monitoring-platform-user-guide.pdf. The monitoring platform 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 platform, 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 is 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 Site Mapper application or the physical layout editor in the monitoring platform.

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

If you do not report the physical and logical mapping of the installed power optimizers to SolarEdge, the monitoring platform 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 monitoring platform via LAN or by using a ZigBee Gateway system or a Cellular Plug-in. Alternatively, you can use RS485 chain (bus) connection to connect multiple SolarEdge devices to one inverter that is already connected to the server, in a master/slave configuration. Refer to *Setting Up Communication* on page 52 .

Providing Installation Information

Use one of the following methods to connect your PV system to the monitoring platform.

Mapper Application

Android

Use the Mapper smart-phone application to scan the power optimizer and inverter 2D bar-codes, and map the system physical layout in the monitoring platform.This application is integrated with the monitoring platform and enables:

- Simple on-site registration of new systems.
- Creating, editing and verifying system physical layout.
- Scanning and assigning the power optimizer serial number to the correct location in the system physical layout.

For detailed information, refer to the *Mapper* demo movies:

- Creating new sites using the Mapper mobile application

- Mapping power optimizers using the Mapper mobile application

iPhone

Use the Mapper smartphone application to scan the power optimizer and inverter 2D bar-codes. This application creates an XML file that can be uploaded to the monitoring platform during site registration. The Mapper can be downloaded from the application stores.

For detailed information, refer to the *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 Monitoring Platform

Create the site in the monitoring platform using the registration form available at https://monitoring.solaredge.us/solaredge-web/p/login. Fill out all required information in the form, which includes information about your installation, as well as details about its logical and physical mapping.

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 monitoring platform during site registration. For an example paper template, refer to http://www.solaredge.us/files/pdfs/physical-layout-template.pdf.

Chapter 5: Configuring the Inverter

This chapter describes the interfaces to use for inverter configuration, and the configuration procedures.

LCD Buttons

Use the four buttons located beneath the LCD panel for controlling the LCD menus, setting the inverter configuration, and moving between the inverter status screens.

To use the LCD buttons when the inverter cover is removed, touch the white dots on the LCD button frame.

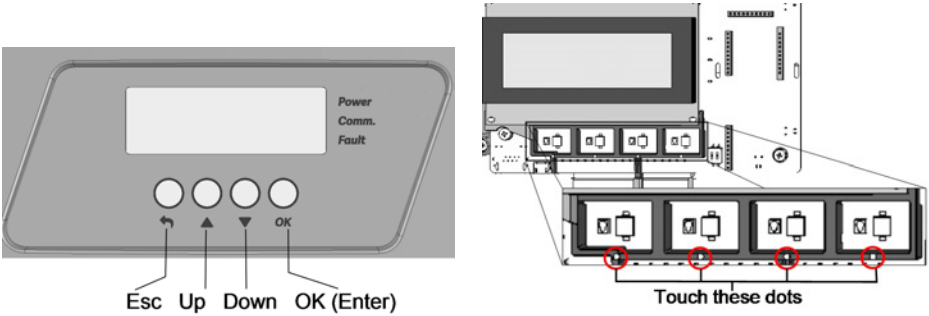


Figure 20: LCD buttons

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.
- **OK/Enter (3)**: Selects a menu option and accepts a value change with a long press (until **Applied** is displayed).

Use the three rightmost buttons **Up**, **Down** and **OK** sequentially for entering the Setup mode.

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 45 for a description of this option. Use the up and down buttons to toggle through the informative displays.
- **Setup mode**: Upon installation, an installer may perform basic configuration , as described in *Inverter Configuration – Setup Mode* on page 39.
- **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 62 and *Inverter Configuration – Setup Mode* on page 39.

Inverter Configuration – Setup Mode

After inverter installation, an installer 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.

AVERTISSEMENT!

La tension de sécurité par défault est de 50V.
Ne pas ouvrir le couvercle ou les connecteurs DC jusqu'à ce que la tension soit affichée comme sécurisé ou jusqu'à ce que cinq minutes au moins se soient écoulées.

2. Press the **OK** button for at least 5 seconds. The following message is displayed:

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

3. Press the **Up**, **Down** and **OK** buttons (Up=1, Down=2, OK=3) for entering the Setup mode password: ▲▼ **OK** ▲▼**OK** ▲▼ (12312312).

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 41. Actual menus may vary from shown depending on the firmware version of the inverter and on the country.

Main menu:

Country:

```
USA+
```

Language:

```
English
German
Spanish
French
Italian
```

Communication:

```
Server<LAN>
LAN Conf
```

```
RS485-1 Conf<S>
ZigBee Conf<S>
Cellular Conf
GPIO Conf <MTR>
```

Power Control:

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

Display:

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

Maintenance:

```
Date and Time
Reset Counters
Factory Reset
FW Upgrade
AFCI <Dis>
Diagnostics
Standby Mode
Grid Protection
Board Replacement
```

Information:

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

Configuration Menu Options

This section describes how to use the LCD menus for configuring the inverter.

Country and Grid

1. Select the **Country** option to specify the country or region 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 or region.

WARNING!

The inverter must be configured to the proper country/ region in order to ensure that it complies with the country grid code and functions properly with the country grids.

AVERTISSEMENT!

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** , the inverter automatically detects the used grid.
- 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.

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 platform
   - The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as energy meters or loggers.
2. Select **Server** to set which communication method is used to communicate between devices and the monitoring platform. Refer to *Setting Up Communication* on page 52 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.

Communication[1,2]:

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
Cellular Conf
GPIO Conf <MTR>
```

Server:

```
LAN
RS485
Zigbee
Cellular
None
```

LAN Conf:

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

RS485-1 Conf:

```
Device Type <SE>
Protocol <M>
Device ID <1>
Slave Detect <#>
Cluster SLV Detect
Long Slave Detect <#>
Slave List <#>
Multi-Inv. Set
```

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

```
Device Type<SE>
Protocol<MPS>
Device ID<1>
```

[1]When using the SolarEdge Cellular Plug-in with the provided SIM card, the Cellular Conf menu is unavailable.

[2]When using the SolarEdge GSM products, RS232 Conf menu is unavailable.

