Installation Guide

StorEdge Three Phase Inverter

For Europe and APAC

Version 1.4

Disclaimers

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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.

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Revision History

Version 1.4 (October 2024)

- General update

Version 1.3 (November 2020)

- Updated *Installation Guidelines* on page 15.
- Added a requirement to minimize the distance between the positive and negative DC optimizer wires in *Step 3: Connecting Power Optimizers in Strings* on page 19.
- Added the requirement for a special bracket, when installing close to the shoreline in *Mounting the Inverter* on page 26.
- For inverter clearance, added a link to *Application Note - Clearance Guidelines* in *Mounting the Inverter* on page 26.
- Added *Opening the Inverter Cover* on page 31.
- Added *Closing the Inverter Cover* on page 39.
- Updated **Activating, Commissioning and Configuring**.
- Added *Creating an Ethernet (LAN) Connection* on page 48.
- Added *Creating RS485 Bus Connection* on page 52.
- Added the option for using a CAT6 for communication connections.
- Updated the communication board TCP details in *Creating an Ethernet (LAN) Connection* on page 48.

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 P/ON/OFF switch located at the bottom on 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.



P = Program/Pair
1 = ON
0 = OFF

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: Voc,max+ (String Length-1)*1V, where:

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

CAUTION!

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

CAUTION!

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

NOTE

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

A SolarEdge inverters can be installed in sites with an alternative power source such as a generator. SolarEdge requires installing a physical or electronic interlock, which will signal to the inverter when the grid has been disconnected. Interlock procurement, installation, maintenance and support are the responsibility of the installer. Damage to the inverter due to incorrect interlock installation or use of an interlock that is incompatible with the SolarEdge system will render the SolarEdge warranty invalid.

For more information on connecting an alternative power source to SolarEdge inverter, refer to https://www.solaredge.com/sites/default/files/se-inverter-support-of-voltage-sources.pdf.

NOTE

The following warning symbols appear on the inverter warning label:

	Risk of electric shock
	Risk of electric shock from energy stored in the capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.
	Hot surface – To reduce the risk of burns, do not touch.

WARNING!

Before operating the system, make sure all components are properly grounded.

WARNING!

When handling the battery, adhere to all manufacturer safety instructions.

CAUTION!

This unit must be operated under the specified operating conditions as described in the technical specifications supplied with the unit.

NOTE

The battery used with the inverter must conform to all local certification requirements.

NOTE

For battery decommissioning and disposal, follow the manufacturer requirements and instructions.

Chapter 1: Overview

SolarEdge's StorEdge™ solution for Smart Energy Management, enables connecting a battery to the inverter.

Power is stored in the battery and can be used for various applications such as maximized self-consumption and time of use profile programming. For backup power, an inverter specifically designed for backup applications is required; this inverter is not in the scope of this document.

The StorEdge Solution Components

- **StorEdge Inverter** is connected to a battery and supplies control and monitoring signals to the battery for operation, in addition to its traditional functionality as a DC-optimized PV inverter.
- **Energy Meter** - The meter is used by the inverter for export/ consumption readings, and for Smart Energy Management applications, such as: export limitation, and maximizing self-consumption.
- **Battery** - A 48V battery designed to work with the StorEdge system. Make sure to use SolarEdge-approved batteries only.

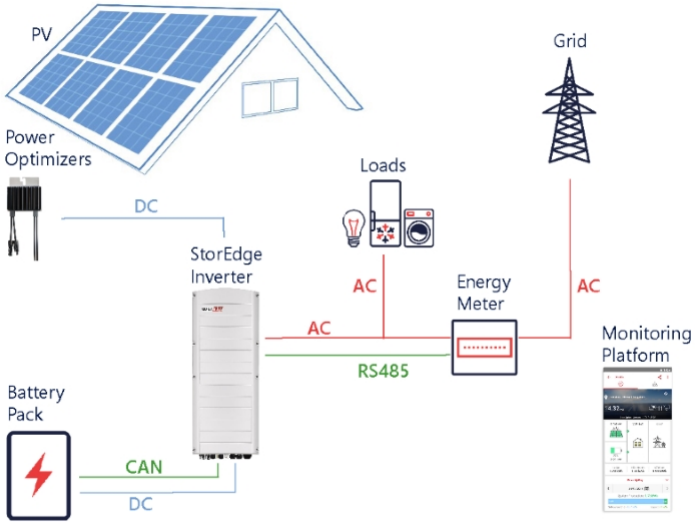


Figure 1: StorEdge system components

NOTE

- Additional SolarEdge inverters (without batteries) can be connected with RS485. The inverters will participate in export limitation and Smart Energy Management.
- PV modules connected to power optimizers are not mandatory for charge/ discharge profile programming.

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
- Safety gloves
- 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 bracket to the mounting surface
  - the power optimizer to the racking (not required for smart modules)
- Wire cutters
- Wire strippers
- Voltmeter

For installing the communication options, make sure you have the following:

- For Ethernet:
  - CAT5/6 twisted pair straight Ethernet cable with RJ45 connector
  - If using a CAT5/6 cable spool: RJ45 connector and RJ45 crimper
- For RS485:
  - Four- or six-wire shielded twisted pair cable.
  - Watchmaker precision screwdriver set

- For CAN
  - Six-wire shielded twisted pair cable with RJ45 connector
  - CAT5/6 twisted pair straight Ethernet cable with RJ45 connector

For connecting the battery to the inverter, use copper cables with the following parameters:

- Maximum length: 5m
- Cross-section area: 35 or 50 mm^2
- Crimping tools
- Shrinking tools

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 power optimizers. Some of the following may not be applicable to smart modules:



WARNING!

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



CAUTION!

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



CAUTION!

The power optimizer must be operated according to the technical specifications provided with the power optimizer.



CAUTION!

Cutting the power optimizer input or output wire 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 and electrical compatibility of the power optimizer connectors with the PV module connectors to which they are connected:

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

For more information, refer to https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf

IMPORTANT SAFETY FEATURE

Modules with SolarEdge power optimizers are safe. They carry only a low safety voltage before the inverter is turned ON. As long as the power optimizers are not connected to the inverter or the inverter is turned OFF, each power optimizer will output a safe voltage of 1V.

Installation Guidelines

- For the minimum and maximum number of power optimizers in a string (string length), see the power optimizer datasheets. Refer to the Designer for string length verification. The Designer is available on the SolarEdge website at: https://www.solaredge.com/products/installer-tools/designer#/.
- *Do not* use extension cables between a module and a power optimizer, between two modules connected to the same power optimizer, or between two power optimizers other than in the following cases:

  Between a power optimizer and a module:

  - Power optimizers with the 4-type suffix in their part number (Pxxx-**4**xxxxxx) - extension cables of up to 16 m can be installed per power optimizer (8 m for DC+ and 8 m for DC-).
  - Power optimizers manufactured starting from working week 42, 2019, as indicated in the serial number (Example: S/N SJ5019A-xxxxxxxx - working week 50, 2019) - extension cables of up to 16 m can be installed per power optimizer (8 m for DC+ and 8 m for DC-).

