

solaredge

SolarEdge

Compact Residential Solution Installation Guide

For Europe, APAC, & South Africa
Version 1.0

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Emission Compliance

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

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

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

Support and Contact Information

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

Country	Phone	E-Mail
Australia (+61)	1800 465 567	support@solaredge.net.au
APAC (Asia Pacific)(+972)	073 240 3118	support-asia@solaredge.com
Benelux	NL (+31): 0800-7105 BE (+32): 0800-76633	support@solaredge.nl support@solaredge.be
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France (+33)	0800 917410	support@solaredge.fr
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Middle East & Africa (+972)	073 240 3118	
South Africa (+27)	0800 982 659	
Turkey (+90)	216 706 1929	
Worldwide (+972)	073 240 3118	

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 SolarEdge Inverter SetApp mobile applications screen or on the SolarEdge 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.

Version History

Version 1 (January 2018)

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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.

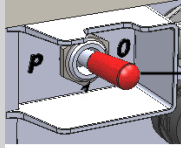
IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING!



The inverter cover must be opened only after shutting off the inverter ON/OFF/P 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.



ON/OFF/P Switch:
 0 = OFF
 1 = ON
 P = Pairing

WARNING!



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

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: $V_{oc,max+} = (String\ Length - 1) * 4V$, where:

- $V_{oc,max}$ = Maximum V_{oc} (at lowest temperature) of the PV module in the string (for a string with multiple module models, 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.

NOTE



The inverter is IP65 rated. Unused conduit openings and glands should be sealed with appropriate seals.


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

The following warning symbols appear on the inverter warning label:



Risk of electric shock



5 Minutes

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.

The compact residential system includes an inverter and optimizer designed to work exclusively with each other, for residential systems of 4-8 modules e.g. homes with limited roof space, social housing projects, or for meeting minimum sustainability requirements.

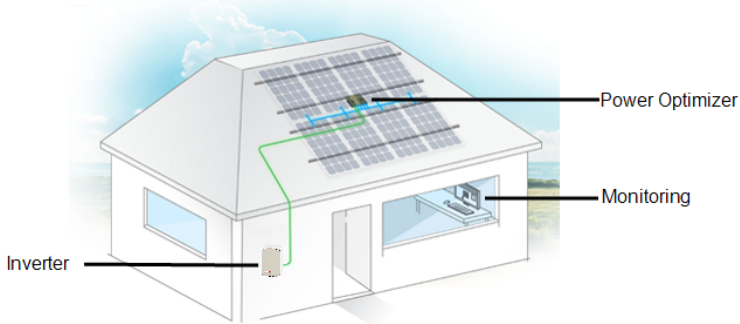


Figure 1: The Compact Residential System

Two inverter versions are available:

- **Basic** version - no communication interfaces
- **Extended** version - with built-in and optional communication interfaces for connection to the SolarEdge cloud-based monitoring platform and for Smart Energy Management

Refer to the electrical specifications for details about the supported interfaces and features.

SolarEdge Inverter

The SolarEdge Compact Residential Solution inverter is a single phase inverter that 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 Extended version inverter also receives the monitoring data from each power optimizer and transmits it to a central server (the SolarEdge monitoring platform; requires Internet connection).

SolarEdge Power Optimizer

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

The Compact Residential Solution power optimizer has 4 inputs, each with an MPP tracker and each for 1-2 modules in series.

The power optimizer includes a safety voltage function that automatically reduces the output of each power optimizer to 10 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

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

SolarEdge Monitoring Platform

The SolarEdge 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. [Installing the Power Optimizer](#), page 11.
2. [Mounting the inverter](#), Page 18.
3. [Connecting the AC and the Power Optimizer to the Inverter](#), page 20.
4. [Commissioning the Installation](#) - inverter Basic version, page 23, or [Commissioning and activating the installation using the SolarEdge Inverter SetApp](#) - inverter Extended version, page 25.
5. [Setting up communication](#) - inverter Extended version, page 42 .

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 5mm screw type for the inverter cover, DC Safety Unit cover (if applicable), and inverter side screws
- Allen screwdriver for M5/M6/M8 screw types
- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill or screwdriver and bits suitable for the surface on which the inverter will be installed. Use of an impact driver is not recommended.
- Appropriate mounting hardware (for example: stainless bolts, nuts, and washers) for attaching:
 - the mounting bracket to the mounting surface
 - the power optimizer to the racking
- MC4 crimper
- 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 -25°C - $+65^{\circ}\text{C}$ / -13°F - 149°F .

Chapter 2: Installing the Power Optimizers

Safety

The following notes and warnings apply when installing the SolarEdge power optimizers.

**WARNING!**

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

**WARNING!**

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

**CAUTION!**

Power optimizers are IP68/NEMA4 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. In order to ensure mechanical compatibility of the SolarEdge optimizers and the modules to which they are connected, use identical connectors from the same manufacturer and of the same type on both the power optimizers and on the modules.

**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 4V.

Installation Guidelines

- The power optimizer can be placed in any orientation.
- Position the power optimizer close enough to the modules so that their cables can be connected.
- Do not leave the power optimizer connectors disconnected . Open connectors should be mated to each other.
- To allow the 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.

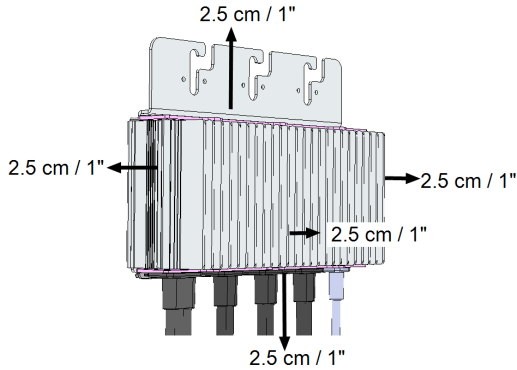


Figure 2: Power optimizer clearance

Package Contents

- One SolarEdge inverter
- One power optimizer
- One inverter mounting bracket
- Two mounting spacers
- Two Allen screws for fastening the inverter to the mounting bracket
- Installation guide
- For built in wireless communication option - RF antenna and mounting bracket

Step 1: Mounting the Power Optimizer

1. Determine the power optimizer mounting location and use the power optimizer mounting bracket to attach the power optimizer to the support structure (see *Figure 3*). Use at least two bracket holes.
2. If required, mark the mounting hole locations and drill the holes.



CAUTION!

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

3. Attach the power optimizer to the rack using M6 (1/4") stainless steel bolts, nuts and washers. Apply torque of 9.5 N*m / 7 lb*ft.
4. Verify that the power optimizer is securely attached to the module support structure .

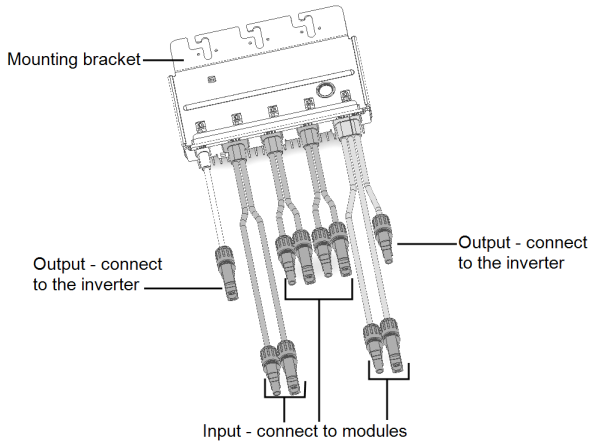


Figure 3: Power optimizer connectors

Step 2: Connecting the PV Modules to the Power Optimizer

You can connect 4-8 modules to the power optimizer. You can connect 1-2 modules in series to each input.

