



Configuration Guide

Single Phase Energy Hub Inverter with Prism Technology

Version 1.3

Disclaimers

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Emission Compliance

This equipment has been tested and found to comply with the limits applied by the local regulations.

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

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

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

Revision History

Version 1.3 (January 2021)

- Added S-series Power Optimisers installation guidelines in *Installation Guidelines* on page 15.
- Added the option to use Opti Clamps in *Step 1: Mounting the Power Optimisers* on page 17.

Version 1.2 (October 2021)

- Editorial changes

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HANDLING AND SAFETY INSTRUCTIONS

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!**

To reduce the risk of injury, read all instructions in this document.

WARNING!

Before opening the inverter cover:



1. Turn off the inverter ON/OFF/P switch located at the bottom of the inverter.
2. Turn off the Connection Unit DC safety switch (if applicable).
3. Turn off the inverter AC circuit breaker on the main service panel.
4. Wait five minutes for the capacitors to discharge.

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

- $V_{oc,max}$ = 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 optimisers 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 Connection Unit is NEMA type 3R rated . Unused 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.



Caution, risk of danger

WARNING!

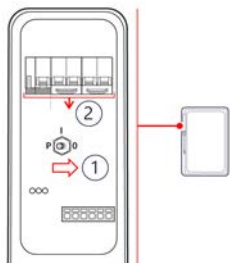
Before operating the system, ensure that the been grounded properly.

WARNING!

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

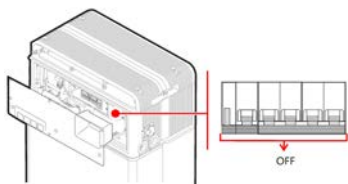
WARNING!

Before connecting the battery to the inverter, verify that the battery is powered off.



SolarEdge Energy Bank

1. Toggle off the battery ON/OFF/P switch.
2. Turn off the battery circuit breaker.



LG Chem Prime Battery

Turn off the circuit breaker.



CAUTION!

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



NOTE

The batteries must be certified according to local regulations and supported by the SolarEdge inverter firmware.



NOTE

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



NOTE

Multiple inverter combination is not supported.



NOTE

The StorEdge Interface is IP65 rated. Unused connectors and glands should be sealed with the provided seals.

NOTE

For inverters with a nameplate up to and including 10kW:



- Maximum short circuit peak current: 78.1A
- Maximum short circuit current duration (until current stops): 113msec
- Maximum 3-cycle short circuit current RMS value: 60A

Chapter 1: Overview

The single phase Energy Hub inverter is SolarEdge's all-in-one solution that uses a single phase DC optimized inverter to manage and monitor solar power generation, energy storage, EV charging and smart energy devices. When installed with a battery and the Backup Interface, homeowners are automatically provided with backup power in the event of grid interruption to power home loads. In addition, solar energy can be stored in a battery for Smart Energy Management applications such as export control, offering demand response and peak shaving, and performing time of use shifting for reduced electric bills.

StorEdge Solution Components

- **Energy Hub inverter** - manages battery and system energy, in addition to its traditional functionality as a DC-optimized PV inverter.

The **Connection Unit**, located at the bottom of the inverter, allows simple installation and connectivity to other system components and includes an external DC Safety Switch.

The **Energy Meter** is used by the inverter for export, import, and consumption readings, and for Smart Energy Management applications, such as export limitation, time-of-use profile programming and maximizing self-consumption.

- **One or multiple batteries (optional)** - DC-coupled batteries designed to work with the SolarEdge system. The batteries can be connected to the system optionally. When installing a battery, connect the DC cables from the battery and from Power Optimisers to an external combiner box, compliant with local regulation. Then, connect the cables from the combiner box to the DC terminals inside the inverter's Connection Unit. We recommend using the SolarEdge combiner box. For installation and connection instructions see:

<https://www.solaredge.com/sites/default/files/se-combiner-box-installation-guide-aus.pdf>

Supported Batteries

Manufacturer	Model	Technical Description	Mark of Conformity
SolarEdge	Energy Bank	Residential ESS (lithium ion battery)	UL 1973 / UL9540 / CE / RCM / (IEC 62619)
LG	RESU10H Prime	Residential ESS (lithium ion battery)	UL 1973 / CE / RCM / TUV (IEC 62619)
LG	RESU16H Prime	Residential ESS (lithium ion battery)	UL 1973 / CE / RCM / TUV (IEC 62619)

For the SolarEdge Energy Bank installation guide, see:

<https://www.solaredge.com/sites/default/files/se-energy-bank-installation-guide.pdf>



■ **Backup Interface (optional, required for backup support)** - controls disconnection of house loads from the grid and integrates the following components to enable grid-tied solar backup and Smart Energy Management. The Backup Interface must be installed to allow the operation of the batteries and inverter during backup.

■ **100A microgrid interconnection device** - disconnects the house loads from the grid in case of a power outage.

NOTE

- Additional SolarEdge inverters can be connected over RS485. The inverters will participate in export limitation, Smart Energy Management and backup operation.
- 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:

- 4 mm Allen torque screwdriver for the inverter enclosure screws
- Allen torque screwdriver for M5/M6/M8 screw types
- Standard torque flat-head screwdrivers set
- Non-contact voltage detector

- Cordless drill (clutch) or screwdriver and bits suitable for the surface on which the inverter and optimisers will be installed. Use of an impact driver is *not* allowed.
- Mounting hardware (stainless bolts, nuts, and washers) for attaching:
 - the mounting brackets to the mounting surface
 - the power optimiser to the racking (not required for smart modules)
- Tools:
 - MC4 crimper
 - Wire cutters
 - Wire strippers
 - Voltmeter
 - Mobile phone with latest SetApp version

For installing the communication options, you may also need the following:

- For Ethernet:
 - CAT6 twisted pair Ethernet cable with RJ45 connector
 - If using a CAT6 cable spool: RJ45 plug and RJ45 crimper
- For RS485 :
 - Four- or six-wire shielded twisted pair cable
 - Watchmaker precision screwdriver set

Inverter Transport and Storage

Transport the inverter in its original packaging, facing up and without exposing it to unnecessary shocks. If the original package is no longer available, use a similar box that can withstand the weight of the inverter (refer to the inverter weight in the specification datasheet provided with the unit), has a handle system and can be closed fully.

Store the inverter in a dry place where ambient temperatures are -13°F to 140°F / -25°C to +60°C.

Chapter 2: Installing the Power Optimisers

Safety

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

CAUTION!

The Power Optimiser must be operated according to the technical specifications provided with the Power Optimiser.

CAUTION!

Cutting the Power Optimiser input or output cable connector is prohibited and will void the warranty.

CAUTION!

All PV modules must be connected to a Power Optimiser.

CAUTION!

If you intend to mount the Power Optimisers 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 Power Optimiser 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 Optimiser 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 Power Optimisers, 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 Power Optimiser connectors 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 Optimisers are safe. They carry only a low safety voltage before the inverter is turned ON. As long as the power optimisers are not connected to the inverter or the inverter is turned OFF, each Power Optimiser will output a safe Voltage of 1V.

Installation Guidelines

- For the minimum and maximum number of Power Optimisers in a PV string (PV string length), see the Power Optimiser datasheets. Refer to the Designer for PV 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 Optimiser, between two modules connected to the same Power Optimiser, or between two Power Optimisers other than in the following cases:

Between a Power Optimiser and a module:

- Extension cables of up to 1.8 m are allowed for all Power Optimisers (0.9 m for DC+, and 0.9 m for DC-).
- S-Series Power Optimisers with the 1-type suffix in their part number (Sxxx-1xxxxxx or Sxxxx-1xxxxxx) - extension cables of up to 16 m can be installed per Power Optimiser (8 m for DC+, and 8 m for DC-).
- P-Series Power Optimisers with the 4-type suffix in their part number (Pxxx-4xxxxxx) and the Mxxx-Series - extension cables of up to 16 m can be installed per Power Optimiser (8 m for DC+, and 8 m for DC-).

