



Installation Guide

**Single Phase Inverter with
HD-Wave Technology
with SetApp Configuration**

For Europe and APAC

Version 1.1

Disclaimers

Important Notice

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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.

Simplified EU Declaration of Conformity

SolarEdge Technologies Ltd. hereby declares that its Wireless Communication, Wi-Fi/ZigBee radio equipment is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at:

<https://www.solaredge.com/sites/default/files/se-single-phase-inverter-certificate-ce-conformity.pdf>.

Revision History

Version 1.1 (June 2020)

- Added *Simplified EU Declaration of Conformity* on page 2.
- Added *Communication Board - Technical Specifications* on page 71.
- Updated the Optimizer Installation Guidelines.
- Updated Activating, Commissioning and Configuring the System.

Version 1.0 (June 2019)

Initial release

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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.

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.

NOTE



Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE



Denotes information about safety issues.

Disposal requirements under the Waste Electrical and Electronic Equipment (WEEE) regulations:

NOTE



Discard this product according to local regulations or send it back to SolarEdge.

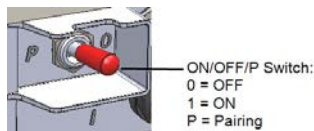
IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING!



The inverter cover must be opened only after switching the inverter ON/OFF/P switch located at the bottom of the inverter to OFF. 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.



WARNING!



Before operating the inverter, ensure that the inverter AC power cable and wall outlet are 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.



WARNING!

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



WARNING!

Do not touch the PV panels or any rail system connected when the inverter switch is ON, unless grounded.



WARNING!

SafeDC complies with IEC60947-3 when installing the system with a worst case SafeDC voltage (under fault conditions) < 120V.

The worst case voltage is defined as: $V_{oc,max} + (\text{String Length} - 1) * 1V$, where:

- $V_{oc,max}$ = Maximum V_{oc} (at lowest temperature) of the PV modules in the string (for a string with multiple modules, use the max value)
- String Length = number of power optimizers in the string



CAUTION!

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




CAUTION!

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

**NOTE**

Use PV modules rated according to IEC 61730 class A.

**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. SolarEdge requires installing a physical or electronic interlock, which will signal to the inverter when the grid has been disconnected. 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.

For more information, refer to

<https://www.solaredge.com/sites/default/files/se-inverter-support-of-voltage-sources.pdf>.

**NOTE**

The following warning symbols appear on the inverter warning label:



Risk of electric shock



Risk of electric shock from energy stored in the capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.



Hot surface – To reduce the risk of burns, do not touch.

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.

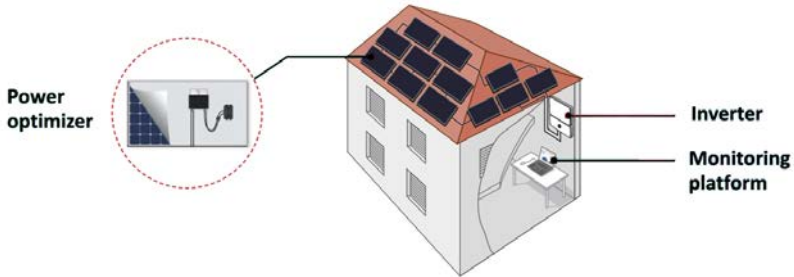


Figure 1: The SolarEdge power harvesting system components

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/P switch is turned OFF
- The inverter AC breaker is turned OFF

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

Two types of power optimizers are available:

- Panel 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.

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 17
2. [Recording power optimizer serial numbers \(optional\)](#), page 35
3. [Mounting the inverter](#), Page 23
4. [Connecting the AC and the Strings to the Inverter](#), page 27
5. [Commissioning and activating the installation](#), page 31
6. [Connecting the inverter to the monitoring platform](#), page 36

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 4 mm screw type for the inverter cover, side screws, and Safety Switch cover (if applicable)
- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill (with a torque clutch) or screwdriver and bits suitable for the surface on which the inverter and optimizers will be installed. Use of an impact driver is *not* allowed.
- 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)

- MC4 crimper (if applicable)
- Wire cutters
- Wire strippers
- Voltmeter
- Mobile phone with latest SetApp version

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 -25°C to +65°C / -13°F to 149°F.

Chapter 2: Installing the Power Optimizer

Safety

The following notes and warnings apply when installing the power optimizers. Some of the following may not be applicable to smart modules:

WARNING!



When modifying an existing installation, turn OFF the inverter ON/OFF/P switch, the DC Safety Unit (if applicable) and the AC circuit breaker on the main AC distribution panel.

CAUTION!



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

CAUTION!



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

CAUTION!



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

CAUTION!



All PV modules must be connected to a power optimizer.

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.

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 module' 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.



For more information, refer to

<https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf>


**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.

Installation Guidelines

- For the minimum and maximum number of power optimizers in a string (string length), see the power optimizer datasheets. Refer to the Designer for string length verification. The Designer is available on the SolarEdge website at: [https://www.solaredge.com/products/installer-tools/designer#/.](https://www.solaredge.com/products/installer-tools/designer#/)
- The length of home-run cables from the first and last power optimizer to the inverter (total cable length) may not exceed the following values:

Single Phase Inverters	Three Phase Inverters
All - 1000 ft. /300 m	SE17K and below - 1000 ft. /300 m Above SE17K - 2300 ft. /700 m

- Do not use extension cables between a module and a power optimizer, between two modules connected to the same power optimizer, or between two power optimizers other than in the following cases:
 - Power optimizers with the 4-type suffix in their part number (Pxxx-4xxxxxx) - extension cables of up to 16 m can be installed per optimizer (8 m for DC+ and 8 m for DC-).
 - Power optimizers manufactured starting from working week 42, 2019, as indicated in the serial number (Example: S/N SJ5019A-xxxxxxx - working week 50, 2019) - extension cables of up to 16 m can be installed per power optimizer (8 m for DC+ and 8 m for DC-).
 - Extension cables can be installed between power optimizers only from row to row, around obstacles or pathways within a row, and from the end of the string to the inverter, as long as the total cable length is not exceeded.
- For connecting power optimizers to the inverter, use cables with a minimum cross-section of 11 AWG/ 4 mm² DC cables.
- 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 power optimizer can be placed in any orientation.
- If connecting more modules than power 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.
- 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

power optimizers are connected to unshaded modules, add more power optimizers to the string.

- To allow for heat dissipation, maintain clearance as specified below.

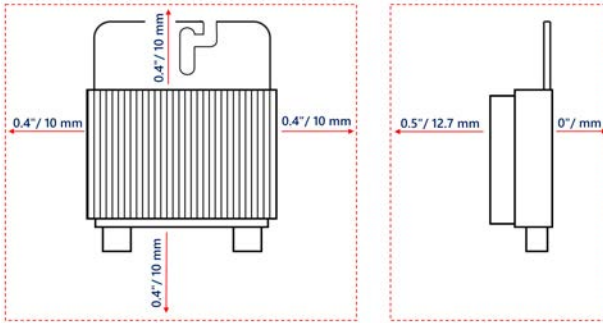


Figure 2: Power optimizer clearance

- When installing modules in a confined space, for example, if installing Building-integrated photovoltaic (BIPV) modules, ventilation measures may be needed to ensure the power optimizers are not be exposed to temperatures outside their specifications.

Step 1: Mounting 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. It is recommended to mount the power optimizer 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!



Drilling vibrations may damage the power optimizer and will void the warranty. Use a torque wrench or an electric drill with adjustable clutch that meets the mounting torque requirements. *Do not* use impact drivers for mounting the power optimizer.

Do not drill through the power optimizer or through the mounting holes.

3. Attach each power optimizer to the rack using M6 (1/4") stainless steel bolts, nuts and washers or other mounting hardware. Apply torque of 9-10 N*m / 6.5-7 lb*ft.
4. Verify that each power optimizer is securely attached to the module support structure.
5. Record power optimizer serial numbers and locations, as described in *Reporting and Monitoring Installation Data* on page 34.

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 power optimizers:

- 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.

⁽¹⁾Not applicable to smart modules.