- 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.



NOTE

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

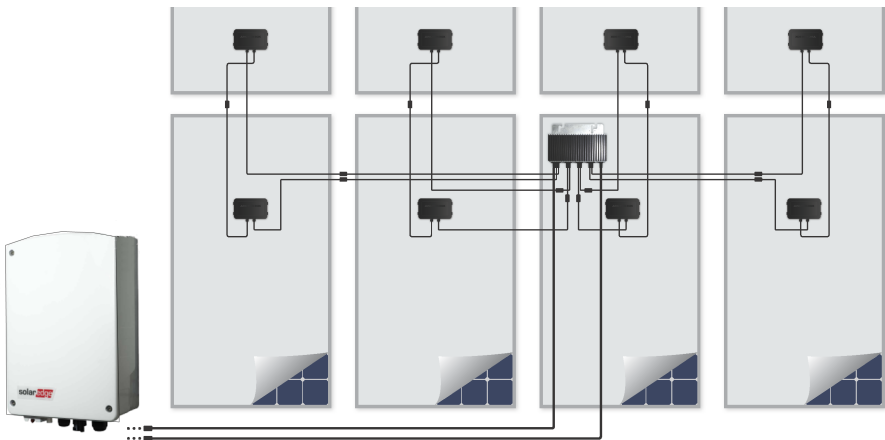


Figure 4: PV module connection

Step 3: Verifying Proper Power Optimizer Connection

After the modules are connected to a power optimizer, the power optimizer outputs a safe voltage of 10V.

Make sure the modules are exposed to sunlight during this process; otherwise, the power optimizers may not be powered.

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

Verify correct polarity by measuring the power optimizer polarity with a voltmeter. Use a voltmeter with at least 0.1V measurement accuracy.

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 58.

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, front or side.

Identifying the Inverter

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

Inverter Interfaces

The following figure shows the inverter connectors and interfaces.

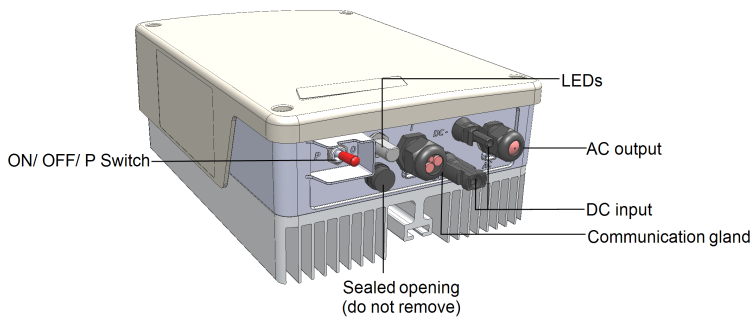


Figure 5: Inverter Interfaces

- **AC output:** For connection of the AC grid
- **DC inputs:** For connection of the PV installation
- **A communication gland,** for connection of inverter communication options. Refer to *Setting Up Communication* on page 42 for more information.
- **ON/OFF/P Switch:**

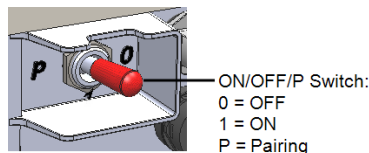


Figure 6: ON/OFF/P switch

- **ON (1)** - Turning this switch ON (after 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 on the

SolarEdgeSetApp mobile application screen. In the Extended version it also allows performing functions:

P Position duration	Function	Comments
Switch moved to P for less than 5 seconds , then released.	<ul style="list-style-type: none"> ○ Displays production information for 5 seconds on the SetApp screen. ○ Displays error type indications (if exist) for 5 seconds. ○ Activates the Wi-Fi access point for connecting to the SolarEdge Inverter SetApp 	While the switch is in P, all LEDs are ON
Switch moved to P for more than 5 seconds , then released.	Starts pairing	

- **LEDs:** three LEDs indicate, by color and state (on/off/blinking¹/flickering²), different system information, such as errors or performance indications.

Generally, 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

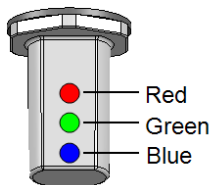


Figure 7: LEDs

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

¹Blinking = Turns ON and OFF for the same duration

²Flickering = Turns ON for 100 ms and turns OFF for 5 seconds

Indication	ON/ OFF/ P switch position	LED color			Comment
		Red	Green	Blue	
Percentage of AC Production: 0 - 33 %	ON (1)	OFF	ON	OFF	This indicates power production as percentage of rated peak AC output power
Percentage of AC Production: 33 - 66 %		OFF	OFF	ON	
Percentage of AC Production: 66 - 100 %		OFF	ON	ON	
Power optimizers not paired		OFF	Blinking	<ul style="list-style-type: none"> o S_OK: ON o 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"> o S_OK: ON o No S_OK: OFF 	
Night mode (no production)	OFF	Flickering			
Inverter is OFF (SafeDC)	OFF (0)	OFF	Blinking	<ul style="list-style-type: none"> o S_OK: ON o No S_OK: OFF 	
Inverter is OFF (DC not safe)		Blinking	Blinking		
Inverter configuration or reboot	ON / P	ON	ON	ON	
Inverter firmware upgrade	ON / P	Blinking	Blinking	Blinking	
No AC power		OFF	OFF	OFF	
Error	Any	ON	ON/ OFF/ Blinking/ Flickering	ON/ OFF / Blinking/ Flickering	Refer to <i>Errors and Troubleshooting</i> on page 54

Mounting the Inverter

The inverter is supplied with a mounting bracket and two mounting spacers.

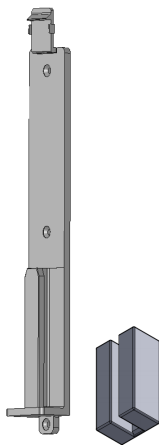


Figure 8: Mounting bracket and spacer



NOTE

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

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 :
 - 20 cm (8") from the top of the inverter.
 - 10 cm (4") from the bottom of the inverter.
 - 10 cm (4") from the right and left of the inverter.
3. Position the bracket against the wall/ pole and mark the 3 drilling hole locations (refer to *Mechanical Specifications* on page 60 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 : Lift the inverter from the sides, or hold it at the top and bottom to lift the unit into place. Slide the inverter onto the bracket until the notch at the top of the bracket clicks into the heat sink.

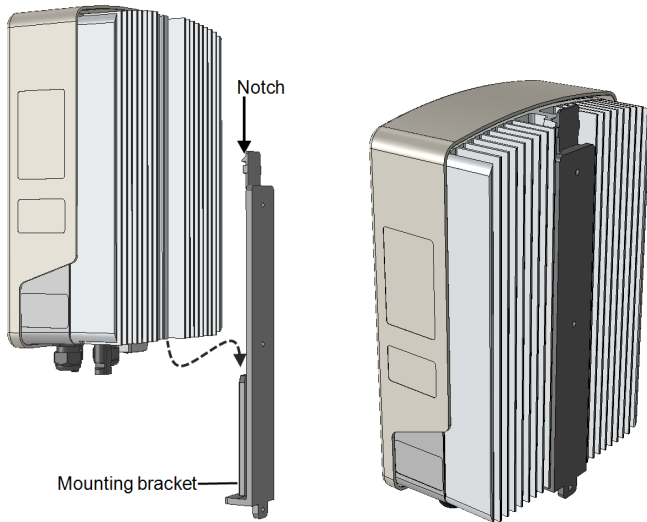


Figure 9: Hanging the inverter on the bracket

6. To increase inverter stability on the surface, you can insert and slide the supplied mounting spacers between the inverter heat-sink fins and the surface.