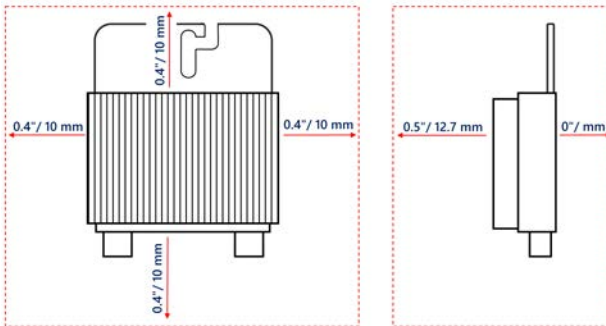
Between two Power Optimisers or between a Power Optimiser and the inverter:

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

Single Phase Inverters
All - 300 m

- The same rules apply for Synergy units of equivalent power ratings, that are part of the modular Synergy technology inverter.
- For connecting homerun DC cables from Power Optimisers to the inverter, use cables with the following cross-sections:
 - For MC4 connectors: 2.5-10 mm²
 - For DC terminal blocks inside the inverter or Connection Unit (if applicable): 2.5-16 mm²

- Frame-mounted Power Optimisers are mounted directly on the module frame, regardless of racking system (rail-less or with rails). For installation of frame-mounted Power Optimisers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The Power Optimiser can be placed in any orientation.
- Position the Power Optimiser close enough to its module so that their cables can be connected.
- Make sure to use Power Optimisers that have the required output and input conductor length.
- Completely shaded modules may cause their Power Optimisers to temporarily shut down. This will not affect the performance of the other Power Optimisers in the PV string, as long as the minimum number of unshaded Power Optimisers connected in a PV string of modules is met. If under typical conditions fewer than the minimum Power Optimisers are connected to unshaded modules, add more Power Optimisers to the PV string.
- To allow for heat dissipation, maintain the following 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 Optimisers are not exceeding the maximum temperatures stated in their specifications.

Step 1: Mounting the Power Optimisers

For each of the Power Optimisers⁽¹⁾:

1. Determine the Power Optimiser mounting location and use the Power Optimiser mounting brackets to attach the Power Optimiser to the support structure. It is recommended to mount the Power Optimiser in a location protected from direct sunlight. For frame-mounted Power Optimisers follow the instructions supplied with the optimisers, 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 holes.



CAUTION!



Drilling vibrations may damage the Power Optimiser 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 Optimiser.

Do not drill through the Power Optimiser or through the mounting holes.

3. Attach each Power Optimiser to the rack using M6 or M8 stainless steel bolts, nuts and washers or other mounting hardware. Apply torque of 9-10 N*m. Opti Clamps may be used instead of M6 bolts to attach Power Optimisers to the rack. For more information see www.opticlamp.com.au.
4. Verify that each Power Optimiser is securely attached to the module support structure.
5. Record Power Optimiser serial numbers and locations, as described in *Reporting and Monitoring Installation Data* on page 50.

Step 2: Connecting a PV module to a Power Optimiser

NOTE



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

⁽¹⁾Not applicable to smart modules.

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 Optimisers:

- Connect the Plus (+) output connector of the module to the Plus (+) input connector of the Power Optimiser.
- Connect the Minus (-) output connector of the module to the Minus (-) input connector of the Power Optimiser.

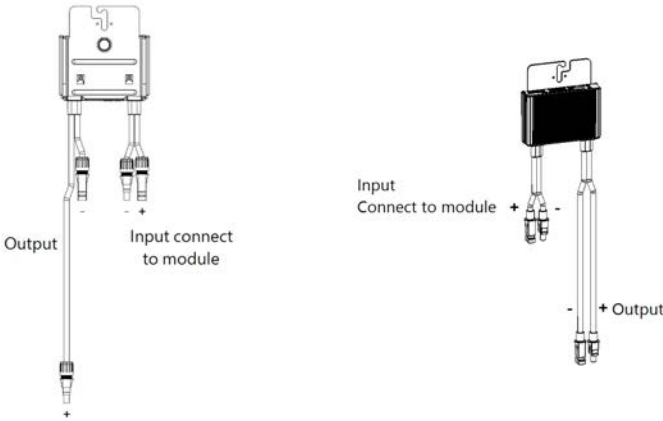


Figure 1: S-Series (left) and P-Series (right) Power Optimiser connectors

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 optimiser 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. When connecting S-Series Power Optimisers, be sure to connect the short Minus (-) output connector of one Power Optimiser to the long Plus (+) output connector of the next Power Optimiser.
2. To minimize electromagnetic interference (EMI), make sure to minimize the distance between the positive and negative DC cables.

For detailed instructions, see:

<https://www.solaredge.com/sites/default/files/se-emi-performance-application-note.pdf>.



3. Connect the rest of the power optimisers in the string in the same manner.

WARNING!



If using a dual-input power optimiser 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 51

Step 4: Verifying Proper Power Optimiser Connection

When a module is connected to a Power Optimiser, the Power Optimiser outputs a safe voltage of 1V ($\pm 0.1V$). Therefore, the total PV string voltage should equal 1V times the number of Power Optimisers connected in series in the PV string. For example, if 10 Power Optimisers are connected in a PV string, then 10V should be produced.

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

In SolarEdge systems, due to the introduction of Power Optimisers 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 PV string Voltage and current, refer to the *V_{OC} and I_{SC} in SolarEdge Systems Technical Note*, available on the SolarEdge website at:

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



→ To verify proper Power Optimiser connection:

- Measure the voltage of each PV string individually before connecting it to the other PV strings or to the inverter. Verify correct polarity by measuring the PV 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 PV string Voltage and verify correct polarity on the DC wires inside the .

For troubleshooting Power Optimiser operation problems, refer to *Power Optimiser Troubleshooting* on page 62.

Proper Power Optimiser 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 optimisers 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 Energy Hub inverter
- One mounting bracket
- Two M5x14mm Allen screws with a spring washer and flat washer - for fastening the inverter to the mounting bracket
- One 9V battery

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.

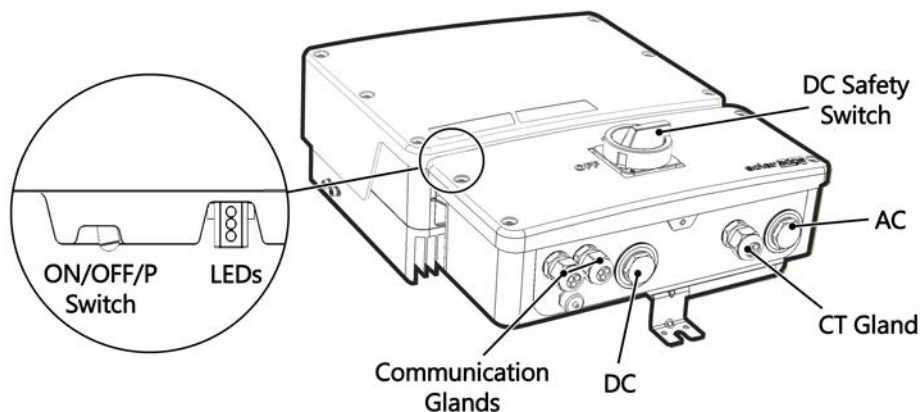


Figure 2: Inverter Interfaces

- **AC conduit entry** - for AC connection to the grid or Backup Interface
- **DC conduit entry** - for DC connection to SolarEdge Power Optimisers and one or more batteries. When installing a battery, connect the DC cables from the battery and from Power Optimisers to an external combiner box, compliant with local regulation. Then, connect the cables from the combiner box to the DC terminals inside the inverter's Connection Unit. We recommend using the SolarEdge combiner box. For installation and connection instructions see: <https://www.solaredge.com/sites/default/files/se-combiner-box-installation-guide-aus.pdf>
- **CT gland** -for connection of external CTs
- **DC Safety switch** - connects and disconnects the DC power to the system
- **Two communication glands:** for connection of inverter communication options. Each gland has three openings.
- **ON/OFF/P switch:**
 - **ON (1)** - Turning this switch ON (after Power Optimiser pairing) starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid.
 - **OFF (0)** - Turning this switch OFF reduces the power optimizer voltage to a low safety voltage and inhibits exportation of power. When this switch is OFF, the control circuitry remains powered up.

