Installation Guide

Three Phase Inverters with Synergy Technology for EU/ International Markets

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The content of these documents is continually reviewed and amended, where necessary. However, discrepancies cannot be excluded. No guarantee is made for the completeness of these documents.

The images contained in this document are for illustrative purposes only and may vary depending on product models.

Read this manual before you attempt to install the product and follow the instructions throughout the installation process. If you are uncertain about any of the requirements, recommendations, or safety procedures described in this manual, contact SolarEdge Support immediately for advice and clarification. The information included in this manual is accurate at the time of publication. However, the product specifications are subject to change without prior notice. In addition, the illustrations in this manual are meant to help explain system configuration concepts and installation instructions. The illustrated items may differ from the actual items at the installation location.

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Revision history

Version	Date	Description
1.8	December 2025	Updated module-to-Power Optimizer connection guidelines Advisory against looping Power Optimizer wires Added multirange selection guidelines
1.7	July 2025	Added fan maintenance procedures.
1.6	March 2024	General updates.

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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

Denotes information about safety issues.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS / CONSERVEZ CES INSTRUCTIONS

WARNING

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

WARNING

- When servicing or replacing SolarEdge equipment, instructions in the SolarEdge Inverter Installation Guide must be followed to maintain the integrity of the PV hazard control system. SolarEdge Power Optimizers and/or inverters may only be replaced with SolarEdge Power Optimizers and/or inverters. Third party equipment is not compatible with SolarEdge equipment.

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WARNING

- Using this equipment in a manner not specified by SolarEdge in this document may impair the protection provided by this equipment.

WARNING

- The inverter cover should be opened only after shutting off the inverter, by moving the ON/OFF/P switch to the OFF (0) position. This disables the DC voltage inside the inverter. Wait at least 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 is 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

- High DC Voltage on PV strings at night when Potential Induced Degradation (PID) rectifier / Volt-Ampere Reactive (VAR) control function is active. DO NOT touch any component or perform any maintenance operation on the PV strings.

WARNING

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

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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+ (PV string Length-1)*1V, where:

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

NOTE

The current unbalance shall be defined as the maximum deviation of line current on any phase, from the average line current of all phases, expressed as a percentage.

The measured maximum inverter current unbalance is as specified in the table below:

Maximum inverter current unbalance

Model	% Current unbalance phase A	% Current unbalance phase B	% Current unbalance phase C
SE43.2K	2.0082	0.0171	1.9908
SE50K	1.7511	0.0978	1.8489
SE66.6K	1.3706	0.0966	1.274
SE80K	1.2938	0.0596	1.2342
SE100K	2.0559	0.1449	1.911
SE110K	1.9407	0.0894	1.8513
SE120K	1.9407	0.0894	1.8513

WARNING

- SolarEdge products can expose you to chemicals including antimony trioxide, which is known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov.

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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

This ⏚ symbol appears at grounding points on the SolarEdge equipment. This symbol is also used in this manual.

NOTE

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 details about connecting an alternative power source to SolarEdge inverter, see Application Note - SolarEdge Inverter - Alternative Power Source.

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

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NOTE

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

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

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Chapter 1: Introducing the SolarEdge Power Harvesting System

System Overview

The SolarEdge power harvesting solution, depicted in the figure below, is designed to maximize the power output from any type of solar Photovoltaic (PV) installation while reducing the average cost per Watt. The following sections describe the components of the SolarEdge power harvesting solution.



Figure: The SolarEdge Power Harvesting Solution

Power Optimizer

The SolarEdge Power Optimizer is a DC-DC converter that is connected to a PV module to maximize power harvesting by performing independent Maximum Power Point Tracking (MPPT) at the module level.

The Power Optimizer regulates the PV string voltage at a constant level, regardless of PV string length and environmental conditions.

The Power Optimizer includes a safety voltage mechanism that automatically lowers the output to a safe voltage in the following cases:

- During fault conditions
- The Power Optimizers are disconnected from the inverter
- The inverter P/1/0 switch is turned OFF
- The inverter AC breaker is turned OFF

NOTE

The safety output voltage level for each Power Optimizer varies depending on the model. See the modelspecific datasheet for details.

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Furthermore, each Power Optimizer also transmits module performance data over the DC power line to the inverter.

Three Phase Inverter with Synergy Technology

The Three Phase Inverter with Synergy Technology (referred to as 'inverter' in this manual) efficiently converts DC power from the Power Optimizers into AC power that can be fed into the main AC service of the site and from there to the grid. The inverter also receives the monitoring data from each Power Optimizer and transmits it to the SolarEdge Monitoring platform (requires a LAN or cellular connection to the Internet).

Two or three Synergy Units comprise the inverter power conversion block, an external Synergy Manager unit acts as a smart AC combiner.

The Synergy Units are connected to the Synergy Manager via AC, DC and communication cables.

Each Synergy Unit operates independently and continues to work in case others stop operating.

A chain of up to 31 inverters can operate together via Modbus over the RS485 line. When setting up a chain of inverters, the inverter that manages communication interface to the internet is called Leader and the rest are Followers.

The following figure depicts a Synergy Manager with three Synergy Units.



Figure: Synergy Manager and the attached Synergy Units

SolarEdge ONE for C&I

SolarEdge ONE for C&I allows you to monitor the technical and financial performance of one or more SolarEdge sites. It provides historical and real-time information on system performance, both at the system and PV module levels.

Designer

SolarEdge Designer is a powerful tool and a user-friendly web application that simplifies solar energy system design. It offers an intuitive interface and advanced optimization features to help professionals create efficient PV designs. With accurate simulation

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algorithms and integration with SolarEdge products, it maximizes system performance. The application also enables financial analysis and supports collaboration.

SetApp

SolarEdge SetApp is a mobile application designed to simplify the process of commissioning and configuring SolarEdge inverters and power optimizers by providing an intuitive and efficient interface for installers.

With SetApp, installers can easily access and configure SolarEdge inverters and power optimizers through their smartphone or tablet. The user-friendly app guides installers step-by-step through the entire commissioning process, ensuring that each component is properly connected and configured for optimal performance. This eliminates the need for complex manual setup procedures and significantly reduces the time and effort required for system installation.

Supported AC grids

This section details the AC grids supported by SolarEdge inverters (model dependent). Ground connection is required for all grids, as described in "Connecting Ground and AC Wires to the Synergy Manager". For overview of common AC grids and the compatibility of SolarEdge inverters, see Technical Note – Grids Supported by SolarEdge Inverters.

Installation Tools and Material List

Standard tools can be used during the installation of the SolarEdge system. The following recommend tools are required for installation:

- Allen screwdriver for 5mm screw type for the inverter cover, Synergy Manager cover, and inverter side screws
- 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 Power Optimizers are installed and for opening the Safety Unit drill guides.

> **CAUTION**
> - Use of an impact driver is not allowed.

- Ring terminals crimping tool
- Wire cutters
- Wire strippers
- Voltmeter

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

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

Installation procedure

The following procedures are required for installing and setting up a new SolarEdge site. Some of these procedures also apply to modification of an existing site.

- Installing the Power Optimizers
- Installing the Synergy Manager and Synergy Units
- Connecting PV Modules and AC to the Synergy Manager
- Connecting AC and PV Strings to the Synergy Manager
- Setting up Communication with the Monitoring Platform
- Activating, Commissioning, and Configuring the System

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Chapter 2: Installing the Power Optimizers

Safety

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

WARNING

- The metallic enclosure of the Power Optimizer must be grounded in accordance with the product's listing and local and national codes.

WARNING

- When modifying an existing installation, turn OFF the inverter P/1/0 switch, the DC Disconnect 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

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

CAUTION

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

CAUTION

- All PV modules must be connected to a Power Optimizer.

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CAUTION

- If you intend to mount the Power 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.

IMPORTANT

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. For information regarding safe voltages, see the relevant datasheet.

CAUTION

Installing a SolarEdge system without ensuring compatibility of the module connectors with the Power Optimizer connectors may be unsafe and could cause functionality problems such as ground faults, resulting in inverter shut down. To ensure mechanical compatibility of the SolarEdge Power Optimizers' connectors with the PV modules' connectors to which they are connected:

- Use identical connectors from the same manufacturer and of the same type on both the Power Optimizers and on the modules;

  or

- Verify that the connectors are compatible in the following way:
  - The module connector manufacturer should explicitly verify compatibility with the SolarEdge Power Optimizer connector
  - 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

Installation Guidelines

For the minimum and maximum number of Power Optimizers in a PV string (PV string length), see the relevant Power Optimizer datasheet.

When connecting multiple modules to a SolarEdge Power Optimizer, all modules must be of the same type and installed with the same orientation and tilt.

Modules in a string or inverter array can be of different types, as long as modules connected to the same power optimizer are of the same type.

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Power Optimizer Wiring

NOTE

Avoid creating loops when securing excess Power Optimizer wires to the mounting structure. If you can't fully extend the wires, aim to make as few loops as possible.

Extension Wiring

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:

- Extension cables of up to 1.8 m are allowed for all Power Optimizers (0.9 m for DC+, and 0.9 m for DC -).
- SolarEdge Sense Connect technology monitors the S-Series Power Optimizer cable connectors and the direct connection created between them and another connector.
- P-Series Power Optimizers with the 4-type suffix in their part number (Pxxx4xxxxxx) and the Mxxxx-Series - extension cables of up to 16 m can be installed per Power Optimizer (8 m for DC+, and 8 m for DC-).

Between two PV modules connected in series to a Power Optimizer

When connecting two PV modules in series to supported Power Optimizers – an extension cable may be installed between the two modules, if the following conditions are met:

- The total round-trip cable length between the (+) and the (-) input terminals of the power optimizer (including the extension cable between the modules and the module output cables) does not exceed 16m/52.5ft.
- Supported Commercial Power Optimizers with the following part numbers are used:
  - Pxxx-4xxxxxx (P Series with 4-type in part number suffix)
  - Sxxx-1xxxxxx (S Series with 1-type in part number suffix)
- The connectors on each end of the extension cable must be identical to PV module's output connectors

NOTE

The extension cable between two modules is considered as auxiliary equipment and is not covered by the SolarEdge warranty.

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NOTE

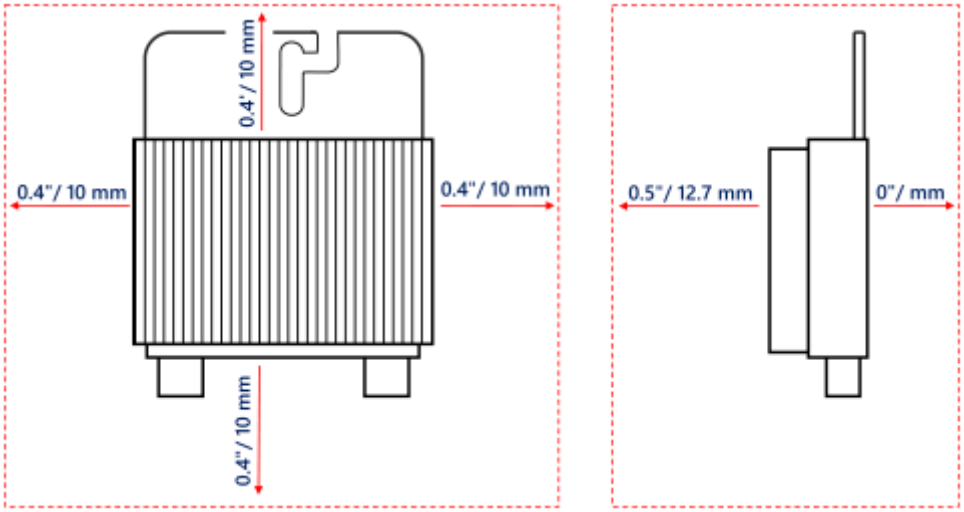
When using a serial input optimizer for up to two modules connected in series, and PV modules installed in landscape orientation, it is recommended to use PV modules with long output cables to avoid the use of an extension (jumper cable) between two modules. "Modules with long output cables" refers to modules with longer cables intended for landscape installation. The output cables length is usually specified in the Mechanical Characteristics section of the PV Module Datasheet.

For planning considerations when connecting multiple PV modules to an Power Optimizer, refer to: https://www.solaredge.com/sites/default/files/application-noteconnecting-solaredge-power-optimizers-to-multiple-pv-modules.pdf

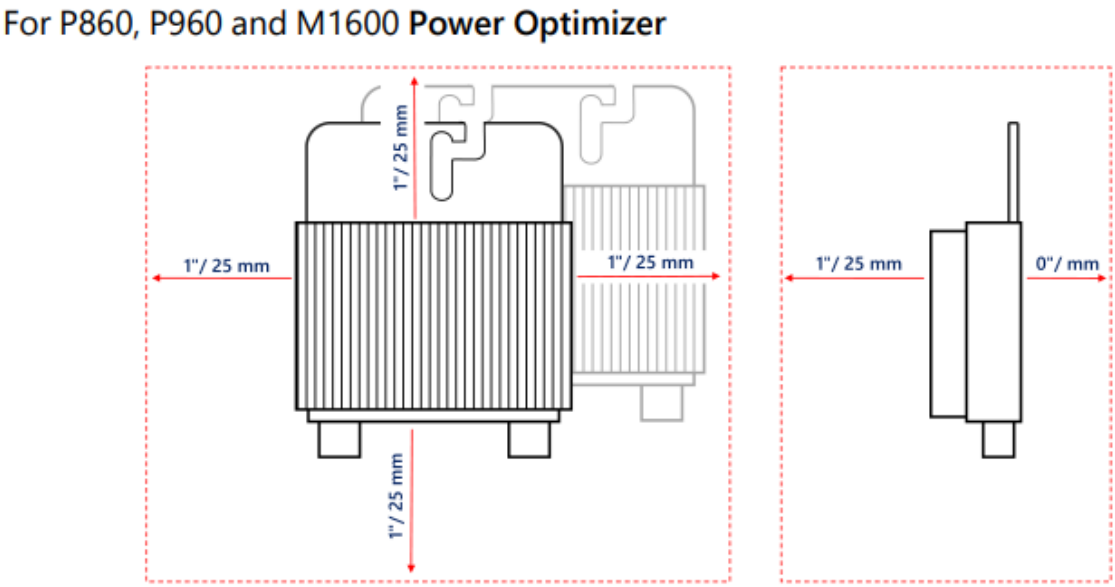
Between two Power Optimizers or between a Power Optimizer and the inverter:

- 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 PV string to the inverter. For more information on how to use extension and adapter cables with power optimizers, refer to https://knowledgecenter.solaredge.com/sites/kc/files/se-extension-cables-with-power-optimizerapplication-note.pdf
- Frame-mounted Power Optimizers are mounted directly on the module frame, regardless of racking system (rail-less or with rails). For installation of frame-mounted Power Optimizers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The Power Optimizer can be placed in any orientation.
- If connecting more modules than Power Optimizer inputs in parallel, use a branch cable. Some commercial Power Optimizer models have a dual input.
- Position the Power Optimizer close enough to its module so that their cables can be connected.
- Make sure to use Power Optimizers that have the required output 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 PV string, as long as the minimum number of unshaded Power Optimizers connected in a PV 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 PV string.
- To allow for heat dissipation, maintain the following clearance:
- For All Power Optimizers, except for the P860, P960 and M1600

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- For P860, P960 and M1600 Power Optimizer



- 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: Mount and Ground the Power Optimizers

To mount each Power Optimizer:[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 Power Optimizer,

[1]This procedure is not applicable to Smart Modules.