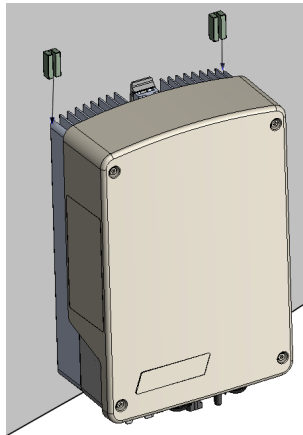


Figure 10: Inserting the spacers

Chapter 4: Connecting the AC and the Power Optimizer to the Inverter

This chapter describes how to connect the inverter to the AC grid, and to the power optimizer.

Connecting the AC Grid to the Inverter

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

The inverter is a single phase inverter; use a three-wire cable. The maximum wire size for the input terminal blocks is 16mm².

1. Turn OFF the AC circuit breaker.



WARNING!

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

2. Open the inverter cover: Release the four Allen screws 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.

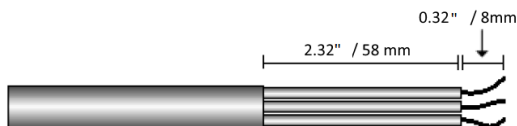


Figure 11: Insulation stripping – AC (3-wire cable)

4. Open the AC cable gland and insert the cable through the gland.
5. Connect the AC wires according to the labels on the terminal block.

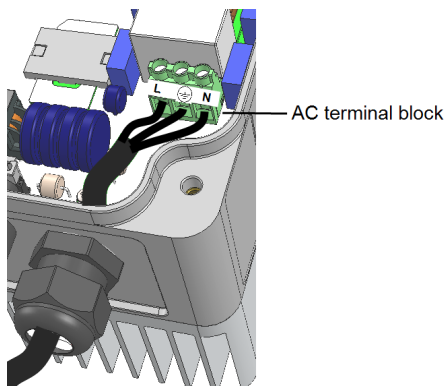


Figure 12: AC connection

6. Tighten the screws of each 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.

Connecting the Power Optimizer to the Inverter

Connect the power optimizer to the DC input pair.

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.

Connect the DC output connectors of the power optimizer to the DC+ and DC- connectors according to the labels on the inverter.



Figure 13: 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 2 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: Commissioning the Installation - Inverter Basic Version

This chapter describes how to activate the system and pair the power optimizer to the inverter in the inverter basic version.

Step 1: Setting the Country

Country setting is done using 8 DIP-switches.

1. Verify that the inverter ON/OFF/P switch is OFF.
2. If not already removed, remove the inverter cover: Open the inverter cover's four 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.

3. Open the DIP Switch cover using a flat blade screwdriver.

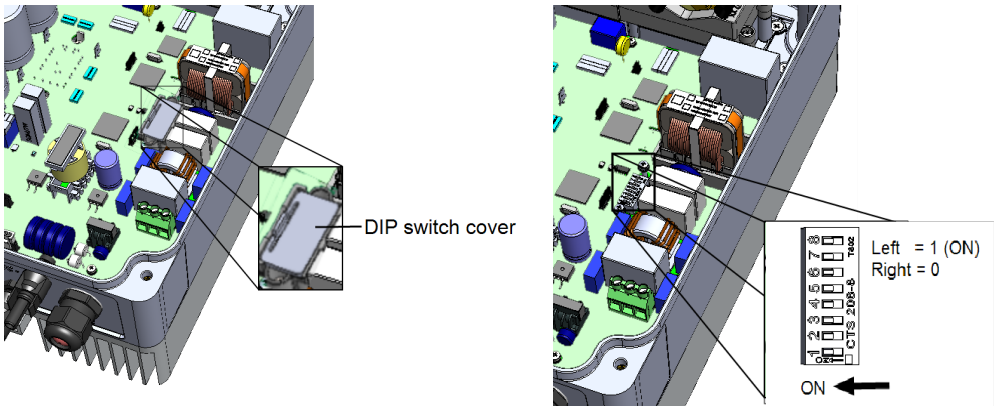


Figure 14: DIP switches in the inverter

4. Set up the county DIP switches according to the country list supplied with your inverter (refer to https://www.solaredge.com/sites/default/files/country_setting_in_se_compact_residential_solution_basic_version.pdf).
5. Close the inverter cover by tightening the screws with a torque of 3.0N*m/ 2.2 lb*ft.



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 power optimizer is replaced, repeat the pairing process.

► To initiate pairing:

1. Move the inverter ON/OFF/P switch to ON. The green LED is blinking.
2. Move the ON/OFF/P switch to the P position, hold for **more than 10 seconds**, and release. The pairing process starts. The blue LED turns ON for 3 seconds after the power optimizer is paired .
3. Wait for the completion of the pairing: the green inverter LED is steadily lit. If pairing fails, the green and red LEDs will continuously blink in alternating pattern until pairing is restarted.

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 10V output.

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.

When the green LED is steadily lit, the inverter enters Production mode and produces power.

Step 3: Verifying Proper Activation

After pairing, verify that the green inverter LED is steadily lit. If not, refer to *Power Optimizer Troubleshooting* on page 58 .

Your SolarEdge power harvesting system is now operational.

Chapter 6: Activating, Commissioning and Configuring the System Using SolarEdge

Inverter SetApp - Inverter Extended Version

If applicable, you can connect communication options at this stage, as described in *Setting Up Communication - Inverter Extended Version* on page 40.

Once all connections are made, the system should be activated and commissioned using the SolarEdge Inverter SetApp mobile application. You can download the app from the iTunes and Google Play app stores prior to reaching the site.



Internet connection is required for the download and for the one-time registration, however 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. Internet connection is required for the download and for the one-time registration.

▶ To activate the installation:

1. Turn ON the AC circuit breaker on the main distribution panel.
2. Move the ON/ OFF/ P switch to the ON position.
3. Open SetApp and follow the instructions on the screen (scan the inverter bar-code; move the ON/OFF/P switch to P position and release within 5 sec. back to ON (1) position). SetApp creates a Wi-Fi connection, upgrades the inverter CPU firmware and activates the inverter.
4. When the activation is complete, do one of the following:
 - Select **Activate Another Inverter** to continue activating additional inverters
 - Select **Start Commissioning** for pairing and other system configuration. The Commissioning screen is displayed. Refer to the next section for more information.

Step 2: Commissioning and Configuring the Installation

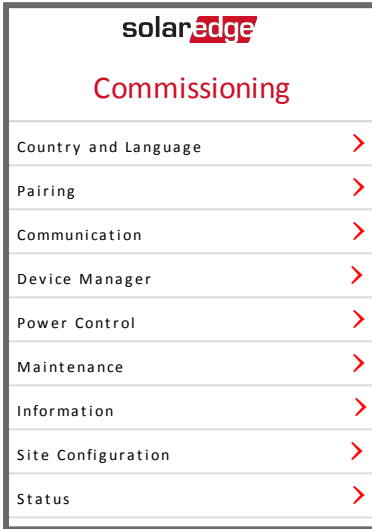
This section describes how to use the SetApp menus for commissioning and configuring the inverter settings.

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**. The main Commissioning menu screen is displayed:



- If the inverter has already been activated and commissioned:
 - a. If not already ON - turn ON AC to the inverter by turning ON the circuit breaker on the main distribution panel.
 - b. Open SetApp and follow the instructions on the screen (scan the inverter bar-code; move the ON/OFF/P switch to P position (for less than 5 sec) and release).
The mobile device creates a Wi-Fi connection with the inverter and displays the inverter main Status screen.

solar edge		
Status		
Inverter		
SN 07318000C		
Power 2 kW	Voltage 230Vac	Frequency 50 Hz
P_OK: 7 of 8 Optimizers Connected	S_OK Server Connected	
Status Production	Switch ON	
CosPhi 1.00	Limit No Limit	Country Netherlands
Voltage 310 Vdc	Temp 20 C	Fan N/A
Commissioning		

- c. Tap **Commissioning** at the bottom of the screen. The main Commissioning menu screen is displayed.