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

P Position Duration	Function	Comments
Switch moved to P for 2 seconds , then released.	<ul style="list-style-type: none"> ➤ Displays (via LEDs) production information for 5 seconds, or error type indications (if exist) for 5 seconds. ➤ Activates the Wi-Fi access point for connecting to the SetApp 	<p>While the switch is in P, all LEDs are ON.</p> <p>When the switch is released all LEDs turn OFF for 0.5 sec and then display the production or error indication.</p>
Switch moved to P for more than 30 seconds , then released.	Resets the communication board	Reset is indicated by all 3 LEDs fast blinking simultaneously
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

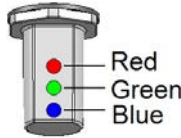


Figure 3: LEDs

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

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

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 a mounting bracket kit:

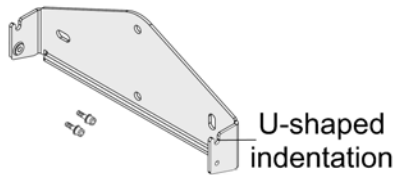


Figure 4: Mounting bracket



NOTE

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

CAUTION!



SolarEdge inverters and Power Optimisers can be installed at a minimum distance of 50 m 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 Optimiser.

For SolarEdge inverters installed at a distance of 200 m or closer to the shoreline, special brackets purchased separately from SolarEdge and SS304 stainless screws are required. For details, please contact your local sales representative.

1. Determine the inverter mounting location, on a wall, stud framing or pole. It is recommended to mount the inverter in a location protected from direct sunlight.
2. To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:

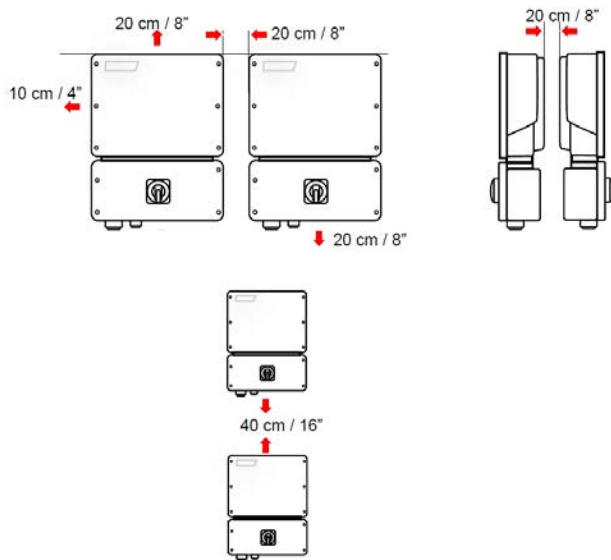


Figure 5: Clearance areas

- If installing a single inverter:
 - 20 cm from the top of the inverter.
 - At least 10 cm from the bottom of the inverter.
 - 10 cm from the right and left of the inverter.
 - If installing multiple inverters:
 - When installing inverters side by side, leave at least 20 cm between inverters.
 - When installing inverters one above of the other, leave at least 40 cm between inverters.
3. Position the mounting bracket against the wall/ pole and mark the drilling hole locations (refer to the *Mechanical Specifications* appendix below for inverter and mounting bracket dimensions).
 4. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.
 5. Hang the inverter on the bracket:

- a. Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place.
 - b. Lower the inverter onto the U-shaped indentations, as shown below. Let the inverter lay flat against the wall or pole.
 - c. Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket.
- Tighten the screws of 4.0 N*m / 2.9 lb.*ft.

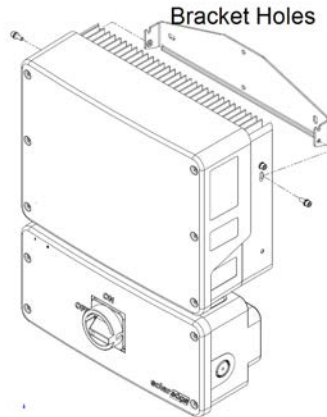


Figure 6: Hanging the inverter on the brackets

6. Optionally, secure the Connection Unit bracket to the wall/pole, using 3 screws:



NOTE

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

- a. Mark the location of the bracket screw for the Connection Unit, and optionally the two additional bracket holes.

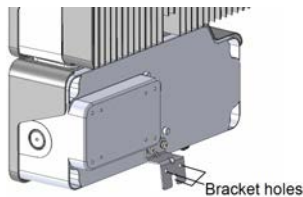


Figure 7: Connection Unit bracket

- b. Remove the inverter from the wall/ pole.

- c. Drill the hole for the Connection Unit bracket.
 - d. Hang the inverter on the mounted brackets.
 - e. Fasten the Connection Unit bracket using a standard bolt.
7. Insert the screws at the top of the inverter brackets and fasten the brackets together.
 8. Verify that all the brackets are firmly attached to the mounting surface.

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.

Circuits supplied via the stand-alone port require an RCD when in backup mode.

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 (Optional)

Install the battery in accordance with the manufacturer instructions.

For the SolarEdge Energy Bank installation guide, see:

<https://www.solaredge.com/sites/default/files/se-energy-bank-installation-guide.pdf>



In addition, follow these guidelines:

- Make sure the battery's circuit breaker switch is OFF.
- Measure the necessary length between the and the battery for all cables.
- Mark polarity on DC cables.

Chapter 5: Connecting the Inverter

This chapter explains how to connect the inverter to:

- AC grid
- DC input

Installing Conduits

Before connecting the inverter, install all conduits as shown below.

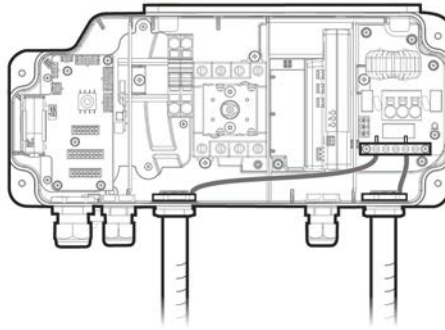


Figure 8: Conduit installation

→ To install a conduit:

1. Switch the DC Safety Switch to OFF.
2. Release the four Allen screws of the Connection Unit 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. Install a conduit of the required diameter:
 - To install a 32 mm conduit, remove the conduit plug together with the reducing washer.
 - To install a 25 mm conduit, use the supplied reducing washer.
 - To install a smaller conduit, use a reducing washer of an appropriate size (not supplied)
4. If required, ground the conduit by connecting it to the grounding bar, as shown above.

Connecting the Inverter to AC Grid

For connecting the inverter to AC grid, use a 1–10 mm² cable.

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

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



→ To connect to AC grid:

1. Turn off the AC circuit breaker on the distribution panel.
2. Strip 2.5" / 60 mm of the external cable insulation and strip 0.6" / 15 mm of the internal wire insulation.