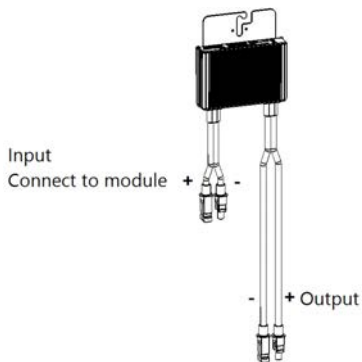


Figure 3: Power optimizer connectors

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.



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.

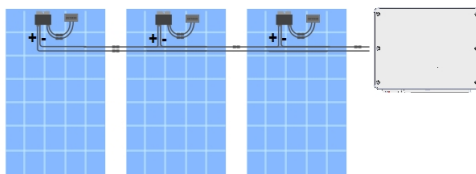


Figure 4: Power optimizers connected in series

3. If you intend to monitor the installation, using the monitoring platform, record the physical location of each power optimizer, as described in *Creating Logical and Physical Layout using Installation Information* on page 35.

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 ($\pm 0.1V$). 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 power optimizers between the PV modules and the inverter, the short circuit current I_{SC} and the open circuit voltage V_{OC} hold different meanings from those in traditional systems.

For more information about the SolarEdge system's string voltage and current, refer to the V_{OC} and I_{SC} in *SolarEdge Systems Technical Note*, available on the SolarEdge website at:

https://www.solaredge.com/sites/default/files/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 Safety Switch.

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 52.

Chapter 3: Installing the Inverter

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



CAUTION!

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

Inverter Package Contents

- One inverter with Safety Switch (if applicable)
- Mounting bracket kit
- Safety Switch sealing cover (if applicable, for use in case of inverter replacement)
- Quick Installation guide

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 components, located at the bottom of the inverter.

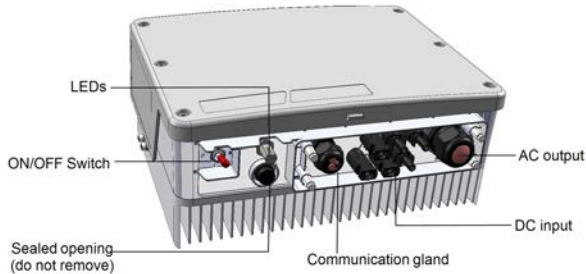


Figure 5: Inverter Interfaces

- **DC input:** MC4 connector, for connection of the PV installation.
- **Communication gland:** For connection of inverter communication options. Refer to *Setting Up Communication to the Monitoring Platform* on page 37 for more information.
- **Drain valve:** Drains any moisture that may be accumulated in the unit.
- **ON/OFF/P switch:**

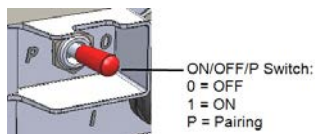


Figure 6: ON/OFF/P switch

- **ON (1)** - Turning this switch ON (after power optimizer pairing) starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid.
- **OFF (0)** - Turning this switch OFF reduces the power optimizer voltage to a low safety voltage and inhibits exportation of power. When this switch is OFF, the control circuitry remains powered up.

- **P** - Moving and releasing the switch allows viewing system information via the LEDs, and performing the following functions:

P Position Duration	Function	Comments
Switch moved to P for 2 seconds , then released.	<ul style="list-style-type: none"> • Displays (via LEDs) production information for 5 seconds, or error type indications (if exist) for 5 seconds. • Activates the Wi-Fi access point for connecting to the SetApp 	<p>While the switch is in P, all LEDs are ON.</p> <p>When the switch is released all LEDs turn OFF for 0.5 sec and then display the production or error indication.</p>
Switch moved to P for more than 5 seconds , then released.	Starts pairing	Pairing is indicated by all 3 LEDs blinking simultaneously.

- **LEDs:** three LEDs indicate, by color and state (on/ off/ blinking⁽¹⁾/ flickering⁽²⁾/alternating⁽³⁾), different system information, such as errors or performance indications. For more information, refer to <https://www.solaredge.com/leds>.

The main LED indications are:

- Blue ON - the inverter is communicating with the monitoring platform
- Green ON - the system is producing
- Green blinking - AC is connected but the system is not producing
- Red ON - system error



(1)Blinking = Turns ON and OFF for the same duration

(2)Flickering = Turns ON for 100 mS and turns OFF for 5 seconds

(3)Alternating = alternate LED flashes

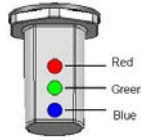


Figure 7: LEDs

The following table describes system performance information by LED color and ON/OFF/P switch position.

Indication	ON/ OFF/ P Switch Position	LED Color			Comment
		Red	Green	Blue	
Power optimizers not paired	ON (1)	OFF	Blinking	<ul style="list-style-type: none"> • S_OK: ON • No S_OK: OFF 	S_OK: ON communication with the monitoring platform is established.
Pairing		Blinking	Blinking	Blinking	
Wake-up/ Grid Monitoring		OFF	Blinking	Blinking	
System Producing		OFF	ON	<ul style="list-style-type: none"> • S_OK: ON • No S_OK: OFF 	
Night mode (no production)		OFF	Flickering	<ul style="list-style-type: none"> • S_OK: ON • No S_OK: OFF 	
Inverter is OFF (Safe DC)	OFF (0)	OFF	Blinking	<ul style="list-style-type: none"> • S_OK: ON • No S_OK: OFF 	
Inverter is OFF (DC not safe)		Blinking	Blinking	<ul style="list-style-type: none"> • S_OK: ON • No S_OK: OFF 	
Inverter configuration or reboot	ON / P	ON	ON	ON	

Indication	ON/ OFF/ P Switch Position	LED Color			Comment
		Red	Green	Blue	
Inverter firmware upgrade	ON / P	Alternating	Alternating	Alternating	The upgrade process can take up to 5 minutes
Error	Any	ON	ON/ OFF/ Blinking/ Flickering	ON/ OFF / Blinking	Refer to <i>Errors and Troubleshooting</i> on page 49

The following table describes production percentage of AC information by LED color and ON/OFF/P switch position.

Indication	ON/ OFF/ P Switch Position	LED Color			Comment
		Red	Green	Blue	
Percentage of AC Production: 0 %	ON (1)	OFF	OFF	OFF	This indicates power production as percentage of rated peak AC output power
Percentage of AC Production: 0 - 33 %		OFF	ON	OFF	
Percentage of AC Production: 33 - 66 %		OFF	OFF	ON	
Percentage of AC Production: 66 - 100 %		OFF	ON	ON	

Mounting the Inverter

The inverter is supplied with a mounting bracket kit:

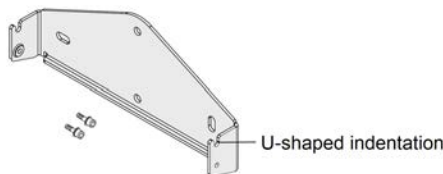


Figure 8: Mounting bracket

NOTE

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

CAUTION!

SolarEdge inverters and power optimizers 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 or power optimizer.

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:

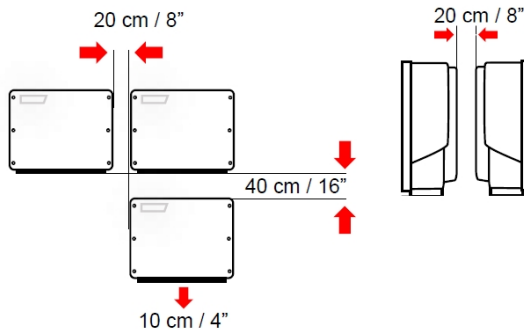


Figure 9: Clearance areas

- If installing a single inverter:
 - 20 cm (8") from the top of the inverter.
 - At least 10 cm (4") from the bottom of the inverter.
 - 10 cm (4") from the right and left of the inverter.
 - If installing multiple inverters:
 - When installing inverters side by side, leave at least 20 cm (8") between inverters.
 - When installing inverters one above of the other, leave at least 40 cm (16") between inverters.
3. Position the mounting bracket against the wall/ pole and mark the drilling hole locations (refer to *Mechanical Specifications* on page 54 for inverter and mounting bracket dimensions).

4. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.
5. Hang the inverter on the bracket:
 - a. Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place.
 - b. Lower the inverter onto the U-shaped indentations, as shown below. Let the inverter lay flat against the wall or pole.
 - c. Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket.

Tighten the screws with a torque of 4.0 N*m / 2.9 lb.*ft.

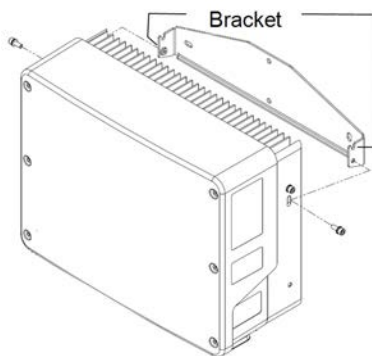


Figure 10: Hanging the inverter on the brackets

6. Optionally, secure the Safety Switch bracket to the wall/pole, using 3 screws:



NOTE

In case of inverter replacement with the Safety Switch 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.

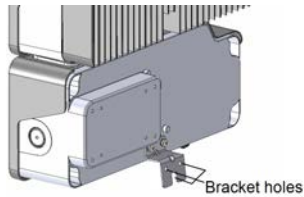


Figure 11: Safety Switch bracket

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

Chapter 4: Connecting the AC and the Strings to the Inverter

This chapter describes how to connect the inverter to the AC grid, and to the strings of modules with power optimizers.

Connecting the AC Grid to the Inverter

The AC output gland can fit an AC cable external gauge of PG21 (9-16 mm diameter) .

The maximum wire size for the input terminal blocks is 16 mm².

For more wiring information refer to the *SolarEdge Recommended AC Wiring Application Note*, available on the SolarEdge website at

<http://www.solaredge.com/files/pdfs/application-note-recommended-wiring.pdf>.



1. Turn OFF the AC circuit breaker.
2. Release the Allen screws of the inverter cover and carefully move the cover horizontally before lowering it.

CAUTION!



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

3. Strip 58 mm / 2.32" of the external cable insulation and strip 8 mm / 0.32" of the internal wire insulation.

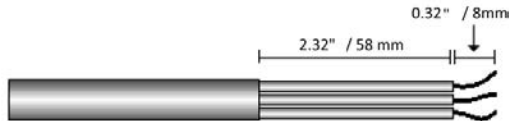


Figure 12: Insulation stripping – AC (3-wire cable)

4. Open the AC cable gland and insert the cable through the gland (see).

WARNING!



Turn OFF the AC before connecting wires to the AC terminals. If connecting equipment grounding wire, connect it before connecting the AC Line and Neutral wires.

5. Connect the AC wires according to the labels on the terminal block.

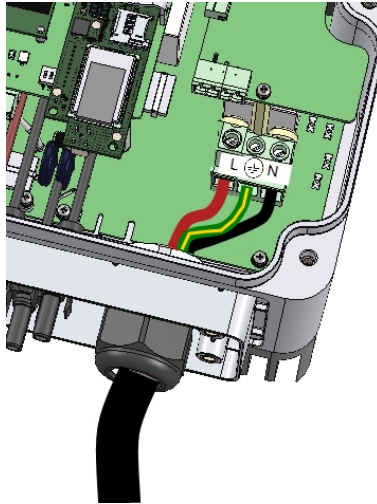


Figure 13: AC connection

6. Tighten the screws of each AC terminal with a torque of 1.2-1.5 N*m / 0.88-1.1 lb*ft.
7. Check that the wires are fully inserted and cannot be pulled out easily.
8. Tighten the AC cable gland with a torque of 2.8-3.3 N*m / 2.0-2.4 lb*ft.
9. Verify that there are no unconnected wires to the inverter and that the unused terminal screws are tightened.

Connecting the Strings to the Inverter

Connect the string to the DC input pairs. If required, connect additional strings in parallel using an external combiner box/branch cables before connecting to the inverter.

NOTE



Functional electrical earthing of DC-side negative or positive poles is prohibited because the inverter has no transformer. Grounding (earth ground) of module frames and mounting equipment of the PV array modules is acceptable.

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.

Connect the DC connectors of each string to the DC+ and DC- connectors. See *Figure 5*.

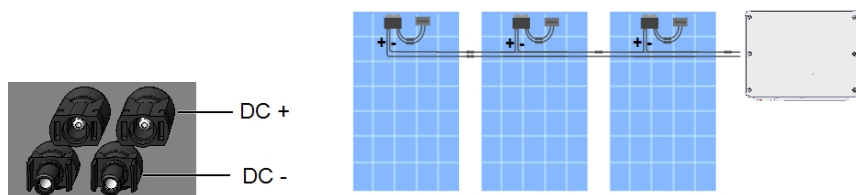


Figure 14: Inverter DC Connections

Selecting a Residual Current Device (RCD)

IMPORTANT SAFETY FEATURE



All SolarEdge inverters incorporate a certified internal Residual Current Device (RCD) in order to protect against possible electrocution and fire hazard in case of a malfunction in the PV array, cables or inverter. There are two trip thresholds for the RCD as required for certification (DIN VDE 0126-1-1). The default value for electrocution protection is 30 mA, and for slow rising current is 300 mA.

If an external RCD is required by local regulations, check which type of RCD is required for the relevant electric code. Install the residual-current device (RCD) in accordance with the applicable local standards and directives. SolarEdge recommends using a type-A RCD. The recommended RCD value is 100 mA or 300 mA unless a lower value is required by the specific local electric codes. When required by local regulations, the use of an RCD type B is permitted.



NOTE

For multiple inverters, an RCD per inverter is required.

In installations where the local electric code requires an RCD with a lower leakage setting, the discharge current might result in nuisance tripping of the external RCD. The following steps are recommended to avoid nuisance tripping of the external RCD:

- Select the appropriate RCD for correct operation of the installation: An RCD with a rating of 30 mA may actually trip at a leakage as low as 15 mA (according to IEC 61008). High quality RCDs will typically trip at a value closer to their rating.
- Configure the trip voltage of the inverter's internal RCD to a lower value than the trip current of the external RCD. The internal RCD will trip if the current is higher than the allowed current, but because the internal inverter RCD automatically resets when the residual currents are low it saves the manual reset.

For detailed information, refer to the *RCD Selection for SolarEdge Inverters Application Note*, available on the SolarEdge website at http://www.solaredge.com/sites/default/files/application_note_ground_fault_rcd.pdf.



Chapter 5: Activating, Commissioning and Configuring the System

You can connect communication options at this stage, as described in *Setting Up Communication to the Monitoring Platform* on page 37.

After completing all connections, activate and commission the system using the inverter SetApp mobile application. You can download the SetApp from the Apple App Store and Google Play before arriving at the site.



Internet connection is required for the download, one-time registration, and logging in, but not required for using the SetApp.

Step 1: Activating the Installation

During system activation, a Wi-Fi connection is created between the mobile device and the inverter and the system firmware is upgraded.

Before activation

- Download, register (first time only) and log-in to SetApp on your mobile device. Verify that the application is updated with the latest version.
- If applicable, turn on all devices (battery, Energy Meter) connected to the inverter, so that the devices may be auto-detected.

→ To activate the inverter:

1. Turn ON the AC circuit breaker on the main distribution panel.
2. Open SetApp and follow the on-screen instructions (scan the inverter bar-code; move the ON/OFF/P switch to P position for 2 seconds and release).

SetApp creates a Wi-Fi connection, upgrades the inverter firmware and activates the inverter.

3. When the activation is complete, do one of the following:
 - Select **Connect to Another Device** to continue activating additional inverters.
 - Select **Start Commissioning** for pairing and other system configuration.

Step 2: Commissioning and Configuring the Installation

This section describes how to use the SetApp menus for commissioning and configuring the inverter settings.

Menus may vary in your application depending on your system type.