In the main menu, 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 26).

Setting Country and Language

1. From the Commissioning screen select **Country and Language**.

Country and Language	
Country	
Germany	▼
Language	
Deutsch (Germany)	▼

- From the **Country** drop-down list, select the required country setting.

**WARNING!**

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

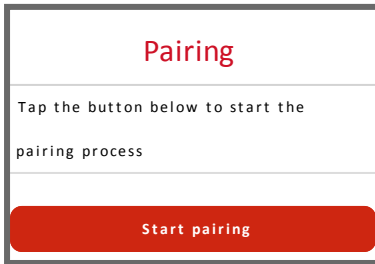
- From the **Language** drop-down list, select the language.
- Tap **OK**.

Pairing

Once all connections are made, the power optimizer must be logically paired to the inverter. The power optimizer does not start producing power until it is paired. This step describes how to assign the power optimizer to the inverter.

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

- From the main menu, select **Pairing**.



- Tap **Start Pairing**.
- 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 4V output.

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.

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

- Tap **OK** to return to the main menu.

Communication

Communication settings can be configured only after communication connections are complete. Refer to *Setting Up Communication - Inverter Extended Version* on page 40.

1. Select the **Communication** menu to define and configure the following:
 - 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 electricity meters or loggers.

solar edge		
Communication		
Server	LAN	>
LAN	DHCP	>
RS485-1	SolarEdge Slave	>
RS485-2	Multi -Device (Modbus)	>
ZigBee	Home Automation Master	>
Wi-Fi	SEDG-7E129A09-33	>
RS232	SolarEdge GSM	>
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disable	>

- 2. Tap the **Server** red arrow to set the communication method to be used for communication between devices and the SolarEdge monitoring platform. The default is LAN. Refer to *Setting Up Communication - Inverter Extended Version* on page 40 for a full description of these communication options.



NOTE

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

Server		
LAN	S_OK	✓
Cellular		
Wi-Fi		
RS485-1 SolarEdge Slave		
ZigBee Slave		

For detailed information about all the configuration options, refer to the *Communication Options Application Note*, available on the SolarEdge website at https://www.solaredge.com/sites/default/files/solaredge-communication_options_application_note_v2_250_and_above.pdf.



Power Control

solar edge		
Power Control		
Grid Control	Enabled	>
Energy Manager		>
Power Reduction Interface (RRCR)	Enabled	>
Reactive Power	CosPhi	>
Active Power		>
Wakeup Configuration		>
Advanced		>
Load Defaults		>

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



Device Manager

From the main menu, select **Device Manager** to configure various system Home Energy Management devices.

For more information refer to <https://www.solaredge.com/products/device-control/#>.



solar edge		
Device Manager		
Add Device	2 connected	>
ZED- 814	Manual, Off	>
Plug 409	Auto, On	>
Remove All		>

Maintenance

From the main menu, select **Maintenance** to configure various system settings, as described below.

solar edge		
Maintenance		
Date and Time	Sep-7 2017 09:45am	>
Temperature	Celsius	>
Reset Counters		>
Factory Reset		>
Arc Fault Circuit Interrupter (AFCI)	Enabled Automatic Reconnect	>
Firmware Upgrade		>
Load / Save Configuration		>
Diagnostics		>
Standby Mode	Disable	>
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.
- **Temperature:** Set the temperature units to use: Celsius or Fahrenheit
- **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.
- **Arc Fault Circuit Interrupter (AFCI):** Enables or disables production interruption in case of arc-fault, sets the reconnection mode, and enables or disables manual AFCI self-test.
Refer to https://www.solaredge.com/sites/default/files/arc_fault_detection_application_note.pdf.
- **Firmware Upgrade:** Perform a software upgrade.
- **Load / Save Configuration:** Enables saving or loading system parameters from one inverter to another.
- **Diagnostics:** Displays the Isolation Status and Optimizers Status screens. Refer to www.solaredge.com/files/pdfs/application_note_isolation_fault_troubleshooting.pdf.
- **Standby Mode:** Enables/disables Standby Mode - for remote commissioning.
- **Grid Protection:** Available in specific countries. Enables viewing and setting grid protection values.
- **Board Replacement:** Backs up and restores the system parameters, including energy counters; Used during board replacement according to the instructions supplied with replacement kits.



Information

From the main menu, select **Information** to view and set various system settings, as described below.

solar edge	
Information	
CPU Version	4.0000.0000
DSP1 Version	1.0210.1066
DSP2 Version	2.0052.0410
Serial Number	7F129A09-33
Hardware IDs	>
Error Log	>
Warning Log	>

- **CPU Version:** The communication board firmware version
- **DSP 1/2 Version:** The digital board firmware version

**NOTE**

Please have these numbers ready when you contact SolarEdge Support.

- **Serial Number** - The inverter serial number as appears on the enclosure sticker
- **Hardware IDs:** Displays the following HW serial numbers (if exist, and connected to the inverter):
 - **This inverter:** the inverter's ID
 - **Meter # :** Modbus meter ID (up to 3 meters can be connected)
 - **ZB:** ZigBee Card MAC address
 - **WiFi:** Wi-Fi MAC address
- **Error Log:** Displays the last five errors, and enables resetting (clearing) the log.
- **Warning Log:** Displays the last five warnings, and enables resetting (clearing) the log.

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 (see also *Viewing System Status* on page 35).
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.

Viewing System Status

During normal operation, the **Status** screen displays all the inverter settings and operation status. Scrolling down displays the values one after the other, as described in the following sections.


The LED indication provides more information about system performance; Refer to *LEDs*. on page 16.


▶ To access the Status screen:

Do one of the following:

- During first time Commissioning and configuration: From the **Commissioning** menu select **Status**. The main inverter Status screen is displayed (see below)
- If the inverter has already been activated and commissioned - open SetApp and follow the instructions on the screen (scan the inverter bar-code; move the ON/OFF/P switch to P position (for less than 5 sec) and release).

The mobile device creates a Wi-Fi connection with the inverter and displays the inverter main Status screen.

A red or orange icon (for example: ) may appear at the top left corner of a status cell, indicating an error. The color indicates error severity (red is top severity). The error description or information appears on the screen. Tap the error line for more information and troubleshooting instructions, and refer to *Errors and Troubleshooting* on page 54.

A gray clock icon () may appear at the top left corner of a status cell, indicating a temporary status, such as a connection process. When the process is complete, the icon disappears and a constant status message is displayed.

Main Inverter Status

solar edge		
Status		
Inverter		
SN 07318000C		
Power 2 kW	Voltage 230Vac	Frequency 50 Hz
P_OK: 7 of 8 Optimizers Connected	S_OK Server Connected	
Status Production	Switch OFF	
CosPhi 1.00	Limit No Limit	Country Netherlands
Voltage 310 Vdc	Temp 20 C	Fan N/A
Switch Off. Production disabled >		
Commissioning		

- **Inverter:** The inverter serial number
- **Power:** The AC output power
- **Voltage (Vac):** The AC output voltage
- **Frequency:** The AC output frequency
- **P_OK: 1 of 1:** There is a connection to the power optimizer and the power optimizer is sending monitoring data.
- **S_OK:** The connection to the SolarEdge monitoring platform is successful (appears only if the inverter is connected to the monitoring platform).
- **Status:** The inverter operation status: Off, Not Paired, Night Mode, Error, Pairing, or Production
- **Switch:** Indicates the position of the inverter ON/OFF/P switch: On, Off, or P position.
- **CosPhi:** Indicates the ratio between active and reactive power. A negative value indicates a lagging CosPhi.