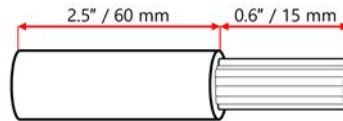


Figure 9: Insulation Stripping – AC Cable

3. Pass the AC cable through the conduit.
4. Connect the wires to the AC terminals as shown below.

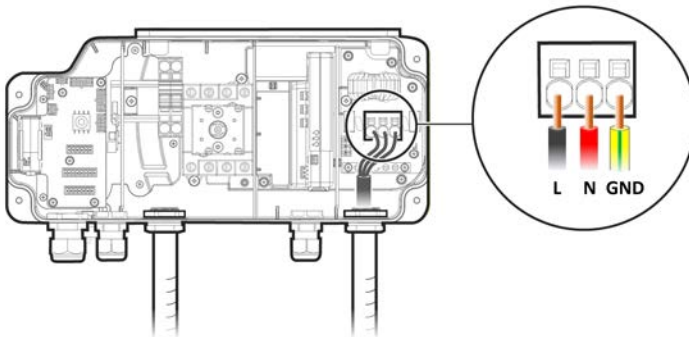


Figure 10: AC connection

Connecting the DC 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.

When installing a battery, connect the DC cables from the battery and from Power Optimisers to an external combiner box, compliant with local regulation. Then, connect the cables from the combiner box to the DC terminals inside the inverter's Connection Unit. We recommend using the SolarEdge combiner box. For installation and connection instructions see: <https://www.solaredge.com/sites/default/files/se-combiner-box-installation-guide-aus.pdf>

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 arraystring modules is acceptable.

NOTE



SolarEdge fixed input voltage architecture enables the parallel arraysstrings 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.

→ To connect to DC strings:

1. Strip 8 mm of the DC wires insulation.
2. Pass the DC wires through the DC conduit.
3. Connect the wires to the DC terminals as shown below. Observe the correct polarity as labeled on the terminals.

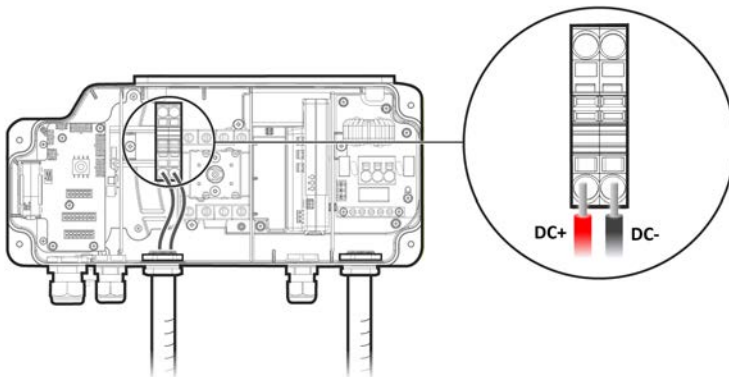


Figure 11: Inverter DC Connections

Connecting the Battery (Optional)

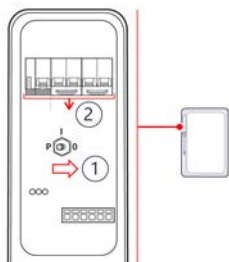
When installing a battery, connect the DC cables from the battery and from Power Optimisers to an external combiner box, compliant with local regulation. Then, connect the cables from the combiner box to the DC terminals inside the inverter's Connection Unit. We recommend using the SolarEdge combiner box. For installation and connection instructions see: <https://www.solaredge.com/sites/default/files/se-combiner-box-installation-guide-aus.pdf>

For setting up communication between the SolarEdge Energy Bank and the inverter, SolarEdge strongly recommends using SolarEdge Energy Net.

WARNING!

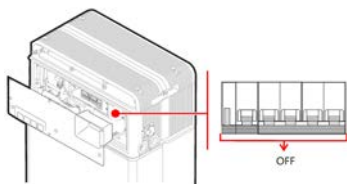


Before connecting the battery to the inverter, verify that the battery is powered off.



SolarEdge Energy Bank

1. Toggle off the battery ON/OFF/P switch.
2. Turn off the battery circuit breaker.



LG Chem Prime Battery

Turn off the circuit breaker.

Use the following cable types:

- **DC** - two pairs of DC cables - 6 mm² (6–10 mm²), 600V insulated.
- **Communication** - 0.25 mm² (0.25–1.5 mm²), 600V insulated or CAT6

→ **To connect communication (for LG Chem batteries only):**

1. Connect the communication cable to the battery's RS485 connector as shown below.
2. Open Communication Gland 2 at the bottom of the inverter's Connection Unit.
3. Feed the other end of the communication cable through one of the gland openings.
4. Remove the connector from the port labeled **2nd Inv-Battery** on the communication board.

- Connect the communication cable to the connector, as shown below.

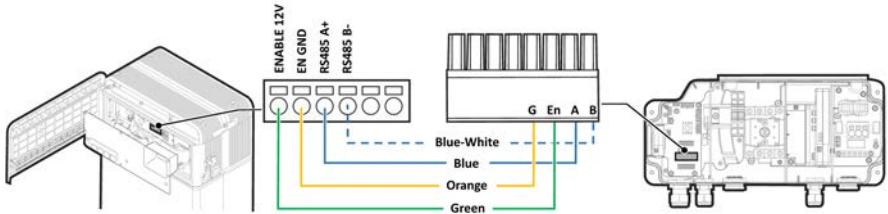


Figure 12: Communication cable connection - RESU Prime batteries to the inverter

- Close Communication Gland 2 of 5.5 N*m.

→ To connect DC cables:

- Connect one pair of DC cables to the battery, as explained in the installation guide that comes with the battery.
- Connect the other ends of the DC cables to the battery input terminals in the combiner box.
- Take the second pair of DC cables and connect them to the inverter output terminals in the combiner box.
- Connect the other ends of the DC cables to the DC terminals in the Connection Unit.

WARNING!



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

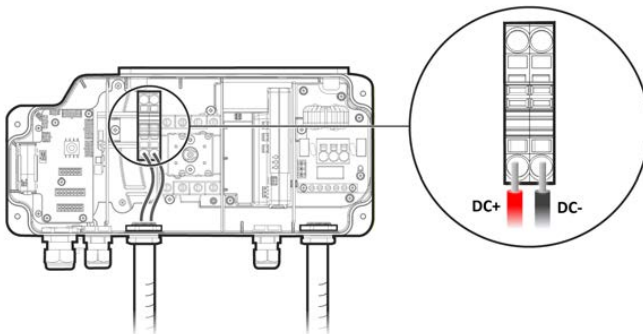


Figure 13: Battery DC cable connection to the inverter

Connecting the Backup Interface

To enable operation of the inverter in the stand-alone mode, the SolarEdge Backup Interface must be installed. When the inverter switches to the stand-alone mode, the Backup Interface ensures the neutral conductor continuity to the loads.

For installation and connection instructions of the Backup Interface see:

<https://www.solaredge.com/sites/se/default/files/se-backup-interface-installation-guide-aus.pdf>

When connecting the Backup Interface to the inverter, use the following cable types:

- **Communication** - 0.25 mm² (0.25–1.5 mm²), 600V insulated or CAT6
- **12V power** -
 - If the distance between the inverter and the Backup Interface is smaller than 15 m, use the CAT6 communication cable (see above).
 - If the distance is greater than 15m/49, use a dedicated cable with a cross section of 2 mm² or greater.

→ **To connect the Backup Interface:**

1. Connect the communication and 12V power cables to the Backup Interface, as explained in the installation manual that comes with the Backup interface.
2. Open Communication Gland 1 at the bottom of the Connection Unit.
3. Feed the other end of the communication cable through one of the gland openings.
4. Remove the 7-pin connector from the port labeled **Backup Interface** on the communication board.
5. Connect the communication cable wires to the 7-pin connector, as shown below.
For the RSD connection, see *Connecting an External RSD Switch (Optional)* on page 39.

