Installation Guide

SolarEdge TerraMax Inverter

PN: SE330KUS, SE250KUS, SE285KUS

for North America

Version 1.3

Disclaimers

Important Notice

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

This manual describes the installation of the SolarEdge TerraMax Inverter Installation Guide. 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.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.

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

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

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

Revision History

Version 1.3 (January 2025)

Added wire lug compatibility.

Version 1.2 - Added wire lug compatibility.

Version 1.1 - Updated maintenance chapter

Version 1.0 - Initial release

Contents

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.

AVERTISSEMENT!

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer des blessures ou un danger de mort. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

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.

ATTENTION!

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivi correctement, pourrait causer un dommage ou destruction de l'équipement. Ne pas dépasser une telle note avant que les conditions requises soient totallement comprises et accomplies.

NOTE

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

IMPORTANT SAFETY INSTRUCTIONS / CONSIGNES DE SÉCURITÉ IMPORTANTES

SAVE THESE INSTRUCTIONS / CONSERVEZ CES INSTRUCTIONS

WARNING!

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

AVERTISSEMENT!

Pour réduire le risque de blessure, lisez toutes les instructions de ce 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.

AVERTISSEMENT!

Lors de l'entretien ou du remplacement de l'équipement SolarEdge, les instructions du guide d'installation de l'onduleur SolarEdge doivent être suivies pour maintenir l'intégrité du système de contrôle des risques photovoltaïques. Les optimiseurs de puissance SolarEdge et/ou les onduleurs ne peuvent être remplacés que par des optimiseurs de puissance SolarEdge et/ou des onduleurs. Les équipements tiers ne sont pas compatibles avec les équipements SolarEdge.

WARNING!

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

AVERTISSEMENT!

L'utilisation de cet équipement d'une manière non spécifiée par SolarEdge dans ce document peut nuire à la protection fournie par cet équipement.

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 five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

AVERTISSEMENT!

Ne pas ouvrir le couvercle de l'onduleur avant d'avoir coupé l'interrupteur situé en dessous de l'onduleur. Cela supprime les tensions CC et CA de l'onduleur. Attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.

P = Program/Pair (Momentary toggle)
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.

AVERTISSEMENT!

Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre. Ce produit doit être raccordé à un système de câblage fixe, métallique, l'équipement-le conducteur de mise à la terre doit être exécuté avec les conducteurs de circuit et raccordé à l'équipement borne de mise à la terre ou de plomb sur le produit.

WARNING!

Opening the inverter and repairing or testing under power must be performed only by qualified service personnel familiar with this inverter.

AVERTISSEMENT!

L'unité ne doit être ouverte que par un technicien qualifié dans le cadre de l'installation et de la maintenance.

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.

AVERTISSEMENT!

Tension CC élevée sur les chaînes photovoltaïques la nuit lorsque le redresseur à dégradation induite potentielle (PID) / la fonction de contrôle Volt-Ampère Réactif (VAR) est active. NE touchez AUCUN composant et n'effectuez aucune opération de maintenance sur les chaînes photovoltaïques.

WARNING!

The Safety Unit meets all requirements for a code-compliant installation of this system. The DC Disconnect Switch disconnects both the positive and negative conductors.

AVERTISSEMENT!

Le sectionneur externe (inclus) repond aux exigences de conformité pour l'installation de ce système . Le coupeur CC ouvre les conducteurs positifs et négatifs.

WARNING!

The inverter input and output circuits are isolated from the enclosure. This system does not include an isolation transformer and should be installed with an ungrounded PV array in accordance with the requirements of NEC Articles 690.35 and 690.43 National Electric Code, ANSI/NFPA 70, 2011 (and Canadian Electrical Code, Part I, for installations in Canada).

Equipment grounding is the responsibility of the installer and must be performed in accordance with all applicable Local and National Codes.

AVERTISSEMENT!

Les circuits d'entrée et de sortie de l'onduleur sont isolés de l'enveloppe. Ce système n'inclut pas d'isolation galvanique (transformateur) et devra être installé sans mise à la terre du champ PV et en accord avec les articles 690.35 et 690.43 du National Electric Code (NEC), ANSI/NFPA 70, 2011 (et du Code Electrique Canadien, Partie 1, pour les installations faites au Canada).
La mise à la terre des équipements est la responsabilité de l'installateur et doit être faite en accord avec les toutes les règles locales et nationales applicables.

WARNING!

SolarEdge TerraMax inverters are rated above 1250VDC. As such installers are required to mark " DANGER — HIGH VOLTAGE" adjacent to each DC wiring compartment.

NOTE

Utility interconnection may require approval from the authority having jurisdiction.

Approval from the authority having jurisdiction is required for making adjustments to utility interactive setpoints.

NOTE

SolarEdge inverters always opens a disconnecting means when the inverter ceases to deliver power because of abnormal Voltage or frequency conditions or in response to a detected unintentional island.

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 .

AVERTISSEMENT!

Les produits SolarEdge peut vous exposer à des agents chimiques, y compris trioxyde d'antimoine, identifiés par l'État de Californie comme pouvant causer le cancer. Pour de plus amples informations, prière de consulter www.P65Warnings.ca.gov.

CAUTION!

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

ATTENTION!

Cette unité doit être utilisée selon les spécifications de fonctionnement, comme décrit dans la dernière fiche technique des spécifications.

CAUTION!

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

ATTENTION!

Objet lourd. Pour éviter la fatigue musculaire ou des blessures au dos, utilisez des techniques de levage appropriées et, si nécessaire - un auxiliaire de levage lors du retrait.

NOTE

This inverter is provided with an IMI (Isolation Monitor Interrupter) for ground fault protection.

NOTE

The state of the ungrounded PV array may temporarily change during Isolation tests (resistor is connected between DC+ and DC- and GND points) and PID rectifier operation (small resistance is connected between DC- and GND points).

NOTE

The inverter is rated for:

- Over voltage category: IV
- Pollution degree: 2

NOTE

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

SolarEdge Terramax inverters incorporate a certified, built-in Ground Fault Current Interrupter (GFCI). The GFCI protects against fire hazard in case of a malfunction in the PV array, DC wires, or DC section of the inverter. The GFCI in the SolarEdge inverter can detect current leakage on the DC side. There is one trip threshold for the GFCI. The threshold detects slowly rising leakage currents in the grounding conductors and limits the currents to ensure fire safety.

Chapter 1: System Overview

SolarEdge Large Scale PV Plants Solution is a part of SolarEdge grid services solution, that enables cloud-based, real-time aggregative control, management, and reporting of distributed energy resources, for the creation of solar power plants.

Virtual power plants are interconnected and decentralized energy networks that offer improved grid reliability, services, stability, and costs. They can help utilities, energy retailers, and large fleet solar owners to meet energy supply shortages and maintain grid stability.

This SolarEdge power harvesting solution is designed to maximize the power output from any type of solar Photovoltaic (PV) installation while reducing the average cost per Watt. *Figure 1* shows and the following sections describe the components of the SolarEdge power harvesting system. *Figure 1* shows SolarEdge Large Scale PV Plants Solution.

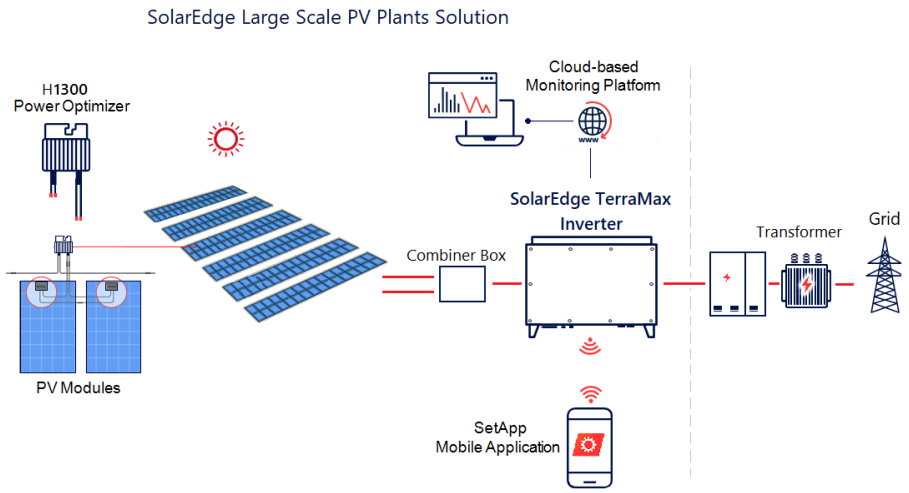

Figure 1: The SolarEdge Large Scale PV Plants Solution

The SolarEdge TerraMax Inverter

The SolarEdge TerraMax Inverter (referred to as 'inverter' in this manual) efficiently converts DC power from the PV modules 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 landline connection to the Internet).

A chain of up to 13 inverters can be set to communicate together over CAN bus and connect to a single transformer.

Each inverter operates independently and continues to work in case others stopped operating.

When setting a chain of inverters, the inverter that manages communication interface to the internet is called Leader and the rest are Followers.

Figure 2: SolarEdge TerraMax Inverter

Combiner Box

NOTE

The combiner box is not part of SolarEdge offering and should be purchased separately.

A combiner box is an enclosure that aggregates the DC output of multiple solar panels and combines them into a single DC circuit. It contains fuses, disconnect switches, and wiring to combine the outputs of two PV arrays into a single larger output, routed to the inverter.

