



Installation Guide

Single Phase Inverter with Compact Technology

For Europe & APAC

Version 1.2

Disclaimers

Important Notice

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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
Belgium (+32)	0800-76633	support@solaredge.be
China (+86)	21 6212 5536	support_china@solaredge.com
DACH & Rest of Europe (+49)	089 454 59730	support@solaredge.de
France (+33)	0800 917410	support@solaredge.fr
Italy (+39)	0422 053700	support@solaredge.it
Japan (+81)	03 6262 1223	support@solaredge.jp
Netherlands (+31)	0800-7105	support@solaredge.nl
New Zealand (+64)	0800 144 875	support@solaredge.net.au
US & Canada (+1)	510 498 3200	ussupport@solaredge.com
United Kingdom (+44)	0800 028 1183	support-uk@solaredge.com
Republic of Ireland (+353)	1-800-901-575	
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Israel (+972)	073 240 3122	
Middle East & Africa (+972)	073 240 3118	
South Africa (+27)	0800 982 659	
Turkey (+90)	216 706 1929	
Worldwide (+972)	073 240 3118	support@solaredge.com

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 Inverter 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 inverter software version as appears in the status screen.

Version History

- Version 1.1 (May. 2018) - Editorial updates
 - Addition of possibility to use compatible connectors from third-party manufacturers upon SolarEdge limitation
 - Addition of note about setting up the site in the monitoring platform
 - Troubleshooting for Basic version - for unknown errors or errors related to grid operations, a recommendation to check the country setting, with electrical shock warning .
 - New bracket type (for the Extended version) - Installation steps, and mechanical dimensions drawing
 - Addition of DIP-switch country setting for Mexico
- Version 1.0 (January 2018) - 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.

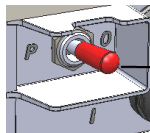
IMPORTANT SAFETY INSTRUCTIONS

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.



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. 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: $V_{oc,max} + 7.5V$, where: $V_{oc,max}$ = Maximum V_{oc} (at lowest temperature) of the PV module connected to the power optimizer.

For 2:1 connection, use the maximum value of the sum V_{oc} per each input.

CAUTION!



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

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.


**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



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 technology 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.

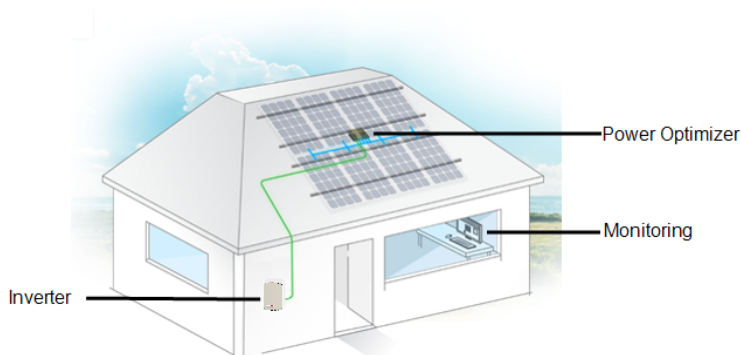


Figure 1: The compact technology System

Two inverter versions are available:

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

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

Single Phase Inverter with Compact Technology

The Single Phase Inverter with compact technology 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 monitoring platform; requires Internet connection).

Power Optimizer with Compact Technology

The Mxxxx power optimizer with compact technology is a DC-DC converter connected to PV modules in order to maximize power harvesting by performing independent Maximum Power Point Tracking (MPPT) at the module level.

The power optimizer with compact technology 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.

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. [Installing the Power Optimizer](#), page 14.
2. [Mounting the inverter](#), Page 23.
3. [Connecting the AC and the Power Optimizer to the Inverter](#), page 26.
4. [Commissioning the Installation](#) - inverter Basic version, page 29, or [Commissioning and activating the installation using the SolarEdge Inverter SetApp](#) - inverter Extended version, page 31.
5. [Setting up communication](#) - inverter Extended version, page 46.

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 and inverter side screws
- Allen screwdriver for M5/M6/M8 screw types
- 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 mounting brackets to the mounting surface
 - the power optimizer to the racking (not required for smart modules)
- 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 to +65°C / -13°F to 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.

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. To ensure mechanical compatibility of the power optimizers' connectors with the PV modules' connectors to which they are connected:

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



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 optimizer is not connected to the inverter or the inverter is turned OFF, the power optimizer will output a safe voltage of 10V.

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.
- 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.

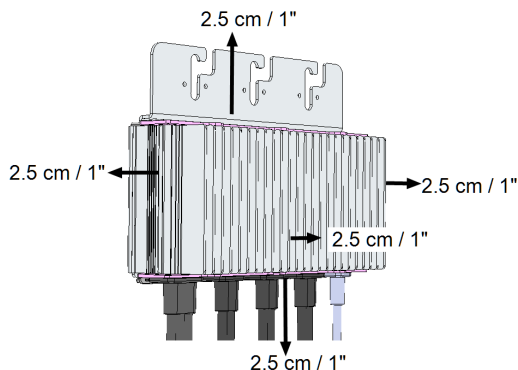


Figure 2: Power optimizer clearance

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

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 .