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or refer to the application note at: https://knowledge-center.solaredge.com/sites/kc/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 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'') or M8 stainless steel bolts, nuts and washers or other mounting hardware. Apply torque of 6.5-7 lbf•ft/9-10N•m.
4. Use the following methods to ground the Power Optimizer:

WARNING

- The metallic enclosure of the Power Optimizer must be grounded in accordance with the requirements of the local and national codes.

NOTE

If the rack manufacturer provides grounding solutions with their hardware, follow the instructions provided by the manufacturer to ground the Power Optimizers.

For mounting on a grounded metal rail:

Use a SolarEdge approved 5/16'' stainless steel grounding star washer between the railing and the flat side of the mounting bracket.

The star washer (used for grounding) should break through the anodize coating of the railing to ensure low resistive connection. Apply a torque of 9.5N•m / 7lbf•ft.

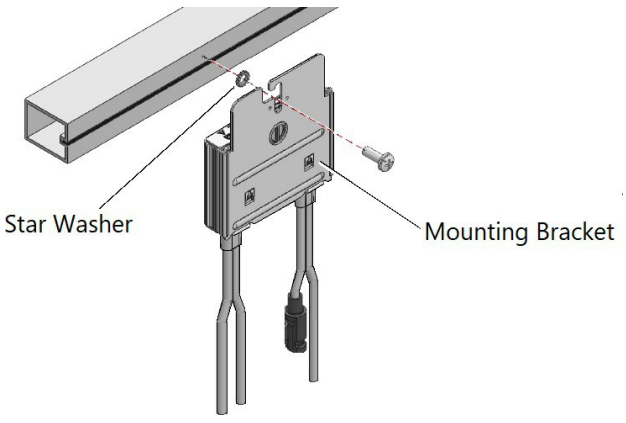


Figure: Power Optimizer installation and grounding using a star washer

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NOTE

Star washers for the S-series and C-series Power Optimizers are not included and should be purchased from a third-party vendor.

For mounting on rails with sliding nut fasteners:

Use mounting required hardware to apply a torque of 9.5N•m / 7lbf•ft.

For details, see Grounding SolarEdge Power Optimizers.

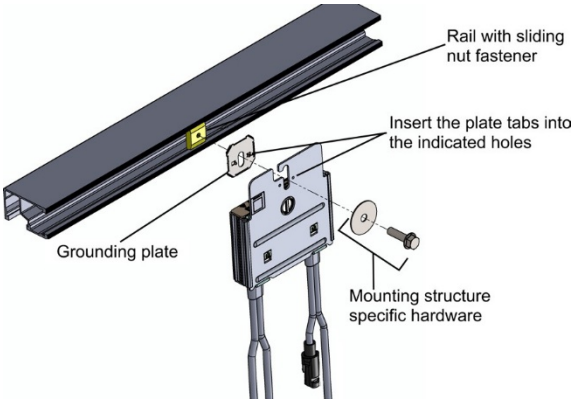


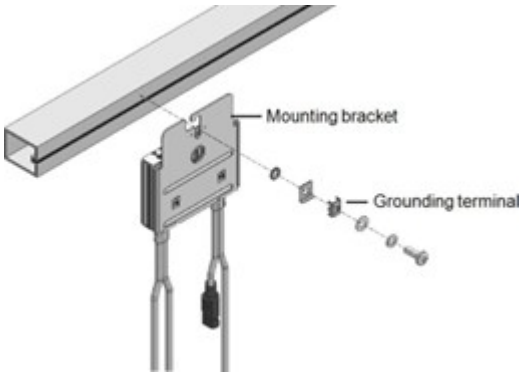
Figure: Power Optimizer installation and grounding using a grounding plate

NOTE

If the star washer cannot be used, use a grounding plate (sourced separately) between the railing and the flat side of the mounting bracket.

For mounting on un-grounded structures (such as a wooden structure):

- If the star washer or the plate cannot be used, use a grounding lug (purchased separately) with an equipment-grounding conductor according to the supplied instructions.
- The grounding terminal accepts wire sizes of 6-14 AWG and must be sized for equipment grounding per NEC 250.122 requirements.
- Tighten the screws connecting the Power Optimizer to the frame and the grounding terminal screw. Apply a torque of 9.5N•m/7lbf•ft.



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Figure: Power Optimizer grounding terminal

5. Verify that each Power Optimizer is securely attached to the module support structure.
6. Record Power Optimizer serial numbers and locations for monitoring purposes.

> **NOTE**
>
> When installing the Power Optimizers before the PV Modules, protect the connectors from rain and dust by mating the positive and negative input leads.

Step 2: Connect 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 cable tension and friction. Proper planning, materials and installation reduce the risk of electric 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.

To connect a 2-to-1 PV module to each Power Optimizer:

1. Connect the plus (+) output connector of one module (A) to the plus (+) input connector of the Power Optimizer.
2. Connect the minus (-) output connector of the other module (B) to the minus (-) input connector of the Power Optimizer.
3. Connect the plus (+) output connector of module (A) to the minus (-) output connector of module (B).

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

To connect a 1-to-1 PV Module to a Power Optimizer:

1. Connect the plus (+) output connector of the module to the plus (+) input connector of the Power Optimizer.
2. Connect the minus (-) output connector of the module to the minus (-) input connector of the Power Optimizer.

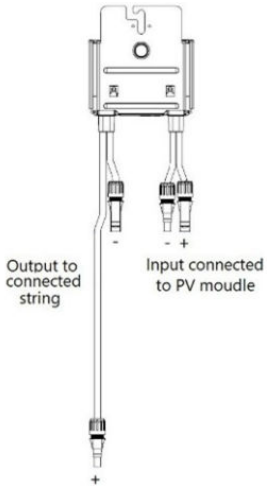


Figure: C-Series 1:1 Power Optimizer connectors

Step 3: Connecting Power Optimizers in PV Strings

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

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NOTE

The DC bus of each unit is separate and not shared for all units. Therefore, in addition to following the inverter design rules, each unit should follow the unit design rules as detailed in the Technical Specifications.

To connect Power Optimizers to PV strings:

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

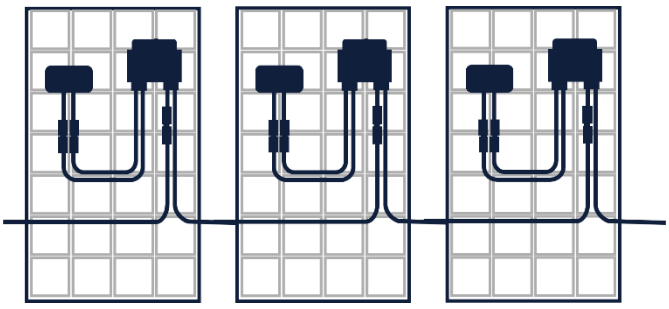


Figure: Power Optimizers connected in series

4. If you intend to monitor the installation, using the SolarEdge Monitoring platform, record the physical location of each Power Optimizer, as described in Creating Logical and Physical Layout Using Installation Information [61].

Step 4: Verify Proper Power Optimizer Connectivity

When a module is connected to a Power Optimizer, the Power Optimizer outputs a safe voltage. Therefore, the total PV string voltage should equal the number of Power Optimizers connected in series in the PV string times the rated Safety Output Voltage of the Power Optimizer.

For example:

- If 10 * S1201 Power Optimizers are connected in a PV string, then 10V should be produced.
- If 14 * C651 Power Optimizers are connected in a PV string, then 7V should be produced.

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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 the Power Optimizer 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.

To verify proper Power Optimizer connectivity:

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.

For troubleshooting Power Optimizer operation problems, refer to Power Optimizer Troubleshooting [64]

Proper Power Optimizer connectivity also be verified in the Designer application. For more information, see https://www.solaredge.com/en/products/software-tools/designer#/.

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Chapter 3: Installing the Synergy Manager and Synergy Units

This section describes how to install the inverter. Install the Synergy Manager and Synergy units either before or after the PV modules and Power Optimizers have been installed.

The inverter is provided with a mounting template that ensures correct installation location of the Synergy Manager and all Synergy Unit mounting brackets. The template ensures that all the Synergy Unit inter-connecting cables can reach the Synergy Units and maintain the correct spacing between the units to ensure proper heat dissipation.

First, mount the Synergy Units and then the Synergy Manager. The Synergy Units can be installed in any order.

CAUTION

To avoid damage to the Synergy Manager or Synergy Unit, do not rest the units on their bottom side. Resting on the bottom side of the units may cause damage to the connectors. Rest the units only on the back side.

Synergy Unit Package Contents

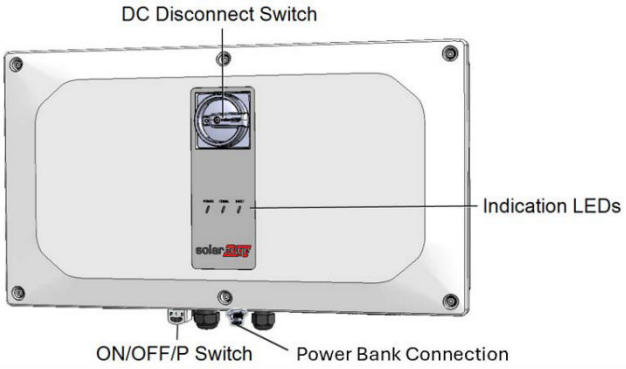
- Synergy Unit
- Mounting bracket kit
- Two Allen screws for fastening the unit to the mounting bracket

Identifying the Units

Stickers on the Synergy Manager and Synergy Units show Serial Numbers.

When creating a site in the SolarEdge Monitoring platform or contacting SolarEdge support, provide the inverter's serial number.

Front Interface of Synergy Manager



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DC Disconnect Switch

The DC Disconnect Switch is a manually operated safety switch for disconnecting the DC power of the SolarEdge system.

NOTE

When the Synergy Manager is OFF (for example during maintenance) it may be locked to prevent a safety hazard:

1. Move the switch to the Lock position.
2. Insert the lock through the knob opening and lock.



P/1/0 Switch

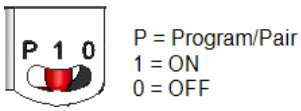


Figure: The P/1/0 switch of the Synergy Manager.

- **1 (ON)** - 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.
- **0 (OFF)** - 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 Synergy Manager and Synergy Units control circuitry remains powered on.
- **P (Program/Pair)** - Holding the switch pressed in P position allows performing the following functions:

Position duration	Function	Description
Switch moved to P for less **than 5 seconds**, then released	Displays production information for 5 seconds on the SetApp screen Displays error type indications (if exist) for 5 seconds. Activates the Wi-Fi access point for connecting to the SolarEdge Inverter SetApp	While the switch is in P, all LEDs are ON

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Position duration	Function	Description
Switch moved to P for **more than 5 seconds**, then released	Starts pairing	

WARNING

- For inverters with manual Rapid Shutdown functionality. Upon Rapid Shutdown initiation, the internal circuitry remains up, therefore the inverter cover must be opened only after shutting off the inverter P/1/0 switch. This disables the DC Voltage inside the inverter (Synergy Manager). Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

Identify LEDs Indications

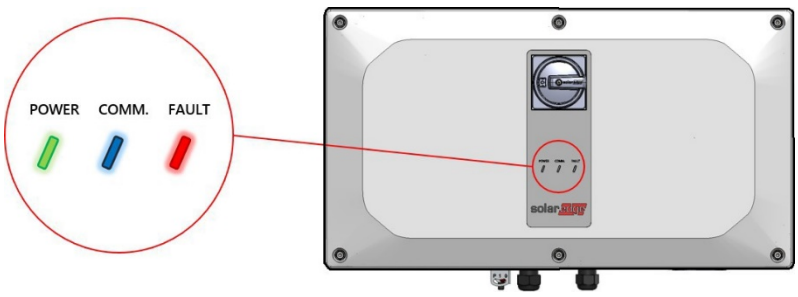
LEDs indications are determined by a color and state. and indicate performance and/or errors:

- On
- Off
- Blinking – Turns ON and OFF for the same duration
- Flickering – Turns ON for 100 ms, and turns OFF for 5 seconds
- Alternating - Alternating LED flashes

The figure below depicts the Indication LEDs of the Synergy Manager.

The most commonly observed LED indications are:

- POWER ON - the system is producing energy
- POWER blinking - AC is connected but the system is not producing power
- COMM. ON - the inverter is communicating with the monitoring platform
- FAULT ON - system error



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The following table describes production percentage of AC information by LED color and P/1/0 switch position.

LED indications

Indication	P/1/0 switch position	LED color			Comment
		Red	Green	Blue	
Power Optimizers are 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	For detailed percentage of production, refer to the following table
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 (1) / P	ON	ON	ON	
Inverter firmware upgrade	ON (1) / P	Alternating	Alternating	Alternating	The upgrade process can take up to 5 minutes
Error	Any	ON	ON/ OFF/ Blinking/ Flickering	ON/ OFF/ Blinking/ Flickering	See Errors and troubleshooting

The following table describes production percentage of AC information by LED color and P/1/0 switch position.