  Between two power optimizers or between a power optimizer and the inverter:

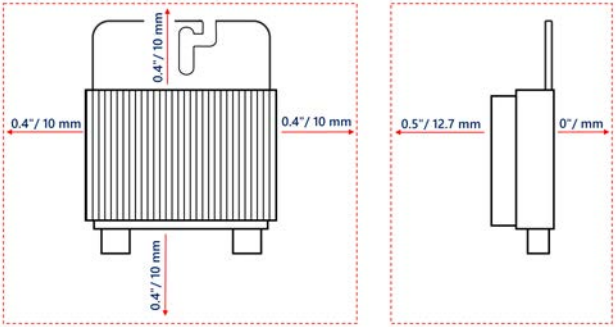
  - Extension cables can be installed between power optimizers only from row to row, around obstacles or pathways within a row and from the end of the string to the inverter. The total length of the extension cables must not exceed the following values:

Single Phase Inverters	Three Phase Inverters
All - 300 m / 1000 ft	SE17K and below - 300 m /1000 ft SE20K and above - 700 m / 2300 ft

- For connecting homerun DC cables from power optimizers to the inverter, use cables with the following cross-sections:
  - For MC4 connectors - 8-14 AWG / 2.5-10 mm^2
  - For DC terminal blocks inside the inverter or Connection Unit - 6-14 AWG / 2.5-16 mm^2

- Frame-mounted power optimizers are mounted directly on the module frame, regardless of racking system (rail-less or with rails). For installation of frame-mounted power optimizers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The power optimizer can be placed in any orientation.
- If connecting more modules than power optimizer inputs in parallel, use a branch cable. Some commercial power optimizer models have a dual input.
- Position the power optimizer close enough to its module so that their wires can be connected.
- Make sure to use power optimizers that have the required output and input conductor length.
- Completely shaded modules may cause their power optimizers to temporarily shut down. This will not affect the performance of the other power optimizers in the string, as long as the minimum number of unshaded power optimizers connected in a string of modules is met. If under typical conditions fewer than the minimum power optimizers are connected to unshaded modules, add more power optimizers to the string.
- To allow for heat dissipation, maintain clearance as specified below.

All power optimizers, except for the P860 and M1600 power optimizers



P860 and M1600 power optimizers

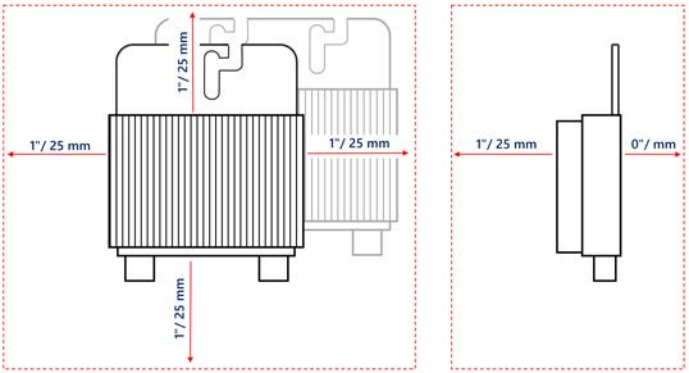


Figure 2: Power optimizer clearance

- When installing PV modules in a confined space such as Building-integrated photovoltaic (BIPV) modules, ventilation measures may be required to ensure that the power optimizers are not exceeding the maximum temperatures stated in their specifications.

Step 1: Mounting the Power Optimizers

For each of the power optimizers[1]:

1. Determine the power optimizer mounting location and use the power optimizer mounting brackets to attach the power optimizer to the support structure . It is recommended to mount the power optimizer in a location protected from direct sunlight. For frame-mounted power optimizers follow the instructions supplied with the optimizers, or refer to https://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
2. If required, mark the mounting hole locations and drill the hole.

   CAUTION!

   Drilling vibrations may damage the power optimizer and will void the warranty. Use a torque wrench or an electric drill with adjustable clutch that meets the mounting torque requirements. *Do not* use impact drivers for mounting the power optimizer.
   Do not drill through the power optimizer or through the mounting holes.
3. Attach each power optimizer to the rack using M6 (1/4'') stainless steel bolts, nuts and washers or other mounting hardware. Apply torque of 9-10 N*m / 6.5-7 lb*ft.
4. Verify that each power optimizer is securely attached to the module support structure.
5. Record power optimizer serial numbers and locations, as described in *Reporting and Monitoring Installation Data* on page 56.

Step 2: Connecting a PV module to a Power Optimizer

NOTE

Improper wiring may cause electrical faults in a PV system. To avoid electrical faults, verify proper locking of connectors and avoid wire tension and friction. Proper planning, materials and installation reduce the risk of el ectric arcs, short-circuits and ground faults in the PV system.

NOTE

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

For each of the power optimizers:

[1] Not applicable to smart modules.

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

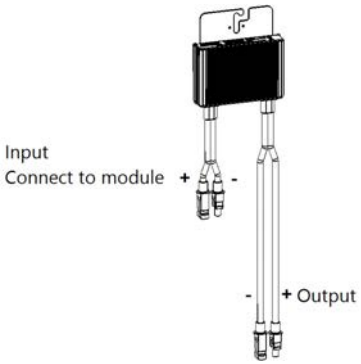


Figure 3: Power optimizer connectors

Step 3: Connecting Power Optimizers in Strings

You can construct parallel strings of unequal length, that is, the number of power optimizers in each string does not have to be the same. The minimum and maximum string lengths are specified in the power optimizer datasheets. Refer to the Designer for string length verification.

1. Connect the Minus (-) output connector of the string's first power optimizer to the Plus (+) output connector of the string's second power optimizer.
2. To minimize electromagnetic interference (EMI), make sure to minimize the distance between the positive and negative DC wires.
   For detailed instructions, see:
   https://www.solaredge.com/sites/default/files/se-emi-performance-application-note.pdf.
3. Connect the rest of the power optimizers in the string in the same manner.

   WARNING!

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

4. If you intend to monitor the installation, using the monitoring platform, record the

physical location of each power optimizer, as described in *Creating Logical and Physical Layout using Installation Information* on page 57.

Step 4: Verifying Proper Power Optimizer Connection

When a module is connected to a power optimizer, the power optimizer outputs a safe voltage of 1V (±0.1V). Therefore, the total string voltage should equal 1V times the number of power optimizers connected in series in the string. For example, if 10 power optimizers are connected in a string, then 10V should be produced.

Make sure the PV modules are exposed to sunlight during this process. The power optimizer will only turn ON if the PV module provides at least 2W.

In SolarEdge systems, due to the introduction of power optimizers between the PV modules and the inverter, the short circuit current I_{SC} and the open circuit voltage V_{OC} hold different meanings from those in traditional systems.

For more information about the SolarEdge system's string voltage and current, refer to the *V_{OC} and I_{SC} in SolarEdge Systems Technical Note*, available on the SolarEdge website at: https://www.solaredge.com/sites/default/files/isc_and_voc_in_solaredge_sytems_technical_note.pdf

→ To verify proper power optimizer connection:

- Measure the voltage of each string individually before connecting it to the other strings or to the inverter. Verify correct polarity by measuring the string polarity with a voltmeter. Use a voltmeter with at least 0.1V measurement accuracy.

NOTE

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

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 62.

Proper power optimizer connection can also be verified in the Designer application.

For more information, refer to https://www.solaredge.com/products/installer-tools/designer#/.

Chapter 3: Installing the Inverter

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



CAUTION!

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

Inverter Package Contents

- One StorEdge inverter
- One mounting bracket
- Two Allen screws for fastening the inverter to the mounting bracket
- Installation guide
- Two 48 mm ferrite beads
- One 39 mm ferrite bead
- Lugs and M8 screws for connecting battery cables on the inverter side
- Heat-shrink tubing

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 components, located at the bottom of the inverter.