```
PAN ID
Scan Channel
Load ZB Defaults
```

RS232 Conf[1]:

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

GPIO Conf:

```
Device Type <RRCR>
```

Power Control

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

Power control options are detailed in the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf.

The Grid Control option may be disabled. Enabling it opens additional options in the menu.

The Energy Manager option is used for setting power export limitation, as described in the *Export Limitation Application Note*, available on the SolarEdge website at https://www.solaredge.com/sites/default/files/export_limitation_application_note_NA.pdf.

For P(Q) diagram refer to https://www.solaredge.com/sites/default/files/application_note_p_q_diagram_of_se_inverters_en_and_na.pdf

NOTE

SolarEdge inverters with "Grid Support" functionality (as marked on the inverter certification label), are compliant with UL 1741 Supplement A. The functionality is built into the inverter and no additional external device is required.

[1] When using the SolarEdge GSM products this menu is unavailable.

Display

Select **Display** to set the following:

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

- **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.

Maintenance

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

```
Date and Time
Reset Counters
Factory Reset
FW Upgrade
AFCI <Dis>
Diagnostics
Standby Mode
Grid Protection
Board Replacement
```

- **Date and Time**: Set the internal real-time clock. If connected to the SolarEdge monitoring platform, 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 platform
- **Factory Reset**: Performs a general reset to the default device settings.
- **FW Upgrade**: Perform a software upgrade by using an SD card. Refer to upgrading_an_inverter_using_micro_sd_card.pdf.
- **Diagnostics**: Displays the Isolation Status and optimizers status screens. Refer to http://www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf.
- **AFCI**: Enables or disables arc-fault self-test. Refer to http://www.solaredge.com/sites/default/files/arc_fault_detection_application_note_na.pdf .
- **Standby Mode**: Enables/disables Standby Mode - for remote commissioning.
- **Grid Protection**: Available in specific countries. Enables viewing and setting grid protection values.
- **Optimizer Conf.**: Opens the Rapid Shutdown menu, to enable/disable PVRSS.

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** (Revenue Grade Meter): A preassembled RGM or any external Energy Meter
  - **RGM2**: A second external Energy Meter
  - **ZB**: ZigBee MAC address
  - **Cell**: MEID (CDMA) or IMEI (GSM)

Status Screens - Operational Mode

During normal operation pressing the LCD buttons 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

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
```

- **Day**: since midnight
- **Month**: since 1st of the current month until today (inclusive)
- **Year**: since January 1st until today (inclusive)

If a meter (RGM) is connected to the inverter, the following status screen, showing the power and energy readings, is displayed in addition to the above screen.

If the meter is set to Export +Import, there are two status screens, with the first line displaying: "Export Meter" or "Import Meter". The following is an example of an export meter status:

```
Export Meter
Status:       <OK/Error#>
Power[W]:         xxxxx.x
Energy[Wh]:       XXXXX.X
```

- **Status**: Displays OK if the meter is communicating with the communication board.
- **<Error message>**: If there is a meter error, it is displayed in this line.
- **Power (W)**: Depending on the meter type connected to the inverter, this line displays the exported or imported power in Watts.
- **Energy (Wh)**: The total energy read by the meter, in Watt/hour. 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 exported to the grid.

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

NOTE

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

Telemetry Status

This screen 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: 10288063 1B
Energy[Wh]:56.7
Vdc_O[V]: 40.0
Vdc_I[V]: 38.3
I_in[A]: 7.8
Temp[C]: 28.0
```

- **Module**: Power optimizer serial number
- **Energy**: power optimizer energy
- **Vdc_O**: Power optimizer output voltage
- **Vdc_I**: Power optimizer input voltage (module voltage)
- **I_in**: Power optimizer input current
- **Temp**: Power optimizer temperature

ID Status

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

```
DSP1/2:1.0210/1.0034
CPU:0003.19xx
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>
     xxxxxxxx
<ERROR MESSAGE>
```

NOTE

If the connection method is CDMA (referred to as "Cellular" in the status screens) or GSM, the server screen is replaced with the Cellular or GSM status screens (see *Cellular Status* on page 49 and *GSM Status* on page 49).

- **Server**: The method of connection to the SolarEdge monitoring platform.
- **S_OK**: The connection to the SolarEdge monitoring platform is successful (should appear only if the is connected to the server).
- **Status**: Displays OK if the inverter established successful connection and communication with the specified server port/ (LAN, RS485 or ZigBee Plug-in).
- **xxxxxxxx**: Eight-bit Ethernet communication connection status: A string of 1s and 0s is displayed. 1 indicates OK, 0 indicates an error.
- **Error message**, according to failure. Refer to *Error Codes* on page 63.

IP Status

This screen 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 screen 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 (Personal Area Network Identification), the ID uniquely represents a device in a Zigbee network.
- **Ch.**: The ZigBee transceiver channel
- **ID**: The ZigBee transceiver ID
- **MID**: The Master ID of the coordinator (master) ZigBee Plug-in. This field is shown only in devices with router (slave) ZigBee cards, and after a successful ZigBee association. If a ZigBee Plug-in is not connected, a **No ZigBee** message is displayed instead of the **MID** field.

Cellular Status

If a cellular (CDMA) Plug-in is connected, this screen replaces the Server status screen:

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

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

GSM Status

If a GSM Plug-in is connected, this screen replaces the Server status screen:

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

- **Server**: The method of communication to the SolarEdge monitoring platform. Should display **Cell**.
- **Status**: Displays OK if the inverter established a successful physical connection to the modem.
- **S_OK**: The last communication to the SolarEdge monitoring platform was successful (appears if the inverter is connected to the platform). If S_OK is not displayed, refer to *Status Screens - Operational Mode* on page 45.
- **MNO**: The mobile network operator name
- **Sig**: The signal strength, received from the 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)
  - **LGR**: Non-SolarEdge logger
  - **MLT**: Multiple devices, such as meters and batteries

- **PROT**: The protocol type to which the port is set:
  - For a SolarEdge device:

RS485 protocol	ZigBee protocol
S: SolarEdge slave	
M: SolarEdge master	
	P2P: ZigBee point-to-point
	MPM: ZigBee multipoint master (for the ZigBee gateway or for load management by the inverter)
	MPS: ZigBee multipoint slave (for a ZigBee router card)

  - For electricity meters, refer to the *application note - Connecting an Electricity Meter to SolarEdge Devices* at http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide-na.pdf.
  - **SS**: SunSpec - for a non-SolarEdge logger (monitoring and control)

Smart Energy Management Status

This screen is displayed only when Smart Energy Management is enabled. The screen shows energy details of the site:

```
Site Limit:      7.0kW
Site Prod:      10.0kW
Site Export:     4.0kW
Self-consume:    6.0kW
```

- **Site Limit**: The limit that was defined for the site
- **Site Prod**: The power produced by the site
- **Site Export**: The power that is fed into the grid
- **Self-consume**: The PV power consumed by the site

For more information, refer to the *Export Limitation Application Note*, available on the SolarEdge website at https://www.solaredge.com/sites/default/files/export_limitation_application_note_NA.pdf.

Power Control Status

This screen is displayed only when Power Control is enabled (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)
  - P(U)
  - 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 *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf.

Chapter 6: Setting Up Communication

The inverter sends the following information to the monitoring platform:

- Power optimizer information received via the DC power lines (the PV output circuit)
- Inverter information
- Information of any other connected devices

This chapter describes setting up communication between:

- the inverter and the monitoring platform through the Internet (wired/ wireless), or through a cellular connection
- multiple inverters for a master/slave configuration

Communication setup is not required for power harvesting, however it is needed for using the monitoring platform.

CAUTION!

When connecting the communication cables, make sure that the ON/OFF switch on the DC Safety Unit is turned OFF, and the AC is turned OFF.

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

ATTENTION!

Lors de la connexion des câbles de communication, assurez-vous que l'interrupteur MARCHE/ARRÊT à la base de l'onduleur soit en position ARRÊT, et le CA est en position ARRÊT. Lors de la configuration des paramètres de communication, assurez-vous que l'interrupteur MARCHE/ARRÊT soit en position ARRÊT, et le CA est en position MARCHE.

Communication Options

The following types of communication can be used to transfer the monitored information from the inverter to the monitoring platform.

Only communication products offered by SolarEdge are supported.

Ethernet

Ethernet is used for a LAN connection. For connection instructions refer to *Creating an Ethernet (LAN) Connection* on page 55.

RS485

RS485 is used for the connection of multiple SolarEdge devices on the same bus in a master-slave configuration. RS485 can also be used as an interface to external devices, such as meters and third party data loggers.

- RS485-1: Enables the connection of multiple devices (inverters/Commercial Gateway) over the same bus, such that connecting only one device to the Internet is sufficient to provide communication services for all the devices on the bus.
- RS485 Plug-in: The RS485 Plug-in provides an additional RS485 port for the inverter for enhanced communications. The kit contains a module, which is installed on the communication board, and has a 3-pin RS485 terminal block. This kit is provided with an installation guide, which should be reviewed prior to connection see, https://www.solaredge.com/sites/default/files/RS485_expansion_kit_installation_guide.pdf

For connection instructions refer to *Creating an RS485 Bus Connection* on page 58.

Cellular

This wireless communication option (purchased separately) enables using a cellular connection to connect one or several devices (depending on the data plan used) to the monitoring platform.

The GSM Plug-in is provided with a user manual, which should be reviewed prior to connection. Refer to https://www.solaredge.com/sites/default/files/cellular_gsm_installation_guide.pdf

ZigBee

This option enables wireless connection of one or several devices to a ZigBee Gateway, for wireless communication to the monitoring platform.
The ZigBee Gateway is provided with an installation guide, which should be reviewed prior to connection. Refer to https://www.solaredge.com/sites/default/files/se-zigbee-home-gateway-installation-guide.pdf.

Communication Connector

A communication gland with multiple openings is used for connection of the various communication options. The table below describes the functionality of each gland opening. Unused openings should remain sealed.

Opening for cable size (diameter)	Connection type
2.5 - 5 mm	RS485
4.5 - 7 mm, with cut	Ethernet (CAT5/6)
2 - 4 mm, with cut	ZigBee, CDMA or GSM antenna cable

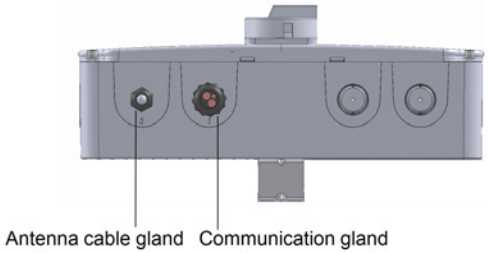


Figure 21: Communication Gland

The communication board has a standard RJ45 terminal block for Ethernet connection, a 6-pin terminal block for RS485 connection, and an 8-pin connector for power control devices.

The SolarEdge ZigBee Plug-in and the CDMA plug-in can be connected to the communication board for optional wireless connection.

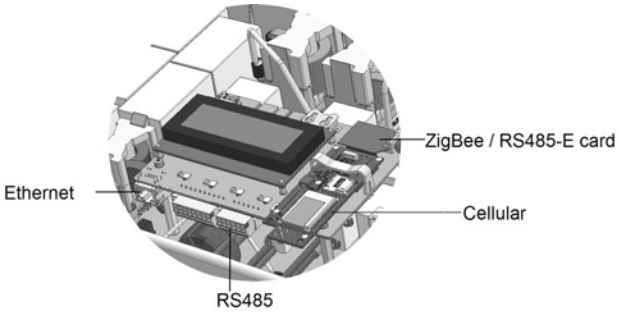


Figure 22: Communication board connectors

Removing the Inverter Cover

If the inverter cover is not already removed, use the following procedure for cover removal.

To remove the inverter cover

1. Turn the inverter ON/OFF switch to OFF. Wait 5 minutes for the capacitors to discharge.

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.

AVERTISSEMENT!

La tension de sécurité par défault est de 50V.
Ne pas ouvrir le couvercle ou les connecteurs DC jusqu'à ce que la tension soit affichée comme sécurisé ou jusqu'à ce que cinq minutes au moins se soient écoulées.

2. Turn the Safety Switch to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
4. Open the inverter cover (see *Figure 23*):
   a. Release the six Allen screws of the cover.
   b. Tilt the top of the cover towards you.
   c. Slide the cover down and remove it.

CAUTION!

When removing the cover, make sure not to damage the internal components. SolarEdge will not be held responsible for any components damaged as a result of incautious cover removal.

ATTENTION!

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.

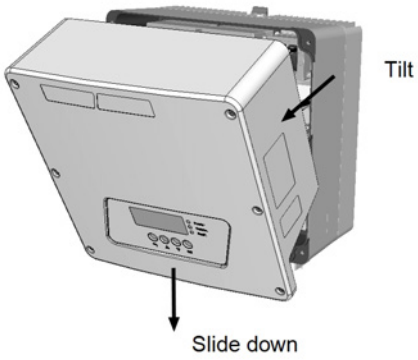


Figure 23: Removing the Inverter Cover

Creating an Ethernet (LAN) Connection

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

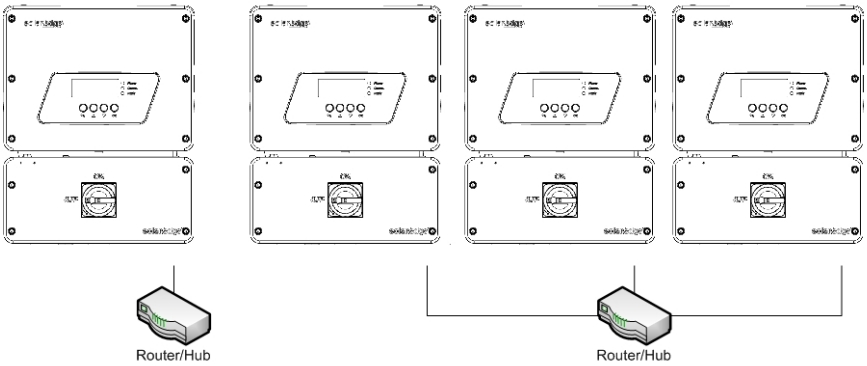


Figure 24: Example of Ethernet connection

Ethernet cable specifications:

- Cable type – a shielded Ethernet cable (Cat5/5E STP) may be used
- 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 recommend to use external surge protection devices.

For details refer to: http://www.solaredge.us/files/pdfs/lightning_surge_protection.pdf.

To connect the Ethernet cable:

1. Remove the inverter and Safety Switch covers as described in *Removing the Inverter Cover* on page 54.
2. Open the communication gland #1.

CAUTION!

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

ATTENTION!

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

3. Remove the plastic seal from one of the large openings.
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. Insert the cable through the opening in the Safety Switch towards the communication board.
6. Push the cable into the cut opening of the rubber fitting.

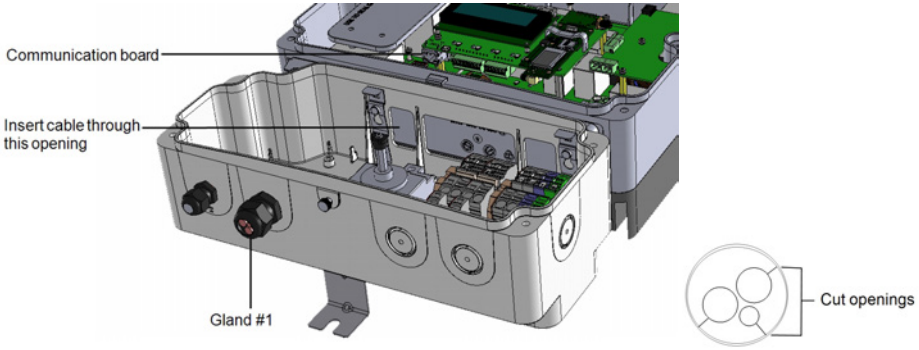


Figure 25: Communication glands and rubber fitting

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[1]		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-

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

RJ45 Pin #	Wire Color[1]		10Base-T Signal 100Base-TX Signal
	T568B	T568A	
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved

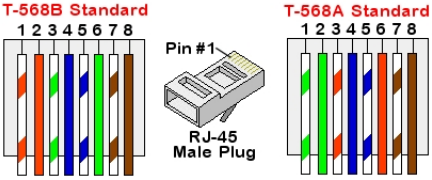


Figure 26: Standard cable wiring