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Production percentage

Percentage of AC Production	1/0/P switch position	LED color			Comment
		Red	Green	Blue	
0%	ON (1)	OFF	OFF	OFF	This indicates power production as percentage of rated peak AC output power
0-33%		OFF	ON	OFF	
33-66%		OFF	OFF	ON	
66-100%		OFF	OFF	ON	

Inverter Interconnection Cable Interfaces

The cables on the right-hand side of the Synergy Manager, interfaces the Synergy Manager to the Synergy Unit of the inverter.

NOTE

Models of the Three Phase Inverters with Synergy Technology are provided with either two or three Synergy Units. The following connection description refers to inverter models with three Synergy Units. In inverter models with two Synergy Units, the Manager Unit connects to the left and center Synergy Units.

To connect cables, follow the writing shown next to each cable on the panel.

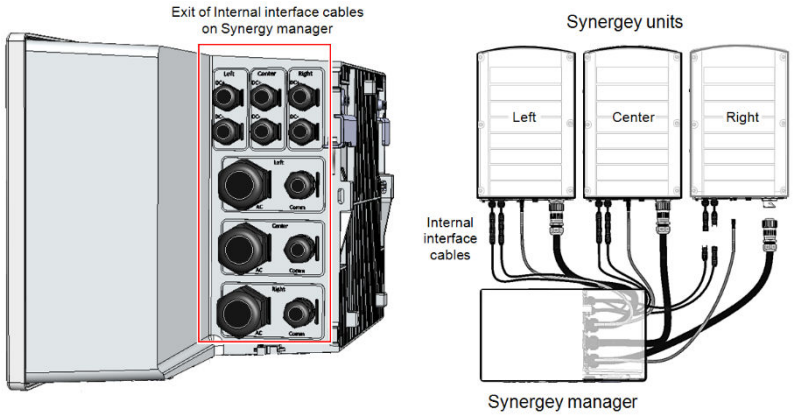


Figure: Interconnection of cables of the inverter

Synergy Manager External Cable Interface

The conduit entries, at the bottom of the Synergy Manager, interfaces the inverter to the grid and PV arrays. The communication glands, support communication cables connecting the inverter to the SolarEdge Monitoring platform and external power bank used for setting up the inverter in sites with no available grid power.

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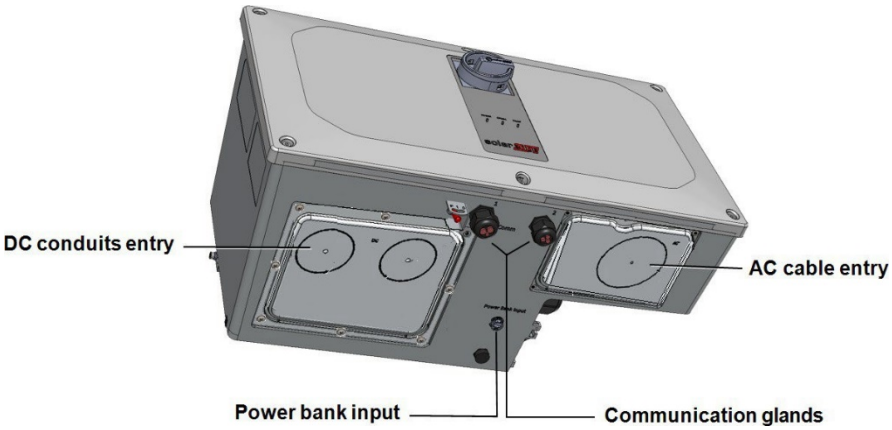


Figure: Synergy Manager - bottom view

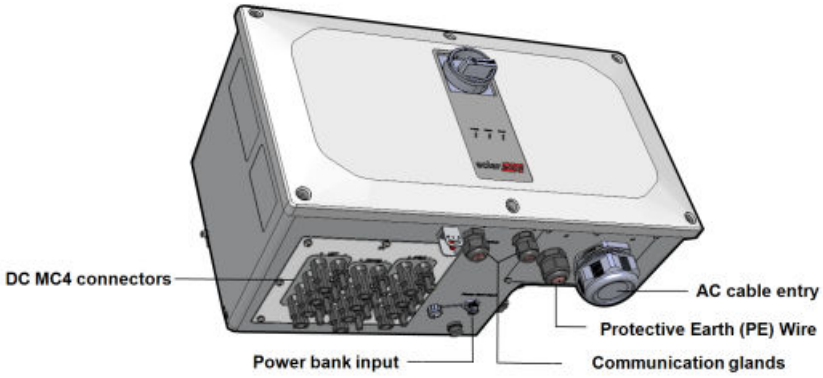


Figure: Synergy Manager with MC4 connectors - bottom view

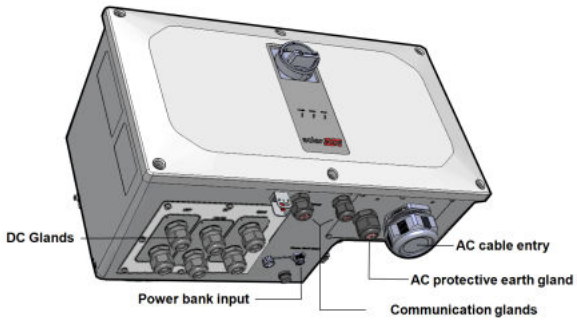


Figure: Synergy Manager with glands - bottom view

- AC Conduits Entry: drill guides for conduits running AC cable from the grid
- DC Conduits Entries: drill guides for conduits running DC cables from the PV arrays
- Power Bank Input: power bank connection enables inverter pre-commissioning when AC power is not connected
- Communication Glands: two communication glands for connecting communication and antenna cables.

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Synergy Unit Interface Connectors

The Synergy Unit connectors are used to interface the Synergy Unit to the Synergy Manager:

NOTE

Connect cables according to labels shown on the Synergy Manager.

- **DC connectors**: for DC input from the Synergy Manager.
- **Communication connector:** for communication with the Synergy Manager
- **AC connector**: for supply of AC power to the Synergy Manager

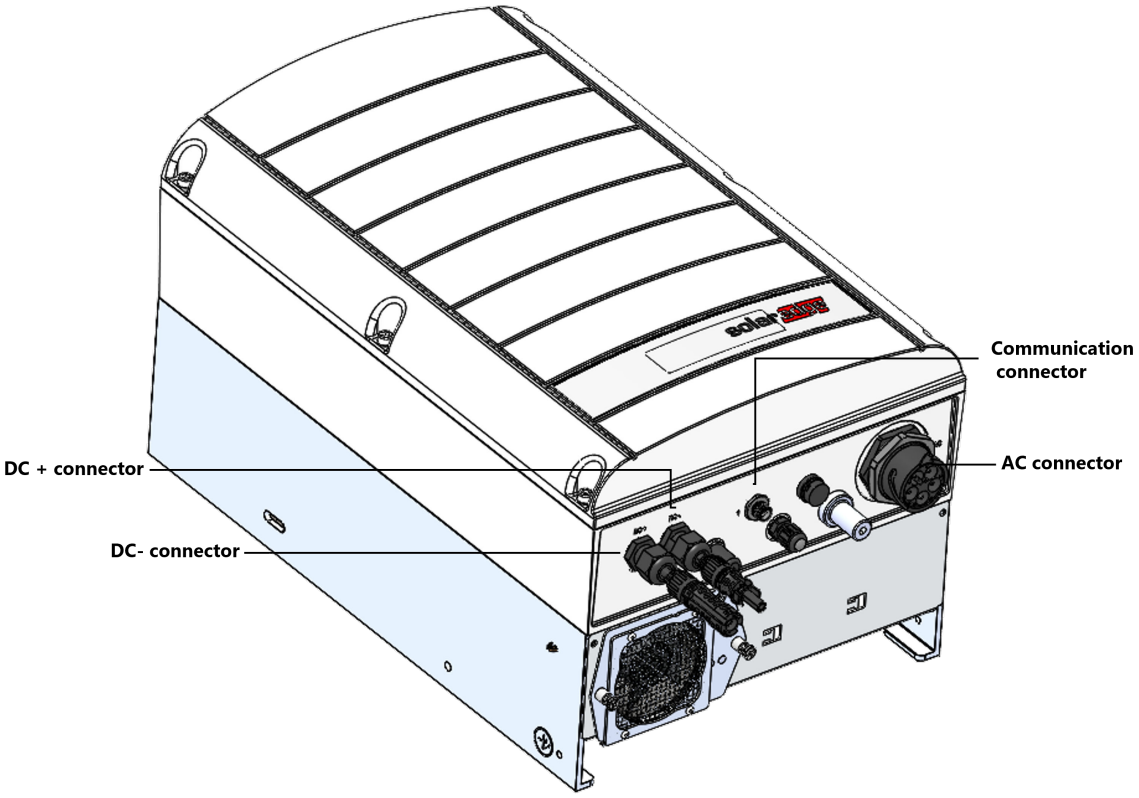


Figure: Synergy Unit Interface Connectors

Mounting and Connecting the Synergy Manager and Synergy Units

This section provides instructions for vertical installation of the inverter and horizontal installation of the inverter on a flat surface.

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NOTE

Make sure the mounting surface or structure can support the weight of 82 kg (for inverter with two Synergy Units) or 114 kg (for inverter with three Synergy Units) of the inverter and brackets. Make sure that the mounting surface is at least 100.8 cm / 39.68″ x 114.5 cm / 45".

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 164ft/50m from the shoreline of an ocean or other saline environment, if there are no direct saltwater splashes on the inverter or Power Optimizer. For SolarEdge inverters installed at 655ft/200m or closer to the shoreline, special brackets must be purchased separately from SolarEdge and SS304 stainless screws are required. For details, please contact your local sales representative.

To mount the inverter:

1. Determine the inverter mounting location on a wall or stud framing. It is recommended to mount the inverter in a location protected from direct sunlight.

   NOTE

   When installing the inverter on a stud framing or a rail, avoid wobbly installation by adding back support at the lower back side of the Synergy Manager and Synergy Units (see the figure below).

2. Allow for proper heat dissipation. Follow the guidelines specified in Application Note - Clearance Guidelines.

   NOTE

   Some inverter models are provided with only two Synergy units.

3. Level the mounting template horizontally against the wall and mark the drilling hole locations for the bracket of the Synergy Units (see the pencil icons in the following figure).

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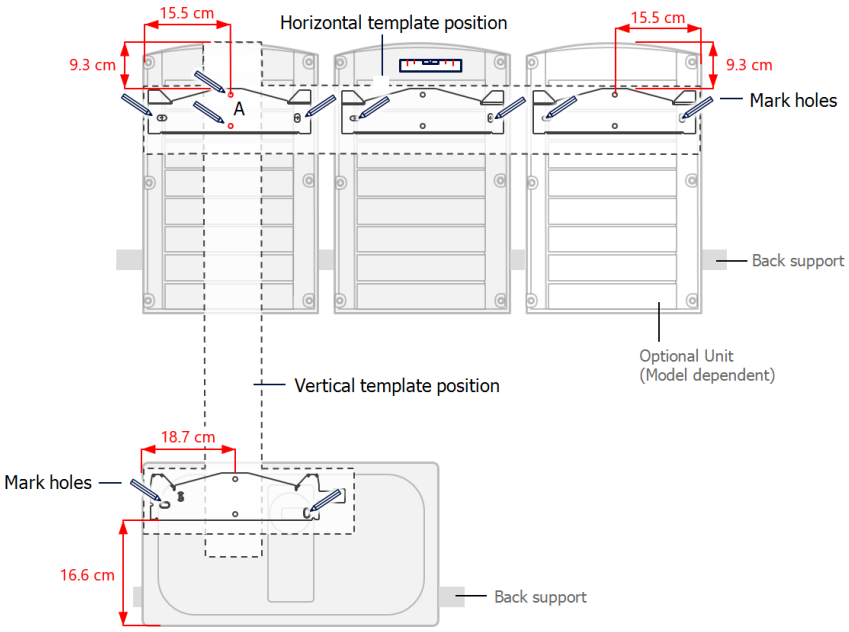


Figure: Marking the locations to drill the holes

4. Place the mounting templates vertically against the wall and mark the drilling hole locations for the bracket of the Synergy Manager. Make sure that the template aligns with the two drilling holes marked A.
5. Drill two holes for each bracket and mount the brackets.
6. Position and secure the mounting brackets to the wall using at least two screws per bracket. Tighten the screws all the way and verify that the brackets are firmly attached to the mounting surface.
7. Mount the Synergy Units:

> **NOTE**
>
> When installing the Synergy Units, always install the **middle** Synergy Unit first.

Lift the Synergy Unit from the sides or hold it at the top and bottom of the unit to lift into place.

Align the two indentations in the enclosure with the two triangular mounting tabs of the bracket and lower the unit until it rests on the bracket evenly (see the figure below).

For the right or left Synergy Units, insert only one screw through the outer (exposed) side of the unit and into the bracket. Tighten the screws to a torque of 2.9 lbf•ft (see the figure below).

> **NOTE**
>
> For the middle Synergy Unit, use both side screws.

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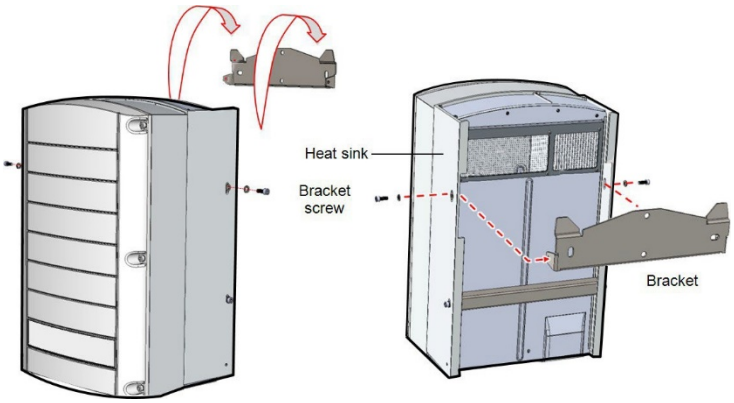


Figure: Hanging the Synergy Unit

8. Hang the Synergy Manager:
   a. Lift the Synergy Manager from its sides.
   b. Align the two indentations in the enclosure with the two triangular mounting tabs of the bracket and lower the unit until it rests on the bracket evenly (see the figure below).
   c. Insert the supplied bracket screw through the right side of the heat sink and into the bracket.