For more information, refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.com/files/pdfs/application_note_power_control_configuration.pdf.

- **Limit:** The inverter maximum output power
- **Country:** The selected country and grid setting
- **Voltage (Vdc):** The DC input voltage
- **Temp** (°C or °F): The inverter heat sink temperature



Multiple Inverters Status

The Multiple Inverters status screen shows the status of all inverters connected to a master inverter in a chain (bus). The master inverter is displayed first, and the connected inverters (slaves) appear one after the other when scrolling.

solar edge		
Status		
Multi-inverters		
Production	Limit	Inverters
1.00 MW	1.00 MW	10/10
Inverter		
SN 07318000C		
Power	Voltage	Frequency
100 kW	277 Vac	60.9 Hz
P_OK: 1 Of 1		S_OK
Optimizers Connected		Server Connected
Status		Switch
Production		OFF
CosPhi	Limit	Country
1.00	Export	ITA
⚠ Switch Off. Production disabled >		
Commissioning		

- **Site status:**
 - **Production:** The AC output power
 - **Limit:** Limitation setting (Export or Production)

Communication Status

This screen displays the status of connection option(s): LAN, RS485, Wi-Fi, GSM or ZigBee card.

Communication		
LAN	RS485-1	RS485-2
Connected	SE Slave	Modbus
	NC	2 of 2
Cellular	Wi-Fi	ZigBee
N/A	NC	NC

For each communication option, one of the following statuses is displayed:

- **Connected:** The inverter established a successful connection and communication with the specified server port/device

- **NC**: Not Connected. Refer to *Troubleshooting Communication* on page 57
- **S_OK**: The connection to the SolarEdge monitoring platform is successful (should appear only if the inverter is connected to the server)
- **N/A**: Not Applicable
- **x of y**: Number of devices connected out of all devices
- Temporarily displayed (with a ⌚ clock sign):
 - **Initializing communication**
 - **Connecting** to a network
 - **Connecting** to SolarEdge servers
- **Error message** (with the ⚠ sign). Refer to *Troubleshooting Communication* on page 57.

Inverter Energy Status

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

Inverter Energy		
Today	This Month	This Year
10 kWh	300 kWh	3.5 MWh
Total: 5.0 MWh		

- **Today**: since midnight
- **This Month**: since 1st of the current month
- **This Year**: since January 1st
- **Total (Wh)**: The inverter total energy. If an external meter is installed, 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 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.

Meter Status

Meters
Production – RS485-2 Modbus ID #2 Status: OK Power: 2 kW, Energy: 4 MWh

- **Type and function**: Displays the meter functionality (Production, Export, Import, Export+Import)
- **Status**: Displays OK if the meter is communicating with the inverter
- **<Error message>**: If there is a meter error, it is displayed in this line.
- **Power**: Depending on the meter type connected to the inverter, this line displays the exported or imported power

- **Energy:** The total energy read by the meter. The value displayed in this line depends on the meter type connected to the inverter and its location:
 - If a bidirectional meter is connected at the consumption point, this value is the consumed energy.
 - If the meter is installed at the production connection point, this value is the energy produced by the site.
 - If the meter is installed at the grid connection point, this value is the energy exported to the grid.

**NOTE**

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

Chapter 7: Setting Up Communication - Inverter Extended Version

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 SolarEdge monitoring platform.

CAUTION!



When connecting the communication cables, make sure that the ON/OFF/P switch at the bottom of the inverter (and the switch of the DC Safety Unit if applicable) 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 DC Safety Unit 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 SolarEdge monitoring platform.

Only communication products offered by SolarEdge are supported.

Always connect the communication options when the relevant devices are powered down - CCG, inverter, etc.

Ethernet

Ethernet is used for a LAN connection. For connection instructions refer to *Creating an Ethernet (LAN) Connection* on page 43.

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/SMIs/CCG) 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-E: The RS485 Expansion Kit 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 46.

ZigBee

This option enables wireless connection, and requires a ZigBee card and an external antenna. ZigBee connection is used for:

- *Monitoring* - connection of one or several devices to a SolarEdge ZigBee Home Gateway, for wireless communication to the SolarEdge monitoring platform. The Home Gateway kit 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>.
- *Home Energy Management* - wireless connection to one or several Home Automation products, which automatically divert PV energy to home appliances. The Home Energy Management products are provided with an installation guide, which should be reviewed prior to connection. Refer to [https://www.solaredge.com/products/device-control#/#/](https://www.solaredge.com/products/device-control#/).



The ZigBee card is built into the inverter Extended version. An antenna is available from SolarEdge.

Wi-Fi

This communication option enables using a Wi-Fi connection for connecting to the SolarEdge monitoring platform. The Wi-Fi option requires a Wi-Fi card and an external antenna.

The Wi-Fi card is built into the inverter Extended version. An antenna is available from SolarEdge for connection to the monitoring platform.

GSM

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

The GSM cellular modem 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



Setting Up Communication

The communication gland located at the inverter bottom is used for connection of the various communication options. The gland has three openings.

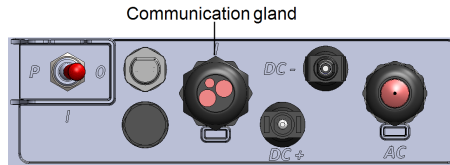


Figure 15: The Compact Residential Inverter connection panel

In the Extended version, the communication board includes:

- Standard RJ45 terminal block for Ethernet connection
- USB connector
- 10-pin terminal block for RS485 connection
- Holders and antenna connectors for ZigBee, Wi-Fi and GSM connection

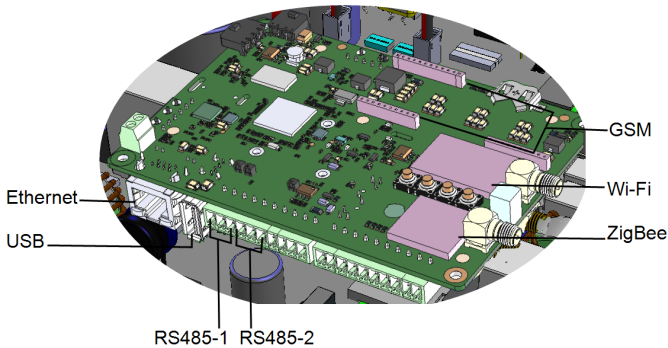


Figure 16: Communication connectors

The following sections describe Ethernet and RS485 connection and configuration. For ZigBee, Wi-Fi and GSM communication, refer to the installation guides provided with these products.

Removing the Inverter Cover

If the inverter cover is not already removed, use the following procedure for cover removal for communication connection or maintenance purposes.

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



CAUTION!

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

Creating Ethernet (LAN) Connection

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

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.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 42.
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 the large opening that has a cut in the rubber fitting .
4. Remove the rubber fitting from the gland and insert the CAT5/6 cable through the gland and through the gland opening in the inverter .
5. Push the cable into the cut opening of the rubber fitting.