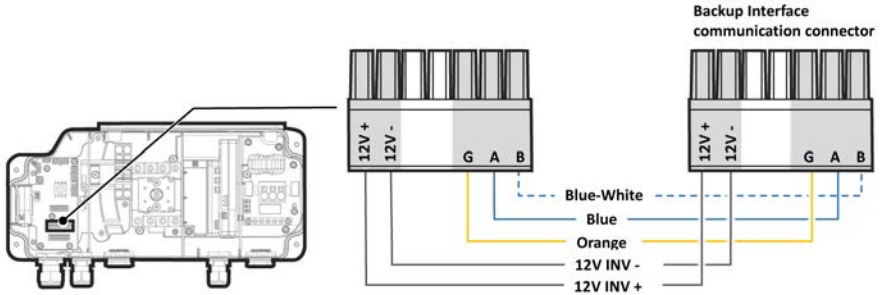


Figure 14: Connecting the Backup Interface

6. Close Communication Gland 1 to a torque of 5.5 N*m.

Connecting an External CT to the Energy Meter (Optional)

To enable import/export or consumption metering, connect an external current transformer (purchased separately from SolarEdge) to the Energy Meter.

→ To connect an external CT:

1. Open the CT gland at the bottom of the Connection Unit.
2. Feed the CT wires through one of the gland openings.
3. Connect the CT wires to Energy Meter's L1 CT connector, as shown below.

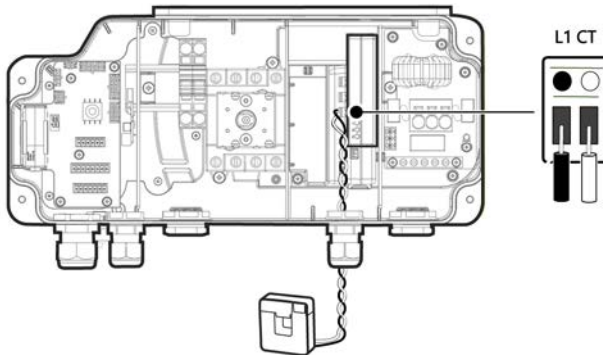


Figure 15: External CT connection

4. Close the CT gland to a torque of 5.5 N*m.

Connecting an External RSD Switch (Optional)

If required, an external rapid shutdown switch can be installed to shut down the system in case of emergency.

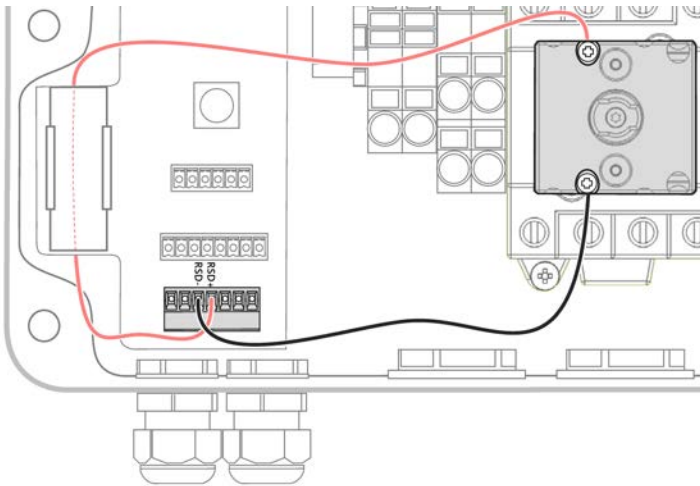
The switch is not supplied by SolarEdge and should be purchased separately.

If the SolarEdge Backup Interface is installed as part of the system, connect the external RSD switch to the Backup Interface (see the Backup Interface installation guide). Then, connect the RSD wires from the Backup Interface to the inverter, in the same manner, as explained below.

→ To connect an external RSD switch to a single inverter

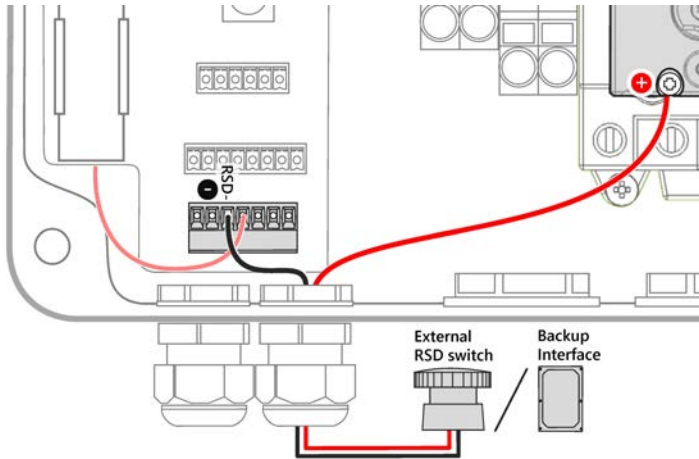
1. Remove the factory installed RSD- wire that connects between the 7-pin **Backup Interface** connector and the Safety Switch.

Do not disconnect the RSD+ wire.



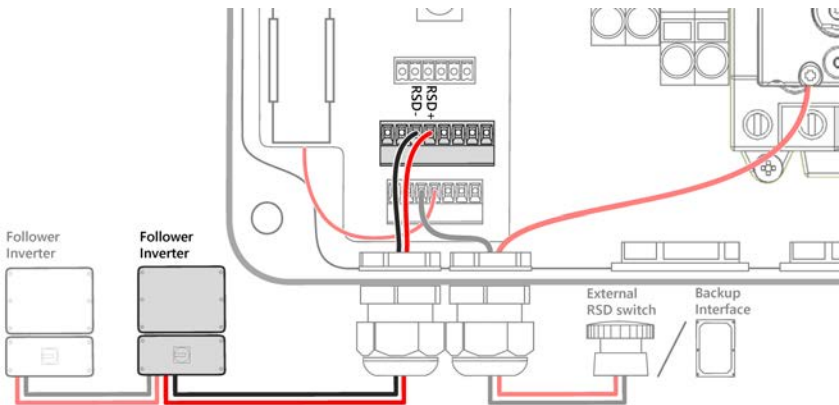
2. Pass the wires from the external RSD switch through Communication Gland 2.

3. Connect the positive wire to the Safety Switch and the negative wire to the RSD- port on the Backup Interface connector.



→ To connect an external RSD switch to multiple inverters:

1. Connect the external RSD switch to the Leader inverter, as explained above.
2. Connect wires to the RSD+ and RSD- ports of the 2nd Inv-Battery connector.



3. Pass the RSD+ and RSD- wires through Communication Gland 1 and connect them to a Follower inverter as explained above:
 - RSD+ to the Safety Switch
 - RSD- to the **Backup Interface** connector
4. If necessary, connect additional Follower inverters in the same manner.

Installing the 9V Battery

A 9V battery is supplied with the inverter to enable the inverter to start production in case of a power outage.

→ To install the 9V battery:

1. Connect the snap-on clip to the battery contacts.
2. Insert the battery into the battery holder in the Connection Unit.

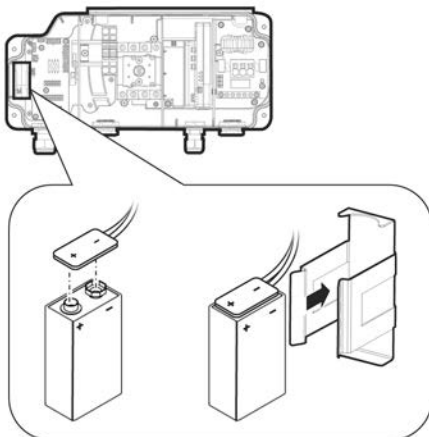


Figure 16: Installing the 9V Battery

3. Close the Connection Unit covers with the Allen screws.

Connecting Multiple Inverters through RS485

Before connecting multiple inverters, make sure your inverters' firmware version supports this feature. For further information, contact SolarEdge support.