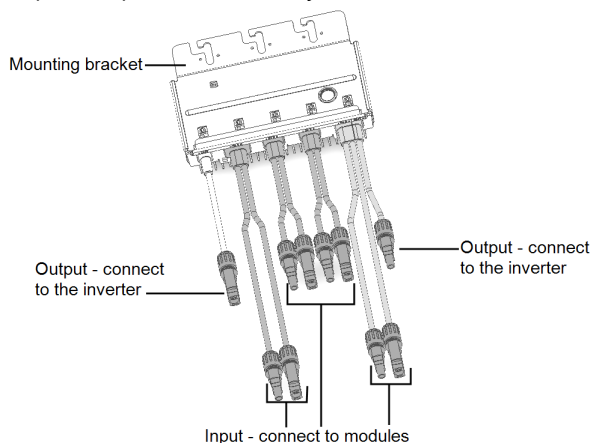


Figure 3: Power optimizer connectors

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.

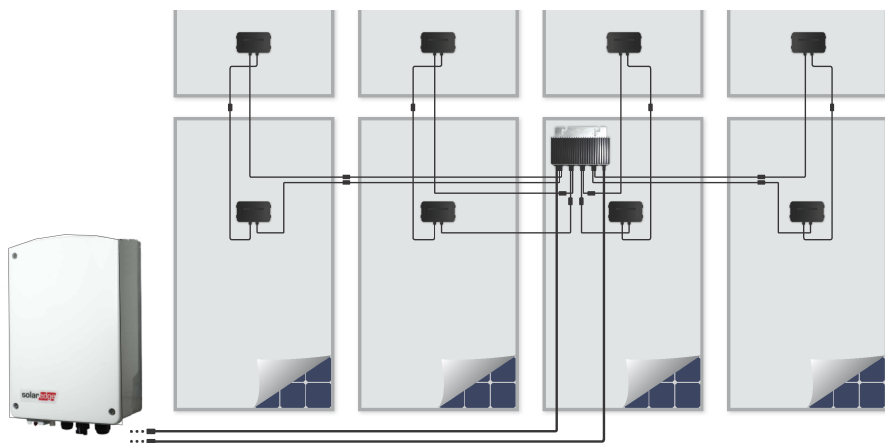


Figure 4: PV module connection

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 63.

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.

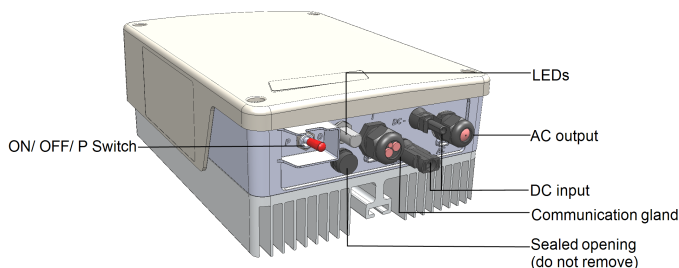


Figure 5: Inverter Interfaces

- **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 46 for more information.
- **ON/OFF/P Switch:**

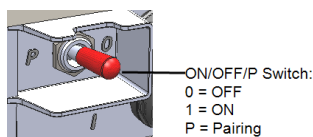


Figure 6: ON/OFF/P switch

- **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 SolarEdge SetApp 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 (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	While the switch is in P, all LEDs are ON. When the switch is released all LEDs turn OFF for 0.5 sec and then display the production or error indication.
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.

(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

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

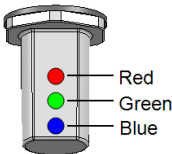


Figure 7: LEDs

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: ONNo 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: ONNo S_OK: OFF	
Night mode (no production)		OFF	Flickering	<ul style="list-style-type: none">S_OK: ONNo S_OK: OFF	

Indication	ON/ OFF/ P switch position	LED color			Comment
		Red	Green	Blue	
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	
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 59

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 one of the following two types of mounting brackets.

The mounting steps in the next sections refer to these types.

The mounting brackets kit includes the following parts:

Type 1:

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

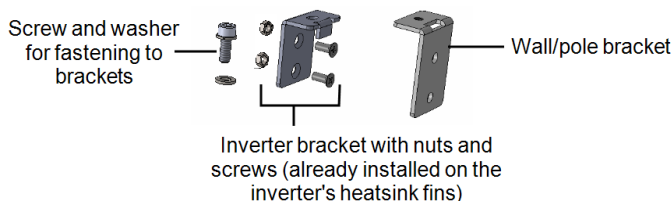


Figure 8: Mounting brackets and screws - Type 1

Type 2:

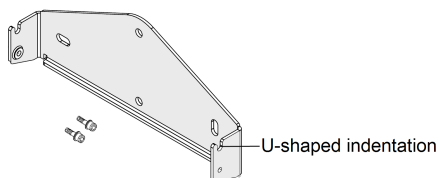


Figure 9: Mounting bracket - Type 2

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 :
 - 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 brackets against the wall/ pole and mark the drilling hole locations (refer to *Mechanical Specifications* on page 65 for inverter and mounting bracket dimensions). For Type 2 - Ensure that the U-shaped indentations are facing up.
4. Drill the holes and mount the brackets. Verify that the brackets are firmly attached to the mounting surface.
5. Hang the inverter on the bracket :
 - Type 1:
 - Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place. Lower the inverter so that the notches on the inverter brackets are inserted in the holes of the wall brackets, as shown below.