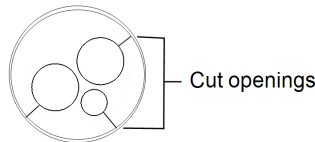


Figure 17: Rubber fitting

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-

¹The 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	
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

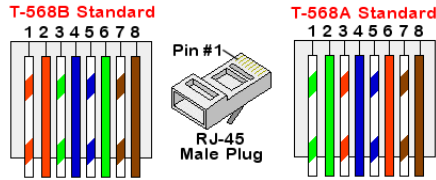


Figure 18: Standard cable wiring

6. Use a pre-terminated cable to connect via the gland 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 18*
 - d. Use a crimping tool to crimp the connector.
 - e. Connect the Ethernet connector to the RJ45 port on the communication board.
7. For the switch/ router side, use a pre-terminated cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above (*Figure 18*).
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. Close the inverter cover.

¹The 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/P switch is OFF.
 - b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.



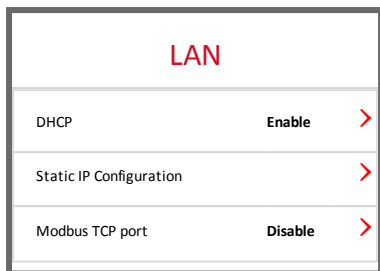
WARNING! ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the inverter cover is removed.

- c. Use the SolarEdge SetApp to access the **Commissioning** main menu screen as described in *Communication* on page 29.
- d. From the main menu tap **Communication**. The Communication screen is displayed:

solarEdge		
Communication		
Server	LAN	>
LAN	DHCP	>
RS485-1	SolarEdge Slave	>
RS485-2	Multi -Device (Modbus)	>
ZigBee	Home Automation Master	>
Wi-Fi	SEDG-7E129A09-33	>
RS232	SolarEdge GSM	
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disable	>

e. In the Communication menus, select the following to configure the connection:

- Server → LAN
- LAN → DHCP → Enable



11. Verify the connection, as described in *Verifying the Connection* on page 50.

**NOTE**

The system automatically establishes communication with the Monitoring Platform as it is configured to LAN by default.

**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
- Modbus TCP Port: 22222 (for incoming and outgoing data)

Creating RS485 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 48.

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

An RS485 surge protection device is available from SolarEdge. For details refer to: https://www.solaredge.com/sites/default/files/rs485_surge_protection_kit_installation_guide.pdf.

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 Switch.

**NOTE**

An additional RS485 port (RS485-E) is available from SolarEdge, allowing configuration of multiple RS485 buses for communications in large sites; Refer to http://www.solaredge.com/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 42.
2. Remove the seal from one of the openings in the communication gland and insert the wire through the opening.
3. Pull out the 6-pin RS485 terminal block connector:
4. Loosen the screws of pins A(+), B(-), and G on the left of the RS485 terminal block (RS485-1).

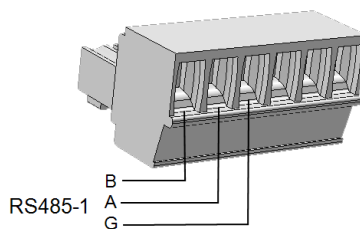


Figure 19: RS485 terminal block

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

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

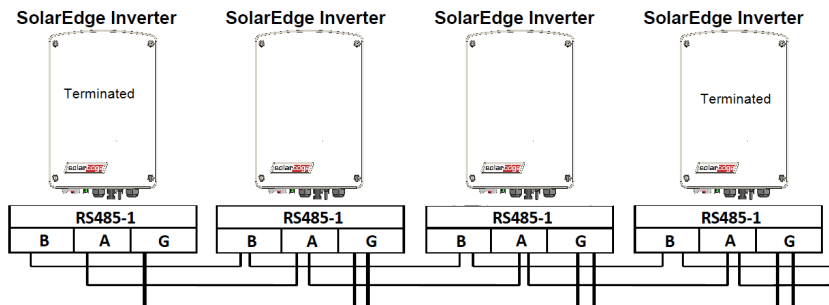


Figure 20: Connecting the inverters in a chain



NOTE

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

- Tighten the terminal block screws.
- Check that the wires are fully inserted and cannot be pulled out easily.
- Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.
- Terminate the first and last device (inverter/Control and Communication gateway, etc.) 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.

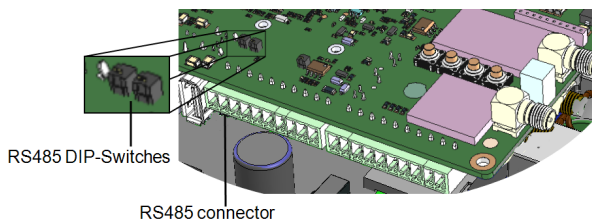


Figure 21: RS485 termination DIP-switches



NOTE

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

► To connect to the monitoring platform:

- 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.
- Connect the master to the SolarEdge monitoring platform via the LAN option (refer to *Creating an Ethernet (LAN) Connection* on page 1) or any of the other options.

► **To configure the RS485 bus:**

All inverters are configured by default as slaves. To configure the master:

1. Verify the ON/OFF/P switch is OFF.
2. Verify the AC is on.
3. Use SetApp to access the **Commissioning** main menu screen as described in *Communication* on page 29.
4. From the main menu tap **Communication**. The Communication screen is displayed:

solar edge		
Communication		
Server	LAN	>
LAN	DHCP	>
RS485-1	SolarEdge Slave	>
RS485-2	Multi -Device (Modbus)	>
ZigBee	Home Automation Master	>
Wi-Fi	SEDG-7E129A09-33	>
RS232	SolarEdge GSM	>
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disable	>

5. Select the following to configure the connection:

- Server → **LAN**
- RS485-1 → Protocol → **SolarEdge Master**
- RS485-1 → **Slave Detect**

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

RS485-1		
Protocol	SolarEdge (Master)	>
Device ID	1	
Slave Detect	3 Slaves	>
Long Slave Detect	3 Slaves	>
Slave List	3 Slaves	>

6. To check the slave IDs and last communication time, select **RS485-1** → **Slave List**.
7. Verify the connection of the master to the SolarEdge 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. Access the Status screen:
 - a. If not already ON - turn ON AC to the inverter by turning ON the circuit breaker on the main distribution panel.
 - b. Open SetApp and follow the instructions on the screen (scan the inverter bar-code; move the ON/OFF/P switch to P position (for less than 5 sec) and release).
The mobile device creates a Wi-Fi connection with the inverter and displays the inverter main Status screen.

2. Check that **S_OK - Server Connected** status appears in the main inverter section:

solar edge		
Status		
Inverter		
SN 07318000C		
Power 2 kW	Voltage 230Vac	Frequency 50 Hz
P_OK: 7 of 8 Optimizers Connected	S_OK Server Connected	
Status Production	Switch ON	
CosPhi 1.00	Limit No Limit	Country Netherlands
Voltage 310 Vdc	Temp 20 C	Fan N/A
Commissioning		

3. Scroll down to the **Communication** section and check that the communication options are as required. For more information refer to *Communication Status* on page 37.

Communication		
LAN Connected	RS485-1 SE Slave NC	RS485-2 Modbus 2 of 2
Cellular N/A	Wi-Fi NC	ZigBee NC

Reporting and Monitoring Installation Data



NOTE

This step requires connecting one of the communication options. Refer to *Setting Up Communication - Inverter Extended Version* on page 40.

The SolarEdge Monitoring System

The SolarEdge cloud-based monitoring platform enables accessing SolarEdge site information, including up-to-date information viewed in a physical or logical view. The monitoring platform is described in detail in the *SolarEdge Monitoring Platform User Guide*, available on the SolarEdge website at

<http://www.solaredge.com/files/pdfs/solaredge-monitoring-platform-user-guide.pdf>.

The SolarEdge 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 SolarEdge monitoring platform.

If you do not report the physical and logical mapping of the installed power optimizers to SolarEdge, the SolarEdge 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 SolarEdge monitoring platform via LAN or by using a SolarEdge ZigBee Home Gateway system or a SolarEdge Cellular Modem. 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 - Inverter Extended Version* on page 40.