→ To access the Commissioning screen:

Do one of the following:

- During first time installation: Upon activation completion, in the SetApp, tap **Start Commissioning**.
- If the inverter has already been activated and commissioned:
 - If not already ON - turn ON AC to the inverter by turning ON the circuit breaker on the main distribution panel.
 - Open SetApp and follow the on-screen instructions (scan the inverter QR code, move the ON/OFF/P switch to P position for 2 seconds and release).
The mobile device creates a Wi-Fi connection with the inverter and displays the main Commissioning screen.

In the main menus, tap the menu red arrows (➤) to perform the system commissioning or configuration task. Tap the **Back** arrow (◀) to return to the previous menu.

The next sections provide more information about configuration options (in addition to **Country and Language** and **Pairing**, described in *Step 2: Commissioning and Configuring the Installation* on page 32).

Setting Country, Grid and Language

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

1. From the **Commissioning** screen select **Country & Grid**.
2. From the **Country & Grid** drop-down list, select the required option and tap **Set Country & Grid**.
3. From the **Language** drop-down list, select your language and tap **Set Language**.

Pairing

1. From the **Commissioning** menu, select **Pairing**.
2. Tap **Start Pairing**.
3. When **Pairing Complete** is displayed, 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/P switch, the DC cables carry a high voltage and the power optimizers no longer output a safe output.

When the inverter starts converting power after the initial connection to the AC, the inverter enters Wake up mode until its working voltage is reached. This mode is indicated by the flickering green inverter LED.

When working voltage is reached, the inverter enters Production mode and produces power. The steadily lit green inverter LED indicates this mode.

4. Tap **OK** to return to the **Commissioning** menu.

Communication

Communication settings can be configured only after communication connections are complete. Refer to *Setting Up Communication to the Monitoring Platform* on page 37.

- Select **Monitoring Communication** to configure communication with the monitoring platform.
- Select **Site Communication** to configure communication between multiple SolarEdge devices or external non-SolarEdge devices, such as batteries or loggers.

Power Control

Power control options are detailed in the *Power Control Application Note*, available on the SolarEdge website at https://www.solaredge.com/sites/default/files/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/feed-in_limitation_application_note.pdf.



Step 3: Verifying Proper Activation and Commissioning

1. Select **Information** and verify that the correct firmware versions are installed on each inverter.
2. Select **Status** and verify that inverter is operating and producing power.
3. Verify that additional configurations were properly set by viewing the relevant Status screens.
4. Verify that the green inverter LED is steadily lit.

Your SolarEdge power harvesting system is now operational.

Reporting and Monitoring Installation Data

Monitoring the site requires connecting the inverter to the monitoring platform, using any of the wired or wireless options available from SolarEdge. Refer to *Setting Up Communication to the Monitoring Platform* on page 37.

The Monitoring Platform

The monitoring platform provides enhanced PV performance monitoring and yield assurance through immediate fault detection and alerts at the module, string and system level.

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.

The monitoring platform enables accessing site information, including up-to-date information viewed in a physical or logical view:

- **Logical Layout:** Shows a schematic tree-layout of the components in the system, such as: inverters, strings, modules, meters and sensors, 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:** Provides a bird's eye view of the actual placement of modules in the site, and allows pinpoint issues to the exact location of each module on a virtual site map.

If you do not report the mapping of the installed power optimizers, 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 monitoring platform includes a built-in help system, that guides you through the monitoring functionality.

For more information, refer to <https://www.solaredge.com/products/pv-monitoring#/>.



Creating Logical and Physical Layout using Installation Information

To display a logical layout, insert the inverter serial number in the new site created in the monitoring platform. 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 map the locations, use one of the methods described in the next sections.

Designer

Designer recommends inverter and power optimizer selection per site size and enables report generation. You can create a project in Designer and export the site design with the string layout to the monitoring platform.

For more information, refer to

<https://www.solaredge.com/products/installer-tools/designer#/>.



Mapper Application

Use the Mapper smart phone application to scan the power optimizer and inverter 2D bar-codes and create a virtual map of a PV site for enhanced monitoring and easier maintenance.

The Mapper 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 module in the system physical layout.

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

- [Creating new sites using the Mapper mobile application](#)
- [Mapping existing sites using the Mapper mobile application](#)



Physical Layout Editor

1. If you are a registered installer, access the monitoring platform site creation page at <https://monitoring.solaredge.com/solaredge-web/p/home#createSites>. If you have not yet signed up, go to <https://monitoring.solaredge.com/solaredge-web/p/createSelfNewInstaller>.
2. Fill out all required information in the screen, which includes information about your installation, as well as details about its logical and physical mapping.



Using a Paper Template

Fill out the Physical Layout Template (downloadable from the SolarEdge website <http://www.solaredge.com/files/pdfs/physical-layout-template.pdf>) using the detachable 2D barcode stickers on each power optimizer. Once the form is completed, use the Mapper to scan the 2D codes and create the map in the monitoring platform. Optionally, you can send the sticker sheet to SolarEdge Support for physical layout creation.



Chapter 6: Setting Up Communication to the Monitoring Platform

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 how to set up communication between:

- The inverter and the monitoring platform through the Internet (wired/ wireless)
- Multiple inverters for a leader-follower 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/P switch at the bottom of the inverter is turned OFF, and the AC is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF/P switch (and the switch of the Safety Switch if applicable) is OFF, and the AC is turned ON.

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 41

RS485

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

For connection instructions refer to *Creating an RS485 Bus Connection* on page 44.

Wi-Fi

This communication option enables using a Wi-Fi connection for connecting to the monitoring platform.

The Wi-Fi access point is built into the inverter. An antenna is required and available from SolarEdge for connection to the monitoring platform.

Wireless Gateway, Wireless Repeater(s)

The Wireless Gateway collects inverter data using a dedicated Wi-Fi connection and connects to the monitoring platform with the help of a home router. Wireless Repeater(s) extend the Wi-Fi signal range between the Wireless Gateway and inverter. Wireless Gateway and Wireless Repeaters can be purchased separately from SolarEdge. For more information, refer to <https://www.solaredge.com/sites/default/files/se-wireless-gateway-wireless-repeater-installation-guide.pdf>.



Cellular

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

The Cellular Plug-in is provided with a user manual, which should be reviewed prior to connection. Refer to <https://www.solaredge.com/sites/default/files/se-cellular-plug-in-for-inverters-with-setapp-installation-guide.pdf>



ZigBee

This option enables wireless connection to one or several Smart Energy products, which automatically divert PV energy to home appliances.

The Smart Energy ZigBee connections require a ZigBee plug-in and an external antenna, available from SolarEdge.

The ZigBee Plug-in for Smart Energy is provided with an installation guide, which should be reviewed prior to connection. Refer to <https://www.solaredge.com/sites/default/files/se-zigbee-plug-in-for-setapp-installation-guide.pdf>

The Smart Energy products are provided with an installation guide, which should be reviewed prior to connection. Refer to https://www.solaredge.com/products/device-control#.



Communication Connectors

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	Antenna cable for wireless communication

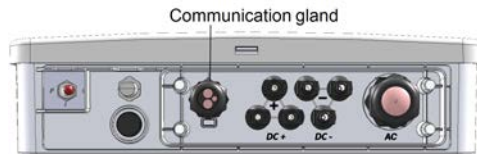


Figure 15: Communication Gland

The communication board has the following connectors:

- Standard RJ45 terminal block for Ethernet connection
- USB
- RS485 connector
- 8-pin connector for power control devices

The SolarEdge Wi-Fi antenna, ZigBee or Cellular Plug-ins can be connected to the communication board for optional wireless connection.

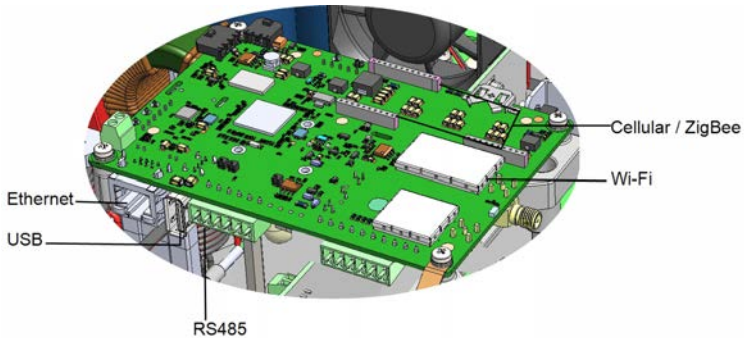


Figure 16: Communication board connectors

Removing the Inverter Cover

1. Switch the inverter ON/OFF/P switch to OFF. Wait 5 minutes for the capacitors to discharge.
2. Turn the DC Safety Unit (if applicable) to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
4. Open the Allen screws of the inverter cover and carefully pull the cover horizontally before lowering it.
5. Open the inverter cover (see *Figure 17*).