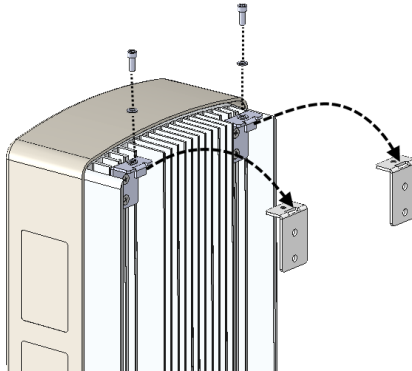


Figure 10: Hanging the inverter on the brackets - Type 1

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

■ Type 2:

- Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place. Lower the inverter onto the U-shaped indentations, as shown below. Let the inverter lay flat against the wall or pole.
- 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 $4.0 \text{ N}\cdot\text{m}$ / $2.9 \text{ lb}\cdot\text{ft}$.

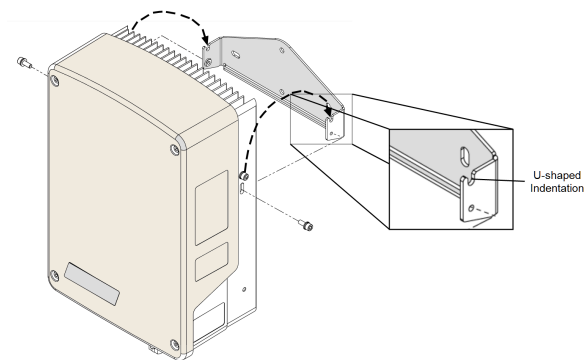


Figure 11: Hanging the inverter on the brackets - Type 2

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 (9-16 mm diameter).

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

The minimum size of the protective earthing (PE) conductor: For copper wires: 10 mm² ; for aluminum wires: 16 mm².

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.

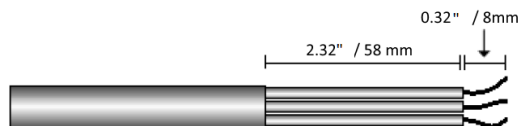


Figure 12: Insulation stripping – AC (3-wire cable)

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.

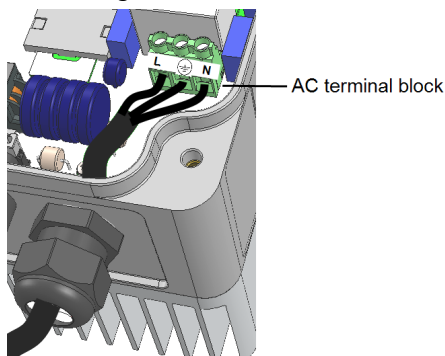


Figure 13: AC connection

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 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 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.

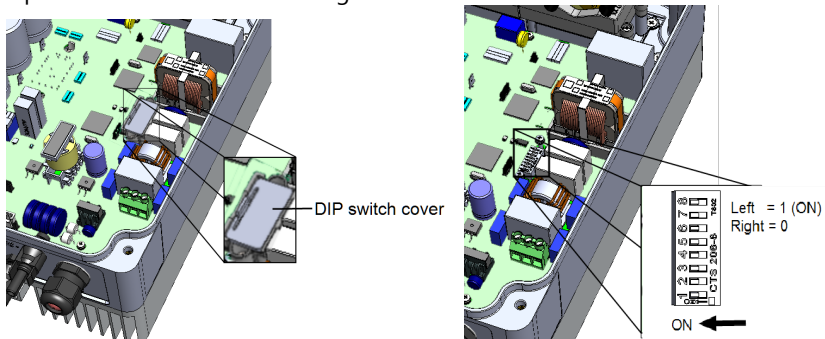


Figure 15: DIP switches in the inverter

4. Set up the county DIP switches according to the country list supplied with your inverter (refer to the [Country Setting in Single Phase Inverter with compact technology \(Basic Version\)](#) document, supplied with the inverter).
5. Close the inverter cover by tightening the screws with a torque of 3.0 N*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 poweroptimizers 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 63.

Your SolarEdge power harvesting system is now operational.

Chapter 6: Activating, Commissioning and Configuring the System Using the 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 44.

Once all connections are made, the system should be activated and commissioned using the Inverter SetApp mobile application. You can download the app from the Apple App Store and Google Play 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. Verify that the application is updated with the latest version.