The H1300 Power Optimizer

The SolarEdge H1300 Power Optimizer is a device that connects to two PV modules and optimizes and maximizes power harvesting performance by performing module-level maximum power point tracking (MPPT). The Power Optimizers regulate the PV string Voltage at a constant level, regardless of PV string length and environmental conditions. It also provides module-level monitoring and safety features such as automatic voltage shutdown. The H1300 Power Optimizer is designed only for SolarEdge inverters and is used for commercial and large field installations.

Figure 3: The H1300 Power Optimizer

The Power Optimizers include a safety Voltage mechanism that automatically reduces the output of each Power Optimizer to 1 Vdc in the following cases:

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

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

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

Monitoring Platform

SolarEdge Monitoring Platform is a user-friendly solution for monitoring and managing solar energy systems. The platform presents real-time monitoring, historical data analysis, alerting capabilities, and remote troubleshooting features.

The platform empowers users to optimize energy production, detect and resolve issues efficiently, and make data-driven decisions to enhance the performance and efficiency of their solar installations.

For more information on the Monitoring Platform, refer to the C&I One User Guide, available at https://utility.solaredge.com/hub/ci_one_user_guide.pdf

SetApp

SolarEdge SetApp is a mobile application developed and 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.

Installation Tools and Material List

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

- Allen screwdriver for 4mm screw type for the inverter cover, inverter cover screws
- Allen screwdriver for M5/M6/M8 screw types
- Standard flat-head screwdrivers set
- Non-contact Voltage detector
- Cordless drill (with a torque clutch) or screwdriver and bits suitable for the surface on which the inverter and Power Optimizers are installed and for opening the inverter AC and DC conduit holes. The use of an impact driver is not allowed
- Ratchet torque & extension for 25.8 lb*ft / 35 N*m, 13.3 lb*ft /18 N*m
- Deep A/F 18mm socket wrench, Deep A/F17mm Socket wrench
- Torque screwdriver with extension for Allen bits 3.5 lb*ft / 4.7 N*m, 2.9 lb*ft / 3.9 N*m, 1.8 lb*ft / 2.4 N*m, 0.9 lb*ft / 1.2 N*m

- Ring/Lug terminals crimping tool
- Wire cutters
- Wire strippers
- Multimeter

Chapter 2: Inverter Overview

Inverter Features

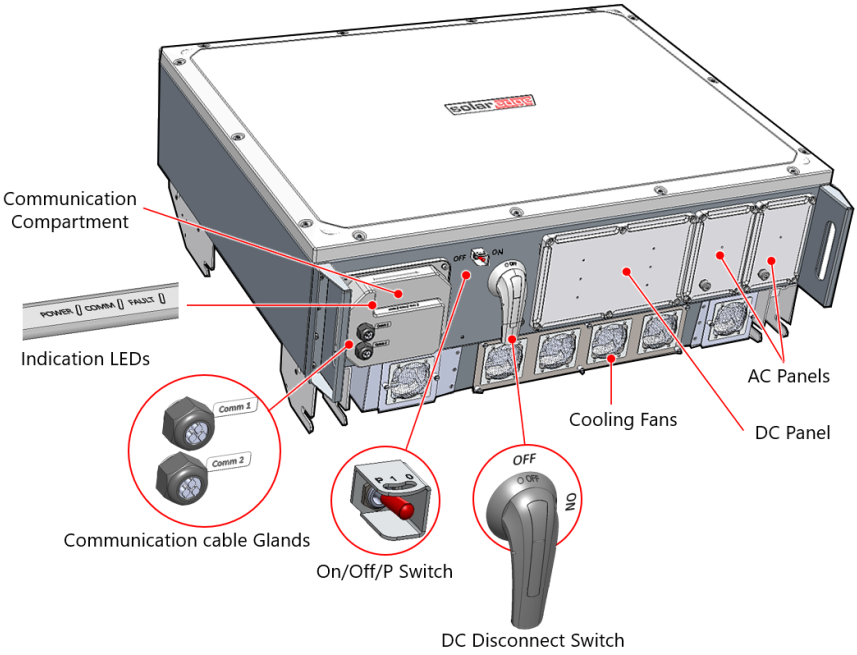

Figure 4: SolarEdge TerraMax Inverter features

DC Disconnect Switch

The DC Disconnect Switch is a manually operated safety switch for disconnecting the DC power of the SolarEdge system. The switch is used to disconnect the solar array from the inverter in case of fire or lower the chance of damage to the inverter caused by weather.

WARNING!

When the inverter is OFF (for example during maintenance) it must be locked to prevent a safety hazard:

Pull the white tab out away from the blue handle and insert a padlock through one of the holes.

AVERTISSEMENT!

Lorsque l'onduleur est éteint (par exemple pendant la maintenance), il doit être verrouillé pour éviter tout risque de sécurité :

Retirez la languette blanche de la poignée bleue et insérez un cadenas dans l'un des trous.

ON/OFF/P Switch

Figure 5 shows the ON/OFF/P switch of the SolarEdge TerraMax Inverter.

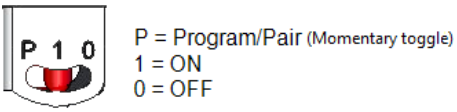

Figure 5: ON/OFF/P switch

- **ON (1)** - Turning this switch ON (after Power Optimizer pairing) starts the operation of the Power Optimizers, enables power production, and allows the inverter to begin exporting power to the utility grid.
- **OFF (0)** - Turning this switch OFF reduces the Power Optimizer Voltage to a low safety Voltage and inhibits exportation of power. When this switch is OFF, the Inverter control circuitry remains powered up.
- **P** - Holding the switch pressed in P position allows performing the following functions:

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

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 five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

AVERTISSEMENT!

N'ouvrir le couvercle qu'après avoir arrêté l'onduleur à l'aide de l'interrupteur ON/OFF/P. Ceci coupe la tension DC à l'intérieur de l'onduleur. Attendez cinq minutes avant d'ouvrir le couvercle. Sinon, il y a risque d'électrocution du à l'énergie stockée dans les condensateurs.

Indication LEDs

LEDs indication consists of color and state (on/ off/ blinking[1]/ flickering[2]/alternating [3]). The LEDs indicate different system information, such as errors or performance. *Figure 6* shows the Indication LEDs of the inverter.

Generally, the main LED indications are:

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

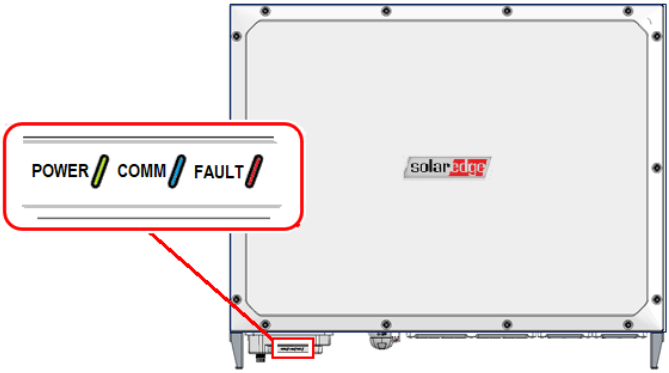

Figure 6: Indication LEDs

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

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

[3]Alternating = Alternate LEDs flash

Indication	ON/ OFF/ P switch position	POWER LED	COMM. LED	FAULT LED	Comment
Power Optimizers not paired	ON (1)	Blinking	▪ S_OK: ON ▪ No S_ OK: OFF	OFF	S_OK: ON means that communication with the Monitoring Platform is established. S_OK: OFF means that there is no communication with the Monitoring Platform.
Pairing		Blinking	Blinking	Blinking	
Wake-up/ Grid Monitoring		Blinking	Blinking	OFF	
System Producing		ON	▪ S_OK: ON ▪ No S_ OK: OFF	OFF	
Night mode (no production)		Flickering	▪ S_OK: ON ▪ No S_ OK: OFF	OFF	
Inverter is OFF (Safe DC - optimizer's output voltage is 1V, DC voltage is below 50V)	OFF (0)	Blinking		OFF	

Indication	ON/ OFF/ P switch position	POWER LED	COMM. LED	FAULT LED	Comment
Inverter is OFF (DC not safe -- DC voltage is above 50V)		Blinking	▪ S_OK: ON ▪ No S_ OK: OFF	Blinking	
Inverter configuration or reboot	ON / P	ON	ON	ON	
Inverter firmware upgrade	ON / P	Alternating	Alternating	Alternating	The upgrade process can take up to 20 minutes
Error	Any	ON/ OFF/ Blinking/ Flickering	ON/ OFF / Blinking/ Flickering	ON	Refer to *Errors and Troubleshooting* on page 75

The following table describes the production percentage of AC information by indication LEDs color and ON/OFF/P switch position.

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

AC Panels

- **AC Conduits Entry**: a panel with drill guides for conduits running AC cable from the grid

DC Panel

To connect wires, follow the writing shown next to each wire on the panel.

- **DC Conduit Entries**: a panel with drill guides for conduits running DC wires from the PV array / String Combiner.
- **Protective Earth (PE) Wire Entry**: PE gland for connecting Protective Earth (PE) wire

Communication Compartment

The communication compartment comprises the communication board of the inverter. The communication board is equipped with the following communication options:

- **Controller Area Network (CAN)** is a communication protocol used for real-time data exchange between up to 13 inverters. CAN communication includes messaging, error detection, and prioritization information.
- **RS-485** is a communication protocol used for real-time data exchange between inverters and third party devices such as meters or local controllers.
- **LAN** is a communication protocol used for connecting the inverter to a remote monitoring platfom via an internet LAN router.