7. Use a pre-crimped 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 the gland.
   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 26*
   d. Use a crimping tool to crimp the connector.
   e. Connect the Ethernet connector to the RJ45 port on the communication board.

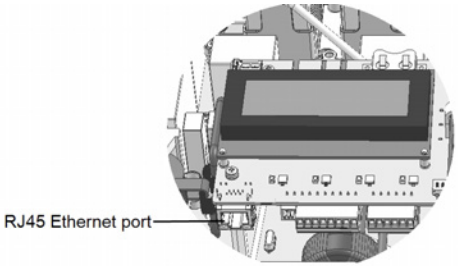


Figure 27: The RJ45 Ethernet connection

8. For the switch/router side, use a pre-crimped 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 26*).
9. 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 platform.

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

10. 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.

AVERTISSEMENT!

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 41.

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)

11. Verify the connection, as described in *Verifying the Connection* on page 61.

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 as described on page 60.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a shielded Ethernet cable (Cat5/5E STP) may be used)
- Wire cross-section area: 0.2- 1 mm²/ 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: https://www.solaredge.com/sites/default/files/overvoltage_surge_protection_na.pdf.

If grounded metal conduit are used for routing the communication wires, a lightning protection device is not required.

If not using surge protection, connect the grounding wire to the first inverter in the RS485 chain; make sure the grounding wire is not in contact with other wires. Connect the grounding wire to the grounding bus-bar in the DC Safety Unit.

NOTE

An additional RS485 port (RS485-Plug-in) is available from SolarEdge, allowing configuration of multiple RS485 buses for communications in large sites; Refer to http://www.solaredge.us/files/pdfs/RS485_expansion_kit_installation_guide.pdf).

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 54.
2. Remove the seal from one of the openings in communication gland and insert the wire through the opening.
3. Pull out the 6-pin RS485 terminal block connector, as shown below:

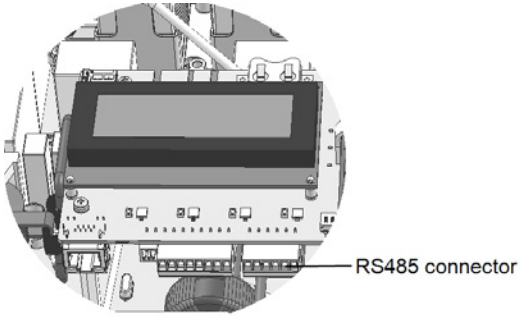


Figure 28: The RS485 terminal block

4. Loosen the screws of pins A(+), B(-), and G on the left of the RS485 terminal block (RS485-1).

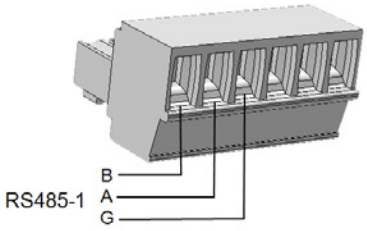


Figure 29: RS485 terminal block

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
   - The wire for G is not from the same twisted pair as A or B.

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

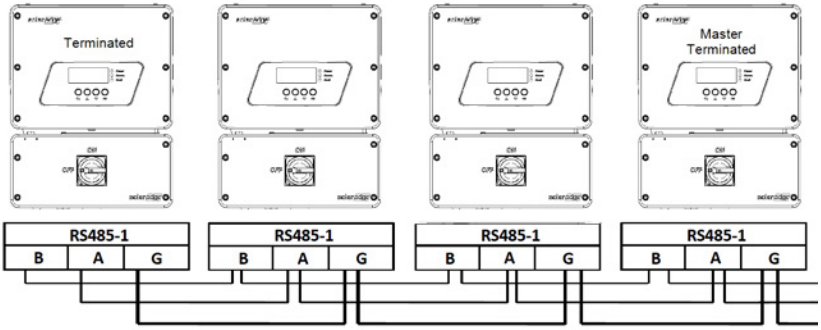


Figure 30: Connecting the inverters in a chain

NOTE

Do not cross-connect B, A and G wires.

7. Tighten the terminal block screws.
8. Check that the wires are fully inserted and cannot be pulled out easily.
9. Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.
10. Terminate the first and last SolarEdge device in the chain by switching a termination DIP-switch inside the inverter to ON (move the left switch up). The switch is located on the communication board and is marked SW2.

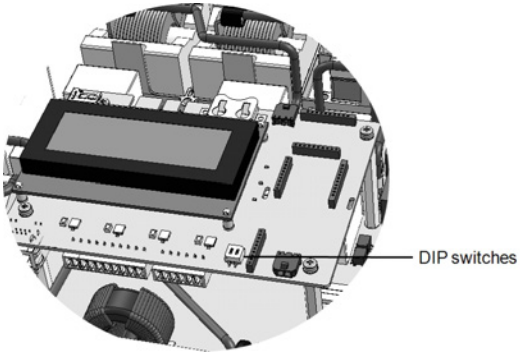


Figure 31: RS485 termination switch

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).

11. If not using surge protection, connect the grounding wire to the first inverter in the RS485 chain; make sure the grounding wire is not in contact with other wires. For inverters with a DC Safety Unit, connect the grounding wire to the grounding bus-bar in the DC Safety Unit.

To connect to the monitoring platform:

1. Designate a single inverter as the connection point between the RS485 bus and the SolarEdge monitoring platform. This inverter will serve as the master inverter.
2. Connect the master to the SolarEdge monitoring platform 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. Make sure the ON/OFF switch is OFF.
2. 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.

AVERTISSEMENT!

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

3. Use the internal buttons to configure the connection (slightly touch the black square buttons). 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**

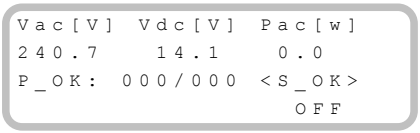
   The system starts automatic detection of the slave inverters connected to the master inverter. The inverter should report the correct number of slaves. If it does not, verify the connections and terminations.
4. Verify the connection of the master to the monitoring platform, as described in the next section.

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 3.0 N*m/ 2.2 lb.*ft. For proper sealing, first tighten the corner screws and then the two central screws.
2. If not already ON - 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 platform. This may take up to two minutes.

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



S_OK: Indicates that the connection to the SolarEdge monitoring platform is successful. If S_OK is not displayed, refer to *Troubleshooting Communication on page 62.*

Appendix A: Errors and Troubleshooting

This appendix describes general system problems, and how to troubleshoot them. For further assistance, contact SolarEdge Support.

Troubleshooting Communication

Troubleshooting Ethernet Communication

When using Ethernet communication, use the **Server Communication Status** window to identify the location of the error:

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

xxxxxxxx is a string of 1s and 0s showing an eight-bit communication connection status. 1 indicates OK and 0 indicates an error.

Bit Location	Error Message	Cause and Troubleshooting
1st	LAN Disconnected	Physical connection fault. Check the cable pin-out assignment and cable connection. Refer to *Creating an Ethernet (LAN) Connection* on page 55
2nd	DHCP Failed, or Invalid DHCP Config	IP settings issue. Check the router and configuration. Consult your network IT.
3rd	Gateway Ping Failed	Ping to router failed. 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.
4th	G Server Ping Failed	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 or connection to SolarEdge server failed. Check the SolarEdge server address, under **LAN Conf** submenu: Address: prod.solaredge.com Port: 22222 Check with your network administrator whether a firewall or another device is blocking transmission.
6th		
7th		
8th	Tcp Connect. Failed	

Troubleshooting RS485 Communication

1. If the message **Master Not Found** appears, check the connections to the master device and fix if required.
2. If after slave detection the number of slaves displayed in the master under **RS485-X Conf → Slave Detect** is smaller than the actual number of slaves, use one of the following methods to identify missing slaves and troubleshoot connectivity problems:
   - Use the **Long slave Detect** to retry connecting to slaves
   - Analyze the **Slave List** to check for missing slaves, and check their connection

   Refer to https://www.solaredge.us/sites/default/files/troubleshooting_undetected_RS485_devices.pdf

Additional Troubleshooting

1. Check that the modem or hub/router is functioning properly.
2. Check that the connection to the internal connector on the communication board is properly done.
3. Check that the selected communication option is properly configured.
4. 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.
5. Check whether a firewall or another type of network filter is blocking communication.

Error Codes

The error messages include an error number (in firmware version 3.18xx and before) or a code (in Firmware version 3.19xx and above) and a description:

```
Error Code XXX
(3xD2)
Error Code 3xD2

<Line 1>
<Line 2>
```

XXX: The error number (firmware version 3.18xx and before).

(#-X#): A code indicating the source of error and the error information (firmware version 3.19xx and later).

Line 1-2: Error description

The error numbers/ codes may differ depending on the inverter type as described in the table below. For troubleshooting errors that are not listed, contact SolarEdge support.

Make sure to have this information at hand when contacting SolarEdge Support for advanced troubleshooting.

Code		Error Message	Troubleshooting
CPU v3.18xx and below	CPU v3.19xx and above		
44	3xB	No Country Selected	Select the country as described in *Country and Grid* on page 41
45	3x2	Inv. Comm. Error	No communication with the digital board. Contact SolarEdge support.
48	3xF	SW Error	Contact SolarEdge support.
176	3x6A	For info contact your installer	Inverter remotely locked. Contact your installer.
178	3x6D	Internal RGM Error	Check: • The wiring of the meter CTs • Connections to the inverter communication board.
185	3x6E	Meter Comm. Error	Refer to the meter troubleshooting in http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide-na.pdf
193	3x6A	OFF/ON to Reconnect	Turn the ON/OFF switch to ON to initiate production.
169	18xA9		RCD Sensor Error. Contact SolarEdge support.
166-168, 170	18xA6-A8 , 18xAA	HW error	Contact SolarEdge support.
171	18xAB	Over voltage Vin	Over voltage in DC input of the inverter. Check the strings' voltage.
12	18xC	ARC_ DETECTED	Refer to https://www.solaredge.com/sites/default/files/arc_fault_detection_application_note_na.pdf.
13	18xD	ARC_PWR_ DETECT	
55	18x37	V-Line Max	AC voltage too high ○ Verify that the inverter is set to the correct country. ○ Turn OFF the inverters in the site and verify AC grid voltage.

Code		Error Message	Troubleshooting
CPU v3.18xx and below	CPU v3.19xx and above		
			○ If the inverter is located far from the connection point to the grid, use a larger gauge AC wire. ○ Consult the grid operator. ○ If permitted by local authorities, change the grid protection values. Refer to http://www.solaredge.com/files/pdfs/viewing_grid_protection_values.pdf
56	18x38	V-Line Min	AC voltage too low ○ Verify that the inverter is set to the correct country. ○ Consult the grid operator. ○ If permitted by local authorities, change the grid protection values. Refer to http://www.solaredge.com/files/pdfs/viewing_grid_protection_values.pdf
57, 59, 60	18x39/3B/3C	I-ACDC L1/L2/L3	AC overcurrent. Contact SolarEdge support.
61	18x3D	I-RCD STEP	Ground Current – RCD. Contact SolarEdge support.
62	18x3E	I-RCD MAX	
64-66	18x40-59/A-F	F-L1/L2/L3 **Max** 1/2/3	AC frequency too high (Line 1/2/3) ○ Verify that the inverter is set to the correct country. ○ Consult the grid operator. ○ If permitted by local authorities, change the grid protection values. Refer to http://www.solaredge.com/files/pdfs/viewing_grid_protection_values.pdf
67-69	18x40-59/A-F	F-L1/L2/L3 **Min** 1/2/3	AC frequency too low (Line 1/2/3) Handle as for the error above.
96,98	18x60/18x62	Islanding Trip1/2	AC grid voltage malfunction. When AC voltage returns the inverter should restart after the reconnection time. If the problem persists, consult with the grid operator.
100-102	18x64-66	TZ L1/L2/L3	AC overcurrent. Contact SolarEdge support.
111-113	18x6F/70/71	Vsrg L1/L2 /L3 Max	AC voltage surge. ○ Check the AC connection to inverter. ○ Verify that the inverter is set to the correct country. ○ Check with the grid operator if a large surge source or irregular load exists near the site. ○ Verify that the output wire size matches the distance between the inverter and the location of the grid connection. ○ Use a larger gauge wire for the AC

Code		Error Message	Troubleshooting
CPU v3.18xx and below	CPU v3.19xx and above		
			output. ○ Refer to the *AC Wiring Application Note* http://www.solaredge.us/files/pdfs/application-note-recommended-wiring.pdf
117	18x75	Overtemp	Temperature too high ○ Verify proper inverter clearances. ○ Make sure the heat-sink fins are clean and unobstructed.
118	18x76	Undertemp	Temperature too low Make sure the inverter is installed in a location with ambient temperatures within the range specified in the datasheet.