→ To activate the inverter:

1. Turn ON the AC circuit breaker on the main distribution panel.
2. 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.

3. 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:
 - 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 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 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 and Language

1. From the Commissioning screen select **Country and Language**.
2. 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.

3. From the **Language** drop-down list, select the language.
4. Tap **Set Language**.

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.

1. From the main 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 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.

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 main menu.

Communication

Communication settings can be configured only after communication connections are complete. Refer to *Setting Up Communication - Inverter Extended Version* on page 44.

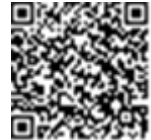
1. Select the **Communication** menu to define and configure the following:
 - The communication option used by the inverter to communicate with the monitoring platform
 - The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as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



NOTE

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

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

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.



Device Manager

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

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



Maintenance

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

- **Date and Time:** Set the internal real-time clock. If connected to the monitoring platform, the date and time are set automatically and only time zone should be set.
- **Reset Counters:** Resets the accumulated energy counters that are sent to the monitoring platform
- **Factory Reset:** Performs a general reset to the default device settings.

- **Firmware Upgrade:** Perform a software upgrade.
- **Diagnostics:** Displays the Isolation status and power optimizer status screens. Refer to https://www.solaredge.com/sites/default/files/application_note_isolation_fault_troubleshooting.pdf.
- **Activate 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 **Commissioning** menu, select **Information** to view and set various system settings, as described below.

- **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 #** : Energy meter ID (up to 3 meters can be connected)
 - **ZB:** ZigBee Plug-in 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 37).
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. Scroll up or down to display various status parameters as described in the following sections.

The LED indication provides more information about system performance; Refer to *LEDs* on page 20.


→ To access the Status screen:

From the **Commissioning** menu select **Status**. The main inverter Status screen is displayed (see below).

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 59.

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	Voltage	Frequency
2 kW	230Vac	50 Hz
 P_OK: 7 of 8	Server Comm.	
Optimizers Connected	S_OK (LAN)	
Status	Switch	
Production	OFF	
CosPhi	Limit	Country
1.00	No Limit	Netherlands
Voltage	Temp	Fan
310 Vdc	20 C	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 monitoring platform. (**Server Connected** 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

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

Site Status

The Site status screen shows the accumulated status of all inverters connected to a master inverter in a chain (bus) and the master inverter status.

solar edge		
Status		
Site		
Production 90 kW 30 kW	Limit 1.00 MW	Inverters 10/10
Inverter SN 07318000C		
Power 100 kW	Voltage 277 Vac	Frequency 60.9 Hz
P_OK: 31 Of 31 P_OK: 10f 1 Optimizers Connected	S_OK Server Connected	
Status Production	⚠	Switch OFF
CosPhi 1.00	Limit Export	Country ITA
⚠ Switch Off. Production disabled >		
Commissioning >		

■ Site status:

- **Production:** The AC output power
- **Limit:** Limitation setting (Export or Production)
- **Inverters:** Number of connected inverters in the cluster, including the master.

Communication Status

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

Communication		
LAN Connected	RS485-1 SE Slave NC	RS485-2 Modbus 2 of 2
Cellular N/A	Wi-Fi NC	ZigBee MP Slave M not Found

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
- **NC:** Not Connected. Refer to *Troubleshooting Communication* on page 62
- **S_OK:** The connection to the 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 62.

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
Export – 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 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 *while the inverter cover is removed*, 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 monitoring platform.

Only communication products offered by SolarEdge are supported.

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

Ethernet

Ethernet is used for a LAN connection. For connection instructions refer to *Creating Ethernet (LAN) Connection* on page 47.

RS485

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

- RS485-1: Enables the connection of multiple devices (inverters/Commercial Gateway) over the same bus, such that connecting only one device to the Internet is sufficient to provide communication services for all the devices on the bus.
- RS485-2: Enables connection of multiple SolarEdge devices and of non-SolarEdge devices over the same bus.

For connection instructions refer to *Creating RS485 Connection* on page 51.

Wi-Fi

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

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

Cellular (GSM, CDMA)

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

The GSM/CDMA Plug-in is provided with a user manual, which should be reviewed prior to connection. Refer to

https://www.solaredge.com/sites/default/files/cellular_gsm_installation_guide_for_inverters_with_setapp.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 products are provided with an installation guide, which should be reviewed prior to connection. Refer to

<https://www.solaredge.com/products/device-control#/>.

The ZigBee station is built into the inverter Extended version. An antenna is required and available from SolarEdge.



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.