Providing Installation Information

Use one of the following methods to connect your PV system to the SolarEdge cloud-based monitoring platform (monitoring platform).

Site Mapper Application

Android

Use the SolarEdge Site Mapper smart-phone application to scan the power optimizer and inverter 2D barcodes, and map the system physical layout in the SolarEdge monitoring platform. This application is integrated with the SolarEdge 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 *SolarEdge Site Mapper* demo movies:

- [Creating new sites using the SolarEdge Site Mapper mobile application](#)



- [Mapping power optimizers using the SolarEdge Site Mapper mobile application](#)



iPhone

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

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



Creating a Site in the SolarEdge Monitoring Platform

Create the site in the monitoring platform using the registration form available at <https://monitoring.solaredge.com/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 SolarEdge monitoring platform during site registration. For an example paper template, refer to <http://www.solaredge.com/files/pdfs/physical-layout-template.pdf>.



Appendix A: Errors and Troubleshooting

This appendix 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 the SolarEdge 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>.



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 **less** than 5 seconds and release it.
2. Observe the LED lights and use the following table to identify the error type

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.

- Right-click the inverter and select **Info** from the menu (Figure 22). The inverter details window is displayed (Figure 23).

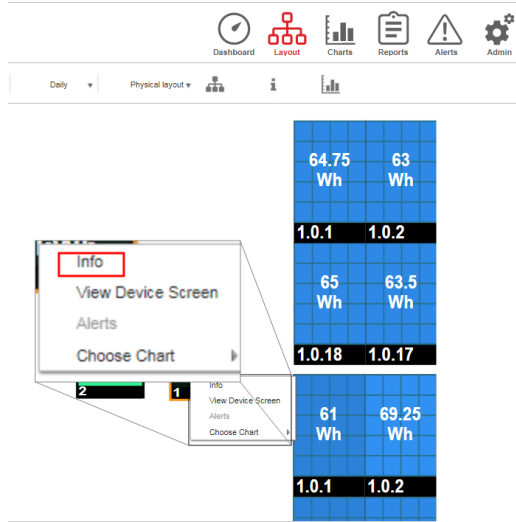


Figure 22: Inverter menu

- Click the **Errors** tab. The list is displayed.

Details for Inverter 1

System data Running operations Device screen **Errors**

Your last refresh: 10/18/2017 10:32 AM Refresh

Code	QTY	Description	Last Occurrence	
119	1	INIT	10/10/2017 07:55	>
61	1	AC Voltage Too Low (Line 1)	09/20/2017 14:32	>
63	1	AC Voltage Too Low (Line 2)	09/20/2017 14:32	>

Figure 23: Inverter details - Error list

▶ To identify the error type using SetApp:

- Access the Status screen as described in *Viewing System Status* on page 35.
- Check for errors indicated by a red or orange icon (for example: 🚫). The color indicates error severity (red is higher severity).

3. Tap the error line for more information and troubleshooting instructions.

solaredge

Status

⚠ Error 3x303: Grid unstable

Inverter
SN 07318000C

Power	Voltage	Frequency
2 kW	230Vac	50 Hz

<p>🕒 P_OK: 7 of 8 Optimizers Connected</p>	<p>S_OK Server Connected</p>
<p>Status Production</p>	<p>⚠ Switch OFF</p>

CosPhi	Limit	Country
1.00	No Limit	Netherlands

Voltage	Temp	Fan
310 Vdc	20 C	N/A

⚠ Error 18X37: V-Line Max. >

⚠ Switch Off. Production disabled >

• **Commissioning**



**Error 18x37: V-Line Max
Troubleshooting**

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.
- 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/pdf/s/viewing_grid_protection_values.pdf

OK

Troubleshooting Communication

Troubleshooting Ethernet (LAN) Communication

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

Error Message	Cause and Troubleshooting
LAN cable disconnected	Physical connection fault. Check the cable pin-out assignment and cable connection.
No DHCP	IP settings issue. Check the router and inverter configuration. Consult your network IT.
Configure Static IP or set to DHCP	
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.
No connection to SolarEdge servers	Ping or connection to SolarEdge server failed. Check the SolarEdge server address, under LAN Conf sub-menu: Address: prod.solaredge.com Port: 22222 Check with your network administrator whether a firewall or another device is blocking transmission.

Troubleshooting RS485 Communication

- If the message **RS485 Master Not Found** appears in the Status screen, check the connections to the master device and fix if required.
- If after slave detection the number of slaves displayed for the master under **RS485-X Conf → Slave Detect** is lower 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.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

Problem	Possible cause and troubleshooting
Pairing failed	The power optimizer is shaded. If you connected the inverter to the SolarEdge 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.
String voltage is 0V	Power optimizer output is disconnected. Connect all power optimizer outputs.
String voltage is 0-10V	Power optimizer not connected in the string. Connect all power optimizers
	Module(s) not connected properly to power optimizer inputs. Connect the modules to the optimizer inputs.
	String reverse polarity. Check string polarity using a voltmeter and correct if needed.
String voltage is higher than 10V	A module is connected directly to the string, without the power optimizer (not applicable to smart modules). Verify that no module outputs are connected without a power optimizer. If the problem persists, contact SolarEdge Support.
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.	

Appendix B: SafeDC™

When AC supply to the inverter is shut off (by shutting off the AC breaker at the site), or when the inverter ON/OFF/P switch is turned to OFF, the DC voltage drops to a safe voltage of 4V per optimizer. 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, the disconnection mechanism operates as follows:

1. Turn the inverter ON/OFF/P switch, located at the bottom of the inverter, to OFF, or disconnect the AC by shutting off the AC breaker at the site. The DC voltage displayed on the inverter LCD begins to decrease.

If the AC breaker was shut off, the LCD does not display. In this case, wait five minutes.

2. When the DC voltage reaches a safe voltage, the PV connectors at the input to the inverter can be disconnected. A galvanic separation then exists between the PV array and the inverter.

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: $V_{oc,max+} (String\ Length-1)*4V$, where:

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



Appendix C: Mechanical Specifications

The following figure provides dimensions of the Compact Residential Solution inverter and power optimizer.

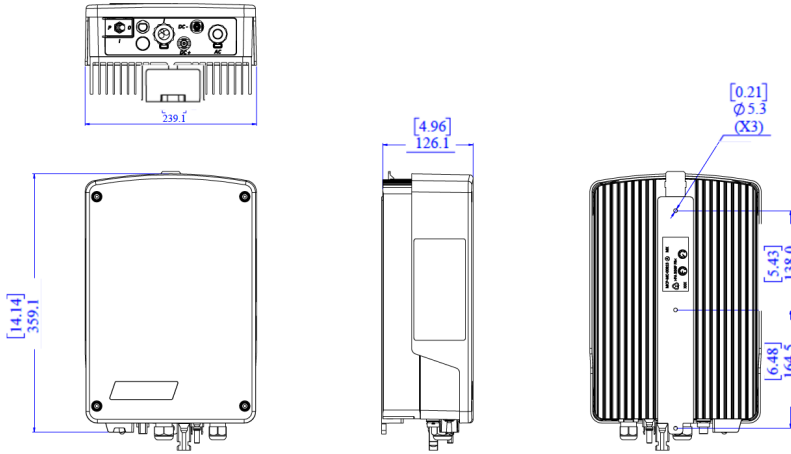


Figure 24: Compact Residential Solution - Inverter dimensions (mm [in])