Communication Cable Glands

Two communication glands on the communication compartment for communication and antenna cables.

Cooling Fans

Six cooling fans for removing warm air from the inverter, improving the power generation.

Chapter 3: Installing the Power Optimizers

General Description

The inverter is designed to directly connect to up to two PV arrays, via an external combiner box.

NOTE

To enable the system operation in full capacity, connect at least 14 strings to the inverter.

A combiner box is an electrical distribution box that may also host DC circuit breakers. 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 DC input in the inverter. The SolarEdge TerraMax Inverter has two DC inputs. therefore up to two combiner boxes can be connected to each inverter.

The combiner box should be installed and connected before connecting to the inverter. This simplifies the commissioning of the inverter by allowing testing and servicing the inverter.

SolarEdge fixed input Voltage architecture enables parallel PV strings to be of different lengths. Therefore, they do not need to have the same number of Power Optimizers, as long as the difference between the shortest and longest string, connected to the same inverter, is no more than five Power Optimizer.

NOTE

The DC Disconnect Switch of the inverter disconnects all ungrounded DC conductors in compliance with the National Electric Code (NEC; Specifically, NEC690.35, which addresses ungrounded PV arrays).

Figure 7 Shows a connection of PV arrays to the inverter via a combiner box.

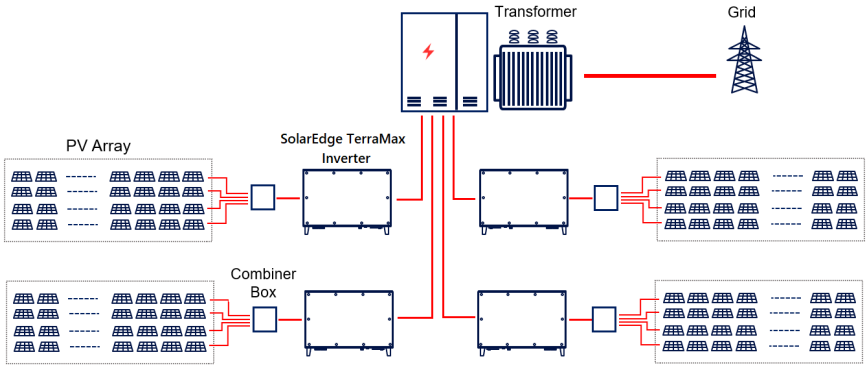

Figure 7: Connection of PV arrays to the Inverter via a Combiner box

Safety

The following notes and warnings apply when installing the Power Optimizers.

WARNING!

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

AVERTISSEMENT!

L'enceinte métallique de l'optimiseur de puissance doit être mise à la terre en accord avec les régulations locales et nationales.

WARNING!

When modifying an existing installation, turn OFF the inverter ON/OFF/P switch, DC Disconnect Switch, and the AC circuit breaker on the main AC distribution panel. Wait five minutes before opening the cover. Otherwise,there is a risk of electric shock from energy stored in the capacitors.

AVERTISSEMENT!

Lors de la modification d'une installation existante, éteindre l'onduleur ON/OFF/P l'interrupteur, l'interrupteur de déconnexion CC et le disjoncteur CA sur le panneau de distribution CA principal. Attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.

WARNING!

Input and output MC4 connectors are not watertight until mated. Open connectors should be mated to each other or plugged with appropriate watertight caps.

AVERTISSEMENT!

Les connecteurs d'entrée et sortie ne sont pas étanches jusqu'à ce qu'ils soient accouplés. Les connecteurs doivent être accouplés ou fermés avec des terminaux étanches.

CAUTION!

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

ATTENTION!

Les optimiseurs de puissances sont compatibles à la norme IP68/NEMA6P. Choisissez le lieu de montage tel que l'optimiseur ne puisse pas être submergé par l'eau.

CAUTION!

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

ATTENTION!

Cette unité doit être opérée suivant les instructions trouvées dans le manuel fourni avec le produit.

CAUTION!

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

ATTENTION!

Sectionner les cables d'entrées ou de sortie de l'optimiseur est interdit et annule sa garantie.

CAUTION!

All PV modules must be connected to a Power Optimizer.

ATTENTION!

Tous les modules doivent être connectés à un optimiseur de puissance.

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.

ATTENTION!

Pour installation à même le module ou la monture du module, consultez d'abord le fabricant du module sur la position et son impact sur la garantie du module. Le perçage de trous dans le cadre du module devra se faire suivant les instructions du fabricant.

CAUTION!

Installing a SolarEdge system without ensuring compatibility of the PV 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 and electrical compatibility of the Power Optimizer connectors with the PV module connectors to which they are connected:

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

For more information, refer to https://knowledge-center.solaredge.com/sites/kc/files/se-1500-optimizer-input-connector-compatibility.pdf

ATTENTION!

Les connecteurs du module doivent être mécaniquement compatibles avec les optimiseurs de puissance. Sinon, le système SolarEdge installé peut être dangereux ou causer des problèmes fonctionnels, tels que les défauts de terre, qui peuvent provoquer un arrêt de l'onduleur. Afin d'assurer la compatibilité mécanique entre les optimiseurs de puissance SolarEdge et les modules auxquels ils sont connectés:

- Utiliser des connecteurs identiques du même fabricant et du même type aussi bien pour les optimiseurs de puissance que pour les modules.
- Vérifiez que les connecteurs sont compatibles de la manière suivante:
  - Le fabricant du connecteur doit explicitement vérifier la compatibilité avec le connecteur SolarEdge.
  - Un rapport de test de tierce partie doit être effectué par l'un des laboratoires externes indiqués ci-dessous:(TUV, VDE, Bureau Veritas UL, CSA,Intertek), qui vérifiera la compatibilité des connecteurs.

Pour plus d'informations, consultez

https://knowledge-center.solaredge.com/sites/kc/files/se-1500-optimizer-input-connector-compatibility.pdf

NOTE

Using incompatible connectors, as detailed above, will only result in voiding the warranty for issues related to connectors, but not for other optimizer issues.

REMARQUE

L'utilisation de connecteurs incompatibles, comme détaillé ci-dessus, entraînera uniquement l'annulation de la garantie pour les problèmes liés aux connecteurs, mais pas pour les autres problèmes d'optimisation.

IMPORTANT SAFETY FEATURE

SolarEdge Power Optimizers are safe as long as the Inverter is turned off. When the inverter is turned off, or a Power Optimizer is disconnected, the output voltage of the Power Optimizer drops to a safe level of 1V.

CARACTÉRISTIQUE DE SÉCURITÉ IMPORTANTE

Les optimiseurs de puissance SolarEdge sont sûrs tant que l'onduleur est éteint. Lorsque l'onduleur est éteint ou qu'un Power Optimizer est déconnecté, la tension de sortie du Power Optimizer chute à un niveau sûr de 1 V.

Package Contents

- Power Optimizers
- Installation Guide

Installation Guidelines

- For the minimum and maximum number of Power Optimizers in a PV string (PV string length), see the Power Optimizer datasheets. Refer to the Designer for PV string length verification. The Designer is available on the SolarEdge website at: https://www.solaredge.com/us/products/installer-tools/designer#/.
- SolarEdge allows the use of extension wires on the input side of the Power Optimizer when connected to a PV module or between two modules as long as:
  - The total length of the round-trip wire, modules, and Power Optimizer input wires, do not exceed 16 m.
  - The connectors of the extension wires are identical to the connectors of the Power Optimizer.
- The Power Optimizer can be placed in any orientation.
- Position the Power Optimizer close enough to its module so that their wires can be connected and fastened to the mounting structure.
- 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, if 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 (see *Figure 8*):

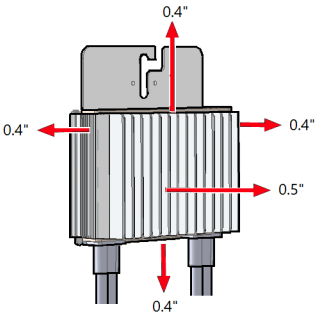

Figure 8: Clearance around the Power Optimizer for heat dissipation

- When installing PV modules in a confined space, ventilation measures may be required to ensure that the Power Optimizers are not exceeding the maximum temperatures stated in their specifications.

Mounting and Grounding the Power Optimizers

For each of the Power Optimizers[(1)]:

1. Determine the Power Optimizer mounting location and use the Power Optimizer mounting brackets to attach the Power Optimizer to the support structure (See *Figure 9*). It is recommended to mount the Power Optimizer in a location protected from direct sunlight.
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.

[(1)]Not applicable to smart modules.

ATTENTION!

Les vibrations résultant du perçage peuvent endommager l'optimiseur de puissance et annulera la garantie. Utilisez une clé dynamométrique ou une perceuse électrique avec embrayage adaptable compatible avec les moments indiqués. Ne pas utiliser des tournevis à percussion pour fixer l'optimiseur. Ne pas percer à travers l'optimiseur de puissance ou ses trous de fixation.

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 6.5-7.4 lb*ft/9-10 N*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.

AVERTISSEMENT!

L'enceinte métallique de l'optimiseur de puissance doit être mise à la terre en accord avec les régulations locales et nationales.