123	18x7B	MainError	Grid measurements are out of range. Contact the grid operator.
127	18x7F	IRCDMax	RCD current surge. Ground faults may occur due to insufficient insulation to the ground. **WARNING!** ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed. **AVERTISSEMENT!** *RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.* Only a qualified technician should handle this problem, and only after taking proper precautions. 1. Turn the inverter ON/OFF switch to OFF. 2. Wait five minutes for the input capacitors to discharge. 3. Disconnect the AC breaker. 4. Disconnect the DC inputs. 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. ○ Do not connect strings with a grounding fault to the inverter. A certified installer must fix the faulty string before connecting it to the inverter ○ For further documentation, contact SolarEdge Support.
133	18x85	Temp Sensor fault	Broken or unconnected temperature sensor. Contact SolarEdge Support.

Code		Error Message	Troubleshooting
CPU v3.18xx and below	CPU v3.19xx and above		
134	18x86	Isolation	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. ○ Check the PV installation for isolation problems and ground leakage. ○ Only a certified PV installer must fix the faulty string before connecting it to the inverter. ○ Refer to www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf
137	18x89	RCD Test	Contact SolarEdge support.
158	18x9E	Controller 3 Err	Contact SolarEdge support.
163	18xA3-5	Tz Over current 1/2/3	Contact SolarEdge support.
166-168	18xA6-8	Tz Over voltage cap1/2/3	○ Verify that the inverter is set to the correct country. ○ Turn OFF the inverters in the site and verify AC grid voltage. ○ If the inverter is located far from the connection point to the grid, use a larger gauge AC wire. ○ Consult the grid operator. ○ If permitted by local authorities, change the grid protection values. Refer to http://www.solaredge.com/files/pdfs/viewing_grid_protection_values.pdf
169	18xA9	Tz Over current Rcd	Contact SolarEdge support.
178-180	18xB2-4	Vf1/2/3 surge	Ground current surge. ○ Check the AC connection to the inverter ○ Check with the grid operator if a large surge source or irregular load exists near the site. ○ If the grid does not have problems contact SolarEdge support.
199	18xC7	RSD Error	Rapid Shutdown hardware error. Contact SolarEdge support.

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 https://www.solaredge.us/sites/default/files/non_reporting_power_optimizers.pdf

Problem	Possible cause and troubleshooting
Pairing failed	Power optimizers are shaded. If you connected the inverter to the monitoring platform, retry pairing remotely (during sunlight). Make sure to leave the inverter ON/OFF switch ON and that S_OK appears in the status screen.
String voltage is 0V	Power optimizer (s) output is disconnected. Connect all power optimizer outputs.
String voltage not 0V but lower than number of optimizers	Power optimizer(s) not connected in the string. Connect all power optimizers
	Module(s) not connected properly to power optimizer inputs (not applicable to smart modules). Connect the modules to the optimizer inputs
	String reverse polarity. Check string polarity using a voltmeter and correct if needed.

Problem	Possible cause and troubleshooting
String voltage is higher than number 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 ±1% per string is reasonable. *Si la tension mesuree est trop haute, la tension basse de securite pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION. Une deviation de ±1% par string est raisonnable.*	Extra power optimizer(s) connected in the string (not applicable to smart modules). 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 (not applicable to smart modules). 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. Power optimizer(s) malfunction. ○ Disconnect the wires connecting the power optimizers in the string. ○ Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizeris located, check its connections, polarity, module, and voltage. ○ Contact SolarEdge Support. 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.