CAUTION!



When removing the inverter 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.

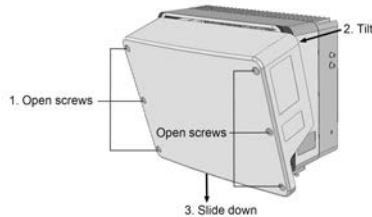


Figure 17: Removing the inverter cover

Removing the DC Safety Unit Cover (if applicable)

1. Turn OFF the AC breaker of the distribution panel and the safety switch (if applicable).
2. Open the DC Safety Unit cover: Release the four Allen screws and remove the cover.

CAUTION!



When removing the DC Safety Unit 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.

Creating an Ethernet (LAN) Connection

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

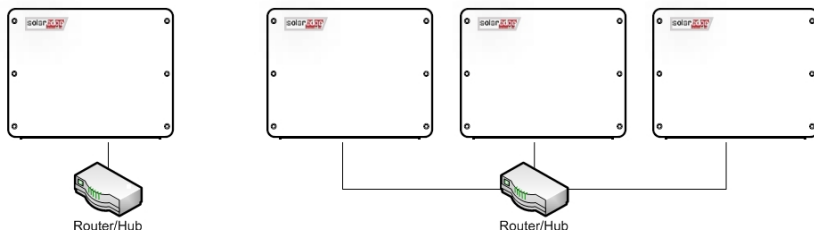


Figure 18: Example of Ethernet connection

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 recommended to use external surge protection devices.

For details refer to:

http://www.solaredge.com/files/pdfs/lightning_surge_protection.pdf.



➔ **To connect the Ethernet cable:**

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 40.
2. Open the communication gland.



CAUTION!

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

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. Push the cable into the cut opening of the rubber fitting.

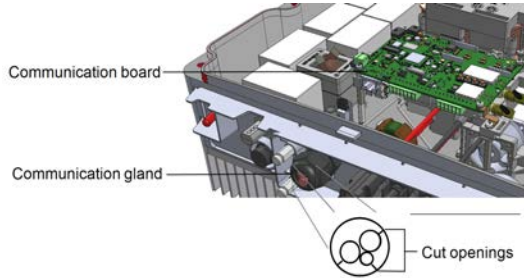


Figure 19: Communication gland and rubber fitting

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-
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved

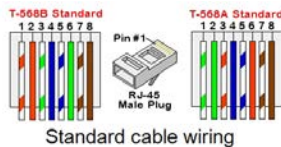


Figure 20: Standard cable wiring

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

6. 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 (see *Figure 20*).
 - d. Use a crimping tool to crimp the connector.
 - e. Connect the Ethernet connector to the RJ45 port on the communication board (see *Figure 16*).

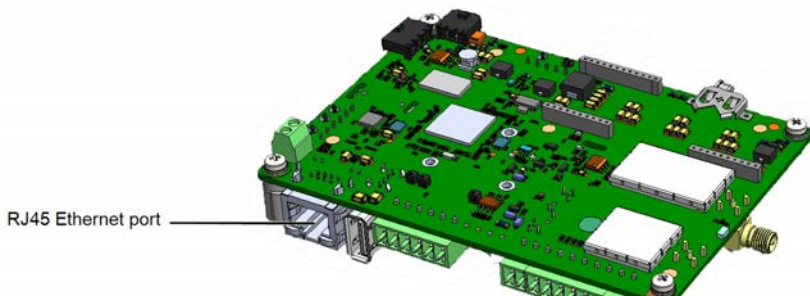


Figure 21: The RJ45 Ethernet connection

7. 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 (see *Figure 20*).
8. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the SolarEdge monitoring platform.
9. The inverter is configured by default to LAN. If reconfiguration is required:
 - a. Make sure the ON/OFF/P switch is OFF.
 - b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
 - c. Configure the connection as described in *Communication* on page 33.

NOTE



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

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

10. Verify the connection, as described in *Verifying the Connection* on page 47.

Creating an RS485 Bus Connection

The RS485 option enables creating a bus of connected inverters, consisting of up to 31 follower inverters and 1 leader 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 46.

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 recommended to use external surge protection devices. For details refer to: https://www.solaredge.com/sites/default/files/lightning_surge_protection.pdf.



If grounded metal conduits 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. For inverters with a Safety Switch, connect the grounding wire to the grounding bus-bar in the Safety Switch.

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 40.
2. Remove the seal from one of the openings in communication gland and insert the wire through the opening.
3. Pull out the RS485 terminal block connector, as shown below.

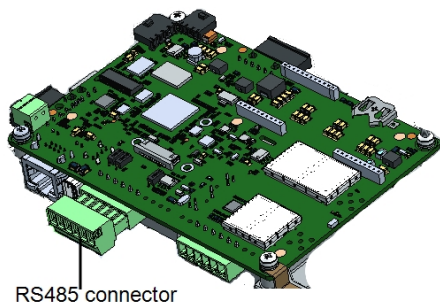


Figure 22: RS485 terminal block on the communication board

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

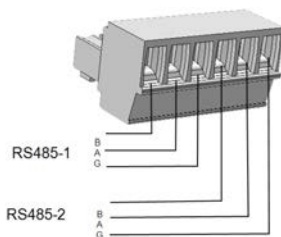


Figure 23: RS485 terminal block

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:

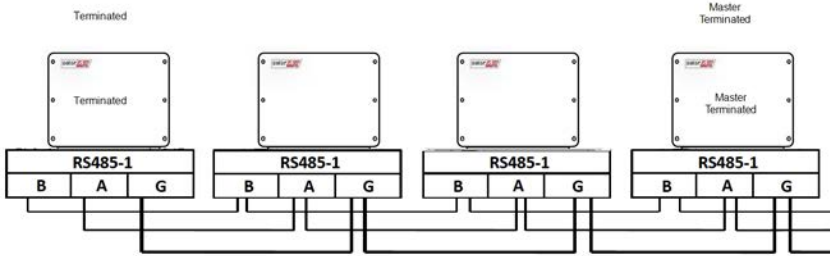


Figure 24: Connecting the inverters in a chain

**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.

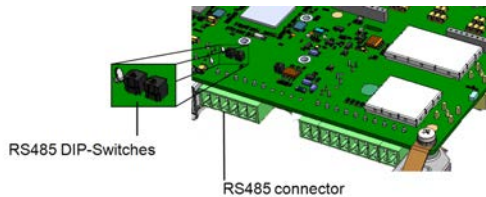


Figure 25: RS485 termination switch

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 Safety Switch, connect the grounding wire to the grounding busbar in the Safety Switch.

→ To connect to the monitoring platform:

1. Designate a single inverter as the connection point between the RS485 bus and the monitoring platform. This inverter will serve as the leader inverter.
2. Connect the leader to the monitoring platform via the LAN option (refer to) or any of the other options.

→ To configure the RS485 bus:

All inverters are configured by default as followers. To configure the leader:

1. Verify the ON/OFF/P switch is OFF.
2. Verify that AC is on.
3. Use SetApp to access the **Commissioning** menu screen as described in *Communication* on page 33.
4. From the **Commissioning** menu tap **Communication**. The Communication screen is displayed.
5. Select the following to configure the connection:
 - Server → LAN, Cellular or Wi-Fi
 - RS485- → Protocol → SolarEdge → **SolarEdge Leader**
 - RS485- → **Follower Detect**

The system starts automatic detection of the follower inverters connected to the leader inverter. The inverter should report the correct number of followers. If it does not, verify the connections and terminations.