You can add inverters to your system to increase on-grid and backup power production. Up to two additional Single phase inverters with HD-Wave technology or Energy Hub inverters may be connected to a single Energy Hub inverter.

If a battery and Backup Interface are installed, the AC output from the additional inverters must be connected to the Backup Interface. Use a circuit breaker (CB-UPG-xx-01) purchasable from SolarEdge. For more information, refer to the *Backup Interface Installation Guide*.

When connecting multiple inverters, use the following cable types:

- **Communication** - 0.25 mm² (0.25–1.5 mm²), 600V insulated or CAT6

→ To connect an additional Energy Hub inverter:

1. Connect the Leader inverter to the Backup Interface, as explained in *Connecting the Backup Interface* on page 37.
2. In both inverters, pass the communication cable through Communication Gland 2.
3. In the Follower inverter, connect the cable to the **2nd Inv RS485** connector.

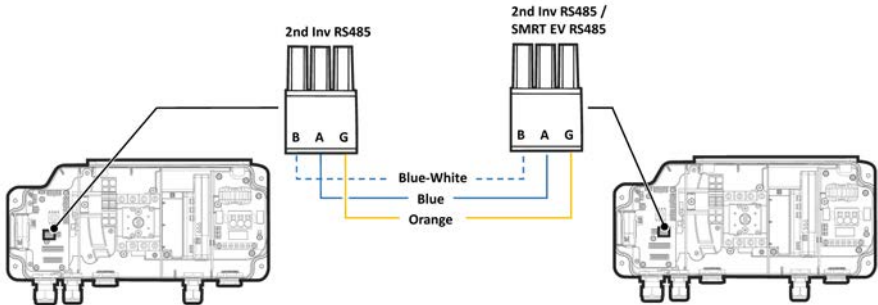


Figure 17: Connecting two Energy Hub inverters

4. In the Leader inverter, connect the cable to either the **2nd Inv RS485** connector or the **SMRT EV RS485** connector.
5. Pull the cables lightly to make sure they are properly connected.
6. Close the communication glands of 5.5 N*m.

→ To connect an additional HD-Wave inverter:

1. In the HD-Wave inverter, connect one end of the communication cable to the **RS485-1** connector on the communication board. For more information, refer to the *HD-Wave inverter Installation Guide*.
2. Pass the other end of the communication through Communication Gland 2 of the Energy Hub inverter.
3. Connect the cable to the **2nd Inv RS485** connector on the communication board.
4. Pull the cables lightly to make sure they are properly connected.
5. Close the communication glands of 5.5 N*m.

Chapter 6: Activating, Commissioning and Configuring the System

After the solar system is installed, it is important to activate and commission the solar system. Activation and commission of the system is performed using the inverter SetApp mobile application.

During the activation and commissioning, the inverter discovers and communicates with all connected components in the solar system, such as: optimizers, peripheral communication devices and other linked inverters. When commissioning is performed, the user is required to set the grid parameters and backup Voltage information (if used).

Before starting the activation and commissioning, verify the all the communication hardware is properly connect. For communication options, refer to: *Setting Up Communication with the Monitoring Platform* on page 53.

Before arriving at the site, download SolarEdge SetApp application to your mobile device from Apple App Store or Google Play .

Before activation and commissioning, download the SetApp application from:



For downloading SetApp, Internet connection, one-time registration and logging are required. No registration is 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 login 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. Turn-on the DC Disconnect Switch (if applicable).
 3. Open SetApp and follow the on-screen instructions (scan the inverter barcode; 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.
 4. 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.
 - If not already ON - move the Connection Unit switch to the ON position.
 - If the Backup Interface is installed - turn on the inverter circuit breaker in the Backup Interface and make sure the Backup Interface's ON/OFF switch is in the ON position.
 - 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. Unless these settings are selected, the inverter will not start production.

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**. If unsure, which regional grid code (Australia A, B, or C) to select, contact your local grid operator to confirm the settings.
3. If relevant, from the **Language** drop-down list, select your language and tap **Set Language**.
4. From the **Commissioning** screen, select **Power Control** and make sure all settings are correct.
5. From the **Commissioning** screen, select **Grid Protection** and make sure all settings are correct.
6. To save the information to a read-only file, tap the **PDF** icon (iOS) or the **JPEG** icon (Android) at the bottom of the screen.

Pairing

1. From the **Commissioning** menu, select **Pairing**.
2. Tap **Start Pairing**.
3. When **Pairing Complete** is displayed, the system startup process begins:
Since the inverter is ON, the Power Optimisers 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 Optimisers 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 53.

- 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. For more information, see *Configuring Communication with Other Devices* on page 46 below.

Power Control

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. To save the information to a read-only file, tap the **PDF** icon (iOS) or the **JPEG** icon (Android) at the bottom of the screen.
2. Select **Status** and verify that inverter is operating and producing power.
3. Verify that additional configurations were properly set by viewing the relevant Status screens.
4. Verify that the green inverter LED is steadily lit.

Your SolarEdge power harvesting system is now operational.

Configuring Communication with Other Devices

If the above devices have not been auto-detected during system activation, configure them as explained below.

→ To set up communication with an LG Chem battery:

1. Run SetApp and select **Commissioning > Site Communication**.
2. From the **Site Communication** screen, select **RS485-1 > Protocol > Modbus (Multi-**

Device).

3. Return to the previous screen and select **Add Modbus Device > Battery**.
4. If installing a second LG Chem Prime battery,
 - a. Select **Add Modbus Device > Battery** again.
 - b. Set the **Device ID** to 14.
5. Verify the battery information by selecting **Battery 1 > Battery Information**.

→ To set up communication with the SolarEdge Energy Bank:

1. Run SetApp.
2. From the **Commissioning** screen, select **Device Manager > Add New Devices**.
3. Follow on-screen instructions.

→ To set up communication with an external Energy Meter:

If you are setting up communication with the meter before the battery, first perform Steps 1-3 above. After that, proceed with the steps below.

1. In the **RS485-1** screen, select **Add Modbus Device > Meter**.
2. 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.
3. Select **Meter 2 > Meter Function > Export+Import (E+I)**.

Running a Battery Self-test

You can run a battery self-test only after finishing the battery installation and configuration (refer to the battery installation guide).

The purpose of the battery self-test is 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.**

Enabling StorEdge Applications

This section describes how to configure your system to use StorEdge applications. Before enabling StorEdge applications, make sure to:

- Finish the battery installation and configuration (refer to the battery installation guide)
- Run a battery self-test, as described above

Backup Power Applications

The produced power is stored in the battery to be used during power outages. When the grid voltage is down, the Backup Interface automatically switches to the Backup mode, disconnecting from the grid, while the Energy Hub inverter supplies power to the backed-up loads. This application requires connection to the Backup Interface and backed-up loads (pre-selected or the entire home).

The application can be used in one of two ways:

- **Backup-only** – energy stored in the battery is discharged for backup power only, that is, when there is no power from the grid
- **Backup with Smart Energy Management**– use some of the battery energy for backup power, and the rest for maximize self-consumption(MSC) or charge/discharge profile programming (for time of use arbitrage) applications.

The Backup application can be used whether or not PV modules are installed at the site. The backup function is disabled by default and can be enabled for on-grid only application, if backup is not needed.

To start using StorEdge applications, you first need to enable the Backup Configuration functionality (disabled by default). If Backup Configuration is disabled, the system will use the battery energy in the following cases:

- When PV production is not sufficient in MSC
 - When using one of charge/discharge profiles that requires battery discharge
- However stored energy will not be used to back up the loads in case of power outage.

→ **To enable Backup Configuration:**

- Open SetApp and select **Commissioning > Power Control > Energy Manager > Backup Configuration > Backup > Enable**.