Appendix B: Mechanical Specifications

The following figure provides inverter dimensions in mm [in].

Mounting Brackets Type 1

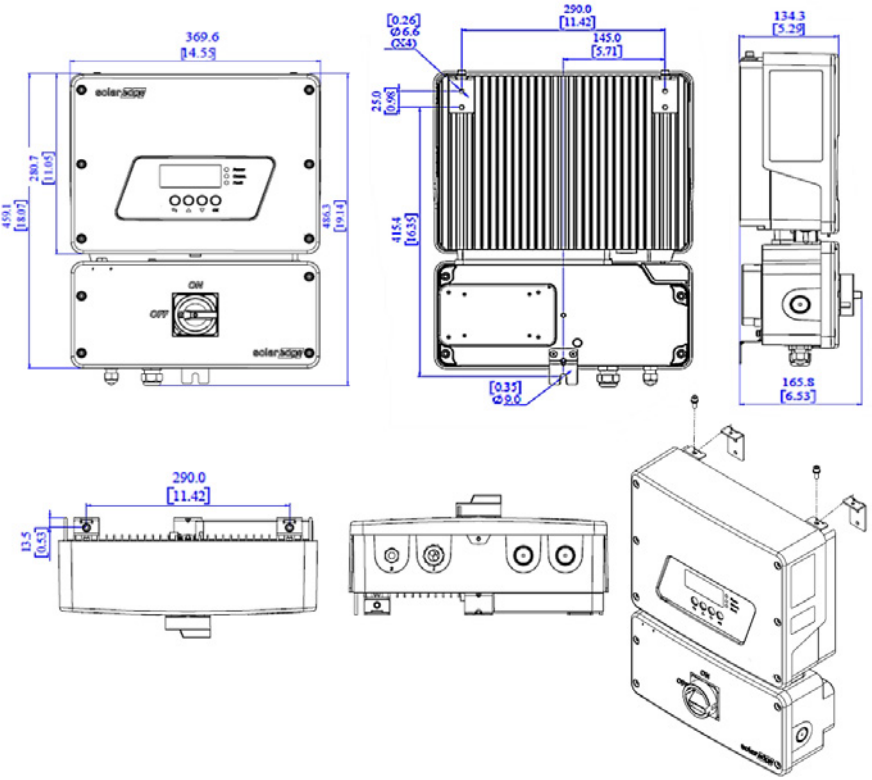


Figure 32: SE3000H-US - SE7600H-US Inverter dimensions

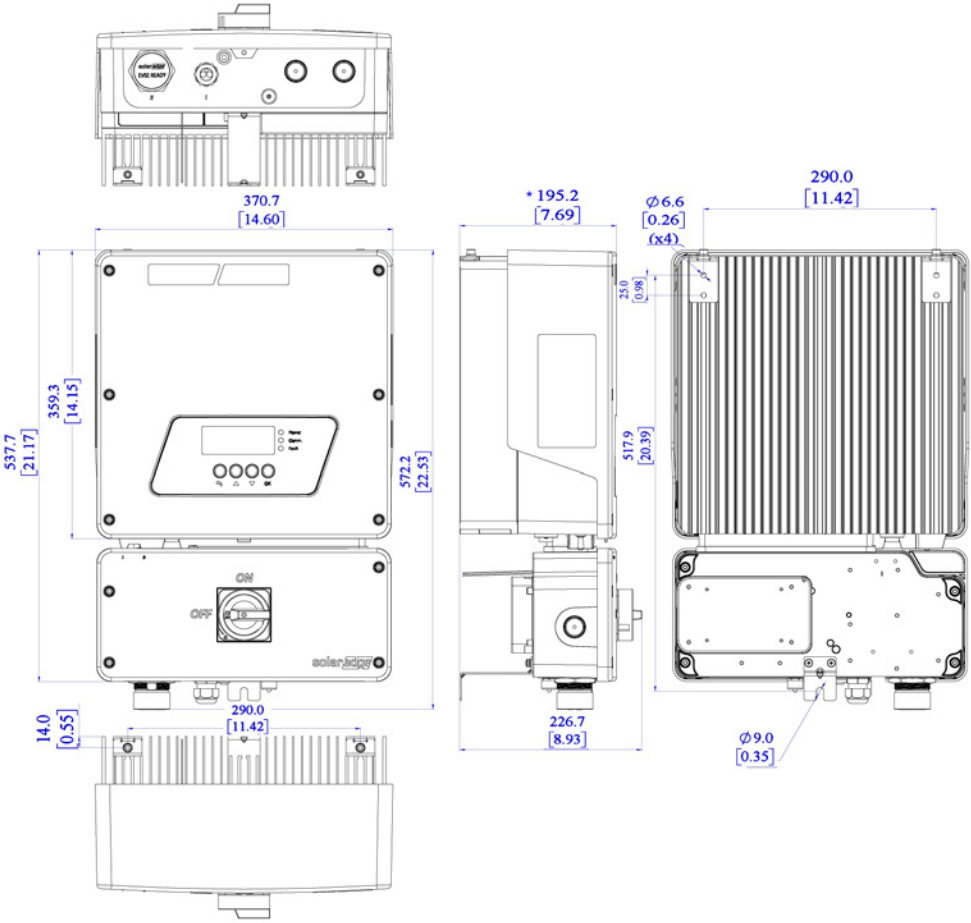


Figure 33: SE10000H-US - SE11400H-US inverter dimensions

Mounting Bracket Type 2

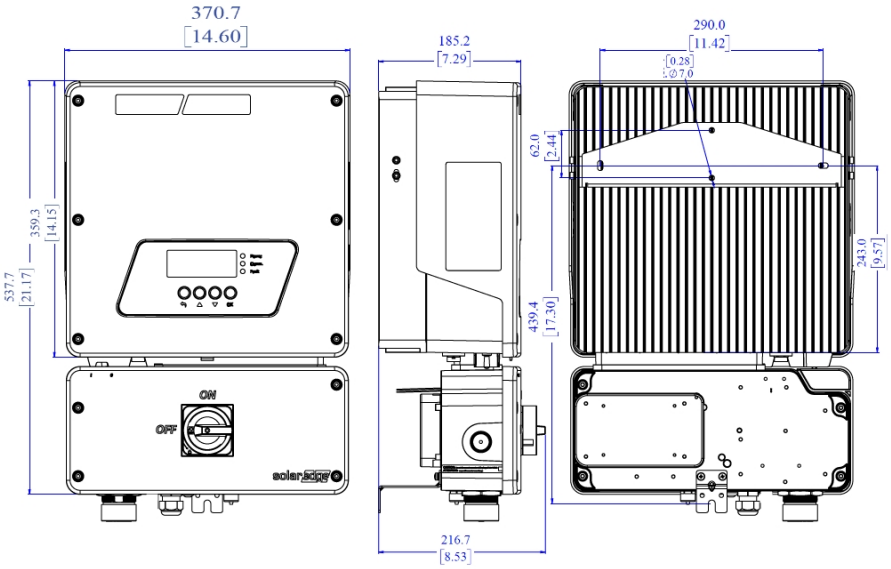


Figure 34: 10K - 11.4K inverter dimensions

Appendix C: 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.

Fuse Replacement

The inverter is equipped with a fuse, located at the top right corner of the inverter.

Fuse replacement kits are available from SolarEdge or you can use other fuses with identical ratings.

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.

AVERTISSEMENT!

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 DC Safety Unit .
3. Open and remove the inverter cover.
4. Remove the existing fuse from the upper corner of the inverter and replace with a new fuse.
5. Close the inverter cover.

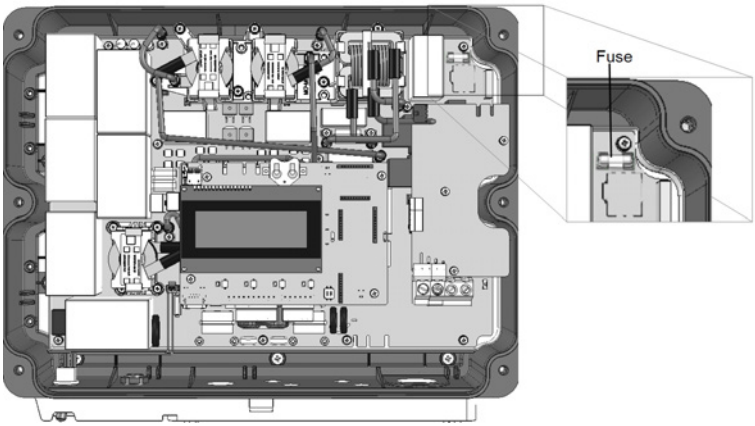


Figure 35: Inverter fuse

6. Turn ON:
   - The inverter ON/OFF switch
   - The DC Safety Unit
7. Verify proper system operation.

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.

AVERTISSEMENT!

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. Disconnect the AC to the inverter by turning OFF the AC circuit breaker of the distribution panel.
3. Turn OFF the DC Safety Unit.
4. Open the DC Safety Unit cover: Release the four Allen screws and remove the cover.
5. Open the inverter cover as described in *Removing the Inverter Cover* on page 54.
6. Disconnect the DC and AC cables from the DC Safety Unit.
7. Disconnect the wires connected between the inverter and the DC Safety Unit:
   - Antenna cable from the communication board
   - DC and AC wires in the DC Safety Unit
   - Grounding cable
8. Disconnect the DC Safety Unit from the inverter by opening the two clips securing the DC Safety Unit to the inverter: Carefully place a screwdriver between the clip and the enclosure and pull the clip.

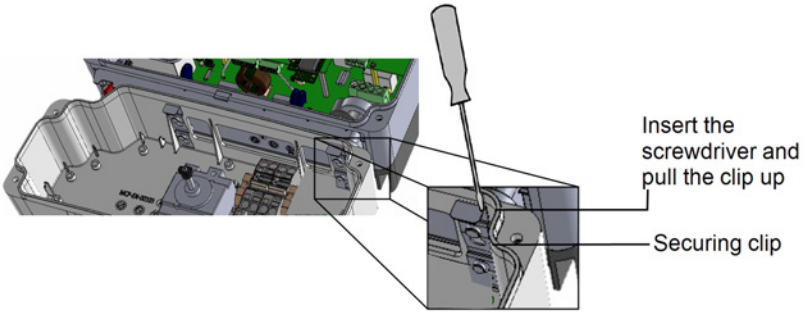


Figure 36: Disconnecting the DC Safety Unit from the inverter

9. Remove the screws securing the inverter to the mounting brackets and lift the inverter from the mounting bracket.

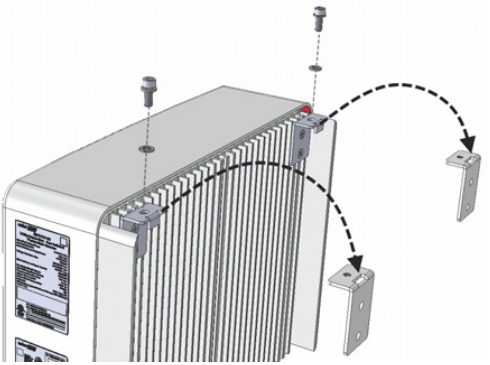


Figure 37: Mounting brackets

NOTE

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

- Lock the DC Safety Unit in the OFF position using a lock on the switch.
- Secure the DC Safety Unit bracket to the wall/pole, using 3 screws
- Use insulation tape to isolate each of the AC and DC wires.
- Seal the open conduits using duct tape.
- Install the DC Safety Unit sealing cover supplied with the inverter and secure with retaining clips.

10. Place the new inverter on the mounting brackets and secure it using the screws.
11. Insert the wires from the inverter into the openings in the DC Safety Unit.
12. Fasten the two clips securing the DC Safety Unit to the inverter.
13. Reconnect the cables: Follow the instructions of *Installing the Inverter* on page 23.
14. Close the inverter cover.
15. Perform the commissioning steps as described in *Commissioning the Installation* on page 32.

Replacing the DC Safety Unit

1. Turn OFF the AC circuit breaker.
2. 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.

AVERTISSEMENT!

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.

3. Turn OFF the DC Safety Unit.
4. Open the DC Safety Unit cover: Release the four Allen screws and remove the cover.
5. Open the inverter cover as described in *Removing the Inverter Cover* on page 54.
6. Disconnect the DC and AC cables from the DC Safety Unit.
7. Disconnect the wires connected between the inverter and the DC Safety Unit:
   - Antenna cable from the communication board
   - DC and AC wires in the DC Safety Unit
   - Grounding cable
8. Disconnect the DC Safety Unit from the inverter by opening the two clips securing the Safety Switch to the inverter: Carefully place a screwdriver between the clip and the enclosure and pull the clip.

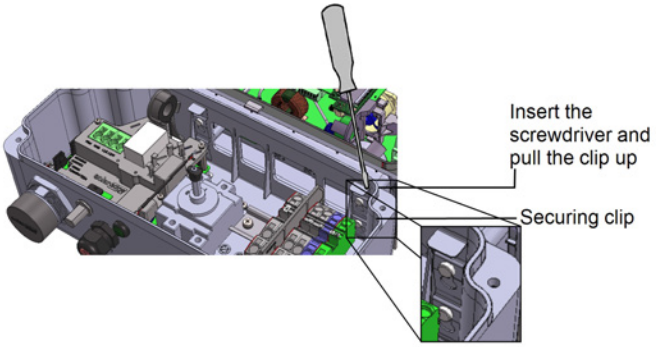