- **For mounting on a grounded metal rail**: Use SolarEdge approved 5/16'' stainless steel grounding star washer between the railing and the flat side of the mounting bracket.

NOTE!

Star washers for the H-series optimizer are not included and may be purchased in bulk (SolarEdge part number OPT-Washer-100 or OPT-Washer-500).

The star washer (used for grounding) should break through the anodize coating of the railing to ensure low resistive connection. Apply a torque of 84 lb*in / 9.5 N*m.

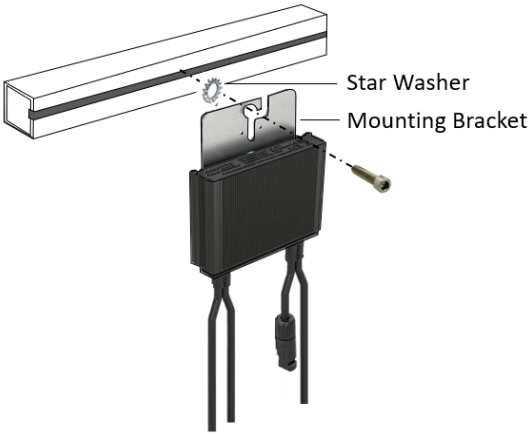

Figure 9: Power Optimizer installation and grounding using a star washer

- **For mounting on rails with sliding nut fasteners**: If the star washer cannot be used, use the SolarEdge grounding plate (purchased separately - Part Number: SE-GNDPLATE-100) between the railing and the flat side of the mounting bracket. Use mounting specific hardware as needed. Apply a torque of 84 lb*in / 9.5 N*m.
  See *Figure 10*.

  NOTE!

  For more detailed information on Grounding SolarEdge Power Optimizer refer to

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

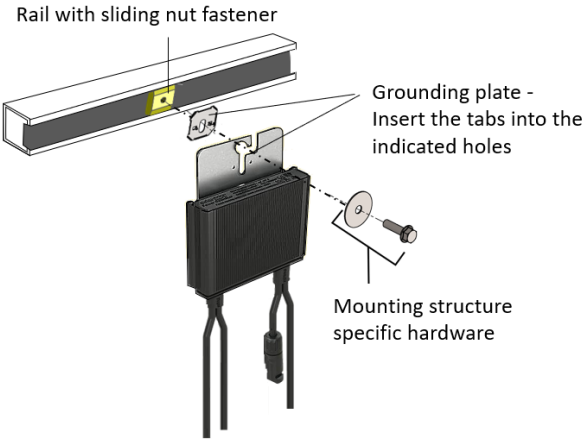

Figure 10: Power Optimizer installation and grounding using a grounding plate

- **For mounting on un-grounded structures** (such as a wooden structure): If the star washer or the plate cannot be used, use the SolarEdge 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 84 lb*in / 9.5 N*m.

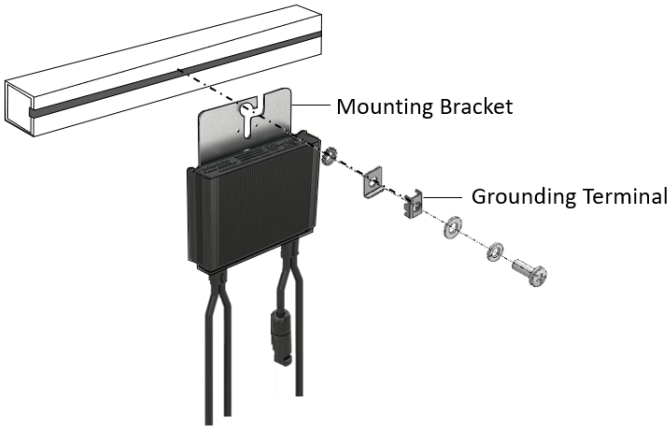

Figure 11: Power optimizer grounding terminal

5. Verify that each Power Optimizer is securely attached to the module support structure.
6. Record Power Optimizer serial numbers and locations, as described in *Reporting and Monitoring Installation Data* on page 73.

NOTE

When installing the Power Optimizers before the PV Modules, protect the connectors from rain and dust by using the provided seals. A seals kit can also be purchased separately (Part ID: OPT-SEAL-100).

Connecting PV module to Power Optimizer

NOTE

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

NOTE

When connecting SolarEdge Power Optimizer to multiple PV modules, the modules must be of the same type.

NOTE

When connecting two modules to one Power Optimizer, both PV modules must be positioned at the same orientation and tilt angle.

For each Power Optimizer:

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

CAUTION!

Do not sharply bend the DC wires. Keep proper bending radius to avoid wire breakage.

ATTENTION!

Ne pliez pas brusquement les câbles DC. Gardez un rayon de courbure approprié pour éviter la rupture du câble.

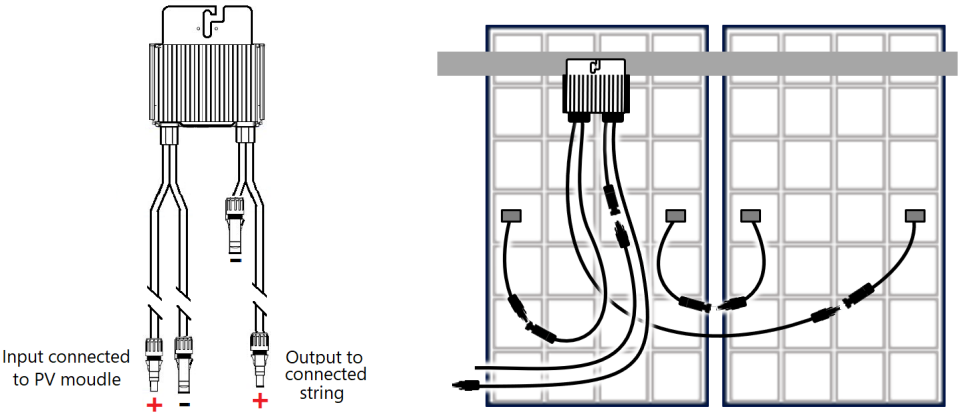

Figure 12: H1300 Power Optimizer Connectors

Connecting Power Optimizers in PV Strings

String Length Guidelines

- **Home-run wires:** You can construct parallel PV strings of unequal wire length, that is, the number of Power Optimizers in each PV string does not have to be the same. However, the longest string, connected to the same inverter, should not include more than five Power Optimizers than the shortest.

CAUTION!

When connecting three or more H1300 optimizer strings through a combiner box, SolarEdge recommends using a 30A fuse for each individual string to protect the system. However, be sure to check local electrical codes and regulations to determine the proper fuse sizing for your specific installation.

ATTENTION!

Lors de la connexion de trois chaînes d'optimiseur H1300 ou plus via un boîtier de combinaison, SolarEdge recommande d'utiliser un fusible de 30 A pour chaque chaîne individuelle afin de protéger le système. Cependant, assurez-vous de vérifier les codes et réglementations électriques locaux pour déterminer la taille de fusible appropriée pour votre installation spécifique.

NOTE:

To minimize electromagnetic interference (EMI), make sure to minimize the distance between the positive and negative DC wires.

NOTE:

The DC input of each inverter must be separate and not shared with other inverters. Follow the inverter design rules as detailed in the Technical Specifications.

The maximum wire lengths in a solar system are shown in *Figure 13*.

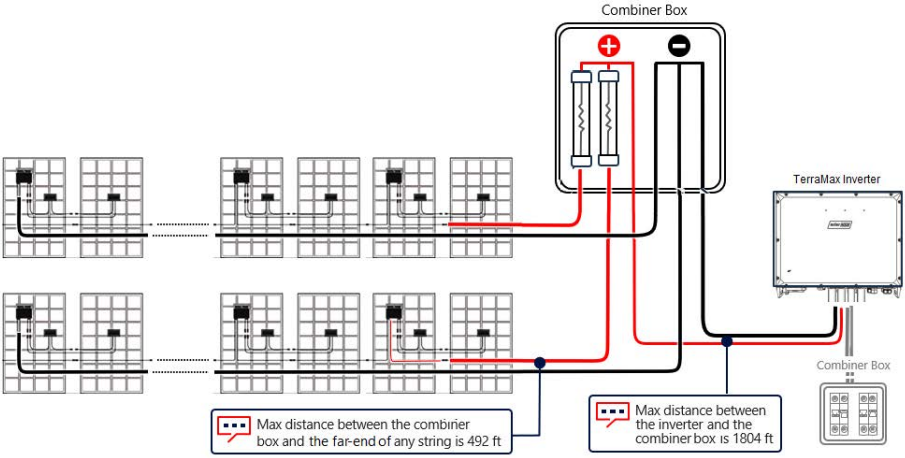

Figure 13: Maximum wire lengths

For Minimum and Maximum number of PV Panels and Power Optimizers in a string, refer to the Product Datasheet.

→ To connect the Power Optimizers on a PV string:

1. Connect the Minus (-) output 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: knowledge-center.solaredge.com/sites/kc/files/se-emi-performance-application-note.pdf
3. Connect the rest of the Power Optimizers to the PV string in the same manner.

CAUTION!

Do not sharply bend the DC wires. Keep proper bending radius to avoid wire breakage.

ATTENTION!

Ne pliez pas brusquement les câbles DC. Gardez un rayon de courbure approprié pour éviter la rupture du câble.