After the Backup Configuration is enabled, the Backup Interface is automatically configured.

→ **To enable a StorEdge application:**

1. Select **Power Control > Energy Manager > Energy Control**.
2. Select one of the following applications:
 - **Backup only** - Set the system to supply power to backed-up loads only in case of a power outage.
 - **Time of use** - Set a charge/discharge profile and the level of charging the battery from AC.
 - **Maximum Self Consumption (MSC)** - Set the system to maximize self-consumption, and then the level of stored energy to be reserved for backup.

Enabling Demand Response Mode for Zero Export

1. Access SetApp.
2. From the **Commissioning** screen, select **Power Control > Power Reduction Interface (RRCR) Mode > DRM**.

For more information on zero export and demand response enabling devices (DRED), see:

<https://www.solaredge.com/sites/default/files/dred-connection-application-note.pdf>

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 53.

The Monitoring Platform

The monitoring platform provides enhanced PV performance monitoring and inverter yield assurance through immediate fault detection and alerts at the module, PV array 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, Power Optimisers, PV arrays, modules, meters and sensors, as well as their electrical connectivity. This view enables you to see which modules are connected in each PV array, which PV arrays 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 Optimisers, the monitoring platform will show the logical layout, indicating which Power Optimisers are connected to which inverter, but will not show PV strings or the physical location of Power Optimisers.

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 optimisers. To map the locations, use one of the methods described in the next sections.

Designer

Designer recommends inverter and Power Optimiser selection per site size and enables report generation. You can create a project in Designer and export the site design with the PV array 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 Optimiser and inverter 2D barcodes and create a virtual map of a PV site for enhanced monitoring and easier maintenance.

The Mapper

- Simple on-site registration of new systems.
- Creating, editing and verifying system physical layout.
- Scanning and assigning the Power Optimiser 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.

Chapter 7: Setting Up Communication with the Monitoring Platform

The inverter sends the following information to the monitoring platform:

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

This chapter describes how to set up communication between:

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

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

CAUTION!



Before connecting the communication cables, make sure that the ON/OFF/P switch at the bottom of the inverter (and the switch of the Connection 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 Connection 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.

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 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>



Communication Connectors

Opening for cable size (diameter)	Connection type
2.5 - 5 mm	RS485
4.5 - 7 mm, with cut	Ethernet (CAT6)
2 - 4 mm, with cut	Antenna cable for wireless communication

The communication board has the following connectors:

- Standard RJ45 terminal block for Ethernet connection
- USB
- RS485 connector

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

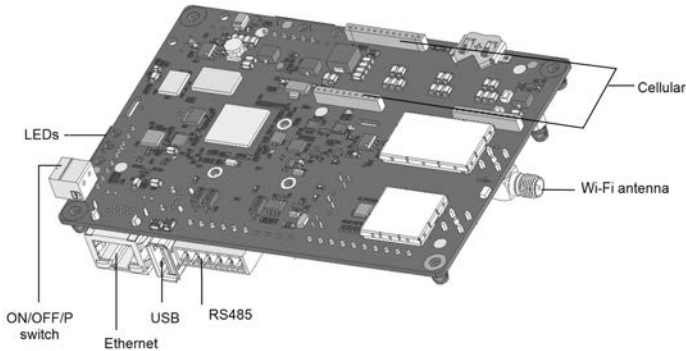


Figure 18: Communication board connectors

Removing the Inverter Cover

→ To remove the inverter cover

1. Switch off the AC circuit breaker on the main distribution panel.
2. Switch off the inverter ON/OFF/P switch and wait 5 minutes for the internal capacitors to discharge.
3. Open the Allen screws of the inverter cover and carefully pull the cover horizontally before lowering it.

CAUTION!



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

Removing the Connection Unit Cover (if applicable)

1. Switch off the AC circuit breaker on the main distribution panel and the safety switch (if applicable).
2. Open the DC Safety Unit cover: Release the four Allen screws and remove the cover.

CAUTION!



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

Creating an Ethernet (LAN) Connection

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

Ethernet cable specifications:

- Cable type – a shielded CAT6 Ethernet cable
- 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 above.
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. Insert the cable through the opening in the Connection Unit towards the communication board.
6. Push the cable into the cut opening of the 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

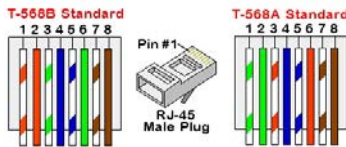


Figure 19: Standard cable wiring

7. Use a pre-terminated cable to connect via Communication Gland 1 to the RJ45 plug on the inverter's communication board or, if using a spool of cable, connect as follows:
 - a. Insert the cable through the gland.
 - b. Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
 - c. Insert the eight wires into an RJ45 connector (see *Figure 19*).
 - d. Use a crimping tool to crimp the connector.
 - e. Connect the Ethernet connector to the RJ45 port on the communication board (see *Figure 18*).
8. For the switch/router side, use a pre-terminated cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above .
9. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the SolarEdge monitoring platform.

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

10. The inverter is configured by default to LAN.
 - 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 46.

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)

11. Verify the connection, as described in *Verifying the Connection* on page 58.

Verifying the Connection

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

1. Commission the inverter as describe in "**Activating, Commissioning and Configuring the System**" on page 43.
2. Access SetApp and select **Status** from the **Configuring** screen.
3. In the **Summary** section, under **Server Comm.**, make sure **S_OK** is displayed together with the selected communication option.
4. Scroll down to the **Communication** section and check that the communication options are as required.

Appendix A: Errors and Troubleshooting

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

Identifying Errors

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

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



→ To identify the error type using the inverter LEDs:

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

<https://www.solaredge.com/leds>



Error Type	Inverter 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.

Energy Hub Inverter Troubleshooting

Malfunction	Description or Possible Cause	Corrective Action
Battery SOE (state of energy) is below 10%, while solar power is being produced	Continuous discharge; no charging	<ul style="list-style-type: none"> ▪ Perform a battery self-test as explained in <i>Running a Battery Self-test</i> on page 47. If the battery self-test is successfully passed, contact SE support. ▪ If the battery cannot be charged, check the battery manufacturing date: Identify battery PN. For example: R15563P3SSEG11703177032 (R15563P3SSEG1YYMMDDLNNN); From battery PN identify the production date: In the example above, the manufacturing date is YY = 17, MM = 03, DD = 17. Contact LG Chem regional customer service for technical assistance.
No power to backed-up loads during a power outage	The loads are not backed up.	<p>Check the following:</p> <ul style="list-style-type: none"> ▪ The inverter is producing power. ▪ The Backup function is enabled, as explained in <i>Enabling StorEdge Applications</i> on page 48. ▪ No error messages are displayed in SetApp. ▪ Backed-up load circuit breakers are on. ▪ The Backup Interface is in the Backup mode (the green LED on the Backup Interface is continuously ON).
The inverter does not turn on.	External shutdown is on.	<ul style="list-style-type: none"> ▪ If an external shutdown switch is installed, make sure it is in the ON position. ▪ If no external shutdown switch is installed, make sure the external shutdown short circuit jumper in the Backup Interface is installed.
Battery self-test failed	Wrong battery connections	Make sure the DC cables, RS485 and En wires between the battery and inverter are correctly connected.

Error 3x6B	Battery communication error	<ul style="list-style-type: none"> Make sure the RS485 and En wires between the battery and inverter are correctly connected. Make sure the battery is correctly configured, as explained in <i>Configuring Communication with Other Devices</i> on page 46.
Error 3x6C	Battery internal error	Contact SolarEdge support.