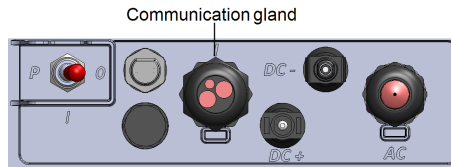


Figure 16: The Single Phase Inverter with compact technology connection panel

In the Extended version, the communication board includes:

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

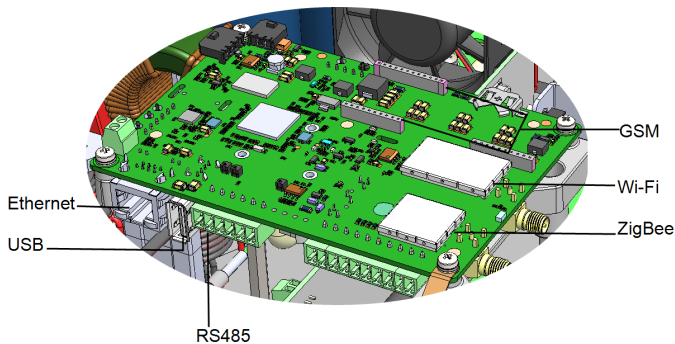


Figure 17: Communication connectors

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 46.
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.

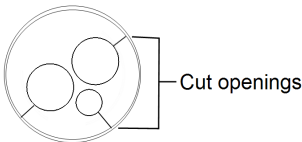


Figure 18: Rubber fitting

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

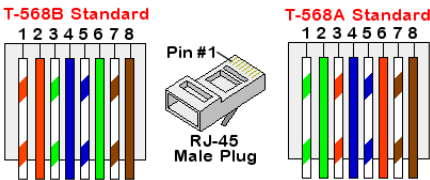


Figure 19: Standard cable wiring

- 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 19*

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

- 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-crimped cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above (*Figure 19*).
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.
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.

3. Use the SolarEdge SetApp to access the **Commissioning** main menu screen as described in *Communication* on page 34.
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	>
Cellular	N/A	>
GPIO	RRCR	>
Modbus TCP port	Disabled	>

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

- Server → LAN
- LAN → DHCP → Enable

LAN		
DHCP	Enable	>
Static IP Configuration		>
Modbus TCP port	Disable	>

11. Verify the connection, as described in *Verifying the Connection* on page 54.



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 53.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a shielded Ethernet cable (Cat5/5E STP) may be used)
- Wire cross-section area: 0.2- 1 mm²/ 24-18 AWG (a CAT5 cable may be used)
- Maximum nodes: 32
- Maximum distance between first and last devices: 1 km /3300 ft.

NOTE

If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommend to use external surge protection devices. For details refer to: https://www.solaredge.com/sites/default/files/lightning_surge_protection.pdf.



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

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

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 46.
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).

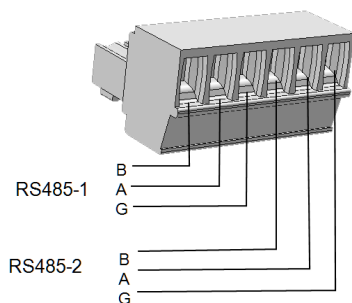


Figure 20: RS485 terminal block

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.

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

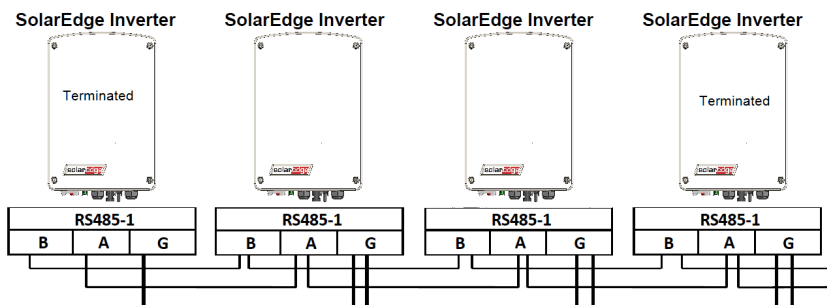


Figure 21: Connecting the inverters in a chain



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 (inverter/Commercial 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.

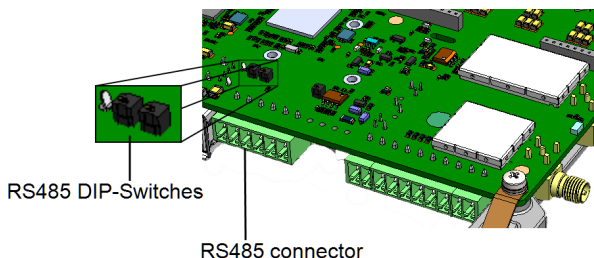


Figure 22: RS485 termination DIP-switches

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:

1. Designate a single inverter as the connection point between the RS485 bus and the monitoring platform. This inverter will serve as the master inverter.
2. Connect the master to the monitoring platform via the LAN option (refer to *Creating an Ethernet (LAN) Connection* on page 1*Creating Ethernet (LAN) Connection* on page 47) 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 that AC is on.
3. Use SetApp to access the **Commissioning** menu screen as described in *Communication* on page 34.
4. From the **Commissioning** menu tap **Communication**. The Communication screen is displayed.
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 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.

6. To check the slave IDs and last communication time, select **RS485-1 → Slave List**.
7. Verify the connection of the master to the monitoring platform, as described in the next section.