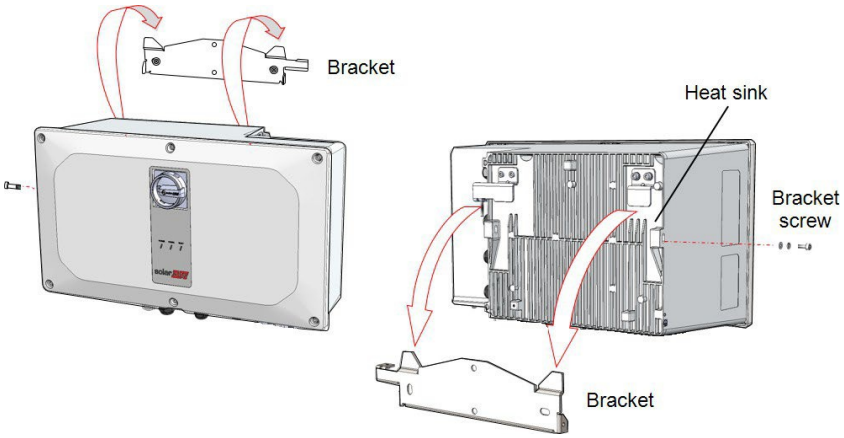


Figure: Hanging the Synergy Manager

Horizontal Mounting of the Inverter

The inverter can be installed horizontally, on a flat surface, at any tilt above 10° (see the figure below). The inverter can be installed under or near the PV modules, thus saving roof space and using the PV modules for shading the inverter.

For more information on horizontal mounting, refer to Horizontal Mounting of Three Phase Inverters.

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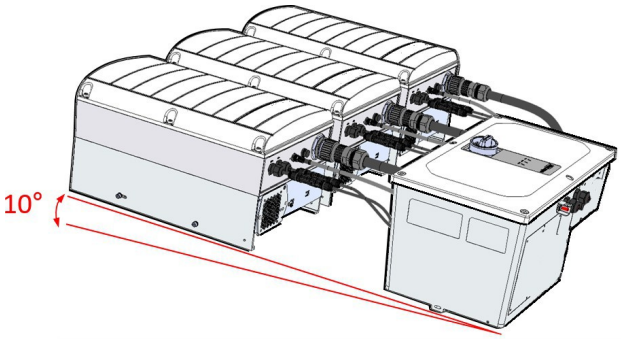


Figure: Horizontal mounting of the inverter.

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Chapter 4: Connecting PV Modules and AC to the Synergy Manager

This section describes how to connect the inverter to the PV modules and to the AC.

Grid Connection Guidelines

In most countries, three phase inverters require neutral connection. In some countries, three phase inverters can be connected to delta grids along with multiple single phase inverters.

NOTE

If local regulations permit, the connection of Neutral is optional in a 4-wire system of three phase inverters.

Prior to system installation, refer to the following documentation:

- The conduits, hubs and fittings must be suited for field wiring systems.
- The hubs and other fittings must comply with UL514B.
- Use the conduit and wiring appropriate for the installation location per the NEC. Outdoor installations must use components that are rated NEMA 3R or higher.
- For short-circuit currents in SolarEdge Three Phase Inverters refer to North America Short-Circuit Current Levels in SolarEdge Three Phase Inverters application note at https://knowledge-center.solaredge.com/sites/kc/files/se-UL1741-short-circuit-currents-three-phase-inverters-tech-note.pdf

NOTE

For more wiring information refer to the SolarEdge Recommended AC Wiring Application Note, available on the SolarEdge website at: https://knowledge-center.solaredge.com/sites/kc/files/application-note-recommended-wiring.pdf

WARNING

- The inverter must be protected by an over-current protection device (a circuit breaker or a fuse) with a maximum rating of 250 A. Over Current Protection Device (OCPD) for the AC output is to be provided at the time of installation. Coordination of conductor sizes with overcurrent protection shall be in accordance with the Canadian Electrical Code, Part I. For the exact rating of an over-current protection device, per model, refer to Application Note: https://knowledge-center.solaredge.com/sites/kc/files/determining-the-circuit-breaker-size-for-three-phase-inverters.pdf

The following wire configurations can be used to connect the Synergy Manager:

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- AC cable with L1, L2, L3, PE wires
- AC cable with L1, L2, L3, N, PE wires
- AC cable with L1, L2, L3 wires and an external PE (Protective Earth) wire
- AC cable with L1, L2, L3, N wires and an external PE wire

WARNING

- Use AC line wires with a maximum of 120 mm2 cross section conductor (For inverter models SE50K, SE55K, SE66.6K, SE80K use up to 95 mm2).
- Use PE wire with a maximum of 70 mm2 cross section conductor (For inverter models SE50K, SE55K, SE66.6K, SE80K use up to 95 mm^2).
- For inverter model SE120, use a PE wire with an outer diameter of 12 to 20 mm. For inverter models SE50K SE55K, SE66.6K, SE80K use 9 to 16 mm.
- Use copper aluminum wires with insulation rated for at least 90°C. Make sure to consider the maximum termination temperature at both ends of the conductor and to base the ampacity on the lower value.
- The AC gland supports a cable of 30 - 50 mm in diameter.

CAUTION

Over-current protection for the AC output must be provided by the installer

Connecting PV Modules to the Synergy Manager

The Synergy Manager is designed to directly connect up to 12 PV strings or up to three PV arrays via an external combiner box.

CAUTION

- When installing a system with three or more PV strings per a Synergy Unit (whether connected directly or via a combiner box), fuses are required. In SolarEdge systems, fuse sizes are different depending on the optimizers model. See the figures below.

The following figure shows the connection of PV strings to the Synergy Manager.

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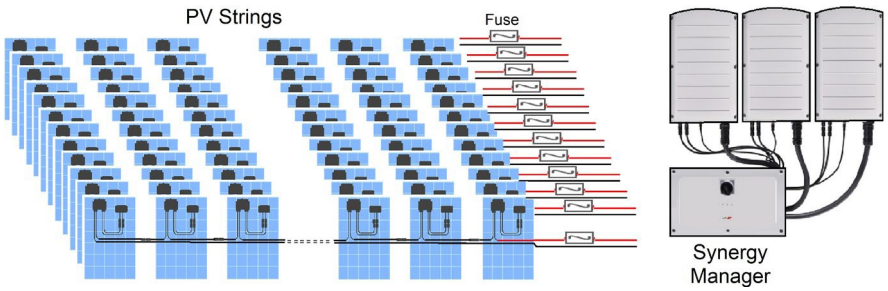


Figure: Connection of PV strings to the Synergy Manager

The following figure shows the connection of PV arrays to the Synergy Manager.

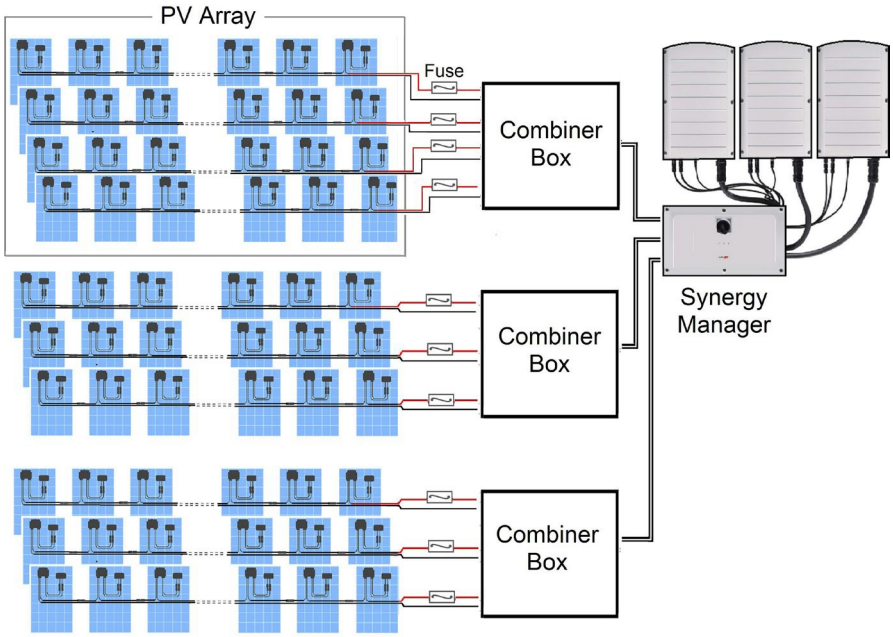


Figure: Connection of PV arrays to the Synergy Manager

Connection of PV arrays to the Synergy Manager is performed via an external combiner box.

A combiner box is an electrical distribution box that can also host DC circuit breakers and/or string fuses. The main purpose of the box is to combine multiple parallel strings of PV modules in the system into a single DC output. This DC output is then connected to a single input in the Synergy Manager of the inverter.

The combiner box should be installed and connected before connecting to the Synergy Manager.

Connection Methods

The Synergy Manager connects to the solar panels using one of the following interface methods:

- DC input terminals (spring-clamps) for a maximum 9 or 12 PV strings, depending on the PN, inside the Synergy Manager
- DC input terminals for three PV arrays inside the Synergy Manager

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The DC Disconnect Switch of the Synergy Manager disconnects all ungrounded DC conductors in compliance with the National Electric Code (NEC; Specifically, NEC690.35, which addresses ungrounded PV arrays). The Synergy Manager is rated to the maximum operating conditions of the inverter.

The drawings below illustrate the various methods of connection of DC from the PV strings and PV arrays to Synergy Manager.

NOTE

In some Synergy Managers, the DC Surge Protection Device Board is mounted horizontally.

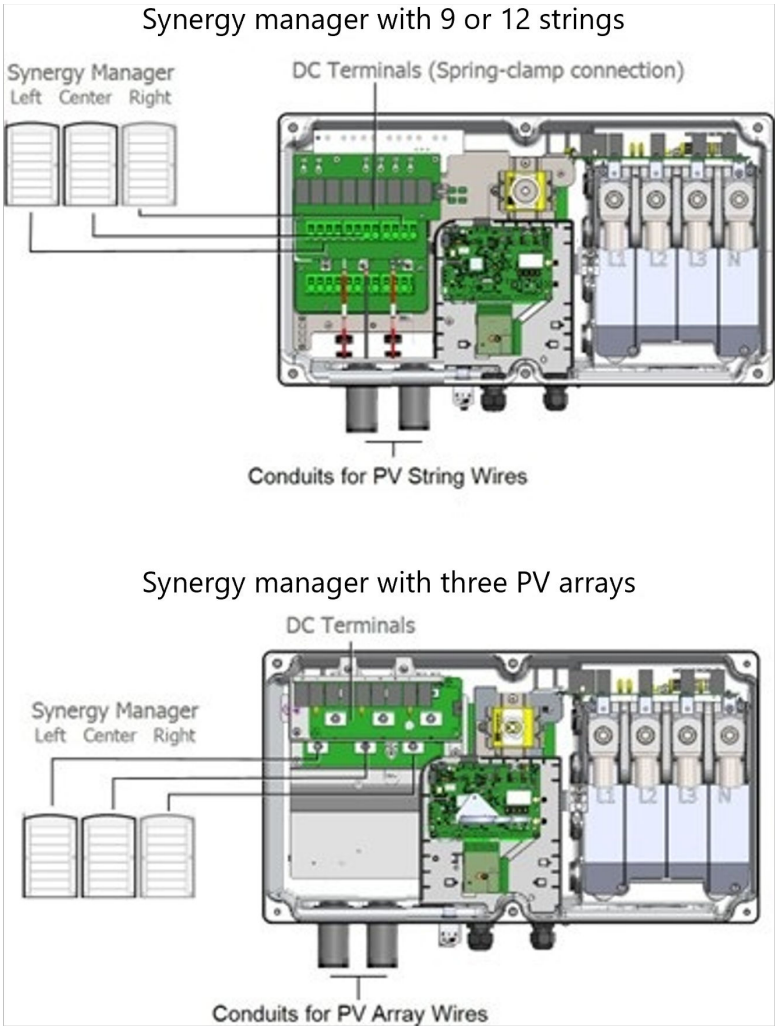


Figure: Connecting methods of PV strings and PV arrays to Synergy Manager.

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NOTE

The SolarEdge fixed input voltage architecture allows parallel PV strings to vary in length, with a maximum total difference of five power optimizers.

Connecting PV Strings to the Synergy Manager

CAUTION

- When installing a system with more than two strings per single Synergy Unit (whether connected directly or via a combiner box), fuses may be required. Please consult with local standards before making a final determination.

To connect the DC wires to a Synergy Manager with spring-clamp DC terminals:

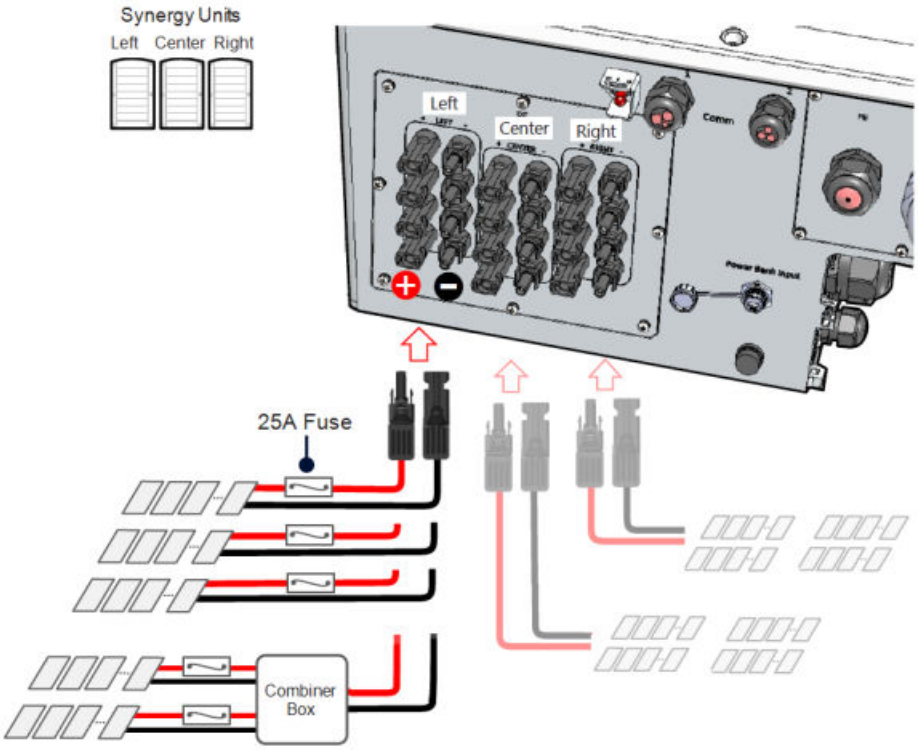


Figure: Connecting PV strings to a Synergy Manager with MC4 Connectors

Connecting PV Arrays to the Synergy Manager

To connect the PV arrays to a Synergy Manager with DC wire terminals:

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NOTE

When connecting cables between the combiner boxes and the inverter, ensure that each pair of cables coming from the combiner box is marked with DC+ and DC- labels.