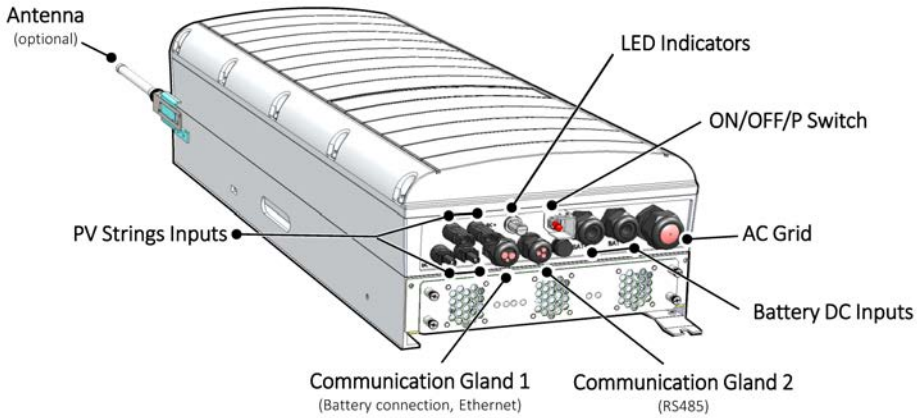


Figure 4: Inverter Interfaces

- **AC output**: AC output gland, AC cable external gauge, M32 (15-21mm diameter) for connection to the grid
- **DC input**: MC4 connector, for connection of the PV installation.
- **Two communication glands**: for connection of inverter communication options. Each gland has three openings.
- **Battery DC inputs:** Two battery glands for connecting charging cables (+ and -)
- **ON/OFF/P switch**:
  - **ON (1)** - Turning this switch ON (after power optimizer pairing) starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid.
  - **OFF (0)** - Turning this switch OFF reduces the power optimizer voltage to a low safety voltage and inhibits exportation of power. When this switch is OFF, the control circuitry remains powered up.

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

P Position Duration	Function	Comments
Switch moved to P for **2 seconds**, then released.	• 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. For more information, refer to https://www.solaredge.com/leds.

  The main LED indications are:
  - Blue ON - the inverter is communicating with the monitoring platform
  - Green ON - the system is producing
  - Green blinking - AC is connected but the system is not producing
  - Red ON - system error

[1] Blinking = Turns ON and OFF for the same duration

[2] Flickering = Turns ON for 100 mS and turns OFF for 5 seconds

[3] Alternating = alternate LED flashes

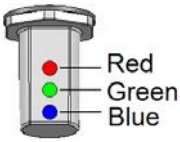


Figure 5: LEDs

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	• S_OK: ON • No S_OK: OFF	S_OK: ON communication with the monitoring platform is established.
Pairing		Blinking	Blinking	Blinking	
Wake-up/ Grid Monitoring		OFF	Blinking	Blinking	
System Producing		OFF	ON	• S_OK: ON • No S_OK: OFF	
Night mode (no production)		OFF	Flickering	• S_OK: ON • No S_OK: OFF	
Inverter is OFF (Safe DC)	OFF (0)	OFF	Blinking	• S_OK: ON • No S_OK: OFF	
Inverter is OFF (DC not safe)		Blinking	Blinking	• S_OK: ON • No S_OK: OFF	
Inverter configuration or reboot	ON / P	ON	ON	ON	

Indication	ON/ OFF/ P Switch Position	LED Color			Comment
		Red	Green	Blue	
Inverter firmware upgrade	ON / P	Alternating	Alternating	Alternating	The upgrade process can take up to 5 minutes
Error	Any	ON	ON/ OFF/ Blinking/ Flickering	ON/ OFF / Blinking	Refer to "Errors and Troubleshooting" 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 a mounting bracket.



Figure 6: Mounting bracket

NOTE

Make sure the mounting surface or structure can support the weight of the inverter and bracket, and make sure that it spans the width of the bracket.

CAUTION!

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

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.

For SolarEdge inverters installed at a distance of 200 m / 655 ft or closer to the shoreline, special brackets purchased separately from SolarEdge and SS304 stainless screws are required.

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 for proper heat dissipation, follow the guidelines specified in *Application Note - Clearance Guidelines*.

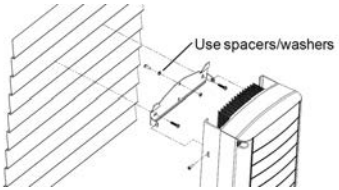
   https://www.solaredge.com/sites/default/files/se-clearance-guidelines-for-multiple-inverter-mounting.pdf

   Maintaining proper clearance between the inverter and other objects prevents power reduction due to excessive temperature.

3. Position the mounting bracket against the wall/pole and mark the drilling hole locations :
   - Ensure that the flat edge of the bracket is at the bottom, as in *Figure 7*.
   - Use at least two bracket holes. Additional holes can be used to fix the bracket. Determine which and how many holes to use according to mounting surface type and material.
4. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.

   NOTE

   When mounting an inverter on an uneven surface, you may use spacers/ washers behind the top mounting hole of the bracket. Depending on the angle, use the appropriate size and number of spacers so that the bracket is perpendicular to the ground. Recommended: a stainless steel 3/4" long screw, with a 1/4" socket button head , two jam nuts and three washers.



5. Hang the inverter on the bracket (see *Figure 7*): Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place.
6. Align the two indentations in the inverter enclosure with the two triangular mounting tabs of the bracket, and lower the inverter until it rests on the bracket evenly.

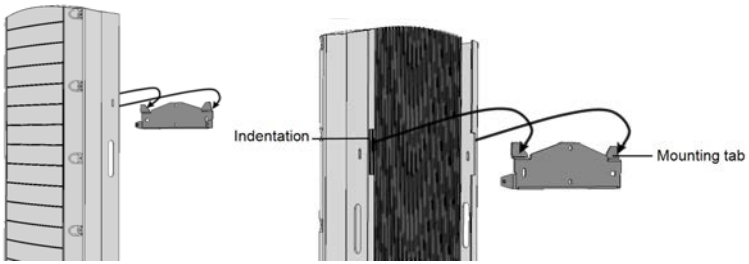


Figure 7: Hanging the inverter on the bracket

7. Insert the two supplied screws through the outer heat sink fins on both sides of the inverter and into the bracket (see *Figure 7*).

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

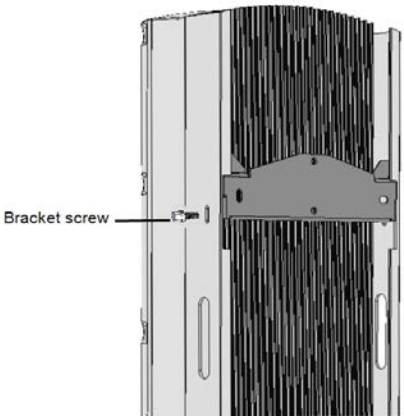


Figure 8: Inserting the bracket screws

8. Fasten the inverter to the surface using the bottom bracket.

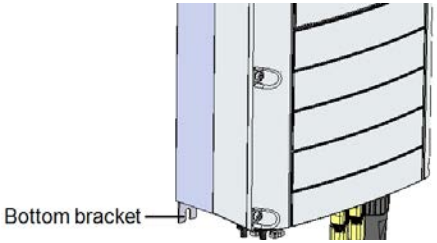


Figure 9: Bottom bracket

9. Remove the inverter cover: Open the inverter cover's ten Allen screws and carefully pull the cover horizontally before lowering it.

Selecting a Residual Current Device (RCD)

IMPORTANT SAFETY FEATURE

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

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

NOTE

For multiple inverters, an RCD per inverter is required.

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

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

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

Chapter 4: Installing the Battery

Install the battery in accordance with the manufacturer instructions.

In addition, follow these guidelines:

- Make sure the battery's circuit breaker switch is OFF.
- For easy access to battery connectors, it is recommended to connect the cables to the battery and to set all battery DIP switches to their correct positions *before* mounting the battery.
- Measure the necessary length between the inverter and the battery for all cables.
- Mark polarity on DC wires.