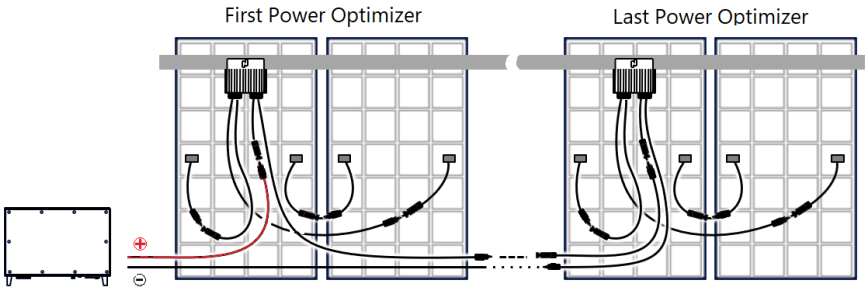

Figure 14: Power Optimizers connected in series

NOTE

If you install Power Optimizers before the PV Modules, protect the connectors from rain and dust by using the seals provided. Seal kits can be purchased separately (part ID: OPT-SEAL-100).

4. If you intend to monitor the installation, using the SolarEdge Monitoring platform, record the physical location of each Power Optimizer, as described in "Reporting and Monitoring Installation Data" on page 73.

WARNING!

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

AVERTISSEMENT!

Les connecteurs d'entrée et sortie ne sont pas étanches jusqu'à ce qu'ils soient accouplés. Les connecteurs doivent être accouplés ou fermés avec des terminaux étanches.

String Tests

Verifying Proper Power Optimizers Connection on a String

When a module is connected to a Power Optimizer, the Power Optimizer outputs a safe Voltage of 1V (±0.1V). Therefore, the total PV string Voltage should equal to 1V times the number of Power Optimizers connected in series in a PV string. For example, if 24 Power Optimizers are connected in a PV string, then 24 Vdc should be produced (see *Figure 15*).

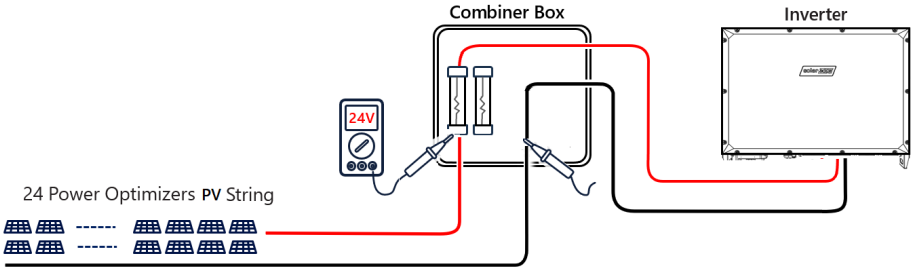

Figure 15: Verifying Proper Power Optimizers Connection on a String

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

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

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

→ To verify proper Power Optimizer connection:

1. Verify that the DC Disconnect switch of the inverter is in the OFF position (See"Inverter Features " on page 17) .
2. 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 " on page 76.

Chapter 4: Installing the Inverter

Mounting the Inverter

This section provides instructions for vertical mounting of the inverter on a metal construction or a wall.

CAUTION!

SolarEdge inverters and Power Optimizers can be installed at a minimum distance of 164 ft 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 655 ft 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.

ATTENTION!

Les onduleurs SolarEdge peuvent être installés à une distance minimum de 50m de la ligne d'eau de l'océan ou autre environnement salin, tant qu'il n'y a pas d'éclaboussements d'eau salée directs sur l'onduleur.

Pour les onduleurs SolarEdge installés à une distance de 200 m ou moins du rivage, des supports spéciaux achetés séparément auprès de SolarEdge et des vis inox SS304 sont nécessaires. Pour les détails, veuillez contacter le commercial de votre région.

- Ensure a clear and safe workspace.
- Open the shipping box and remove the inverter from the shipping platform.

CAUTION!

The inverter weighs 175 kg (386 lb). To prevent injuries and strain, never attempt to lift the shipping box by hand.

ATTENTION!

L'onduleur pèse 175 kg (386 lb). Pour éviter les blessures et les tensions, n'essayez jamais de soulever le carton d'expédition à la main.

- Verify all components and check for damage.
- Lift the inverter using a forklift or a hoist. Handle and transport with care.
- Read the user manual and gather accessories.
- Store packaging materials for future use.

- For temporary storage of the inverter, keep it in a dry, and well-ventilated area, away from potential hazards.

Dimensions

Figure 16 shows the dimensions of the inverter.

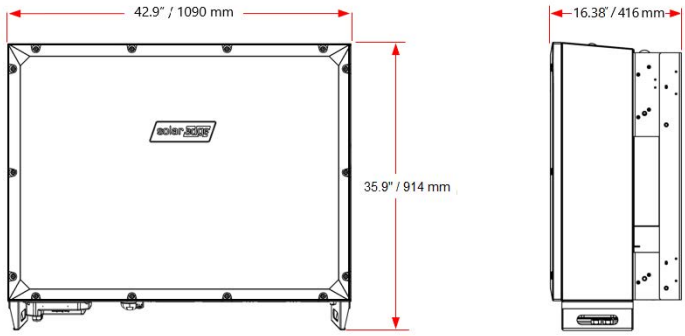

Figure 16: Inverter dimensions

Installation location and Positioning

Figure 17 shows the allowed mounting positions of the inverter.

NOTE:

SolarEdge recommend to keep the inverter shaded and out of direct sunlight to prevent overheating, reduction in power output and premature wear of electrical components.

NOTE:

The Inverter position must be vertical to the ground with no tilt.

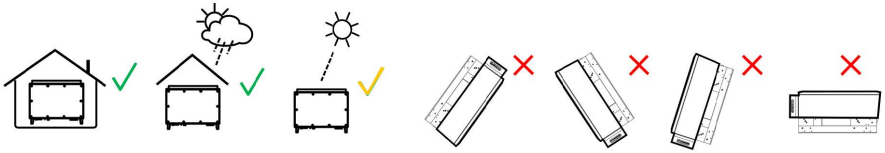

Figure 17: Location and position of the inverter

Clearance Requirements

To allow proper heat dissipation and prevent power reduction due to excessive temperature, ensure sufficient air circulation, and maintain minimum clearance between the inverter and other objects (see *Figure 18*).

It is recommended that the inverter be shaded to minimize direct sunlight exposure and heat absorption.

If shaded areas are unavailable, it is recommended to build a simple shade structure above the inverter to shield it from direct overhead sunlight.

In case any type of metal fencing is required, it is strongly recommended to use a mesh fence or metal beam construction that will allow proper airflow and heat dissipation.

CAUTION!

By installing the Inverters on a Centralized platform, all space clearances around the inverter must be followed. Vertical installation of inverters (one above other) is prohibited.

ATTENTION!

En installant les onduleurs sur une plate-forme centralisée, tous les dégagements autour de l'onduleur doivent être respectés. L'installation verticale des onduleurs (les uns au-dessus des autres) est interdite.

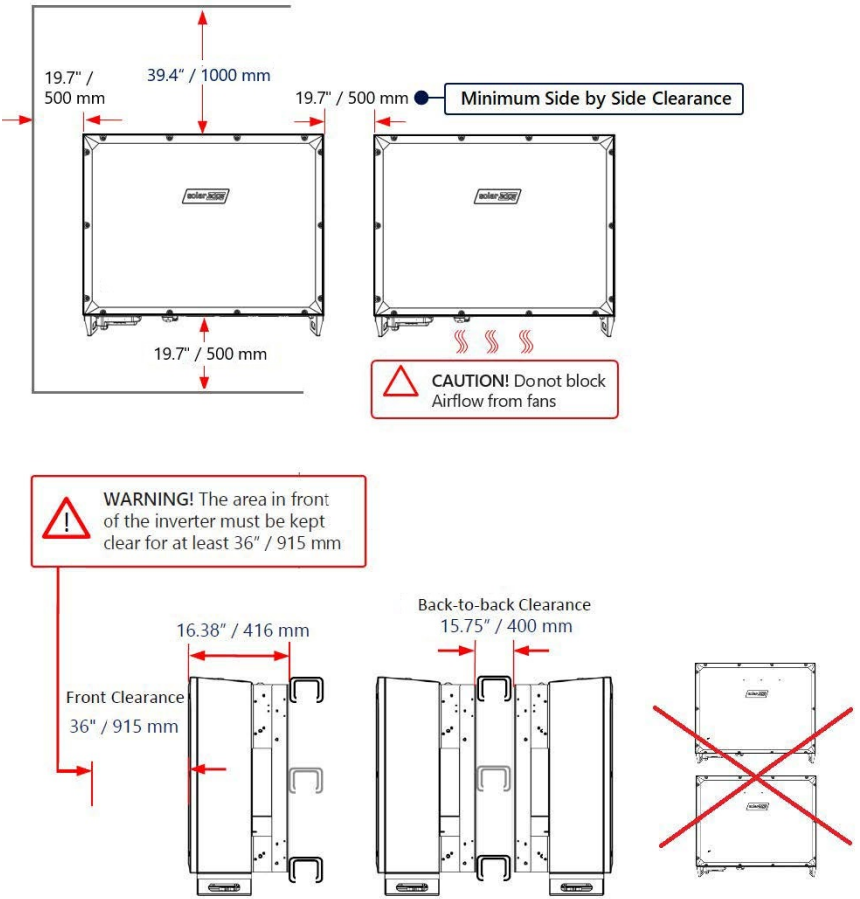

Figure 18: Inverter clearance requirements

Inverter Transport and Storage

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

Shipping Box Contents

The shipping box of the inverter contains the following:

- Inverter
- Mounting Bracket Kit
- 4 Screw-in Handles (Optional)
- 2 Lifting Eye Bolts
- Documentation Bag

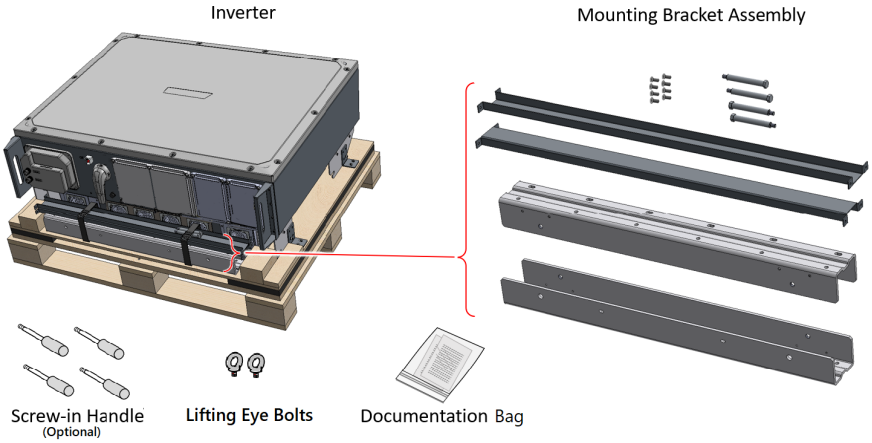

Figure 19: Inverter Package Contents

Identifying the Inverter

The stickers on the inverter specify the inverter's **Serial Number** and **Electrical Ratings**.

When opening a site in the SolarEdge Monitoring Platform and when contacting SolarEdge support, provide the inverter's serial number.

Mounting Bracket

Assembling the Mounting Bracket

→ To assemble the mounting bracket:

1. Insert and secure the four Load Support Screws into the two Mounting Bars (see *Figure 20*). Torque the Load Support Screws to 8 N*m/71 lb*in.
2. Use the left eight connecting screws to join the two Connecting Bars to the Mounting Bars. Torque the screws to 4.5 N*m/40 lb*in.

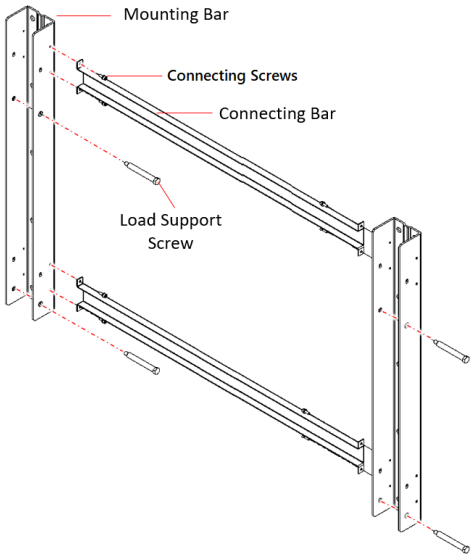

Figure 20: Assembling the Mounting Bracket

Installing the Mounting Bracket

→ To install the mounting bracket:

1. Level the mounting bracket of the inverter horizontally against the metal frame and mark at least eight drilling hole locations (see *Figure 21*).

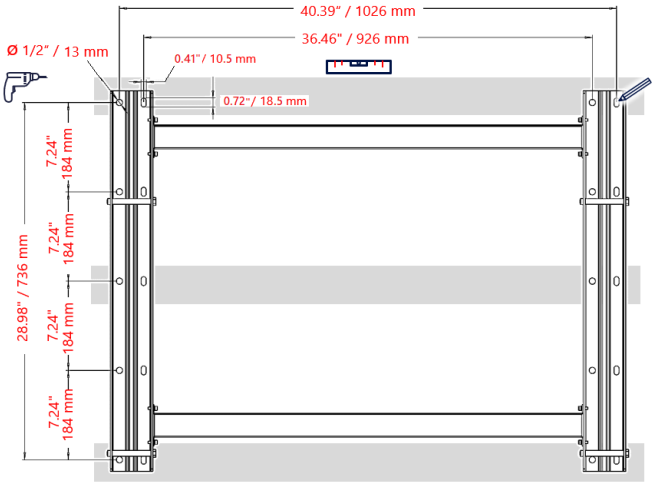

Figure 21: Marking the drilling holes for the mounting bracket

2. Drill at least eight holes for mounting the bracket.
3. Position and secure the mounting bracket to the metal frame using at least eight bolts per fixture (At least four M8 bolts per each mounting bar). Tighten the bolts all the way and verify that the mounting bracket is firmly attached to the metal frame.

Mounting the Inverter Before Conduits are Installed and Wiring is Laid Down

→ To mount the inverter:

1. If optional screw-in handles are used, anchor the screw-in handle to any point at the inverter (see *Figure 22*).
2. Hoist the inverter towards the mounting bracket. Use the two lifting eye bolts on the inverter for securely lifting the inverter. To avoid any stress on the inverter during lifting, always consider the center of gravity of the inverter while lifting.

CAUTION!

HEAVY OBJECT 386 lb/175 kg. To avoid injury, use proper lifting techniques, and if required - a lifting aid. When lifting, balance the load to avoid stress.

ATTENTION

Objet lourd (386 lb/175 kg). Pour éviter les blessures, utilisez des techniques de levage appropriées et, si nécessaire, une aide au levage. Lors du levage, équilibrez la charge pour éviter le stress.

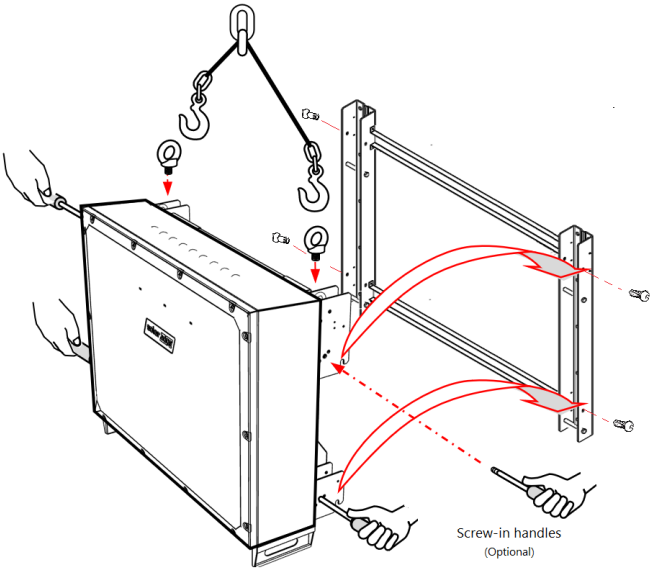

Figure 22: Mounting the inverter before wiring is laid down

3. Move the inverter to the destination by using the bottom handles as well as the Screw-in handle.
4. Align the four hangers on the back inverter enclosure with the mounting bracket and lower the inverter until it rests on the bracket evenly (see *Figure 22*).
5. Tourqe the foure screws securing the inverter to the mounting bracket to 40 lb*in.
6. Once the conduits and wires are laid down, remove and drill cable holes in the AC and DC panels, at the bottom of the inverter. Reinstall the panels and lead the AC and DC conduits, via the panels, into the inverter (see "Drilling Conduit Holes" on page 51).

Mounting the Inverter when Wiring is Already Laid Down

→ To mount the inverter:

1. If optional screw-in handles are used, anchor the screw-in handle to any point at the inverter (see *Figure 22*).
2. loosen the screws securing the front panel of the inverter and remove the panel.
3. Hoist the inverter towards the mounting bracket. Use the two lifting eye bolts on the inverter for securely lifting the inverter. To avoid any stress on the inverter during lifting, always consider the center of gravity of the inverter while lifting.

CAUTION!

HEAVY OBJECT 386 lb/175 kg. To avoid injury, use proper lifting techniques, and if required - a lifting aid. When lifting, balance the load to avoid stress.

ATTENTION!

Objet lourd 386 lb/175kg. Pour éviter les blessures, utilisez des techniques de levage appropriées et, si nécessaire, une aide au levage. Lors du levage, équilibrez la charge pour éviter le stress.