6. To check the follower IDs and last communication time, select **RS485 → Follower List**.
7. Verify the connection of the leader 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. Go to **Commissioning > Status**.
2. In the **Summary** section, under **Server Comm.**, make sure **S_OK** is displayed together with the selected communication option.

3. Scroll down to the **Communication** section and check that the communication options are as required.

Appendix A: Errors and Troubleshooting

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

Identifying Errors

Errors may be indicated in various system interfaces: On the inverter bottom panel, a red LED indicates an error. In the monitoring platform and SetApp, errors are displayed with codes.

For more information on the codes displayed for error and warning messages, refer to <http://www.solaredge.com/sites/default/files/se-inverter-installation-guide-error-codes.pdf>. This document describes errors that appear in SetApp, monitoring platform, and LCD (for inverters with LCD). To identify the error types, use the methods described below.



→ To identify the error type using the inverter LEDs:

1. Move the ON/OFF/P switch to **P** position for **2 seconds** and release it.
2. Observe the LED lights and use the following table to identify the error type. For more information, refer to <https://www.solaredge.com/leds>.



Error type	LED color and state		
	Red	Green	Blue
Arc detected	ON	OFF	OFF
Isolation or RCD problem	Blinking	OFF	OFF
Grid error	OFF	ON	OFF
High temperature	OFF	Blinking	OFF
Pairing failed	OFF	OFF	ON
Other issue	OFF	OFF	Blinking

→ To identify the error type using the monitoring platform:

1. Open the site dashboard and click the **Layout** icon.
2. Right-click the inverter and select **Info** from the menu. The inverter details window is displayed.
3. Click the **Errors** tab. The list is displayed.

Troubleshooting Communication

Troubleshooting Ethernet (LAN) Communication

The possible errors and their troubleshooting are detailed in the following table:

Error Message	Possible Cause and Troubleshooting
LAN cable disconnected	Physical connection fault. Check the cable pin-out assignment and cable connection.
No DHCP Configure Static IP or set to DHCP	IP settings issue. Check the router and configuration. Consult your network IT.
Gateway not responding	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.
No Internet connection	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. For Wi-Fi networks, ensure that user-name and password are as defined in the internet provider AP/ router.

Troubleshooting RS485 Communication

- If the message **RS485 Leader Not Found** appears in the Status screen, check the connections to the leader device and fix if required.
- If after follower detection the number of followers displayed for the leader under **RS485-2 Conf → Follower Detect** is lower than the actual number of followers, refer to the following application note to identify missing followers and troubleshoot connectivity problems:

https://www.solaredge.com/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.

Power Optimizer Troubleshooting

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

Malfunction	Possible Cause and Corrective Action
<p>String voltage is higher than number of optimizers</p> <p>WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of $\pm 1\%$ per string is reasonable.</p>	<p>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.</p> <p>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.</p> <p>Power optimizer(s) malfunction.</p> <ol style="list-style-type: none"> 1. Disconnect the wires connecting the power optimizers in the string. 2. Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizer is located, check its connections, polarity, module, and voltage. 3. 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].

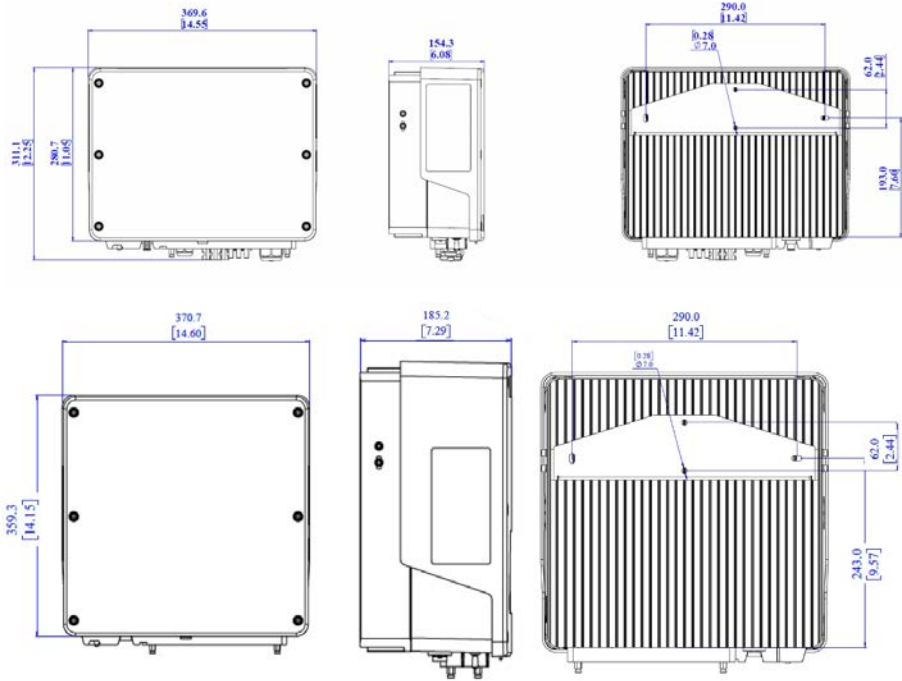


Figure 26: SE10000H-SE11400H inverter dimensions

Appendix C: Replacing and Adding System Components

This appendix includes replacement procedures for the SolarEdge system components.



NOTE

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

Replacing an Inverter

1. Turn OFF the inverter ON/OFF/P switch, and wait until the green LED is blinking , indicating that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.
2. Disconnect the AC to the inverter by turning OFF the AC circuit breaker of the distribution panel.
3. For inverters with a Safety Switch, turn OFF the Safety Switch.
4. Open the Safety Switch cover (if applicable): Release the four Allen screws and remove the cover.
5. Open the inverter cover as described in *Removing the Inverter Cover* on page 40.
6. Disconnect the DC plugs from the inverter.
7. Disconnect the AC wires from the AC terminal block and remove the ferrite bead.

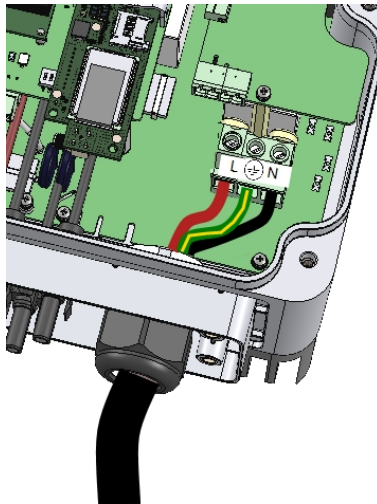


Figure 27: AC connections

8. Disconnect the DC and AC cables from the Safety Switch (if applicable).
9. Disconnect the wires connected to the inverter or between the inverter and the Safety Switch:
 - Antenna cable from the communication board
 - DC and AC wires in the Safety Switch
 - Grounding cable
10. Disconnect the Safety Switch 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.

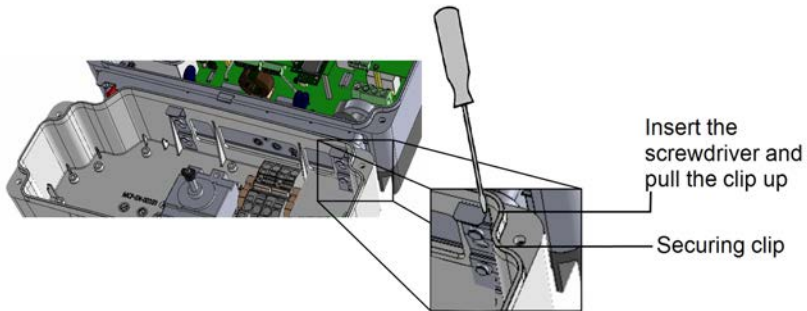


Figure 28: Disconnecting the Safety Switch from the inverter

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

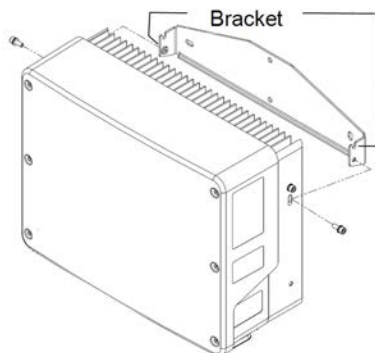


Figure 29: Mounting brackets

**NOTE**

If you remove the old inverter and do not immediately install a new one, use insulation tape to isolate each of the AC and DC wires

12. Place the new inverter on the mounting brackets and secure it using the screws.
13. Insert the wires from the Safety Switch into the openings in the inverter and the ferrite bead.
14. Fasten the two clips securing the Safety Switch to the inverter.
15. Reconnect the cables: Follow the instructions of .
16. Close the inverter and Safety Switch covers.
17. Perform the commissioning steps as described in *Activating, Commissioning and Configuring the System* on page 31.