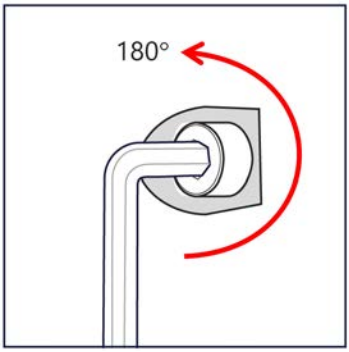
Chapter 5: Connecting the Inverter

This chapter explains how to connect the inverter to:

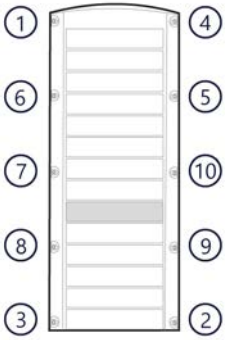
- AC grid
- DC strings of modules with power optimizers
- Energy Meter
- Battery

Opening the Inverter Cover

1. Switch the inverter ON/OFF/P switch to OFF. Wait 5 minutes for the capacitors to discharge.
2. Disconnect AC to the inverter by turning off the circuit breaker on the distribution panel.
3. Turn off the battery.
4. Loosen all bolts of the inverter cover half a turn.



5. Release all bolts fully in the order, shown below.



6. Carefully remove the inverter cover.

Connecting the AC Grid

Use a five-wire cable. The maximum wire size for the input terminal blocks is 4 mm^2.

1. Turn OFF the AC circuit breaker.
2. Unscrew the ten Allen screws holding the inverter cover and remove the cover.

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 60 mm / 2.4'' of the external cable insulation and strip 8 mm / 0.32'' of the internal wire insulation.

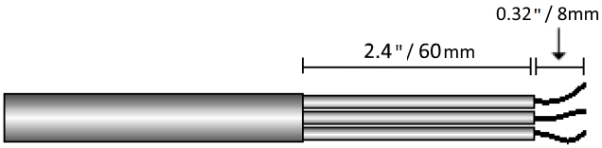


Figure 10: Insulation Stripping – AC Cable

4. Open the AC gland and insert the AC cable through the gland.

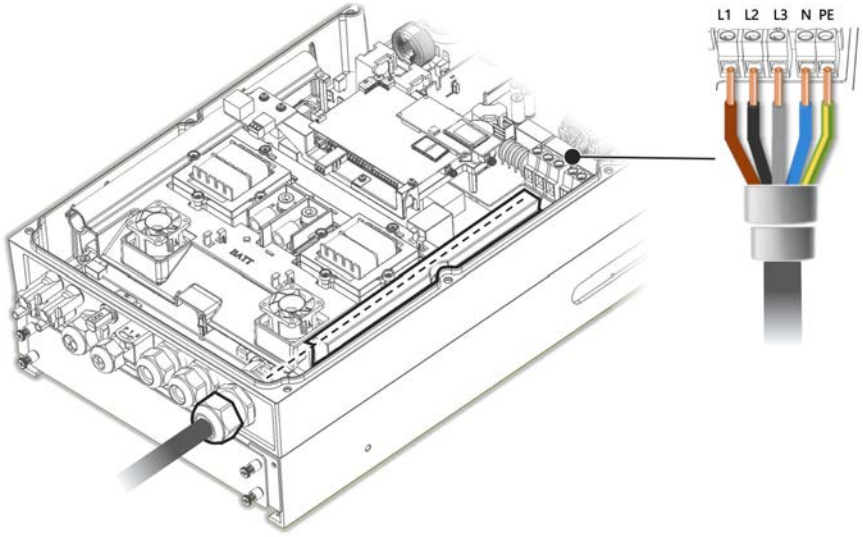


Figure 11: Connection to the AC Grid

5. Pass the cable through the tunnel.
6. Thread the AC cable through two ferrite beads supplied with the inverter: one 48 mm and one 39 mm.
7. Connect the AC cable to the AC terminals. Connect the PE (grounding) wire first.
8. Tighten the terminal block screws with a torque of 1.2-1.5 N*m / 0.88-1.1 lb*ft.
9. Check that the wires are fully inserted and cannot be pulled out easily.
10. Tighten the AC gland with a torque of 2.8-3.3 N*m / 2.0-2.4 lb*ft.
11. Verify that there are no unconnected wires to the inverter and that the unused terminal screws are tightened.

Connecting the Strings to the Inverter

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

NOTE

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

NOTE

SolarEdge's fixed input voltage architecture enables the parallel strings to be of different lengths. Therefore, they do not need to have the same number of power optimizers, as long as the length of each string is within the permitted range.

Connect the DC connectors of each string to the DC+ and DC- connectors. See *Figure 4*.

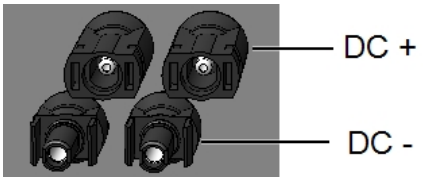


Figure 12: Inverter DC Connections

Connecting the Energy Meter

For Smart Energy Management applications, such as maximizing self-consumption, the StorEdge solution requires an Energy Meter.

To install the Energy Meter, refer to the installation guide supplied with it: http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide.pdf.

Use a 3-wire shielded twisted pair cable, 0.2 (0.2-1) mm² 600V or CAT5/6.

→ To connect the Energy Meter to the inverter

1. Connect one end of the communication cable to the Energy Meter, as explained in the Energy Meter's installation guide.

2. Open Communication Gland 2 and insert the other end of the communication cable through the gland.

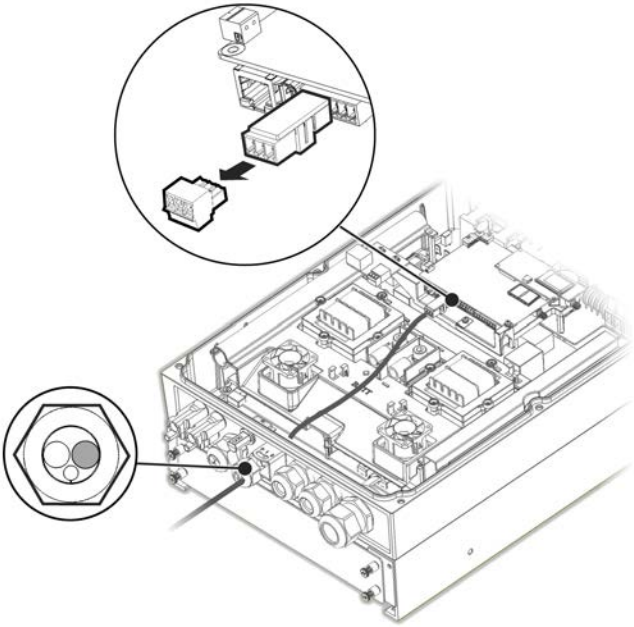


Figure 13: Meter Connection

3. Remove the 3-pin connector from the RS485-1 port on the communication board and loosen its screws.

4. Insert the meter wires into the connector as shown below and tighten them with the screws.

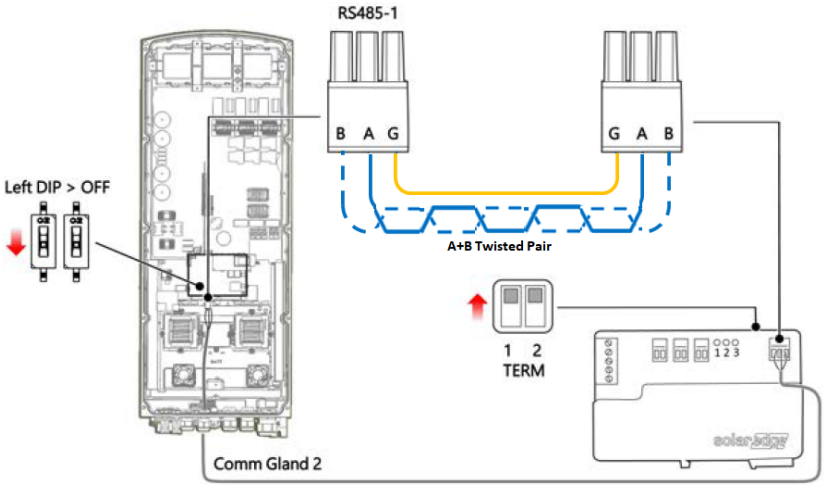


Figure 14: Meter Connection 2

5. Connect the connector back to the RS485-1 port.
6. Make sure the RS485-1 DIP switch (the left switch) on the inverter's communication board is OFF.
7. Terminate the Energy Meter by moving up the DIP switches, as shown above.