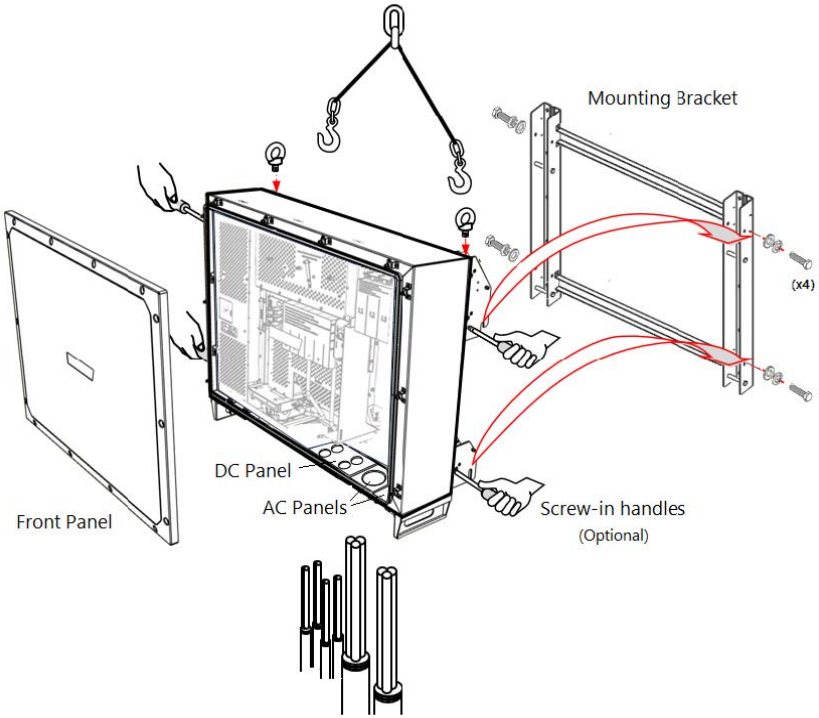

Figure 23: Mounting the inverter when wiring is already laid down

4. Move the inverter to the destination by using the bottom handles as well as the Screw-in handle.
5. Remove and drill cable holes in the AC and DC panels, at the bottom of the inverter. Reinstall the panels and lead the AC and DC conduits, via the panels, into the inverter (see "Drilling Conduit Holes" on the next page).

6. Lower the inverter, leading the AC and DC conduits through the holes in the AC and DC panels at the bottom of the inverter.
7. Align the four hangers on the back inverter enclosure with the mounting bracket and lower the inverter until it rests on the bracket evenly (see *Figure 22*).
8. Tourqe the foure screws securing the inverter to the mounting bracket to 40 lb*in.

Drilling Conduit Holes

This section describes how to drill entry holes for the AC, DC, and PE (Ground) cable conduits at the bottom of the inverter.

This procedure must be performed only on a site where wiring is already laid down.

→ To drill cable conduit holes:

1. Release the screws securing the DC and AC panels and remove the panels from the bottom of the inverter enclosure.

CAUTION!

To avoid damage to the internal part of the inverter, always remove the panels from the enclosure before drilling holes.

ATTENTION!

Pour éviter d'endommager les pièces internes de l'onduleur, retirez toujours les panneaux du boîtier avant de percer des trous.

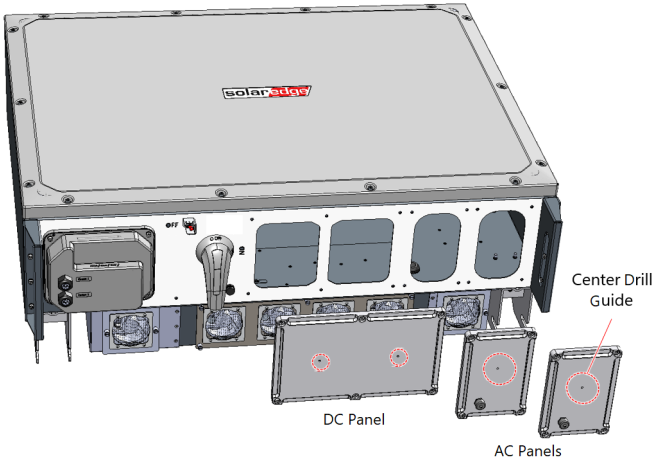

Figure 24: AC and DC panels with center drill guides at the bottom of the inverter

2. Locate the center drill guides for conduits on the DC and AC panels. Drill up to 3" entry hole(s) on the DC panel and one 2.5" on the AC panels (see *Figure 24*).
3. Position the DC and AC panels back at the bottom of the inverter and torque the screws to 3.9 N*m/34 lb*in.

Connecting PV Strings and Arrays

This section describes how to connect the inverter to the PV strings and PV arrays.

CAUTION!

The DC inputs (PV inputs) of the inverter are not intended for connection to a battery or any other type of DC source except a PV array / string.

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.

→ To unlock the Inverter and connect the PV strings to the DC terminal block of the inverter:

1. To unlock the inverter and enable power production, move the lock from SHIPMENT to OPERATION (see *Figure 25*).

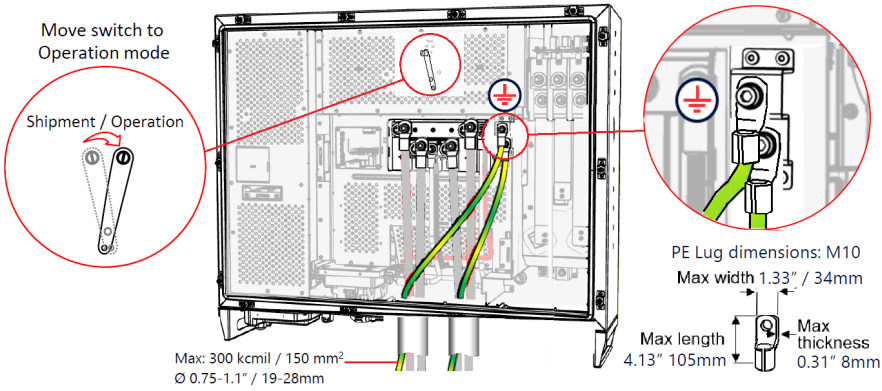

Figure 25: Unlocking the inverter and Connecting PE (Ground)

2. Remove the nut from Protective Earth (PE) gland and insert the PE wire through the PE gland.
3. Strip the required length of insulation from the PE wire, crimp a lug and connect the wire to a PE terminal and tighten the screw to 16.3 N*m / 144 lb*in.
4. Strip the required length of insulation from the DC+ and DC- wires.

5. If aluminum wires are used, an oxidized layer on the wires could result in thermal issues, production loss, or damage to the inverter.

   Perform the following steps 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.

6. Crimp lugs on the DC wires.

CAUTION!

- For aluminum wires: Use Al/Cu (bi-metal) lugs or aluminum lugs with bi-metal washers.
  Place the bi-metal washer between the aluminum lug and the inverter bus bar, copper side facing the bus bar.
- For copper wires: Use only copper tin-plated lugs.

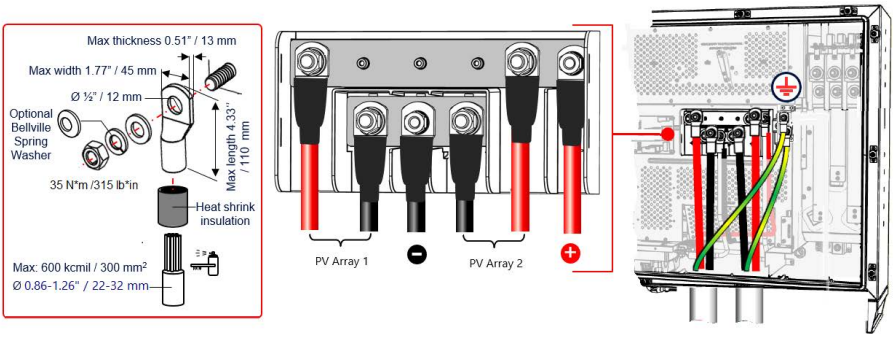

Figure 26: Connecting the DC wires to the Inverter

7. Connect the DC wires to the DC bus-bar according to the labels on the terminals. Tighten the nuts to 35 N*m/315 lb*in (see *Figure 26*).

CAUTION!

DO NOT use an impact driver or any electrical tool to fasten the terminal screws.

8. Tighten the nut of the DC conduits according their specification.
9. Place the cover of the DC terminal block in position and push until you hear a lock click.
10. Close the front cover of the inverter and fasten the screws to 3.9 N*m/34 lb*in.

Connecting AC to the Inverter

This section describes how to connect the AC and ground to the Inverter.

The AC connections of 3 AC phases (L1, L2, and L3) and Ground. The AC connection of the inverter is spread across two cables, AC 1, and AC 2. to enable a flexible mechanical connection.

WARNING!

To avoid shock hazard conditions, the Protective Earth (PE) Ground wire must be connected to the inverter before connecting the AC wires.

AVERTISSMENT!

Pour éviter les risques d'électrocution, le fil de terre doit être connecté à l'onduleur avant de connecter les fils CA.

Wiring Guidelines

- Use AC line wires with a maximum of 600 kcmil cross section conductor
- Use PE wire with a maximum of 300 kcmil cross section conductor
- Use wires compatible with local standards according to Inverter AC voltage.
- 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.

NOTE

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

- 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.

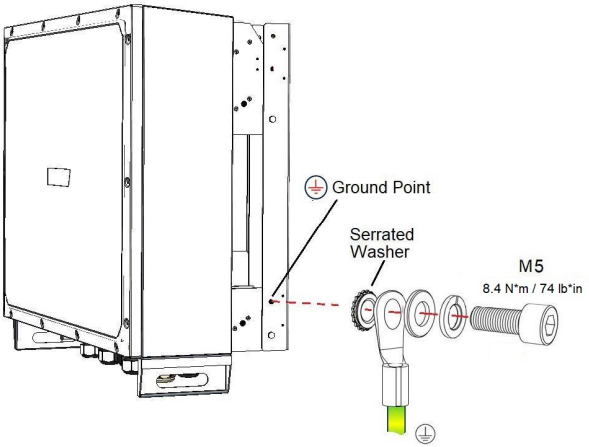

Figure 27: Grounding the mounting bracket of the inverter

Grid Connection Information

Prior to system installation, refer to the following table showing the short-circuit current in SolarEdge TerraMax Inverters:

The following table shows the short-circuit current in SolarEdge TerraMax Inverters:

Inom (A)	Ip (A)	1 RMS cycle (A)	3 RMS cycles (A)	Duration (ms)
275	592	217	236	150

WARNING!