Replacing the Safety Switch

1. Turn OFF the inverter ON/OFF/P switch, and wait until the green LED is blinking, indicating that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.
2. Turn OFF the AC breaker of the distribution panel and the Safety Switch.
3. Open the Safety Switch cover: Release the four Allen screws and remove the cover.
4. Open the inverter cover as described in *Removing the Inverter Cover* on page 40.

5. Disconnect the DC wires from the inverter and the AC wires from the Safety Switch.
6. Disconnect the wires between the inverter and the Safety Switch.
 - Antenna cable from the communication board
 - RS485 and/or Ethernet connection from the communication board
 - Grounding cable
7. Open the Safety Switch bracket screws.

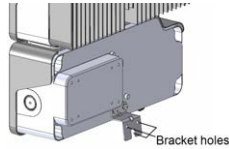


Figure 30: Safety Switch bracket

8. Disconnect the Safety Switch 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.

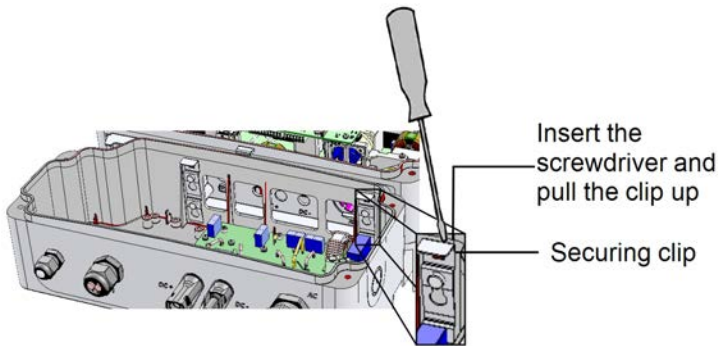


Figure 31: Disconnecting the Safety Switch from the inverter

9. Detach the Safety Switch from the inverter.
10. Place the new Safety Switch and secure it to the inverter using the clips.
11. Insert the wires from the inverter into the openings in the Safety Switch and the ferrite bead.
12. Reconnect the cables: Follow the instructions of *Installing the Inverter* on page 19.
13. Close the inverter cover.
14. Fasten the Safety Switch bracket using a standard bolt.

15. Perform the commissioning steps as described in *Activating, Commissioning and Configuring the System* on page 31.

Adding, Removing, or Replacing Power Optimizers

1. Turn OFF the inverter ON/OFF/P switch, and wait until the green LED is blinking, indicating that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.
2. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
3. Turn OFF the Safety Switch (if applicable).
4. Disconnect and connect the necessary power optimizers.
5. Perform pairing and other procedures described in *Activating, Commissioning and Configuring the System* on page 31 on all inverters to which power optimizers were added or from which power optimizers were removed.
6. In the monitoring platform, use the **Replace** button in the **logical layout** tab (in site Admin). Replace the serial number of the removed power optimizer with the serial number of the newly installed power optimizer. Refer to <https://www.solaredge.com/sites/default/files/se-monitoring-portal-site-admin.pdf>



Appendix D: SafeDC™

The SolarEdge inverters are certified for compliance with the following standards as disconnection devices for PV generators, meaning that they can replace a DC disconnect:

- IEC 60947-3:1999 + Corrigendum: 1999 + A1:2001 + Corrigendum 1:2001 + A2:2005;
- DIN EN 60947-3
- VDE 0660-107:2006-03
- IEC 60364-7-712:2002-05
- DIN VDE 0100-712:2006-06.

In compliance with these standards, follow the instructions below to disconnect DC power:

1. Move the inverter P/ON/OFF switch to OFF (0).
2. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.

Technical Specifications - Single Phase Inverters with HD-Wave Technology (Europe & APAC)

	SE2200H	SE3000H	SE3500H	SE3680H	SE4000H	SE5000H	SE6000H	Units
OUTPUT								
Rated AC Power Output	2200	3000	3500	3680	4000	5000 ⁽¹⁾	6000	VA
Maximum AC Power Output	2200	3000	3500	4000	4000	5000 ⁽¹⁾	6000	VA
AC Output Voltage (Nominal)	220 / 230							Vac
AC Output Voltage Range	184 - 264.5							Vac
AC Frequency (Nominal)	50 / 60 ± 5							Hz
Maximum Continuous Output Current	10	14	16	16	18.5	23	27.5	A
Maximum Continuous Overcurrent Protection	10	14	16	16	18.5	23	27.5	A
Residual Current Detector / Residual Current Step Detector	300 / 30							mA
Inrush current AC (Peak/Duration)	2.8 / 20							Aac (rms) / ms
Maximum Output Fault Current	38							A
Power Factor Range	1 (adjustable from -0.9 to +0.9)							
Total Harmonic Distortion	< 3							%
Protective class	Class I							

(1)SE5000H is limited to 4600VA in Germany

	SE2200H	SE3000H	SE3500H	SE3680H	SE4000H	SE5000H	SE6000H	Units	
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes								
Overvoltage Category	III								
INPUT									
Maximum DC Power	3400	4650	5425	5700	6200	7750 ⁽¹⁾	9300	W	
Transformer-less, Ungrounded	Yes								
Maximum Input Voltage	480								Vdc
Nominal DC Input Voltage	380								Vdc
Maximum Input Current	6.5	9	10	10.5	11.5	13.5	16.5	Adc	
Maximum Back-feed Current	0								
Reverse-Polarity Protection	Yes								
Ground-Fault Isolation Detection	600kΩ Sensitivity								
Overvoltage Category	II								
Maximum Inverter Efficiency	99.2								%
European Weighted Efficiency	98.3	98.8				99		%	
Nighttime Power Consumption	< 2.5								W
ADDITIONAL FEATURES									
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Wi-Fi (optional), Cellular (optional)								
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi station for local connection								
Smart Energy Management	Export Limitation								
Arc Fault Protection	Integrated, User Configurable (According to UL1699B)								

(1)7130VA in Germany

	SE2200H	SE3000H	SE3500H	SE3680H	SE4000H	SE5000H	SE6000H	Units	
STANDARD COMPLIANCE									
Safety	IEC-62109-1/2, NZ3100								
Grid Connection Standards	IEC61727, IEC62116, EN 50438, VDE-AR-N-4105, VDE 0126-1-1, UTE_C_15-712, G83/2, G59/3, CEI-021, ÖNORM, TF3.2.1, C10-11, NRS 097-2-1								
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12, FCC part15 class B								
RoHS	Yes								
INSTALLATION SPECIFICATIONS									
AC Output - Cable Gland Diameter	9 - 16							mm	
AC Supported Wire Cross Section	1 - 13							mm ²	
DC Input ⁽¹⁾	1 x MC4 pair				2 x MC4 pairs				
Dimensions (HxWxD)	280 x 370 x 142							mm	
Noise	< 25							dB(A)	
Weight	9.5			10.5		11		kg	
Cooling	Natural Convection								
Operating Temperature Range ⁽²⁾	-40 to +60							°C	
Protection Rating	IP65 - Outdoor and Indoor								

⁽¹⁾Connection of additional strings in parallel to a single input is allowed as long as the cumulative current does not exceed 45A.