Connecting the Battery

WARNING!

The battery must be powered off before and during wiring.

For connecting the battery to the inverter, use copper cables with the following parameters:

- Maximum length: 5m
- Cross-section area: 35 or 50 mm^2

Connecting DC Cables

1. Make sure the battery circuit breaker is OFF.
2. Make sure DC to the inverter is OFF.
3. Strip the required length of the battery's DC cables.
4. Crimp the supplied lugs on the power cables and tighten them with the heat shrinks.

5. Remove the plastic cover from the battery terminals.

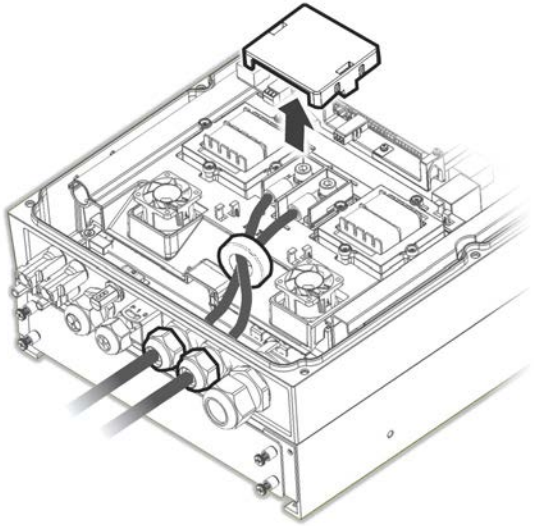


Figure 15: Connection of Battery DC Cables to the Inverter

6. Pass the non-crimped ends of the DC cables through a 48 mm ferrite bead supplied with the inverter.
7. Pass the non-crimped ends of the DC cables from the inside of the inverter outwards, through the battery DC input glands. The correct polarity is marked on the inverter.

WARNING!

Make sure to connect the power cables at correct polarity. Connecting the power cables at reverse polarity may result in damage to the inverter or battery.

8. Connect the DC cables to the battery terminals of the inverter. Tighten the terminals with the supplied M8 screws with a torque of 5N*m/3.7lb*ft.
9. Reinstall the plastic cover on the inverter's battery terminals.
10. Tighten the battery DC input glands.

Connecting the CAN Bus Cable

Communication between the inverter and battery is established using the Controlled Area Network (CAN) bus. Use a shielded Ethernet cable (CAT5/5E STP/6).

1. Pass the CAN bus cable through Communication Gland 1.

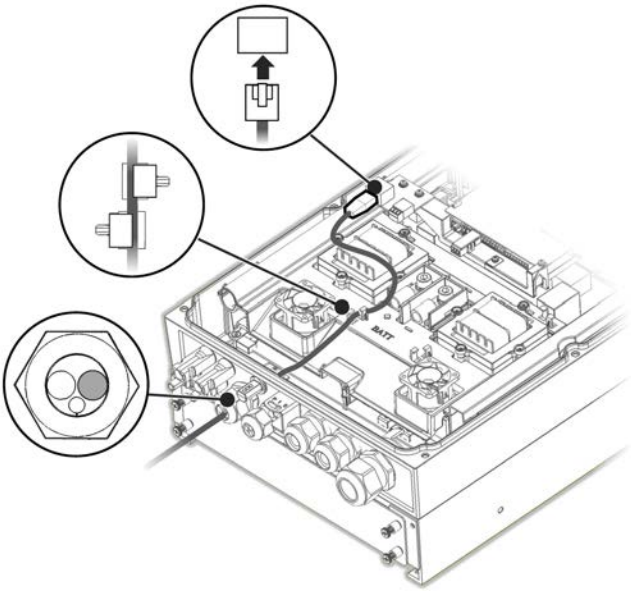


Figure 16: Connection of CAN Cable from Battery to Inverter

2. Connect the cable to the CAN bus connector.
3. Set the DIP switches on the CAN bus board:
   - Two right DIP switches - Switch to ON.
   - Left DIP switch (PIN 2 - PIN 6) - Selects a grounding PIN for the CAN bus connector. Set according to battery manufacturer's instructions.

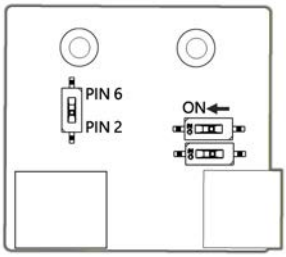


Figure 17: DIP switch set-up on the CAN board

Connecting the Grounding Cable

- Connect the grounding cable from the battery to the grounding hole on the side of the inverter, as shown below. Use an M6 screw.

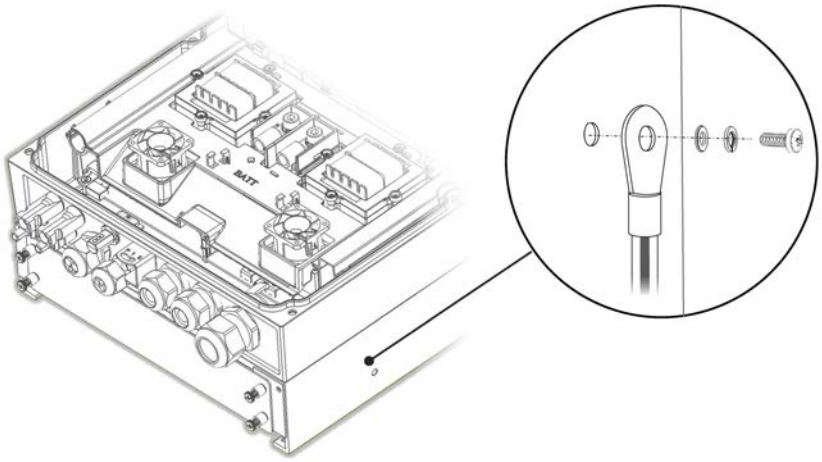
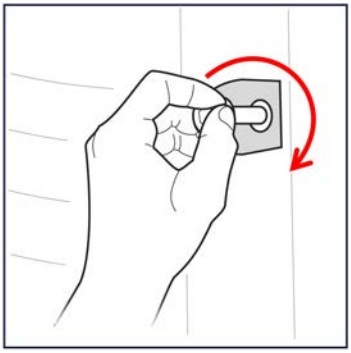


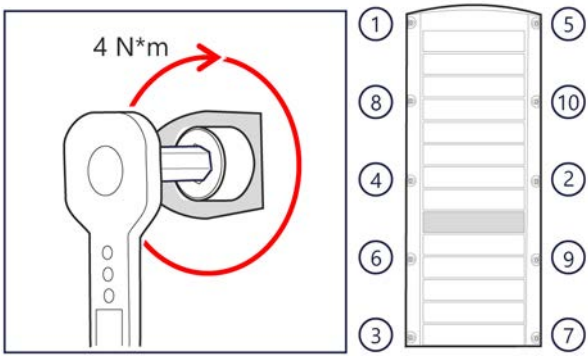
Figure 18: Grounding the battery

Closing the Inverter Cover

1. Mount the cover.
2. Fasten all bolts slightly with a hand, so that they hold the cover.



3. Fasten all bolts to a torque of 4 N*m in the order, shown below.



Chapter 6: Activating, Commissioning and Configuring the System

You can connect communication options at this stage, as described in *Setting Up Communication with the Monitoring Platform* on page 47.