Verifying the Connection

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

1. 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 main Commissioning screen.

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

solar ^{edge}		
Status		
Inverter		
SN 07318000C		
Power	Voltage	Frequency
2 kW	230Vac	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 41.

Communication		
LAN Connected	RS485-1 SE Slave NC	RS485-2 Modbus 2 of 2
Cellular N/A	Wi-Fi NC	ZigBee MP Slave M not Found

Reporting and Monitoring Installation Data

NOTE



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 - Inverter Extended Version* on page 44.

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](#)



Upon scanning the power optimizer, the Mapper activates a dedicated mapping process to ensure that all four power optimizer inputs are assigned to their module(s). You can approve each input assignment separately.



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.

The power optimizer is represented throughout the monitoring platform as a collection of its inputs. The input number (1 to 4) appears after the numbers of module, string, and optimizer: 1.1.1-1, 1.1.1-2, 1.1.1-3 and 1.1.1-4. This convention is applied across all monitoring platform features, including navigation trees, layout, reports, charts, etc.

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.



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 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 **less** than 5 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 (*Figure 23*). The inverter details window is displayed (*Figure 24*).

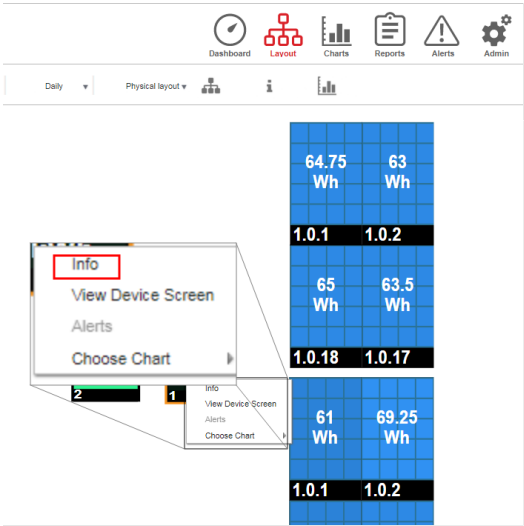


Figure 23: Inverter menu

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

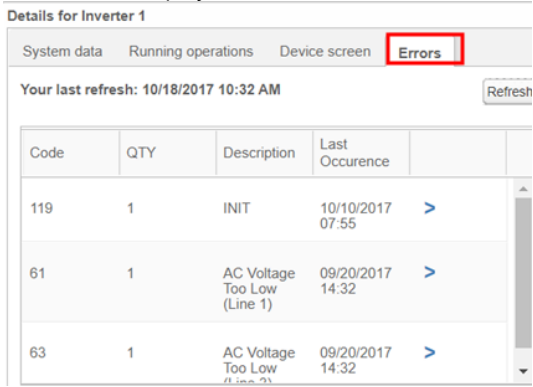


Figure 24: Inverter details - Error list

Troubleshooting General Errors in Basic Version

For unknown errors or errors related to grid operations, check that the country setting DIP switches are correctly set. Refer to the [Country Setting in Single Phase Inverter with compact technology \(Basic Version\)](#) document supplied with the inverter.

**WARNING!**

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

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, refer to the following application note to identify missing slaves 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

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 10V 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 SetApp screen begins to decrease.
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: $V_{oc,max} + 7.5V$, where: $V_{oc,max}$ = Maximum V_{oc} (at lowest temperature) of the PV module connected to the power optimizer.

For 2:1 connection, use the maximum value of the sum V_{oc} per each input.

Appendix C: Mechanical Specifications

The following figures provide dimensions of the Single Phase Inverter with compact technology and power optimizer with compact technology.

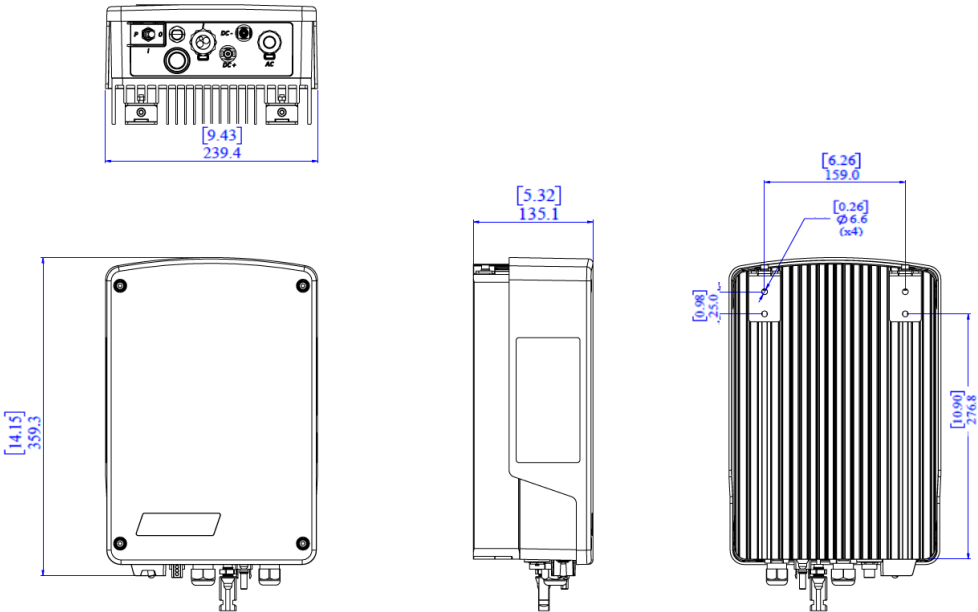


Figure 25: Single Phase Inverter with compact technology dimensions (mm [in]) - Type 1