NOTE

Use copper or aluminum wires with insulation rated for at least 90°C. Make sure to consider the maximum termination temperature at both ends of the conductor and to base the ampacity on the lower value.

1. Connect the PV arrays to the Synergy Manager as shown in the following diagram.

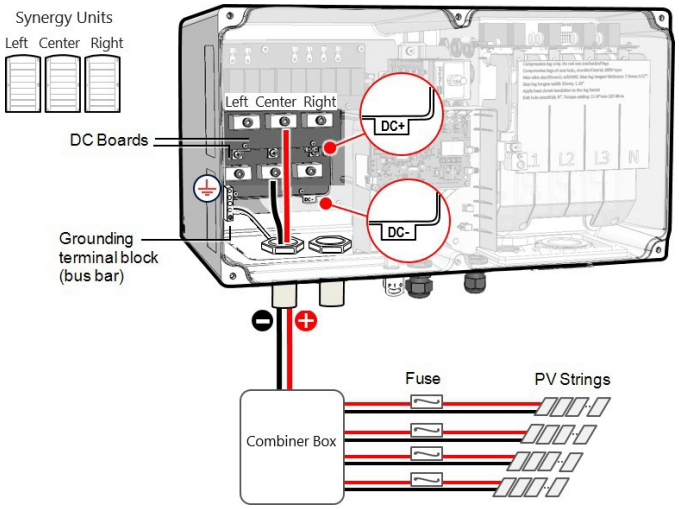


Figure: Connecting PV arrays to the Synergy Manager.

2. Loosen the Allen screws of the DC terminals.
3. Strip 25 mm of insulation from the DC wires.

NOTE

Before connecting aluminum wires to the terminals:

a. Remove oxide from the exposed wires with emery paper or a steel wire brush.

b. Clean dust with a cloth and Isopropyl alcohol (IPA).

c. Coat wires with a designated antioxidant aluminum wire grease immediately after cleaning

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CAUTION

- Connection of oxidized aluminum wires may result in resistance and high temperatures at contact points.

4. Route the DC wires to the DC+ and DC- terminals on the DC+ and DC- boards of the Synergy Manager (see DC+ and DC- indications on the DC boards).

CAUTION

- The DC boards have three pairs of DC terminals. Each pair is connected to a single Synergy Unit (Left, Center and Right). When installing a system with more than three PV strings per a single Synergy Unit (whether connected directly or via a combiner box), fuses are required. In SolarEdge system, fuse sizes are based on the Power Optimizer output current.

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 string modules is acceptable.

5. Close the Synergy Manager cover and secure it by tightening the six screws to a torque of 12 N•m.

Connecting Ground and AC Wires to the Synergy Manager

This section describes how to connect AC and Ground (also referred to Protective Earth - PE) to the Synergy Manager.

Connecting Protective Earth (PE)

WARNING

- Turn OFF the AC before connecting the AC terminals. When connecting equipment Grounding wire, connect it before connecting the AC Line and Neutral wires.

To connect Protective Earth (PE) to the Synergy Manager:

1. Turn OFF and secure the main AC circuit breaker in the OFF position at the circuit breakers panel.
2. Release the six Allen screws and carefully remove the cover of the Synergy Manager.

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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. Insert the conduit with the AC lines and PE wire through AC opening at the bottom of the Synergy Manager.

CAUTION

- Ground the conduit nut if required by regulation.

4. Strip 10 to 11 mm of insulation from the PE wire.
5. Connect the PE wire to the PE terminal and fasten the Allen screw to a torque of:
   - 5 N•m for wires of 16 mm^2 to 25 mm^2 or 8 N•m for wires of 35 mm^2 to 70 mm^2

NOTE

Before connecting lugs to aluminum wires:

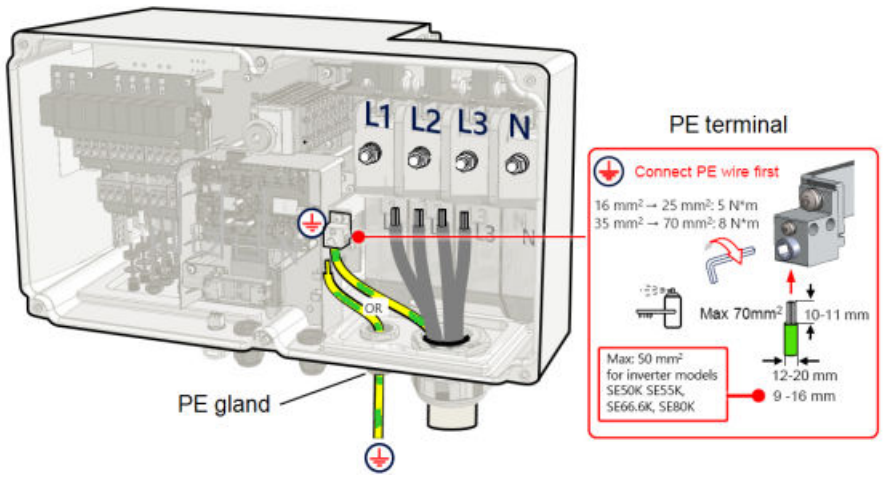
a. Remove oxide from the exposed wires with emery paper or a steel- wire brush.

b. Clean dust with a cloth and Isopropyl alcohol (IPA).

c. Coat wires with a designated antioxidant aluminum wire grease immediately after cleaning.

NOTE

Use ferrule when connecting a fine stranded wire.



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Figure: Connecting the Protective Earth (PE) wire

Alternatively, route a separate PE wire through the PE gland. Connect the wire to the PE terminal and fasten the Allen screw to a torque of 5 N•m for wires of 16 mm^2 to 25 mm^2 or 8 N•m for wires of 35 mm^2 to 70 mm^2. Secure the PE gland with a torque of 12 N•m.

NOTE

Ground the conduit nut if required by regulation.

To connect AC wires to the Synergy Manager:

1. Verify that the main AC circuit breaker is in OFF position at the circuit breakers panel.
2. Remove the upper cover of the AC terminal block.

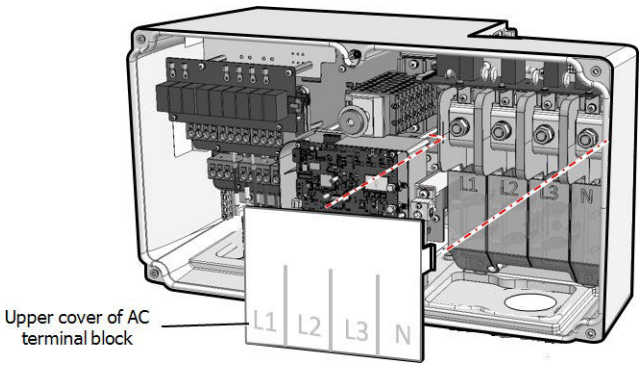


Figure: Upper cover of AC terminal block

3. Route the AC wires through the AC conduit.
4. Fasten the conduit nut inside the Synergy Manager.
5. Strip the required length of insulation from the AC cable and AC wires.
6. Crimp lugs on the AC wires.

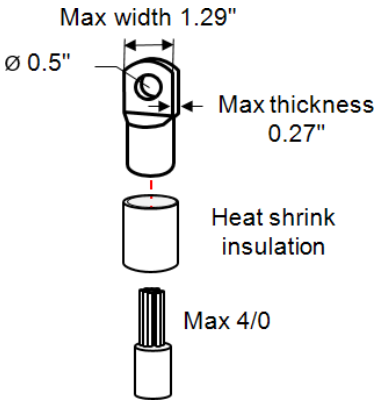


Figure: Crimping a lug on an AC wire

Lug parameters:

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- Bolt hole diameter size: 0.5" / 10mm
- Compression lugs of the one-hole, standard barrel, 600V type
- Maximum wire size: 120mm^2 (For inverter models SE50K, SE55K, SE66.6K, SE80K use 95 mm^2)
- Maximum lug tongue thickness: 0.27" / 7mm
- Maximum lug tongue width: 1.29" / 33mm

7. Use heat shrink to isolate the lug barrels.
8. Remove the nut of the AC terminals.
9. Connect the lug of the AC wires according to the labels on AC terminal block. Fasten the nut of the AC terminals to a torque of 21 N•m.

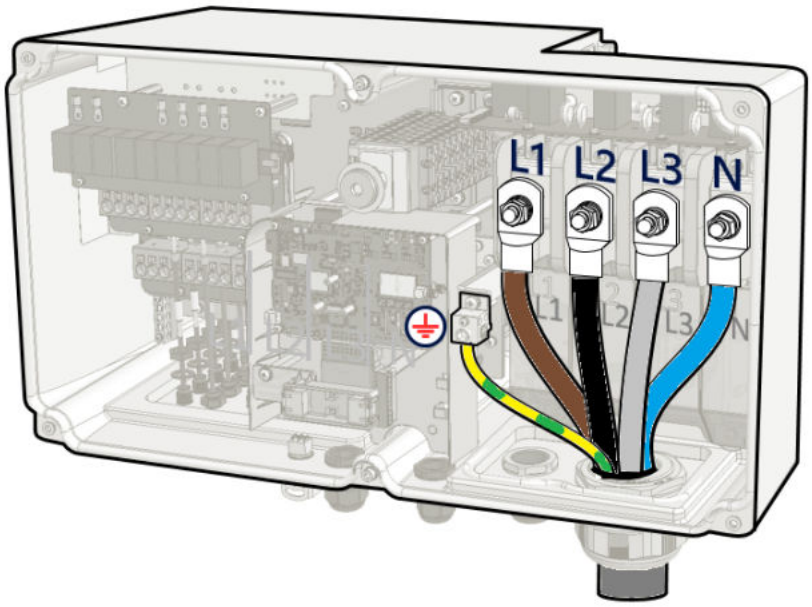


Figure: Connecting AC wires to the AC terminals

10. Place the upper cover of the AC terminal block and push until a lock click is heard. Close the Synergy Manager cover and secure it by tightening the six screws to a torque of 2.6 lbf·ft.

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Chapter 5: Set Up Communication with the Monitoring Platform

The SolarEdge monitoring platform provides valuable information that allows you to track inverter energy production and PV system performance, including:

- Power Optimizer information received via the DC power lines (the PV output circuit)
- Inverter information
- Information on other connected devices

This chapter describes how to set up communication between:

- The inverter and ONE for C&I through the Internet (wired/wireless)
- Multiple inverters in a leader-follower configuration

Communication setup is not required for power harvesting, however it is needed for using ONE for C&I.

CAUTION

- When connecting the communication cables, make sure that the P/1/0 switch on the inverter is turned OFF, the DC Disconnect Switch on the Connection Unit is turned OFF and the AC is turned OFF. When configuring the communication parameters, make sure that the P/1/0 switch on the inverter is OFF, and the AC is turned ON.

Communication Options

The following types of communication can be used to transfer site data through the inverter to the Monitoring platform.

NOTE

This guide refers to third party communication products, such as internet switches and routers that are not supported by SolarEdge. For detailed information on how to install and use the products, refer to the respective publication provided with each product.

External Communication Options

Ethernet: Ethernet is used for a LAN connection. For connection instructions refer to Creating an Ethernet (LAN) Connection on page 1.

Wi-Fi: The Wireless Gateway collects inverter data using a dedicated Wi-Fi. The inverter connects to the Monitoring platform via 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, see https://knowledge-center.solaredge.com/sites/kc/files/se-wireless-gateway-wireless-repeater-installation-guide.pdf.

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Cellular: Cellular Plug-in (purchased separately) provides cellular communication to connect one or several inverters to the Monitoring platform. Cellular communication depends on the purchased data plan.

Internal Communication Options

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.

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

Communication Connectors

The table below describes the openings of the communication glands of the Three Phase inverter.

Communication glands

Gland #	Opening	Functionality
Com 1	One small - 2- 4mm/0.08-0.16in	External antenna cable
	Two large - 4.5-7mm/0.18-0.27in	Ethernet connection (CAT6) or cellular
Com 2	All three large -2-4mm/0.1-1.2in	RS485

The communication board has a standard RJ45 terminal block for Ethernet connection, and a 6-pin terminal block for RS485 connection, as shown below:

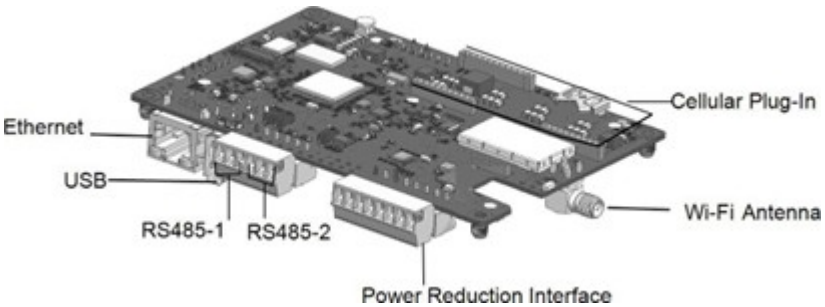


Figure: Internal communication connectors

Communication Board

The communication board is located, inside the Synergy Manager and serves as the communication hub of the inverter.