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









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

Step 1: Activating the Installation

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

Before activation

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

→ To activate the inverter:

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

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

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

Step 2: Commissioning and Configuring the Installation

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

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

→ To access the Commissioning screen:

Do one of the following:

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

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

Setting Country, Grid and Language

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

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

Pairing

Once all connections are made, all the power optimizers must be logically paired to their inverter. The poweroptimizers do not start producing power until they are paired. This step describes how to assign each inverter to the poweroptimizers from which it will produce power.

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

1. From the **Commissioning** menu, select **Pairing**.
2. Tap **Start Pairing**.
3. When **Pairing Complete** is displayed, the system startup process begins:

   Since the inverter is ON, the power optimizers start producing power and the inverter starts converting AC.

   WARNING!

   When you turn ON the inverter ON/OFF/P switch, the DC cables carry a high voltage and the power optimizers no longer output a safe output.

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

   When working voltage is reached, the inverter enters Production mode and produces power. The steadily lit green inverter LED indicates this mode.
4. Tap **OK** to return to the **Commissioning** menu.

Communication

Communication settings can be configured only after communication connections are complete. Refer to *Setting Up Communication with the Monitoring Platform* on page 47.

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

Power Control

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

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

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

Step 3: Verifying Proper Activation and Commissioning

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

Your SolarEdge power harvesting system is now operational.

Configuring Communication with the Energy Meter

1. Switch the inverter ON/OFF/P switch to OFF.
2. Access SetApp and select **Commissioning > Site Communication**.
3. From the **Site Communication** screen, select **RS485-1 > Protocol > Modbus (Multi-Device).**
4. In the **RS485-1** screen, select **Add Modbus Device > Meter.**
   The meter is automatically identified.
5. Set the Energy Meter's **CT Rating** according to the CT specifications. If the CT rating

value returns to 0, check communication with the CT.

6. Select **Meter 1 > Meter Function > Export+Import (E+I).**

Configuring Communication with the Battery

1. Make sure the battery's circuit breaker switch is ON.
2. Switch the inverter ON/OFF/P switch to OFF.
3. Access SetApp and select **Commissioning** > **Site Communication**.
4. Tap **CAN**.
5. On the **Batteries** screen that opens, select your battery type from the list.

Running a Battery Self-test

Run a battery self-test to check the battery's charge and discharge functionality.

→ To run a battery self-test:

1. Make sure the battery's circuit breaker switch is ON.
2. Switch the inverter ON/OFF/P switch to ON.
3. In SetApp, select **Commissioning** > **Maintenance** > **Diagnostics** > **Self-Test** > **Battery Self-Test** > **Run Test**.
4. Wait for all tests to complete and check the results in the summary table.
   If any of the tests have failed, see the table below for possible solutions:

Test Results	Solution
Charge failed	Check that the power and communication cables between the battery and inverter are properly connected.
Discharge failed	Check that the power and communication cables between the battery and inverter are properly connected.
Communication	Check that the communication cables between the battery and inverter are properly connected.
Inverter switch is off	Switch the inverter ON/OFF/P switch to ON.

→ To show the last test results:

- Select **Commissioning** > **Maintenance** > **Diagnostics** > **Self-Test** > **Battery Self-Test** > **Show Last Results**.

Configuring StorEdge Applications

Maximize Self-consumption (MSC)

In this mode, the battery is automatically charged and discharged to meet consumption needs.

The battery has two states:

- OFF – the battery is in standby
- ON – the battery is controlled for maximized self-consumption

Battery OFF periods can be configured to extend battery lifetime by minimizing the number of shallow discharges (for example at nighttime or during the winter).

→ To set up maximize self-consumption:

1. Access SetApp and select **Commissioning > Power Control**.
2. Select **Energy Manager** > **Energy Control** > **Maximum Self Consumption.**
3. Optionally, set the battery OFF periods as follows:
   a. Select **Set Operation**, and then select a month from the list that appears.
   b. Select a month. A list of options is displayed.
   c. Select one of the options:
      - Select **Always OFF** to avoid battery usage entirely (for example during winter)
      - Set **Start Time** and **End Time** to set battery usage in specific hours and avoid usage during specific hours throughout the month (for example at night). This sets the periods during which the battery will be in the OFF state.
      - Select **Always ON** to use battery at all times for charging/ discharging.

Chapter 7: Setting Up Communication with the Monitoring Platform

The inverter sends the following information to the monitoring platform:

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

This chapter describes how to set up communication between:

- The inverter and the monitoring platform through the Internet (wired/ wireless)
- Multiple inverters for a leader-follower configuration

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

Communication Options

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

Only communication products offered by SolarEdge are supported.

Ethernet

Ethernet is used for a LAN connection.

RS485

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

Wi-Fi

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

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

Wireless Gateway, Wireless Repeater(s)

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

Cellular

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

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

ZigBee

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

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

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

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

Creating an 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 (CAT6) may be used
- Maximum distance between the inverter and the router – 100 m/ 330 ft.

NOTE

If using a cable longer than 10 m / 33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommended to use external surge protection devices.

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

→ To connect the Ethernet cable:

1. Remove the inverter cover as described in *Opening the Inverter Cover* on page 31.
2. Open Communication Gland 1.

CAUTION!

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

3. Remove the plastic seal from one of the large openings.
4. Remove the rubber fitting from the gland and insert the CAT6 cable through the gland and through the gland opening in the inverter.
5. Push the cable into the cut opening of the rubber fitting.

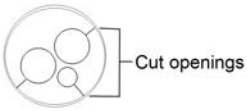


Figure 19: Rubber fitting

CAT6 standard cables have eight wires (four twisted pairs), as shown in the diagram below. Wire colors may differ from one cable to another. You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding.

RJ45 Pin #	Wire Color[1]		10Base-T Signal 100Base-TX Signal
	T568B	T568A	
1	White/Orange	White/Green	Transmit+
2	Orange	Green	Transmit-
3	White/Green	White/Orange	Receive+
4	Blue	Blue	Reserved
5	White/Blue	White/Blue	Reserved
6	Green	Orange	Received-
7	White/Brown	White/Brown	Reserved
8	Brown	Brown	Reserved

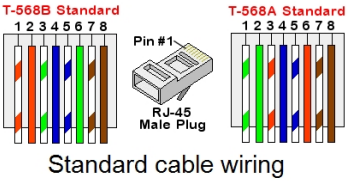


Figure 20: Standard cable wiring

6. Use a pre-crimped cable to connect via gland #1 to the RJ45 plug on the inverter's communication board or, if using a spool of cable, connect as follows:
   a. Insert the cable through Commuication Gland 1.
   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 20*.
   d. Use a crimping tool to crimp the connector.
   e. Connect the Ethernet connector to the RJ45 port on the communication board.

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

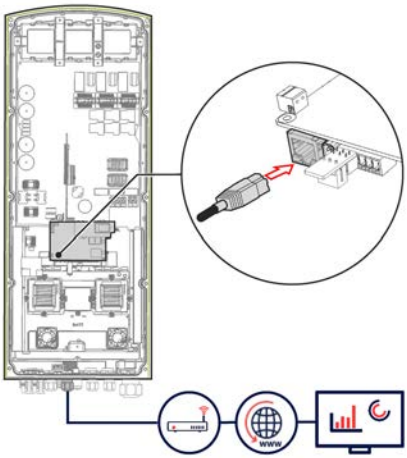


Figure 21: RJ45 Ethernet connection

7. For the switch/router side, use a pre-crimped cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above (*Figure 20*).
8. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the monitoring platform.
9. The inverter is configured by default to LAN. If reconfiguration is required:
   a. Make sure the ON/OFF/P switch is OFF.
   b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
   c. Configure the connection as described in *Communication* on page 43.