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	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	<p>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.</p> <p>For Wi-Fi networks, ensure that user-name and password are as defined in the internet provider AP/ router.</p>

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- > Follower Detect** is lower than the actual number of followers, refer to the following application note to identify missing followers and troubleshoot connectivity problems:

https://www.solaredge.com/sites/default/files/troubleshooting_undetected_RS485_devices.pdf


Additional Troubleshooting

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

Power Optimiser Troubleshooting

Malfunction	Possible Cause and Corrective Action
Pairing failed	Power Optimisers 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.
PV string Voltage is 0V	Power Optimiser (s) output is disconnected. Connect all Power Optimiser outputs.

Malfunction	Possible Cause and Corrective Action
PV string voltage not 0V but lower than number of Power Optimisers	Power Optimiser(s) not connected in the PV string.
	Connect all Power Optimisers.
	Panel(s) not connected properly to Power Optimiser inputs (not applicable to smart modules).
	Connect the modules to the Power Optimiser inputs.
	PV string reverse polarity.
	Check PV string polarity using a voltmeter and correct if needed.

Malfunction	Possible Cause and Corrective Action
<p>PV string Voltage is higher than number of Power Optimisers</p> <p>WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of $\pm 1\%$ per PV string is reasonable.</p> 	<p>Extra Power Optimiser(s) connected in the PV string (not applicable to smart modules). Check if an extra Power Optimiser is connected in the PV string. If not – proceed to next solution.</p> <p>A module is connected directly to the PV string, without a Power Optimiser (not applicable to smart modules). Verify that only Power Optimisers are connected in the PV string and that no module outputs are connected without a Power Optimiser. If the problem persists, proceed to the next step.</p> <p>Power Optimiser(s) malfunction.</p> <ol style="list-style-type: none"> 1. Disconnect the wires connecting the Power Optimisers in the PV string. 2. Measure the output voltage of each Power Optimiser to locate the Power Optimiser that does not output 1V safety Voltage. If a malfunctioning Power Optimisers located, check its connections, polarity, module, and Voltage. 3. Contact SolarEdge Support. Do not continue before finding the problem and replacing the malfunctioning Power Optimiser. If a malfunction cannot be bypassed or resolved, skip the malfunctioning Power Optimiser, thus connecting a shorter PV string.

Appendix B: 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.

Single Phase Energy Hub Inverter - Technical Specifications

for Australia

SExxxxH/SExxxxH-B/SExxxxH-BPV/SExxxxH-MMB/SExxxxH-MM⁽¹⁾

PN	SE3000H	SE4000H	SE5000H	SE6000H	SE8250H	SE10000H	Unit
Output - AC On grid							
Rated AC Power	3000	4000	5000	6000	8250	10000	VA
Max AC Power Output	3000	4000	5000	6000	8250	10000	VA
Rated Current AC Output	14	18.5	23	27.5	37.5	45.5	AC A
Maximum Continuous Output Current	14	18.5	23	27.5	37.5	45.5	A
AC Output Voltage (nominal)	220 / 230						Vac
AC Output Voltage Range	184 - 264.5						Vac
AC Frequency Range (nominal)	50/60 ± 5						Hz
Max Inrush Current AC (peak / duration)	2.8/20	2.8/20	2.8/20	2.8/20	3.45/20	3.45/20	Aac (rms) / ms
Max Output Fault Current	35	35	48	48	80	80	A
Max Output Continuous Overcurrent Protection	14	19	23	36.5	37.5	45.5	A
Overvoltage category (mains)	OVC III						
Over voltage category (PV)	OVC II						
Total Harmonic Distortion (THD)	<3						%
Power Factor	1, adjustable -0.8 to 0.8						

Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
Active Anti-Islanding method	Slip mode frequency shift							
Charge Battery from AC (if Allowed)	Yes							
Typical Nighttime Power Consumption	<2.5							W
Inverter Topology	Non-isolated							
Impedance				$P_{st} = 0,043 @ Z_{ref}$ $P_{lt} = 0,043 @ Z_{ref}, Z_{max}$ $0,13\Omega + j0,13\Omega$		$P_{st} = 0,019 @ Z_{ref}$ $P_{lt} = 0,019 @ Z_{ref}, Z_{max}$ $0,08\Omega + j0,08\Omega$		
Output - AC Backup⁽²⁾								
Rated AC Power in Backup Operation ⁽³⁾	3000	4000	5000	6000	7400	9,000	W	
AC Output Voltage (Nominal)	220 / 230							Vac
AC Output Voltage Range	184-264.5							Vac
AC Frequency	50/60 ± 5							Hz
Maximum Continuous Output Current in Backup Operation ⁽⁴⁾	14	19	23	28	34	41.5	A	
Input - DC (PV and Battery)								
Transformer-less, Ungrounded	Yes							
Max Input Voltage	480							Vdc

Nom DC Input Voltage	380			400			Vdc
Ground-Fault Isolation Detection	600kohm Sensitivity						
2-pole Disconnection	Yes						
Maximum DC PV Power	6000	8000	10000	12000	16500	20000	W
Max Input Current ⁽⁵⁾	8.5	11	14	16.5	22.5	25.5	Adc
Max Back-feed Current	0						
Max Inverter Efficiency	99.2						%
Isc PV (absolute maximum)	8.5	11	14	16.5	22.5	25.5	DC A
European Weighted Efficiency	98.8		99				%
Reverse-Polarity Protection	Yes						
Battery Storage							
Supported Battery Types	SolarEdge Energy Bank, LG RESU10H Prime, LG RESU16H Prime						
Number of Batteries per Inverter	Up to 3 SolarEdge Energy Bank batteries or up to 2 LG Prime batteries ⁽⁶⁾						
Continues Power	Up to inverter rated backup power						W
Smart Energy Capabilities							
Consumption Metering	Built-in ⁽⁷⁾						
Battery Storage	In backup: Up to 3 inverters, 88.2kWh with SolarEdge Energy Bank batteries						
EV Charging	Smart EV ready - separate EV charger and cabling required						
ADDITIONAL FEATURES							
Supported Communication Interfaces	RS485 - Modbus devices, RS485 - SE protocol, Ethernet, Wi-Fi, EnergyNet						

Integrated AC, DC and Communication Connection Unit	Yes		
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection		
STANDARD COMPLIANCE			
Safety	IEC-62103 (EN50178), IEC-62109, AS/NZS3100		
Grid Connection Standards	AS/NZS4777		
Emissions	IEC-61000-6-2, IEC-61000-6-3, IEC-61000-3-11, IEC-61000-3-12		
INSTALLATION SPECIFICATIONS			
AC Output and DC Input Conduit Size / Wire Cross Section	32mm Maximum / 1-16 mm ²		
Dimensions with Connection Unit (HxWxD)	450 x 370 x 174	540 x 370 x 185	mm
Weight with Connection Unit	<15	<20	kg
Communication Glands	2		
Noise	<25	<50	dBA
Cooling	Natural convection		
Operating Temperature Range	-40 to +60 ⁽⁸⁾		°C
Protection Rating	IP65 - Outdoor and Indoor		
Protective Class	I		

(1) These specifications apply to inverters with part numbers SExxxxH-AUS3xxxxx and connection unit model number DCD-1PH-AU-PxH-F-x.

(2) Not designed for standalone applications and requires AC for commissioning.

-
- (3) Rated AC power in Backup Operation are valid for installations with multiple inverters. For a single backup inverter operation, rated AC power in backup is 90% of the stated value.
- (4) Rated current in backup operation are valid for installations with multiple inverters. For a single backup inverter operation, rated current in backup is 90% of the stated value.
- (5) A higher current source may be used; the inverter will limit its input current to the values stated.
- (6) Support for 2 LG Prime batteries with compatible inverter firmware .
- (7) For consumption metering current transformers should be ordered separately: SE-CTML-0350-070 or SE-ACT-0750-100 or SE-ACT-0750-250.
- (8) Full power up to at least 50°C; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf>

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 SetApp mobile application, 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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