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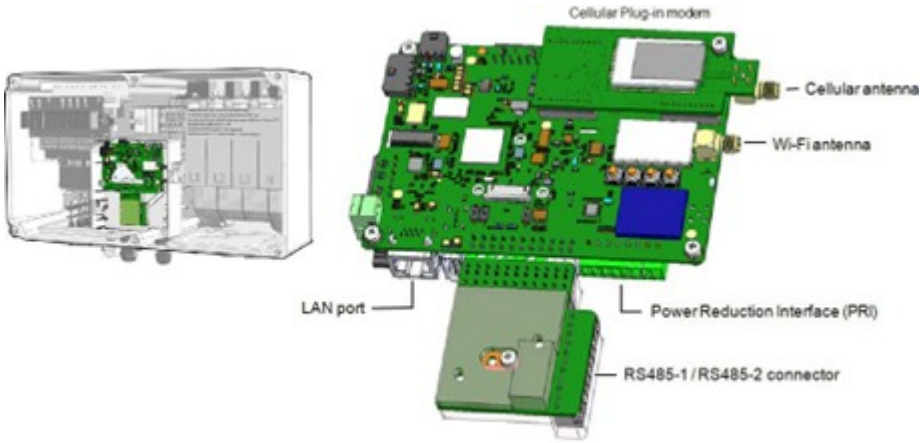


Figure: Synergy Manager – communication board

The Communication Board includes the following interface connectors:

- Cellular antenna - Antenna port for a Cellular Plug-in modem connecting the inverter to the internet.
- Wi-Fi Antenna - Wireless LAN antenna port for connecting the inverter to an internet modem
- Power Reduction Interface (PRI) - Connecting the Inverter to a power reduction device, such as a generator. For more information, see SolarEdge Inverters, Power Control Options — Application Note
- RS485-1 / RS485-2 connector - Two Modbus ports for connecting multiple connectors in a daisy chain.
- LAN port - Ethernet cable port for connecting the inverter to an internet modem.

Removing the Synergy Manager Cover

To remove the Synergy Manager cover:

1. Turn OFF the P/1/0 switch of the Synergy Manager.



Figure: Synergy Manager, P/1/0 switch, and DC Disconnect switch

2. Wait for at least five minutes for the DC voltage inside the inverter to drop to a safe level.

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NOTE

Before doing any maintenance work on the inverter, test for safe AC and DC voltages.

3. Turn OFF the DC Disconnect switch of the Synergy Manager.
4. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
5. Release the six Allen screws of the cover and remove the Synergy Manager 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.

Creating a Local Area Network (LAN) Connection

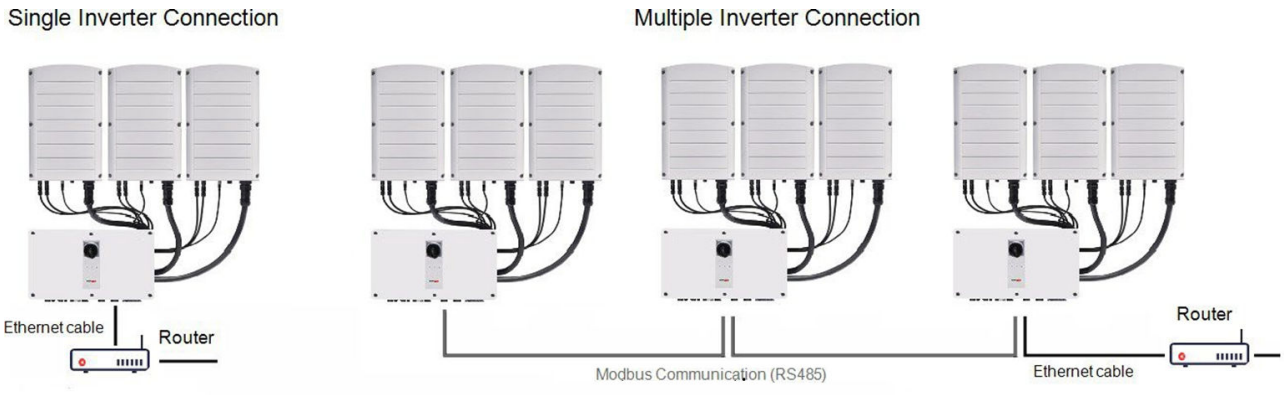
This communication option enables connection to the SolarEdge monitoring platform via Ethernet.

Ethernet cable specifications:

- Cable type – a shielded Ethernet cable (CAT6) should be used
- Maximum distance between the inverter and the router – 100m/ 330ft.

NOTE

If using an Ethernet cable longer than 10m/33ft in areas where there is a risk of induced Voltage surges by lightning, it is recommended to use external surge protection devices: https://knowledge-center.solaredge.com/sites/kc/files/lightning_surge_protection.pdf



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Figure: Ethernet connection options

To connect the Ethernet cable:

1. Remove the nut of the COMM1 gland.

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

2. Insert the CAT6 Ethernet cable through the gland nut.
3. Remove the rubber fitting.
4. Remove the plastic seal from the rubber fitting.
5. Insert the CAT6 Cable through the cut in the rubber fitting.

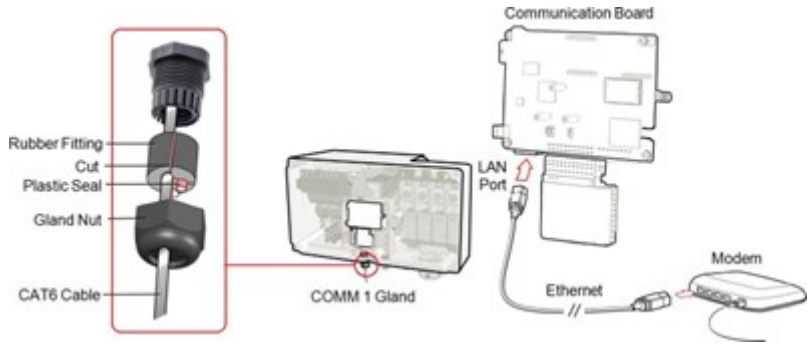


Figure: Inserting the Ethernet (CAT6) cable

6. Route the Ethernet cable to the communication board and plug to the LAN port.
7. Crimp an RJ45 plug on the Ethernet cable.
8. Tighten the gland nut to 4 lbf•ft.

Ethernet (CAT6) Cables

CAT6 cables have eight wires (four twisted pairs), as shown in the pin layout of the Ethernet connector in the figure "Ethernet connector – pin layout" 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-code.

Ethernet wire colors

RJ45 Pin	Wire color[1] T568B	Wire color T568A	10Base T Signal 100Base TX Signal
1	White/Orange	White/Green	Transmit+

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

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

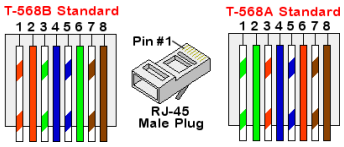


Figure: Ethernet connector – pin layout

Use a non-crimped cable to connect via the gland to the RJ45 port on the inverter's communication board or, if using a spool of cable, connect as follows:

- Insert the cable through the gland.
- Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
- Insert the eight wires into an RJ45 connector, as shown in the figure "Ethernet connector – pin layout" above.
- Use a crimping tool to crimp the connector.
- Connect the Ethernet connector to the RJ45 port on the communication board as shown in the figure "Inserting the Ethernet (CAT6) cable" above.

For the switch/router side, use a pre-crimped cable or use a crimper to prepare an RJ45 communication connector

Connect the cable RJ45 connector to the RJ45 port of the Ethernet router or switch.

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.

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NOTE

There are no LED indicators on the Ethernet connector, if the inverter is not communicating with the Monitoring platform through a LAN refer to "Troubleshooting Communication".

LAN Configuration

To configure LAN:

1. The inverter is configured by default to LAN. If reconfiguration is required, do the following:
   a. Verify the P/1/0 switch is OFF.
   b. Verify the AC is ON
   c. Close the cover and turn ON the DC Disconnect switch of the Synergy Manager.

      WARNING
      - ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires when the Synergy Manager cover is removed.

   d. Use the SolarEdge SetApp to access the **Commissioning** main menu screen. For details, see Activating, Commissioning, and Configuring the System [55].
   e. From the **Commissioning** screen, tap **Communication**.
   f. Select **Configure Ethernet** to configure the connection.
2. Verify the connection as described in RS485 Bus configuration on.

NOTE

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

NOTE

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

- Destination Address: prodssl.solaredge.com
- Modbus TCP Port: 443 (for incoming and outgoing data)

Creating an RS485 Bus Connection

The RS485 option enables creating a bus of connected inverters, consisting of up to 31 follower inverters and 1 leader inverter. Using this option, inverters are connected to each

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other in a bus (chain), via their RS485 connectors. The first and last inverters in the chain must be terminated. For details, see Step 10.

RS485 wiring specifications:

- Cable type: Belden RS-485 or CAT6
- Maximum nodes: 32
- Maximum distance between first and last devices: 1 km /3300 ft

NOTE

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

To connect the RS485 communication bus:

1. Release the six Allen screws and carefully remove the Synergy Manager cover.
2. Remove the seal from one of the openings in communication gland #2 and insert the wire through the opening.
3. Pull out the 6-pin RS485 terminal block connector, as shown in the figure below:

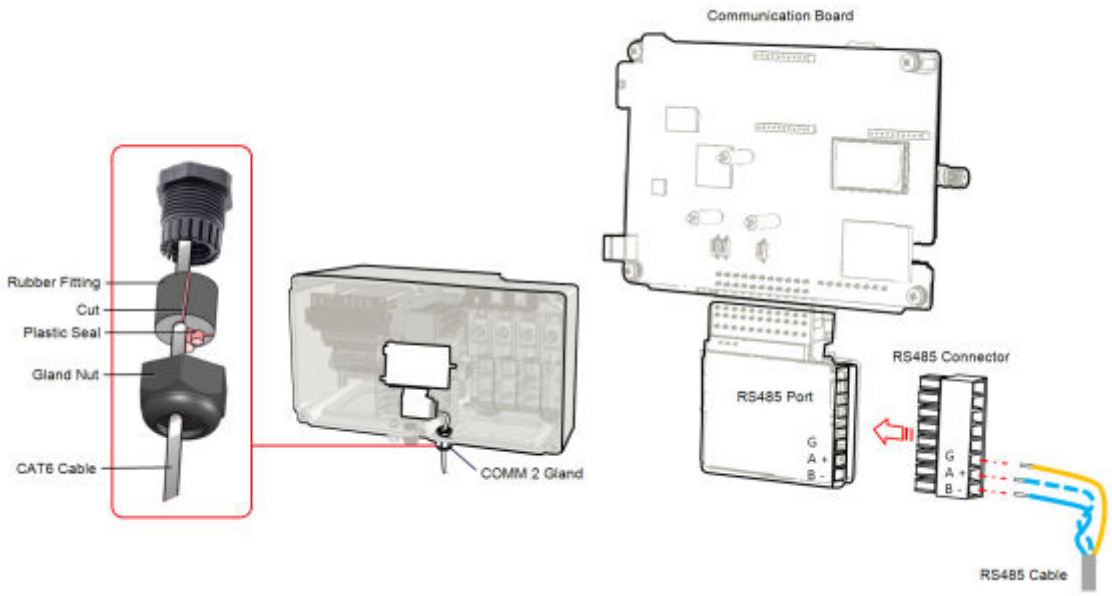


Figure: Communication board and connections

4. Loosen the screws of pins A(+), B(-), and G on the left of the RS485 terminal block (RS485-1 or RS485-2).
5. Insert the wire ends into the G, A and B pins shown above. Use Four- or six-wire twisted pair cable for this connection.

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NOTE

You can use any color wire for each of the A, B and G connections, as long as:

- The same color wire is used for all A pins the same color for all B pins and the same color for all G pins.
- The wire for G is not from the same twisted pair as A or B.

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

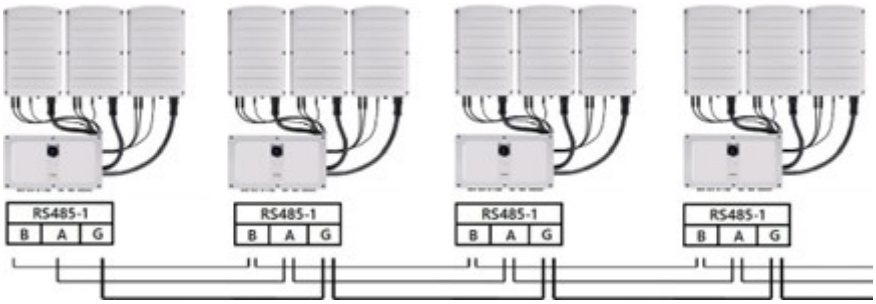
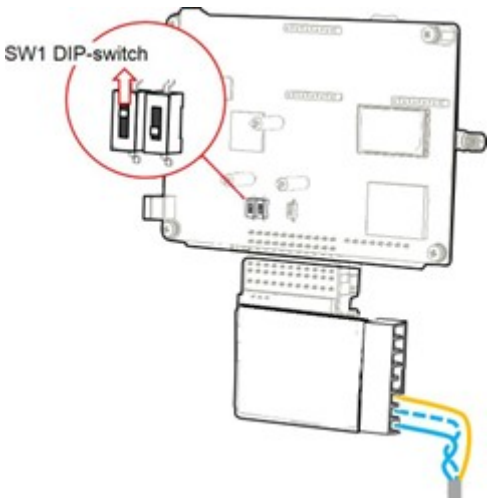


Figure: Connecting the inverters in a chain

NOTE

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

7. Tighten the terminal block screws.
8. Check that the wires are fully inserted and cannot be pulled out easily.
9. Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.
10. Terminate the first and last SolarEdge device in the chain by switching a termination DIP-switch inside the inverter to ON (move the left switch up). The DIP-switch is located on the communication board and is marked SW1.



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Figure: RS485 termination DIP switch (SW1)

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

11. Tighten the nut of the COMM2 gland to a torque to 3 lbf·ft.

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. The leader is the inverter connected to the Home network and the one that the meter MUST be connected to. To configure the leader:

1. Make sure the inverter's 0/1/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
4. From the Commissioning screen, select Site Communication > RS485 > Protocol > SolarEdge > SolarEdge Leader.
5. Return to the RS485- 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 > 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 platform has been successfully established.

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1. If the Synergy Manager cover is not closed, close it: Attach the cover and secure it by tightening the screws of 2.6 lbf•ft. For proper sealing, first tighten the corner screws and then the two central screws.
2. Commission the inverter. For details, see Activating, Commissioning and Configuring the System [55]
3. Access SetApp and select **Status** from the **Configuring** screen.
4. In the **Summary** section, under **Server Comm.**, make sure **S_OK** is displayed together with the selected communication option.
5. Scroll down to the Communication section and check that the communication options are as required.

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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 commissioning 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: Power 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 all the communication hardware is properly connected.

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









To download SetApp, an Internet connection, a one-time registration, and a login are required.