   NOTE

   If your network has a firewall, you may need to configure it to enable the connection to the following address:
   - Destination Address: prodssl.solaredge.com
   - TCP Port: **443** (for incoming and outgoing data)
10. Verify the connection, as described in *Verifying the Connection* on page 55.

Creating RS485 Bus Connection

The RS485 option enables creating a bus of connected inverters, consisting of up to 31 follower inverters and 1 leader inverter. Using this option, inverters are connected to each other in a bus (chain), via their RS485 connectors. The first and last inverters in the chain must be terminated as described on page 54.

RS485 wiring specifications:

- Cable type: CAT6 and higher with shielding protection of the twisted pairs of wires and an outer foil or braided shielding
- Wire cross-section area: 0.2- 1 mm^2/ 24-18 AWG
- Maximum nodes: 32
- Maximum distance between first and last devices: 1 km /3300 ft.

NOTE

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

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

If not using surge protection, connect the grounding wire to the first inverter in the RS485 chain; ensure it is not in contact with other wires. For inverters with a StorEdge Connection Unit, connect the grounding wire to the grounding bus-bar in the StorEdge Connection 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 *Opening the Inverter Cover on page 31.*
2. Open Communication Gland 1 and insert the cable through one of the openings.
3. Remove the 3-pin connector from the RS485-2 port, as shown below, and loosen its screws.

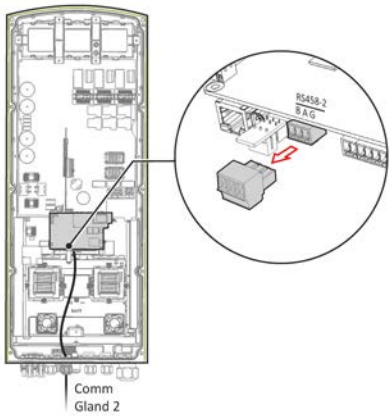


Figure 22: RS485 connector on the communication board

4. Insert the wire ends into the **B**, **A** and **G** opening on the connector.

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

5. For creating an RS485 bus, connect all B, A and G pins in all inverters, as shown below.

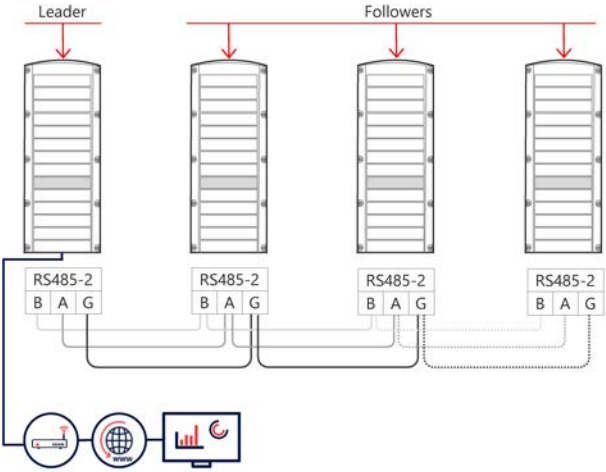


Figure 23: Connecting the inverters in a chain

NOTE

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

6. Tighten the connector screws.
7. Check that the wires are fully inserted and cannot be pulled out easily.
8. Connect the RS485-2 connector to the RS485 port on the communication board.
9. Terminate the first and last SolarEdge inverter in the chain. The inverer can be terminated by switching on (up) the left DIP switch on the communication board.

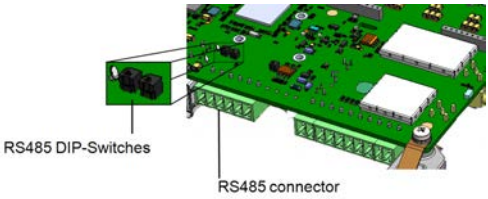


Figure 24: RS485 termination switch

NOTE

Only the first and last SolarEdge inverter in the chain must be terminated. In the other inverters in the chain, the DIP switch must be in the off (down) position.

10. If no surge protection is used, 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 StorEdge Connection Unit, connect the grounding wire to the grounding bus-bar in the StorEdge Connection Unit.

RS485 Bus Configuration

→ To connect to the monitoring platform:

1. Designate a single inverter as the connection point between the RS485 bus and the monitoring platform. This inverter will serve as the leader inverter.
2. Connect the leader to the monitoring platform using Ethernet (refer to *Creating an Ethernet (LAN) Connection* above).

→ To configure the RS485 bus:

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

1. Make sure the inverter's ON/OFF/P switch is off.
2. Make sure that the AC circuit breaker on the main distribution panel is on.
3. Access SetApp, as described in *Communication* on page 43.
4. From the **Commissioning** screen, select **Site Communication** > **RS485-2** > **Protocol** > **SolarEdge** > **SolarEdge Leader**.
5. Return to the **RS485-2** screen and select **Follower Detect.**

   The system starts automatic detection of the follower inverters connected to the leader inverter. The inverter should report the correct number of followers. If it does not, verify the connections and terminations in all inverters in the chain.
6. To check the follower IDs and last communication time, select **RS485-2** > **Follower List**.
7. Verify the connection of the leader to the monitoring platform, as described below.

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 SetApp and select **Commissioning** > **Status**.
2. In the **Summary** section, under **Server Comm.**, make sure **S_OK** is displayed together with the selected communication option.

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

Reporting and Monitoring Installation Data

Monitoring the site requires connecting the inverter to the monitoring platform, using any of the wired or wireless options available from SolarEdge. Refer to *Setting Up Communication with the Monitoring Platform* on page 47.

The Monitoring Platform

The monitoring platform provides enhanced PV performance monitoring and inverter 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, optimizers, strings, modules, meters and sensors, as well as their electrical connectivity. This view enables you to see which modules are connected in each string, which strings are connected to each inverter, and so on.
- **Physical Layout**: Provides a bird's eye view of the actual placement of modules in the site, and allows pinpoint issues to the exact location of each module on a virtual site map.

If you do not report the mapping of the installed power optimizers, the monitoring platform will show the logical layout indicating which power optimizers are connected to which inverter, but will not show strings or the physical location of power optimizers.

The monitoring platform includes a built-in help system, that guides you through the monitoring functionality.

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

Creating Logical and Physical Layout using Installation Information

To display a logical layout, insert the inverter serial number in the new site created in the monitoring platform. When the communication between the inverter and the monitoring server is established, the logical layout is displayed.

To display a physical layout, you need to map the locations of the installed power optimizers. To map the locations, use one of the methods described in the next sections.

Designer

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

For more information, refer to https://www.solaredge.com/products/installer-tools/designer#/.

Mapper Application

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

The Mapper application is integrated with the monitoring platform and enables:

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

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

- Creating new sites using the Mapper mobile application
- Mapping existing sites using the Mapper mobile application

Physical Layout Editor

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

Using a Paper Template

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

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 SetApp, errors are displayed with codes.

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

→ To identify the error type using the inverter LEDs:

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

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

→ To identify the error type using the monitoring platform:

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

Troubleshooting Communication

Troubleshooting Ethernet (LAN) Communication

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

Error Message	Possible Cause and Troubleshooting
LAN cable disconnected	Physical connection fault. Check the cable pin-out assignment and cable connection.
No DHCP Configure Static IP or set to DHCP	IP settings issue. Check the router and inverter configuration. Consult your network IT.
Gateway not responding	Ping to router failed. Check the physical connection to the switch/ router. Check that the link LED at the router /switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection.
No Internet connection	Ping to google.com failed. Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider. For Wi-Fi networks, ensure that user-name and password are as defined in the internet provider AP/ router.