⁽²⁾Full power up to at least 50°C / 122°F. For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf>

Recommended circuit breaker/ fuse size to use at the connection point of the SolarEdge inverter to the grid:

Inverter	Maximum Output Current (A)	Minimum Fuse Rating (A)	Maximum fuse rating (A)
SE2200H	10	16	50
SE3000H	14	20	50
SE3500H	16	20	50
SE3680H	16	20	50
SE4000H	18.5	25	50
SE5000H	23	32	50
SE6000H	27.5	40	50

Technical Specifications - Single Phase Inverters with HD-Wave Technology (Europe & APAC)

	SE8000H	SE10000H	Units
OUTPUT			
Rated AC Power Output	8000	10000	VA
Maximum AC Power Output	8000	10000	VA
AC Output Voltage (Nominal)	220 / 230		Vac
AC Output Voltage Range	184 - 264.5		Vac
AC Frequency (Nominal)	50 / 60 ± 5		Hz
Maximum Continuous Output Current	36.5	45.5	A
Max. continuous overcurrent protection	36.5	45.5	A
Residual Current Detector / Residual Current Step Detector	300 / 30		mA
Inrush current AC (Peak/Duration)	3.45 / 20		Aac(rms) / ms
Max. output fault current	80		A
Power factor range	1 (adjustable from -0.8 to +0.8)		
Total harmonic distortion	< 3		%
Protective class	Class I		
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes		
Overvoltage category	III		

	SE8000H	SE10000H	Units
INPUT			
Maximum DC Power	12400	15500	W
Transformer-less, Ungrounded		Yes	
Maximum Input Voltage		480	Vdc
Nominal DC Input Voltage		400	Vdc
Maximum Input Current	20.5	25.5	Adc
Maximum back-feed current		0	
Reverse-Polarity Protection		Yes	
Ground-Fault Isolation Detection		600k Ω Sensitivity	
Overvoltage category		II	
Maximum Inverter Efficiency		99.2	%
European Weighted Efficiency		99	%
Nighttime Power Consumption		< 2.5	W
ADDITIONAL FEATURES			
Supported communication interfaces	RS485, Ethernet, ZigBee (optional), Built-in GSM (Optional)		
Inverter commissioning	With the SetApp mobile application using built-in Wi-Fi station for local connection		
Smart Energy Management	Export Limitation		
STANDARD COMPLIANCE			
Safety	IEC-62109-1/2,		
Grid Connection Standards	G83/1, G83/2, G59/3, RD661, RD1699, UTE C15-712		
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12, FCC Part 15 Class B		
RoHS	Yes		

	SE8000H	SE10000H	Units
INSTALLATION SPECIFICATIONS			
AC Output - Cable Gland diameter	9 - 16		mm
AC Supported Wire Cross Section	1 - 13		mm ²
DC Input ⁽¹⁾	3 x MC4 pair		
Dimensions (HxWxD)	360 x 370 x 185		mm
Noise	< 50		dBA
Weight	16.5		kg
Cooling	Natural Convection		
Operating Temperature Range ⁽²⁾	-40 to +60		°C
Protection Rating	IP65 - Outdoor and Indoor		

Recommended circuit breaker/ fuse size to use at the connection point of the SolarEdge inverter to the grid:

Inverter	Maximum Output Current (A)	Minimum Fuse Rating (A)	Maximum fuse rating (A)
SE8000H	36.5	50	80
SE10000H	45.5	63	80

⁽¹⁾Connection of additional strings in parallel to a single input is allowed as long as the cumulative current does not exceed 45A.

⁽²⁾For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf>

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

Applicable to inverters with part number SEXXXXH-AUXXXBXX4

	SE2500H	SE3000	SE4000H	SE5000H	SE6000H	SE8000H	SE10000H	Units
OUTPUT								
Rated AC Power Output	2500	3000	4000	5000	6000	8000	10000	VA
Maximum AC Power Output	2500	3000	4000	5000	6000	8000	10000	VA
AC Output Voltage (Nominal)	220 / 230							Vac
AC Output Voltage Range	184 - 264.5							Vac
AC Frequency (Nominal)	50 / 60 ± 5							Hz
Maximum Continuous Output Current	11.5	14	18.5	21.7	27.5	36.5	45.5	A
Max. continuous overcurrent protection	11.5	14	18.5	21.7	27.5	36.5	45.5	A
Residual Current Detector / Residual Current Step Detector	300 / 30							mA
Inrush current AC (Peak / Duration)	2.8 / 20					3.45 / 20		Aac(rms) / ms
Max. output fault current	35			48		80		A
Power factor range	1 (adjustable from -0.9 to +0.9)							
Total harmonic distortion	< 3							%
Protective class	Class I							
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
Overvoltage category	III							

	SE2500H	SE3000	SE4000H	SE5000H	SE6000H	SE8000H	SE10000H	Units
INPUT								
Maximum DC Power	3875	4650	6200	7750	9300	12400	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							
Nominal DC Input Voltage	380					400		Vdc
Maximum Input Current	7.5	9	11.5	13.5	16.5	20.5	26	Adc
Maximum back-feed current	0							
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Overvoltage category	II							
Maximum Inverter Efficiency	99.2							
European Weighted Efficiency	98.3	98.8					99	%
Nighttime Power Consumption	< 2.5							
ADDITIONAL FEATURES								
Supported Communication Interfaces	RS485, Ethernet, ZigBee (optional), Wi-Fi (Built-in; antenna included), Cellular (Optional)							
Smart Energy Management	Export Limitation							
Arc Fault Protection	Integrated, User Configurable (According to UL1699B)							
Inverter Commissioning	with the SetApp mobile application using built-in Wi-Fi Access-Point for local connection							
STANDARD COMPLIANCE								
Safety	IEC-62109, AS/NZ3100							
Grid Connection Standards	AS/NZ4777:2015							
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12, FCC part15 class B							

	SE2500H	SE3000	SE4000H	SE5000H	SE6000H	SE8000H	SE10000H	Units
RoHS	Yes							
INSTALLATION SPECIFICATIONS								
AC output conduit size / Wire cross section	19-25 mm / 1-13 mm ²							
DC input conduit size / # of strings / Wire cross section	19-25 mm / 1-2 strings / 1-13 mm ²				19-25 mm / 1-3 strings / 1-13 mm ²			
AC Terminal Block Cross Section	1-13							mm ²
Dimensions with Safety Switch (HxWxD)	450 x 370 x 174				540 x 370 x 185			mm
Weight with Safety Switch	10		11.4		11.9		17.6	kg
Cooling	Natural Convection							
Operating Temperature Range ⁽¹⁾	-40 to +60							°C
Noise	< 25				< 50			dBa
Protection Rating	IP65 - Outdoor and Indoor							

Recommended circuit breaker/ fuse size to use at the connection point of the SolarEdge inverter to the grid:

Inverter	Maximum output current (A)	Minimum fuse rating (A)	Maximum fuse rating (A)
SE2500H	12.5	16	50
SE3000H	16	20	50
SE4000H	18.5	25	50
SE5000H	23	32	50
SE6000H	27	40	50
SE8000H	48	63	80
SE10000H	48	63	80

⁽¹⁾Full power up to at least 50°C. For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf>

Communication Board - Technical Specifications

Power		
Input voltage	5	Vdc
Connector type	Micro-fit	
Power consumption	<3	W
Operating temperature	-40°C – 105	°C
Communication interfaces		
RS485 interfaces	2 ports	
Ethernet interface	10/100-BaseT	
Wi-Fi interface	802.11b/802.11g/802.11n	
ZigBee interface	O-QSPK	
Power reducer	4/6 pin control, 5V	
ZigBee		
Operating frequencies	2412 – 2462	MHz
Bandwidth	2.25	MHz
Clock frequency	38.4	MHz
Maximum RF power	18.85	dBm
Antenna gain	5	dBi
Wi-Fi		
Operating frequencies	2405 – 2480	MHz
Bandwidth	20	MHz
Clock frequency	26	MHz
Maximum RF power	11.32	dBm
Antenna gain	5	dBi
Ethernet		
Clock frequency	50	MHz
Mode operating	100BASE-TX	

Support Contact Information

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



<https://www.solaredge.com/service/support>

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 product SetApp mobile application or on the monitoring platform or by the LEDs, 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 product's software version as it appears in the status screen.

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