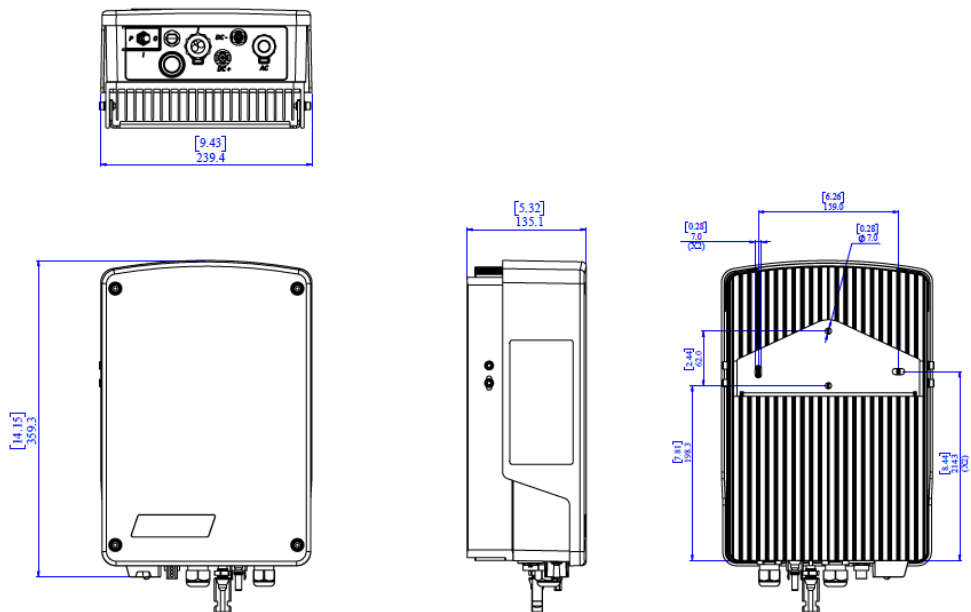


Figure 26: Single Phase Inverter with compact technology dimensions (mm [in]) - Type 2

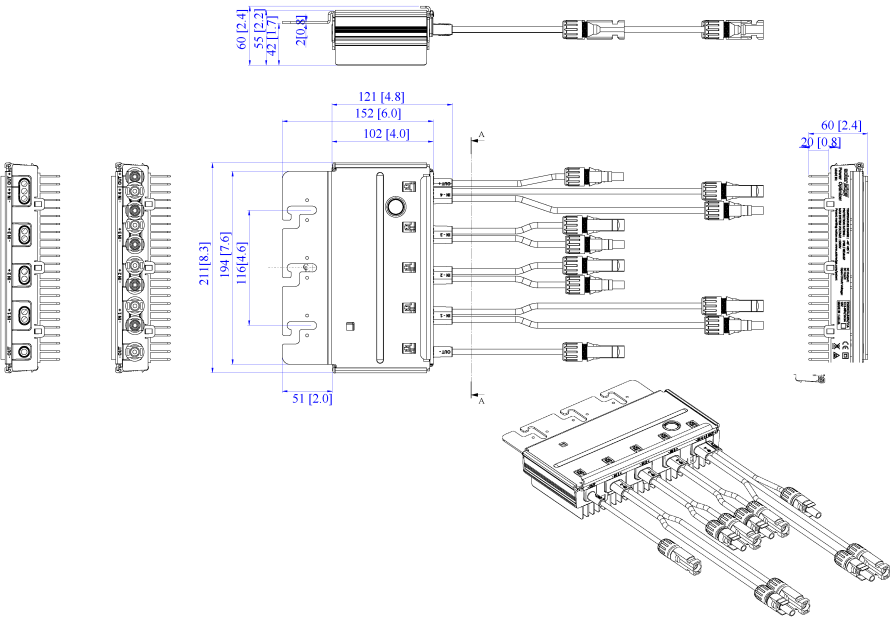


Figure 27: Power Optimizer with compact technology dimensions (mm[in])