Troubleshooting RS485 Communication

- If the message **RS485 Leader Not Found** appears in the Status screen, check the connections to the leader device and fix if required.
- If after follower detection the number of followers displayed for the leader under **RS485-1** > **Follower Detect** is lower than the actual number of followers, refer to the following application note to identify missing followers and troubleshoot connectivity problems:
  https://www.solaredge.com/sites/default/files/troubleshooting_undetected_RS485_devices.pdf

Additional Troubleshooting

1. Check that the modem or hub/router is functioning properly.
2. Check that the connection to the internal connector on the communication board is properly done.
3. Check that the selected communication option is properly configured.
4. Use a method independent of the SolarEdge device to check whether the network and modem are operating properly. For example, connect a laptop to the Ethernet router and connect to the Internet.
5. Check whether a firewall or another type of network filter is blocking communication.

StorEdge Three Phase Inverter Troubleshooting

Error Code	Error Message	Possible Cause and Troubleshooting
1Dx7D	High battery voltage	Verify that the battery is connected to the inverter as required.
1Dx7E	Low battery voltage	Verify that the battery is connected to the inverter as required.
1Dx88	Internal communication error	Verify that the RS485 connector on the communication board is connected as required.
1Dx89	Internal DC power connection error	Verify that the connection between the DCDC PCB and the inverter PCB is connected as required.
1Dx8A	High DC voltage fault	Verify that the connection between the DCDC PCB and the inverter PCB is connected as required and check for short in string - inverter power connection.
1Dx8D	High battery voltage	Verify that the battery is connected to the inverter as required.
1Dx8E	Low battery voltage	Verify that the battery is connected to the inverter as required
1Dx9F	Battery communication error	Verify that the CAN connectors are connected as required.
1DxA0	Battery error	Call battery vendor support.

1DxA1	Battery not selected	Configure battery as required.
1DxA2	Operation conditions verification failed	Verify that the battery is connected to the inverter as required, battery voltage is within range and the battery is enabled (power and communication).

Power Optimizer Troubleshooting

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

Malfunction	Possible Cause and Corrective Action
String voltage is higher than number of optimizers WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of ±1% per string is reasonable.	Extra power optimizer(s) connected in the string (not applicable to smart modules). Check if an extra power optimizer is connected in the string. If not – proceed to next solution.
	A module is connected directly to the string, without a power optimizer (not applicable to smart modules). Verify that only power optimizers are connected in the string and that no module outputs are connected without a power optimizer. If the problem persists, proceed to the next step.
	Power optimizer(s) malfunction. 1. Disconnect the wires connecting the power optimizers in the string. 2. Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizeris located, check its connections, polarity, module, and voltage. 3. Contact SolarEdge Support. Do not continue before finding the problem and replacing the malfunctioning power optimizer. If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string.

Appendix B: Mechanical Specifications

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

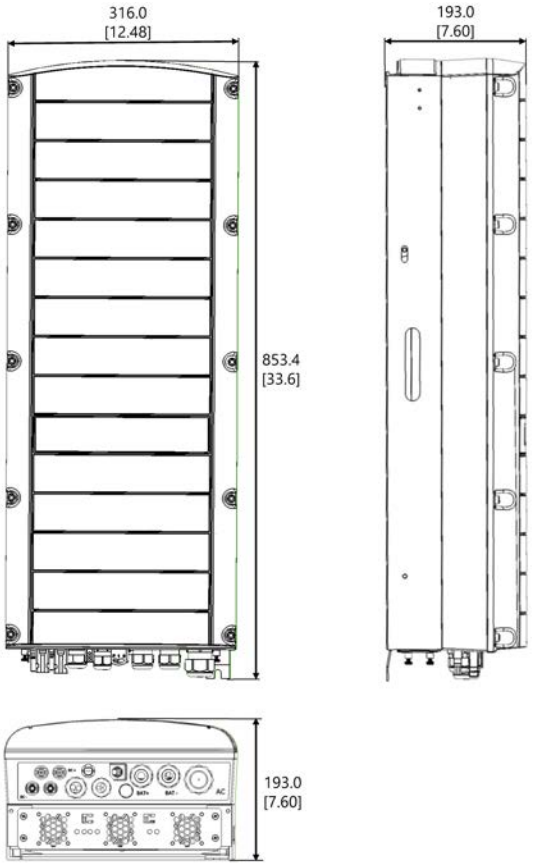


Figure 25: StorEdge Three Phase Inverter dimensions

Appendix C: SafeDC™

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

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

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

1. Move the inverter P/ON/OFF switch to OFF (0) and 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.

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: Voc,max+ (String Length-1)*1V, where:

- Voc,max = Maximum Voc (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

StorEdge Three Phase Inverter - Technical Specifications

SE5K-RWS / SE7K-RWS / SE8K-RWS / SE10K-RWS[1]

	SE5K-RWS	SE7K-RWS	SE8K-RWS	SE10K-RWS	Unit
OUTPUT					
Rated AC Power Output	5000	7000	8000	10000	VA
Maximum AC Power Output	5000	7000	8000	10000	VA
AC Output Voltage — Line to Line / Line to Neutral (Nominal)	380/220 ; 400/230				Vac
AC Output Voltage — Line to Line Range / Line to Neutral Range	184 - 264.5				Vac
AC Frequency	50/60 ± 5				Hz
Maximum Continuous Output Current (per Phase)	8	11.5	13	16	A
Residual Current Detector / Residual Current Step Detector	300 / 30				mA
Grids Supported — Three Phase	3 / N / PE (WYE with Neutral)				
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes				
INPUT PV					
Maximum DC Power (Module STC)	6750	9450	10800	13500	W
Transformer-less, Ungrounded	Yes				
Maximum Input Voltage	900				Vdc
Nominal DC Input Voltage	750				Vdc
Maximum Input Current	8.5	12	13.5	16.5	Adc
Reverse-Polarity Protection	Yes				

(1) These specifications apply to inverters with Part number: SEXK-XXS48

Ground-Fault Isolation Detection	700kΩ Sensitivity			
Maximum Inverter Efficiency	98			%
European Weighted Efficiency	97.3	97.4	97.6	%
Nighttime Power Consumption	< 2.5			W
INPUT BATTERY				
Maximum DC Power	5000			W
Input Voltage Range	40- 62			Vdc
Maximum Continuous Input Current	130			Adc
Battery Communication	CAN, RS485 (optional)			
ADDITIONAL FEATURES				
Supported Communication Interfaces	2 x RS485, Ethernet, Zigbee communications for Smart Energy (requires antenna)(1), Wi-Fi (requires antenna)(2), Built-in GSM (optional)			
STANDARD COMPLIANCE				
Safety	IEC-62103 (EN50178), IEC-62109			
Grid Connection Standards(2)	VDE 0126-1-1, VDE-AR-N-4105, AS-4777, G83 / G59			
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12			
RoHS	Yes			
INSTALLATION SPECIFICATIONS				
AC Output – Cable Gland Diameter	15 - 21			mm
Battery DC – Cable Gland Diameter	2 x 8-11			mm
PV DC Input	2 x MC4 pair			
Dimensions (HxWxD)	853 x 316 x 193			mm
Weight	37			kg
Operating Temperature Range	-40 - +60			˚C
Cooling	Internal and external fans			
Noise	< 50			dBA

(1) Antenna kit for ZigBee/Wi-Fi communication should be purchased separately

(2) For all standards refer to Certifications category in Downloads page:
http://www.solaredge.com/groups/support/downloads

Protection Rating	IP65 — Outdoor and Indoor	
Mounting	Bracket provided	

Support Contact Information

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



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

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

- Model and serial number of the product in question.
- The error indicated on the product SetApp mobile application or on the monitoring platform or by the LEDs, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge server, if the site is connected.
- The product's software version as it appears in the status screen.


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