Figure 38: Disconnecting the DC Safety Unit from the inverter

9. Detach the DC Safety Unit from the inverter.
10. Place the new DC Safety Unit and secure it to the inverter using the clips.
11. Insert the wires from the inverter into the openings in the DC Safety Unit.
12. Reconnect the cables: Follow the instructions of *Installing the Inverter* on page 23.
13. Close the inverter cover.
14. Perform the commissioning steps as described in *Commissioning the Installation* on page 32.

Technical Specifications - Single Phase Inverters with HD-Wave Technology (North America)

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	Unit
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400	VA
Max AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400	VA
AC Output Voltage Min.-Nom.-Max.(183 - 208 - 229)	-	✓	-	✓	-	-	-	Vac
AC Output Voltage Min.-Nom.-Max.(211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5[1]							Hz
Maximum Continuous Output Current 208V	-	16	-	25	-	-	-	A
Maximum Continuous Output Current 240V	12.5	16	21	25	32	42	47.5	A
Max. output fault current and duration @208V	-	17.5 / 20	-	27.5 / 20	-	-	-	A / ms
Max. output fault current and duration @240V	14 / 20	17.5 / 20	23 / 20	27.5 / 20	40 / 20	56.6 / 20		A / ms
Inrush current AC (Peak/ Duration)	2.8 / 20					3.45 / 20		Aac (rms) / ms
Max. output overcurrent protection	35		48		55	80		A

[1] For other regional settings please contact SolarEdge support

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	Unit
Power factor range	1 (adjustable from -0.85 to +0.85)							
Total harmonic distortion	< 3%							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @208V	-	5100	-	7750	-	-	-	W
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17670	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current 208V	-	9	-	13.5	-	-	-	Adc
Maximum Input Current 240V	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600 kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99							%
Nighttime Power Consumption	< 2.5							W
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Cellular (Optional)							

	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	Unit
Revenue Grade Data, ANSI C12.20	Optional[1]							
Rapid Shutdown - NEC 2014 and 2017 690.12	Automatic Rapid Shutdown upon AC Grid Disconnect							
STANDARD COMPLIANCE								
Safety	UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07							
Grid Connection Standards	IEEE1547, Rule 21, Rule14 (HI)							
Emissions	FCC part15 class B							
RoHS	Yes							
INSTALLATION SPECIFICATIONS								
AC output conduit size / AWG range	3/4" minimum / 14 - 6 AWG					3/4" minimum / 14-4 AWG		
DC input conduit size / # of strings / AWG range	3/4" minimum / 1-2 strings / 14-6 AWG					3/4" minimum / 1-3 strings / 14-6 AWG		
Dimensions with Safety Switch (HxWxD)	17.7 x 14.6 x 6.8 / 450 x 370 x 174					21.3 x 14.6 x 7.3 / 540 x 370 x 185		in/mm
Weight with Safety Switch	22 / 10	25.1 / 11.4		26.2 / 11.9		38.8 / 17.6		lb / kg
Noise	< 25				< 50			dBA
Cooling	Natural Convection				Natural convection and internal fan (user replaceable)			
Operating Temperature Range	-13 to +140 / -25 to +60[2] (-40°F / -40°C option)[3]							°F/ °C
Protection Rating	IP65/ NEMA 3R (Inverter with Safety Switch)							

[1] Revenue grade inverter P/N: SExxxxH-US000NNC2

[2] For power de-rating information refer to: https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf

[3] -40 version P/N: SExxxxH-US000NNU4

Recommended OCPD size per grid:

Inverter	Maximum Output Current (A)	Minimum Fuse Rating (A)	Maximum Fuse Rating (A)	
			208 VAC	240 VAC
SE3000H-US	12.5	20	---	50
SE3800H-US	16	20	50	50
SE5000H-US	21	30	50	50
SE6000H-US	25	35	---	50
SE7600H-US	32	40	---	50
SE10000H-US	42	60	---	80
SE11400H-US	47.5	60	---	80

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
110% < 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

If you have technical queries concerning our products, please contact our support through SolarEdge service portal:
http://www.solaredge.com/groups/support/services

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Worldwide:	+ 972 (0) 73 240 311 8
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