Technical Specifications - Single Phase Inverter with compact technology

Inverter Specifications

	SE1000M	SE1500M	SE2000M	Unit
Output				
Maximum AC power output	1000	1500	2000	VA
AC output voltage (nominal)	220/230			Vac
AC output voltage range	184 – 264.5			Vac
AC frequency(nominal)	50 ±5			Hz
Maximum continuous output current	5	7	9.5	A
Max. continuous overcurrent protection	5	7	9.5	A
Residual current detector/ Residual current step detector	300 / 30			mA
Inrush current AC (Peak/ Duration)	2.8 / 20			Aac (rms) / ms
Max. output fault current	38			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			
Input				
Maximum DC power	1350	2025	2640	W
Transformer-less, ungrounded	Yes			
Maximum input voltage	500			Vdc
Operating voltage	75 - 480			Vdc
Maximum input current	11			Adc
Maximum back-feed current	0			Adc
Reverse-polarity protection	Yes			
Ground-fault isolation detection	600 kΩ Sensitivity			
Overvoltage category	II			
Maximum inverter efficiency	97			%
European weighted efficiency	95.7	96.5	97	%

	SE1000M	SE1500M	SE2000M	Unit
Night-time power consumption	< 2.5			W
Additional Features				
Supported communication interfaces	<ul style="list-style-type: none">• Basic:N/A• Extended: RS485 Interface, communication to the monitoring platform via integrated Wi-Fi / Ethernet / ZigBee or optional Cellular GSM			
Smart Energy Management	<ul style="list-style-type: none">• Basic: N/A• Extended: Export Limitation, Home Energy Management			
Standard Compliance				
Safety	IEC-62103 (EN50178), IEC-62109			
Grid connection standards	VDE-AR-N-4105, VDE 0126-1-1, AS-4777, RD-1663, DK 5940			
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12, FCC part 15 class B			
RoHS	Yes			
Installation Specifications				
AC output	Cable Gland - diameter 9-16			mm
DC input	1 MC4 pair			
Dimensions (W x L x H)	340 x 239 x 127			mm
Weight	7.15			kg
Cooling	Natural Convection			
Noise (typical)	< 25			dBA
Operating temperature range ⁽¹⁾	-20 - +60			°C
Maximum altitude	2000			m
Operating humidity – non condensing	< 95			%
Protection Rating / Environmental category	IP65 – Outdoor and Indoor			
Pollution degree classification (inside / outside)	2/3			
Bracket mounted (bracket provided)				

(1) For inverter power de-rating refer to the application note at the following link:

<http://www.solaredge.com/files/pdfs/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)
SE1000M	5	10	38
SE1500M	7	10	38
SE2000M	9	16	38

Power Optimizer Specifications

M2640 (for 4-8 60-cell modules or 4 72-cell modules)		Unit
INPUT		
Number of Inputs	4	
Number of MPP Trackers	4 (1 per Input)	
Rated DC Power per Input ⁽¹⁾	660	W
Absolute Maximum Input Voltage per Input (Voc at lowest temperature)	96	Vdc
MPPT per Input Operating Range	12.5 - 80	Vdc
Maximum Short Circuit Current per Input (Isc)	10.5	Adc
Maximum Efficiency	99.5	%
Weighted Efficiency	98.8	%
OUTPUT DURING OPERATION		
(POWER OPTIMIZER CONNECTED TO OPERATING INVERTER)		
Maximum Output Current	10.5	Adc
Maximum Output Voltage	340	Vdc
OUTPUT DURING STANDBY		
(POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF)		
Safety Output Voltage per Power Optimizer	10 ± 1	Vdc
INSTALLATION SPECIFICATIONS		
Maximum Allowed System Voltage	600	Vdc
Dimensions (W x L x H)	145 x 211 x 56	mm
Weight (including cables)	1.5	kg
Input Connector	4 x MC4 pairs	
Output Connector	1 x MC4 pair	
Operating Temperature Range	-40 - +85 / -40 - +185	°C / °F
Protection Rating	IP68	

⁽¹⁾Rated STC power of the module. Module of up to +5% power tolerance allowed.

PV System Design:

Inverter	SE1000M	SE1500M	SE2000M	Unit
Number of power optimizers (M2640) per Inverter	1			
Maximum DC System Power	1350	2025	2640	Wdc

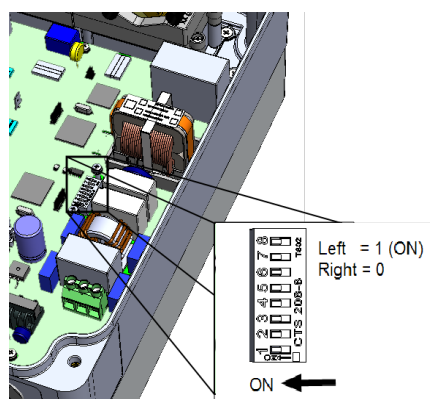
Country Setting in Single Phase Inverter with Compact Technology Basic Version

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
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

Country	DIP Switch #							
	1	2	3	4	5	6	7	8
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
Mexico 220V	0	0	1	1	0	1	0	0
Mexico 240V	0	0	0	0	1	0	1	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
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,
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www.solaredge.com/service/support

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