NOTE

It is possible to perform DC commissioning on the inverters before completing the AC connection to the electrical grid. DC commissioning, also referred to as "commissioning from the sun", is performed in daylight using the SolarEdge SetApp mobile application.

Step 1: Activate 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 you begin:

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- 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 (Energy Meter, Backup Interface) 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 P/1/0 switch to P position for 2 seconds and release).

   SetApp creates a Wi-Fi connection, upgrades the inverter firmware and activates the inverter.
4. Select the relevant inverter model (multirange selection), if applicable. The inverter is activated and the firmware automatically updates during this process. For details, refer to this model selection guide.
5. When the activation is complete, do one of the following:
   - Select **Connect to Another Device t**o continue activating additional inverters.
   - Select **Start Commissioning** for pairing and other system configuration.

> **NOTE**
>
> When commissioning a Leader inverter, from the Commissioning screen select the Central Commissioning for fast and simple commissioning powered by a wizard.

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, the commissioning process will continue automatically. follow the SetApp instructions.

  OR
- If the inverter has already been activated and commissioned:
  - If it is 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 P/1/0 switch to P position for 2 seconds and release).

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

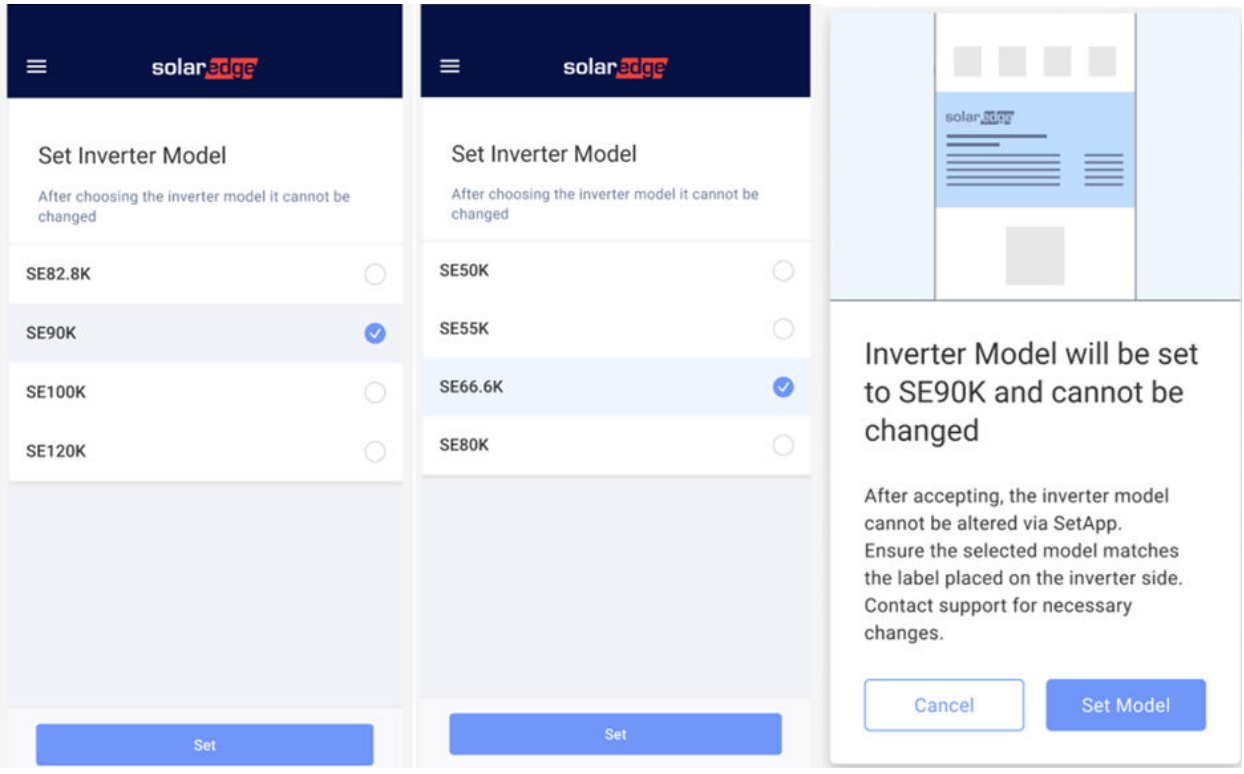
Multirange Selection SE-DBL and SE-TRI Inverters

To choose the right inverter model follow the steps below:

1. Select the appropriate inverter model from the drop-down menu in the SetApp interface.
2. Verify that the correct model label is applied to the inverter. The inverter will have either a SE100K label or an SE66.6K label from the factory. Please ensure the correct model label is affixed on the inverter or select a label from the label bag and attach it in the same location as the existing model label.

IMPORTANT

The new label shall be placed at the same location as the old label and shall not be placed elsewhere, especially on removable parts. Ensure the label is properly attached so that it does not curl at the edges and corners.



IMPORTANT

- After confirming the inverter model in SetApp, only the SolarEdge support team can modify the inverter model.
- The selected model must match the approved project plan set and installed OCPD devices.

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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.
3. If relevant, from the Language drop-down list, select your language and tap Set Language.
4. 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

Once all connections are made, all the Power Optimizers must be paired with the inverter. This section describes how to assign the Power Optimizers to the inverter. The pairing process takes place during the first activation of the inverter. The pairing process is automatically triggered after the commissioning process. In some cases, where Power Optimizers are replaced, proactive pairing process is required.

To activate the proactive 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 P/1/0 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.

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- From the Commissioning menu, select Monitoring Communication > Auto Select. SetApp will automatically detect your connection method. Follow the on-screen instructions to complete the configuration and establish communication with the monitoring platform.
- From the Commissioning menu, Select Site Communication to configure communication between multiple SolarEdge devices or external non SolarEdge devices, such as batteries or data loggers.

For more information on the Monitoring Platform, refer to the ONE for C&I User Guide available on the SolarEdge website at: https://knowledge-center.solaredge.com/sites/kc/files/solaredge-monitoring-portal-user-guide.pdf

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.
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.

Pre-commissioning (Off-Grid)

The following items are required for Pre-commissioning:

- Mobile device with SolarEdge SetApp application
- Power bank: 60W output port, USB-C Power Delivery (PD): 20V 3A (not provided)
- USB cable: 3.3 ft (1 meter), USB-C to USB-C (not provided)

IMPORTANT

Commissioning should be performed in full daylight.

NOTE

When pre-commissioning multiple inverters, each inverter needs to be commissioned individually.

To pre-commission the inverter:

1. Turn OFF and secure the AC circuit breaker in OFF position in the circuit breakers panel.
2. Verify that SolarEdge SetApp is installed on your mobile device.

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3. Turn the DC Disconnect Switch on the Synergy Manager to ON position (if applicable).
4. Remove the cover from the Power Bank input port at the bottom of the Synergy Manager. Connect the USB cable between the Power Bank and the input port - Upon connection, all LEDs light steady for one minute, and then alternate blue / green

> **NOTE**
>
> Alternating red / blue LEDs indicate a problem with the power bank.

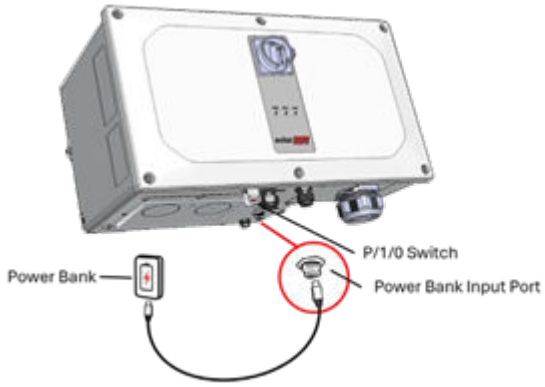


Figure: Pre-commissioning the inverter

5. Open SetApp on your mobile device and follow the on-screen instructions.
6. When instructed, hold the P/1/0 switch in P position and release within two seconds and continue to follow the on-screen instructions.
7. Disconnect the power bank and cover the power bank input port.
8. Turn OFF the DC Disconnect switch and the P/1/0 switch.
9. Wait until the inverter turns-off (all LEDs turn-off).

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.

SolarEdge ONE for C&I

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.

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- Pinpoint the location of alerted components using the physical layout.

> **NOTE**
>
> 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 Optimizers, 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 Optimizers, the Monitoring platform will show the logical layout, indicating which Power Optimizers are connected to which inverter, but will not show PV 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/en/products/software-tools/monitoring-platform.

Creating Logical and Physical Layout using Installation Information

To display a logical layout, insert the inverter 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 PV array layout to the monitoring platform.

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

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://monitoringpublic.solaredge.com/mfe/registration/?locale=en_US
2. Fill out all the required information in the screen, which includes information about your installation.

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Signaling Options

Alternative Power Source

Energy-generation systems (such as PV inverters) connected to the grid may consist of different types of energy generating sources.

In some cases, when grid power is disconnected, PV inverters operate in parallel with other voltage sources, such as generators.

When inverters operate concurrently with generators, they may be subjected to voltage and frequency fluctuations that exceed trips, which are preset according to regional grid connection requirements. To support simultaneous operation of the inverter and a generator, the inverter extends its Voltage and frequency operating range once it receives a Power Reduction Interface (PRI) signal indicating that grid power is unavailable (alternative Power Source mode"). When the grid power is restored, the inverter automatically reverts to its default country setting, which includes the original Voltage and frequency operating range.

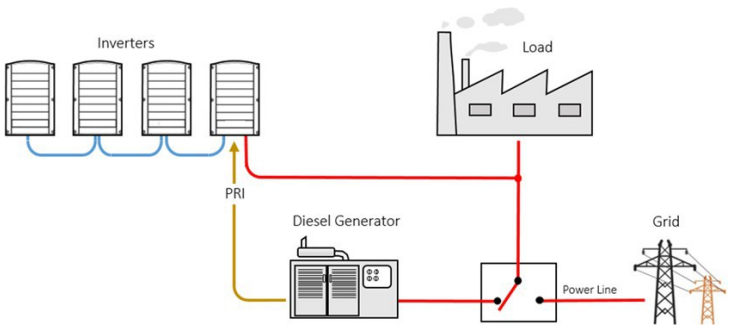


Figure: Example of Alternative Power Source

The Power Reduction Interface (PRI) terminal block is on the communication board. Used signaling the inverter to switch to Alternative Power Source mode.

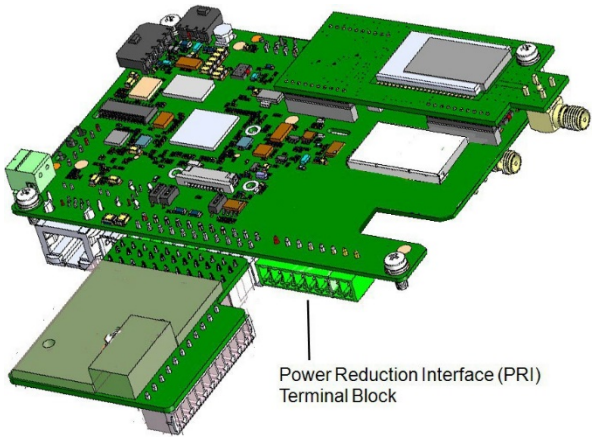


Figure: PRI Terminal Block Location on the Communication Board of the inverter

For detailed connection and configuration of the inverter in alternative power source mode, see: https://knowledge-center.solaredge.com/sites/kc/files/se-inverter-support-of-voltage-sources.pdf

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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:

https://knowledge-center.solaredge.com/sites/kc/files/troubleshooting_for_se_inverter_insallation_guide_addendum_na.pdf

This document describes the errors and alerts that appear in SetApp, and the Monitoring Platform and the way of troubleshooting them.

To identify the error types, use the methods described below.

To identify the error type using the inverter LEDs:

1. Move the P/1/0 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/us/leds

Inverter LED color and state

Error type	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 issues	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.

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Power Optimizer Troubleshooting

For details about Power Optimizer troubleshooting, see SolarEdge Isolation Fault Troubleshooting.

Troubleshooting Communication

Troubleshooting Ethernet (LAN) Communication

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

Ethernet communication troubleshooting

Error message	Possible cause and troubleshooting
LAN cable disconnected	Physical connection fault. Check the cable pinout assignment and cable connection.
No DHCP	IP settings issue. Check the router and configuration. Consult your network IT.
Configure static IP or set to DHCP	IP settings issue. Check the router and configuration. Consult your network IT.
Gateway not responding	Ping to router failed. Check the physical connection to the switch/ router. Check that the link LED at the router /switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection.
No Internet connection	Ping to google.com failed. Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider.

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 is lower than the actual number of followers, refer to the following application note to identify missing followers and troubleshoot connectivity problems: https://knowledge-center.solaredge.com/sites/kc/files/se-troubleshooting-undetected-can-bus-follower-devices-application-note.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.

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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.

Isolation Fault

In photovoltaic systems with a transformer-less inverter, the DC is isolated from ground. PV modules with defective isolation, unshielded wires, defective power optimizers, or a faulty inverter, can cause a leakage of DC current to the ground (PE - protective earth). Such a fault is also called an isolation fault or ground fault. To identify and locate an isolation fault in a PV system, refer to: https://knowledge-center.solaredge.com/sites/kc/files/application_note_isolation_fault_troubleshooting.pdf

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Appendix B: Maintenance

This appendix describes how to perform preventive maintenance to the inverter. By performing these preventive maintenance tasks, you can help keep the inverter functioning properly and avoid potential problems.

Routine maintenance of the inverter

Perform a yearly mechanical inspection of the mounted solar inverter to ensure its proper and efficient functioning, and prolonging its lifespan.

Visual inspections

By performing these inspection steps, you can help ensure that your inverter is installed safely:

1. Check the mounting of the inverter: Check that the mounting brackets of the inverter are secured to the wall and not showing signs of wear or damage or corrosion. Make sure that the inverter is firmly installed.
2. Inspect the physical condition: Inspect the physical condition of the inverter enclosures. Check for cracks, dents, and other physical damage. Ensure that all screws securing the front panel are in place.
3. Check the ventilation: Check that the cooling fan, at the bottom of the inverter, operate and that air can freely flow around the inverter.
4. Check the conduit connections: Inspect the physical condition of the conduits. Ensure that conduits are secured properly to the inverter, and to the wall.
5. Check the wiring glands: Check that the unused openings in the communication glands, at the bottom of the Inverter, are sealed.
6. Check the wiring: Check that the communication cables are not damaged. If cables are disconnected, immediately power-off the inverter.
7. Checking Ground Connections: Check that the Ground (PE) wire is tightly connected to all enclosure of the inverter.