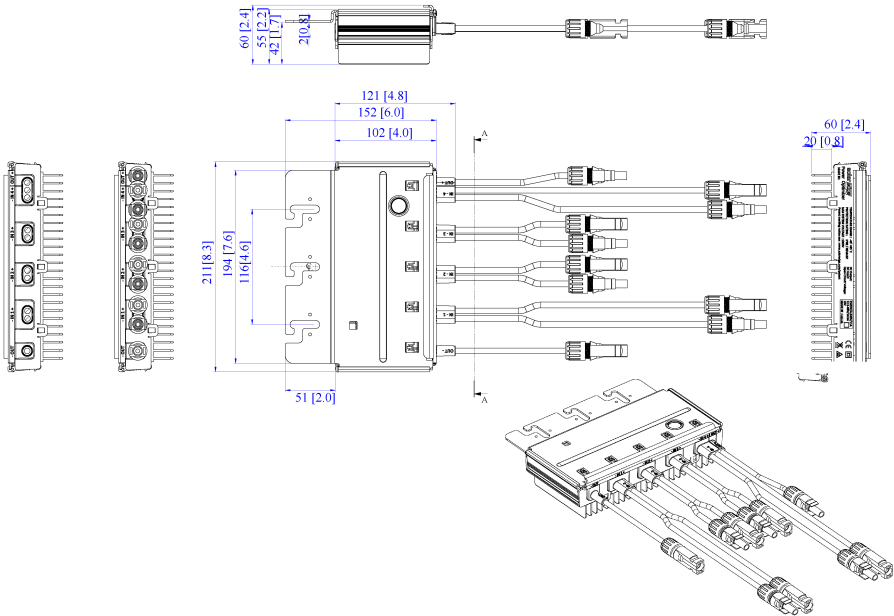
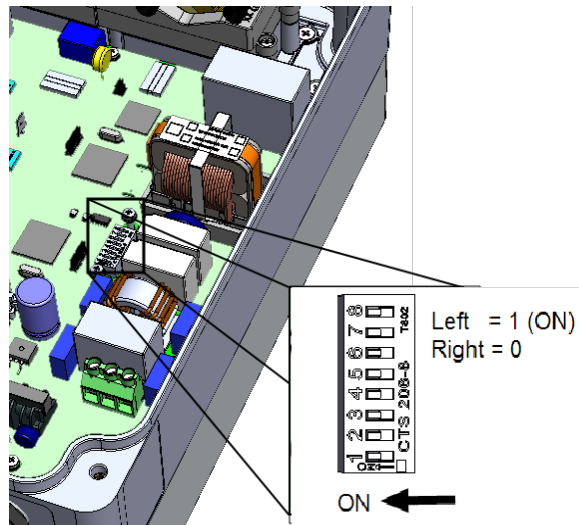


Figure 25: Compact Residential Solution - Power Optimizer dimensions (mm[in])

Country Setting in SolarEdge Compact Residential Solution Basic Version

Country setting is done using 8 DIP-switches, located in the inverter. Refer to *Commissioning the Installation - Inverter Basic Version* in the Installation Guide.

Prior to setting, verify that the country is supported according to the list of supported countries by SolarEdge inverters: https://www.solaredge.com/sites/default/files/se_inverters_supported_countries.pdf.



Country	DIP Switch #							
	1	2	3	4	5	6	7	8
Austria	1	0	1	0	1	0	0	0
Belgium	0	1	0	0	1	0	0	0
Belgium Delta	1	0	1	0	1	0	0	1
Brazil	1	1	0	1	0	1	0	0
Bulgaria	1	1	1	1	0	0	0	0
Cape Verde	0	1	1	0	1	1	1	0
China	1	0	0	1	0	1	0	0
Croatia	0	0	1	1	1	1	0	0
Curacao	0	0	1	1	0	0	1	0
Custom	0	1	0	1	1	1	0	0
Cyprus	1	0	0	0	1	0	0	0
Cyprus 240V	1	1	0	1	0	0	1	0
N. Cyprus 240V	1	0	1	1	0	0	1	0
CzechRep	0	0	0	0	1	0	0	0
Denmark	1	0	1	1	1	0	0	0
Denmark Res	0	1	0	0	0	1	0	0
Denmark VDE	0	1	0	0	0	0	1	0
Denmark VDE Res	1	1	0	0	0	0	1	0
Dubai LV	1	1	0	1	1	1	1	0
Europe EN50438	1	0	1	0	1	1	1	0
Finland	1	0	0	1	1	1	1	0
France	0	1	0	0	0	0	0	0
General	0	0	0	0	0	0	0	0
Germany	1	1	0	0	0	0	0	0
Ghana	0	0	0	1	1	1	1	0
Greece Co	0	0	1	0	0	0	0	0
Greece Is	1	0	1	0	0	0	0	0

Country	DIP Switch #							
	1	2	3	4	5	6	7	8
Hungary	0	0	1	0	1	0	1	0
India	1	1	0	1	1	1	0	0
Ireland	0	0	1	0	0	0	1	0
N. Ireland	0	0	0	1	1	0	1	0
Israel	0	1	1	0	0	0	0	0
Israel Commercial	0	1	1	1	0	0	1	0
Italy	1	1	1	0	0	0	0	0
Italy (No SPI)	0	1	0	0	1	1	0	0
Italy (No SPI) 277	0	1	1	1	0	1	1	0
Japan 2K/50Hz	1	1	0	0	1	1	1	0
Japan 2K/60Hz	0	0	1	0	1	1	1	0
Japan 50Hz	0	1	0	1	1	0	0	0
Japan 60Hz	1	1	0	1	1	0	0	0
Japan Auto	1	0	0	1	1	0	0	0
Kenya	1	1	0	1	0	0	0	1
Korea	0	0	0	1	1	0	0	0
Kuwait	1	0	1	0	1	0	1	0
Latvia	1	1	1	1	0	1	0	0
Lithuania	0	0	0	1	0	1	0	0
Macau	0	0	0	1	1	0	0	1
Malaysia	0	1	0	0	1	0	1	0
Mauritius	1	0	0	0	0	1	0	0
Netherlands	1	1	0	0	1	0	0	0
Norway	1	1	1	0	1	0	1	0
Norway Delta	0	1	1	0	1	0	0	1
Philippines	0	1	0	1	0	1	0	0
Philippines 230 delta	1	1	1	1	0	1	1	0

Country	DIP Switch #							
	1	2	3	4	5	6	7	8
Poland	1	0	1	0	0	1	0	0
Portugal	0	0	1	0	1	0	0	0
Romania	0	1	1	1	0	1	0	0
Singapore	1	1	1	0	1	0	0	0
Slovakia SSE-D	1	0	1	1	1	1	1	0
Slovakia VSD	0	1	1	1	1	1	1	0
Slovakia ZSED	0	0	1	1	1	1	1	0
Slovenia	0	0	1	0	0	1	0	0
South Africa	0	0	0	0	1	1	0	0
Spain	0	0	0	1	0	0	0	0
Sri Lanka	0	0	0	0	0	1	0	0
Sweden	0	1	1	1	1	0	0	0
Switzerland	1	0	0	1	1	1	0	0
Tahiti	1	1	0	0	1	0	1	0
Taiwan	0	0	1	1	1	0	0	0
Taiwan 220V No N	1	0	0	0	1	0	0	1
Thailand MEA	0	1	1	0	1	0	0	0
Thailand PEA	1	1	1	1	1	0	0	0
Turkey	1	0	0	0	1	1	0	0
UK 230V	1	0	0	1	0	0	0	0
UK 240V	1	1	1	0	0	1	0	0
UK 480V	0	0	0	0	1	1	1	0
Victoria	0	1	0	1	0	0	0	1
Zimbabwe 230	1	0	0	0	1	1	1	0
Indonesia	0	1	0	0	1	1	1	0

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

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

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