Ground connection

The following process should only be done by a qualified electrician or someone with the proper training and equipment to avoid electrical hazards. To check a proper connection of a ground wire to the inverter, perform the following steps:

1. Ensure that the Ground (PE) wire is connected to the designated location on the enclosure of inverter.
2. Use a continuity tester to check the continuity between the ground wire, inverter's enclosure, metal conduits, and the earth. The tester should indicate a continuous circuit.

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Fan Maintenance

Each Synergy Unit has a cooling fan that can be accessed from the bottom panel of the enclosure. Keep the fan clean and free of dust. When needed, and at least once a year, open the fan screen and clean the accumulated dust using a brush.

Check the fan to make sure it is functioning properly and is free of dust and debris. A dirty fan can cause the inverter to overheat, reducing its efficiency.

To clean the external fan filter:

1. Turn **OFF (0) t**he P/1/0 Switch of the Synergy Manager.
2. Gently clean any dust or debris with a soft bristle brush.
3. Turn **ON (1)** the P/1/0 switch.
4. Use the SetApp mobile application to connect to the inverter and follow the on- screen instructions. From the Commissioning screen, tap Status and check that Fan OK is displayed in the Status screen

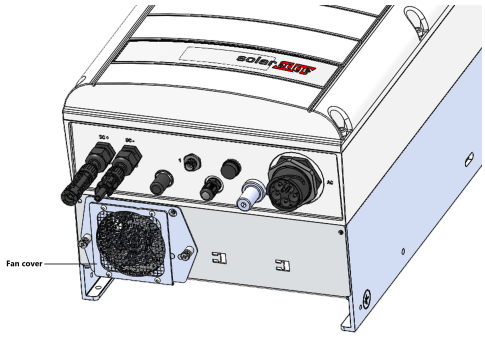


Figure: Externally cleaning the fan

To clean the internal fan filter:

1. Turn **OFF (0)** P/1/0 Switch of the Synergy Manager.
2. Turn **OFF** the DC Disconnect Switch on the front cover of the Synergy Manager (for details, see Front Interface of Synergy Manager [23]) and the AC breaker on the distribution panel.

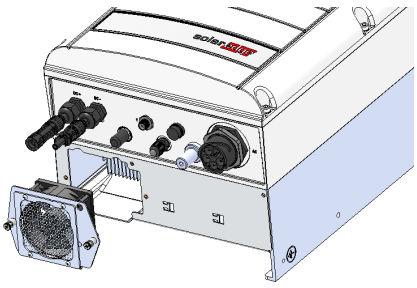


Figure: Removing the Fan Assembly

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WARNING

- Wait five minutes for the input capacitors of the inverter to discharge.

3. Unscrew and remove the two Thumb Screws securing the Fan Assembly to the Synergy Unit.
4. Pull out the Fan Assembly from within the inverter.
5. Clean the accumulated dust on the fan and screen using a brush. install the Fan assembly and secure the Thumb Screws.
6. Turn **ON** the AC breaker on the distribution panel
7. Turn **ON** the DC Disconnect Switch on the front cover of the Synergy Manager. For details, see Front Interface of Synergy Manager [23].
8. Turn **ON(I)** the P/1/0 Switch of the Synergy Manager.
9. Use the SetApp mobile application to connect to the inverter and follow the on- screen instructions. From the Commissioning screen, tap Status and check that Fan OK is displayed in the Status screen.

Wire Connections

Follow this procedure for maintaining the wire connections of the inverter:

1. Turn P/1/0 Switch of the inverter to OFF (0) and wait at least five minutes for the DC voltage inside the inverter to drop to a safe value before preceding to the next step.
2. Turn OFF the DC Disconnect Switch on the on the front cover of the Connection Unit of the inverter and turn OFF the AC circuit breaker on the distribution panel.
3. Remove the front cover of the Connection Unit.
4. Inspect the wire connections: Visually inspect all wire connections, looking for signs of damage, wear and tear, loose connections or overheating. If you find any signs of damage, it's important to address them promptly to prevent further issues.
5. Ensuring tight DC connections: Gently hold each wire and try to pull it out from each spring-clamped terminal. Verify that all wires are locked inside the terminals.
6. Ensuring tight AC connections: Gently hold each wire and try to pull it out from each spring-clamped terminal. Verify that all wires are locked inside the terminals.
7. Ensuring tight PE wire connection: Fasten the screw of the PE terminal to a torque of 1.1 lbf•in.
8. Check the wire insulation: Inspect the insulation on all wires for any signs of damage, such as cracks, overheating or abrasions. If you find any issues, repair or replace the wire as necessary.
9. Attach the Connection Unit cover and secure the four screws to 6.6 ftf•lb (7.6 ftf•lb for plastic screws) in a crossed pattern.

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10. Turn ON the AC circuit breaker on the distribution panel.
11. Turn ON(I) the P/1/0 Switch of the inverter.
12. Turn ON the DC Disconnect Switch on the front cover of the Connection Unit.

General cleaning

Clean the inverter: Dirt and debris can accumulate on the inverter over time, which can reduce its performance. Clean the inverter regularly with a soft brush, a soft cloth, and mild detergent to keep it functioning efficiently.

Monitoring the Solar System Performance

The SolarEdge monitoring platform enables to monitor PV strings connected to the inverter. It provides accurate information about the present and past performance of each PV module individually and the system as a whole. The platform enables to detect, pinpoint and troubleshoot faults, efficiently manage maintenance operations, and analyze site profitability.

Smart algorithms continuously track the power, Voltage, and current of all PV modules and inverters, as well as a range of statistical indicators to detect performance events that require intervention or maintenance.

If you are experiencing alerts from the SolarEdge monitoring system, it may indicate an issue with the PV modules, inverter, or the monitoring system itself. Some common alerts include:

1. Panel mismatch: This alert occurs when the performance of one or more panels in the solar array is not matching the expected performance. This could be due to shading, soiling, a malfunction, or other factors that are affecting the performance of the panel.
2. To learn more on generating a PV module mismatch report, refer to https://knowledge-center.solaredge.com/sites/kc/files/monitoring_platform_ mismatch_analysis_report.pdf
3. Inverter failure: This alert occurs when the inverter, which is responsible for converting the DC power generated by the PV modules into AC power has failed.
4. To learn more on viewing alerts in the monitoring platform, refer to https://knowledge-center.solaredge.com/sites/kc/files/se-alerts-in-monitoring- application-note.pdf
5. Communication failure: This alert occurs when the monitoring system is unable to communicate with the SolarEdge inverter. This could be due to a problem with the inverter itself, or with the communication network that connects the monitoring system to the inverter.

It's important to address these alerts promptly to ensure the proper functioning of the system. If you're unsure how to address a specific alert, it may be helpful to contact SolarEdge support for assistance.

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Appendix C: Adding Optional Components

This appendix describes the optional components available for the inverter. Before ordering component, verify that your inverter model supports the component and that the component is not already provided with the inverter.

Ordered Installation and replacement kits for components include procedures for removal and installation of the components.

NOTE

Replaced component or part may require being disposed according local regulations. If you wish to discard components or parts, contact your local authorities and ask for the correct method of disposal.

AC Surge Protection Device (SPD)

The AC SPD is a device designed to protect the inverter from Voltage spikes and surge attempts forming on the AC grid lines. The SPD limits the Voltage supplied to the inverter by either blocking or shorting to ground Voltages above a safe threshold. The SPD is installed inside the inverter and communicates with the SolarEdge Monitoring platform for reporting surge protection events and faults.

For installation and configuration of the AC SPD, refer to: https://knowledge-center.solaredge.com/sites/kc/files/se-synergy-manager-ac-spd-installation-guide.pdf

DC Surge Protection Device (SPD)

The DC SPD is a device designed to protect the inverter from Voltage spikes and surge attempts, forming on the PV DC lines, mainly induced by lightning. The SPD limits the Voltage supplied to the inverter by either blocking or shorting to ground Voltages above a safe threshold. The SPD is installed inside the inverter and communicates with the SolarEdge Monitoring platform for reporting surge protection events and faults.

For installation and configuration of the DC SPD, refer to: https://knowledge-center.solaredge.com/sites/kc/files/se-synergy-manager-dc-spd-installation-guide.pdf

Wi-Fi Antenna

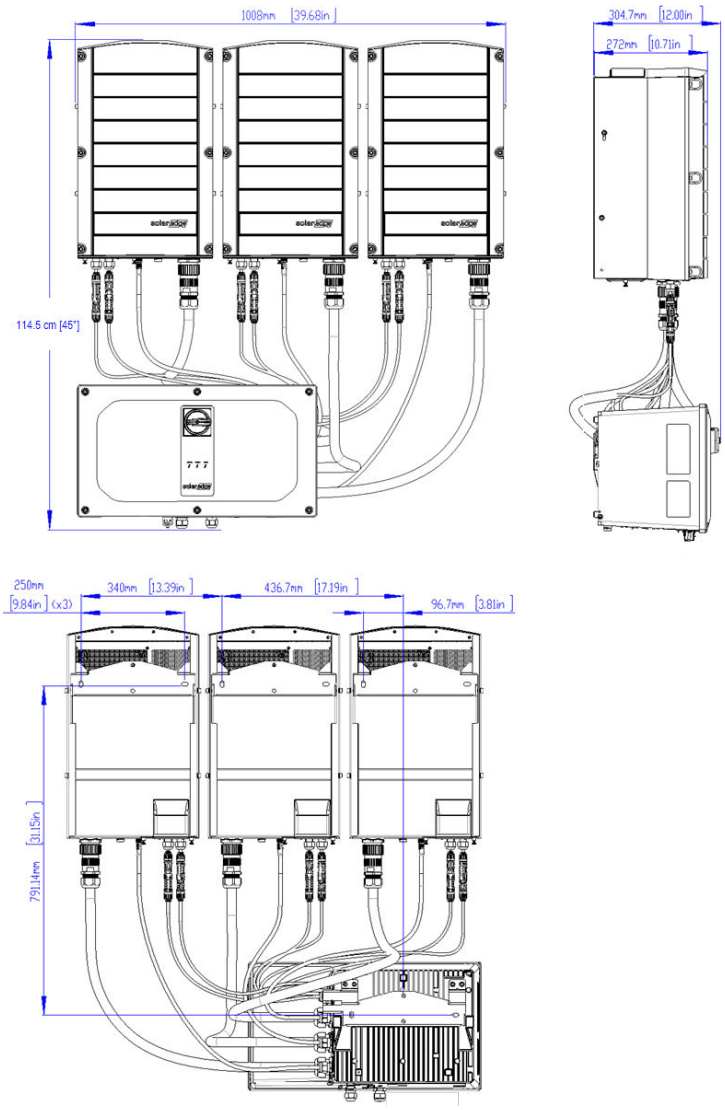
Cellular Plug-in

The cellular plug-in provides wireless communication between the inverter and the SolarEdge monitoring platform. The Cellular Plug-in kit is provided with an antenna and user manual. For more information on the Cellular Plug-in, refer to: https://knowledge-center.solaredge.com/sites/kc/files/cellular_gsm_installation_guide_for_inverters_with_setapp.pdf

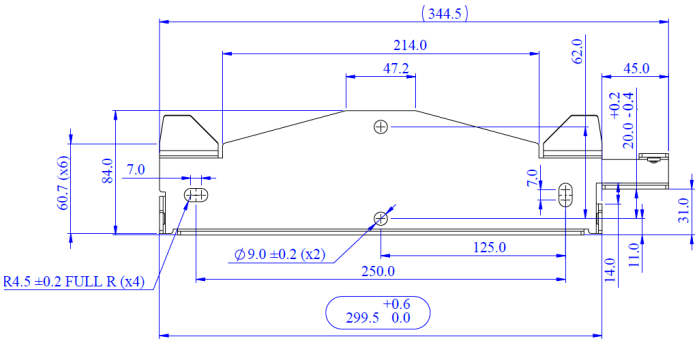
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Appendix D: Mechanical Specifications

The following figure shows the dimensions of the Three Phase Inverter with Synergy Technology.

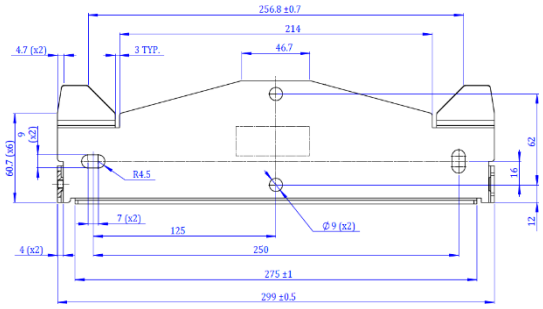


Synergy Manager mounting bracket



Synergy Unit mounting bracket

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Appendix E: SafeDC

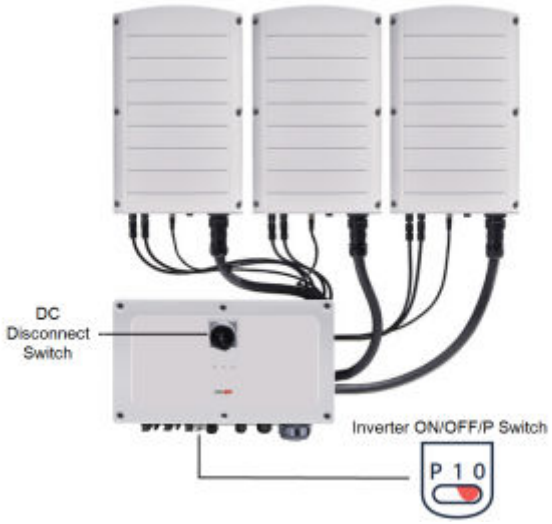
When AC supply to the inverter is shut off (by shutting off the AC breaker at the site), or when the inverter ON/OFF/P switch is turned to OFF, the DC Voltage drops to a safe Voltage of 1V per Power Optimizer.

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

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

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

1. Move the inverter ON/OFF/P switch to the OFF (0) position. Wait for five minutes for the DC Voltage inside the inverter to drop to a safe level before proceeding to the next step.
2. Move the DC Disconnect Switch (if applicable) to the OFF (0) position. For reference, see the following image.



3. Turn OFF the circuit breakers on the distribution panel to disconnect the AC from the inverter.

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