The inverter must be protected by an over-current protection device (a circuit breaker or a fuse) with a recommended rating of 350 A per phase.

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

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 NEC and Canadian Electrical Code, Part I.

AVERTISSMENT!

L'onduleur solaire doit être protégé par un dispositif de protection contre les surintensités (un disjoncteur ou un fusible) d'une valeur nominale recommandée de 350 A par phase. La protection contre les surintensités pour la sortie CA doit être fournie par l'installateur.

Le dispositif de protection contre les surintensités (OCPD) pour la sortie CA sera fourni lors de l'installation. La coordination des tailles de conducteurs avec la protection contre les surintensités doit être conforme au NEC et au Code canadien de l'électricité, partie I.

→ To connect the AC wires to the inverter:

1. Release the Allen screws that secure the front cover to the inverter and carefully remove the cover (see *Figure 28*).

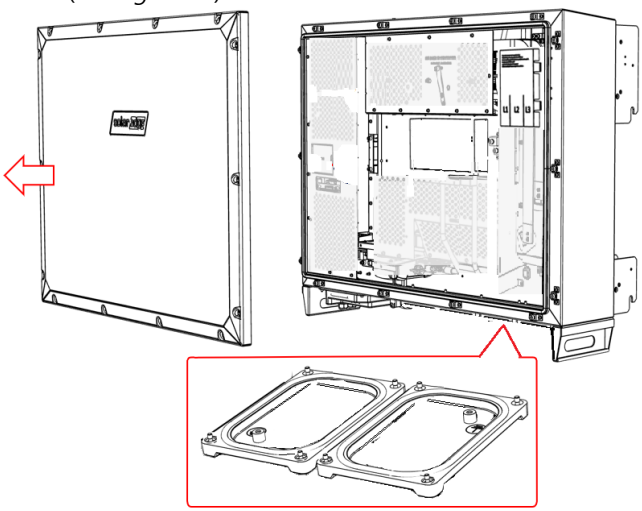

Figure 28: Inverter cover and AC panels

2. Remove the nut from Protective Earth (PE) gland and insert the PE cable through the PE gland (see *Figure 28*).
3. Strip the required length of insulation from the PE wire, crimp a lug and connect the wire to a PE terminal and tighten the screw to 16.3 N*m/144 lb*in (see *Figure 29*).

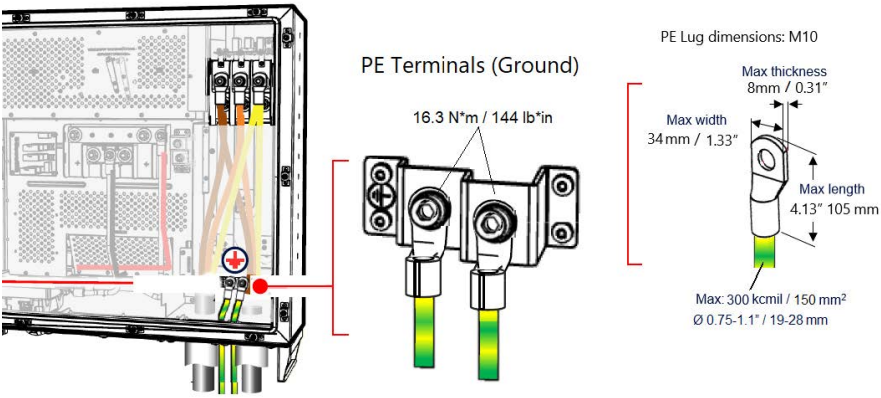

Figure 29: Connecting PE (Ground) to the Inverter

4. Use up to 2.5'' conduit. Lead the cable conduits through the AC drill holes and secure the conduit nuts.
5. Connect a PE (Ground) wire between a metal conduit and the PE (Ground) terminal on the AC panels (see *Figure 30*).

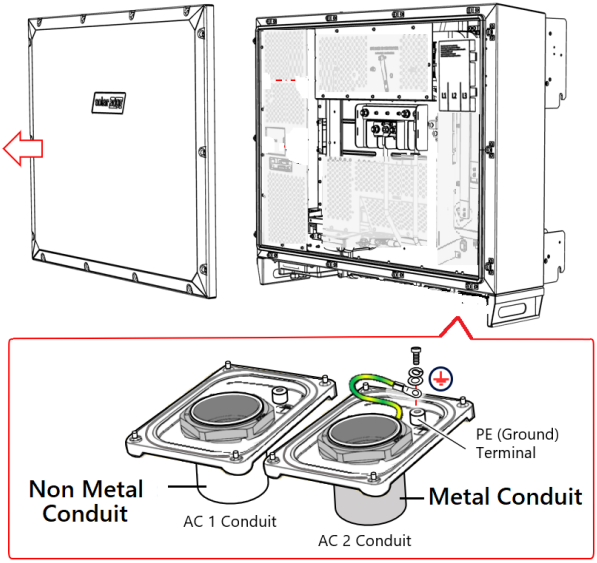

Figure 30: AC Panels

6. Remove the Protective Cover from the AC terminal block.

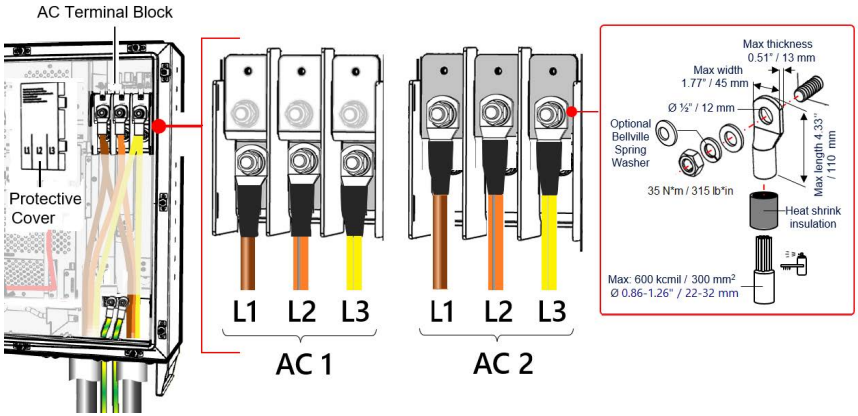

Figure 31: Connecting AC wires to the Inverter

7. Strip the required length of cable jacket from the AC 1 and AC 2 cables to expose the cable wires.
8. Strip the required length of insulation from the L1, L2, L3 wires of the AC 1 and AC 2 cables.
9. If aluminum wires are used, an oxidized layer on the wires could result in thermal issues, production loss, or damage to the inverter.

   Perform the following steps 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.
10. Crimp lugs on the wires of the AC 1 and AC 2 cables.

CAUTION!

- For aluminum cables: Use Al/Cu (bi-metal) lugs or aluminum lugs with bi-metal washers.
  Place the bi-metal washer between the aluminum lug and the inverter bus bar, copper side facing the bus bar.
- For copper cables: Use only copper tin-plated lugs.

11. Connect the L1, L2, L3 wires to the terminal block according to the labels on the terminals. Tighten the nuts to 35 N*m/315 lb*in (see *Figure 31*).

CAUTION!

DO NOT use an impact driver or any electrical tool to fasten the terminal nuts.

ATTENTION!

N'utilisez PAS de visseuse à percussion ou d'outil électrique pour serrer les écrous des bornes.

12. Tighten the nut of the AC and PE conduits according to their specification.
13. Place the Protective Cover on the AC terminal block and push until you hear a lock click.
14. Close the front cover of the inverter and fasten the screws to 3.9 N*m/34 lb*in in a crossed pattern.

Connecting Communication

In large solar installations, SolarEdge TerraMax Inverters are connected in a communication network to monitor system performance and identify any faults or issues.

The two common communication protocols used for inverter networks are CAN (Controller Area Network) and RS-485 (Modbus protocol).

The CAN network is used for linking up to 13 SolarEdge TerraMax Inverters. The maximum distance allowed between first and last inverter is 2460 ft.

IMPORTANT NOTE!

Only SolarEdge TerraMax Inverters should be connected to the CAN bus network. **Do not connect** inverters or devices other than SolarEdge TerraMax Inverters to the CAN bus.

RS-485 is used to connect peripheral equipment such as meters, Power Plant Controller (PPC) or other third-party equipment. The maximum distance allowed between the inverter and a third party device is 3280 ft.

In CAN network, one inverter acts as the Leader inverter. This Leader unit serves as the gateway to external monitoring and direct data through a connected LAN router and an internet link.

The other inverters in the system are Follower inverters, which report operational and production data back to the Leader inverter, linked to the same bus.

The CAN protocol uses a single, shielded twisted pair cable to connect the inverters in a daisy-chain layout. RS-485 networks also follow a daisy-chain design utilize shielded twisted pair cabling. The CAN network requires proper line termination at the two farthest ends of the chain to prevent signal reflection and interference. This is achieved by termination switches on the communication board of the two inverters located at the both ends of the chain.

IMPORTANT NOTE

Make sure the CAN Switch (see item 9 in *Figure 34*) is set to ON position on the first and last inverters on the CAN bus.

The inverter is equipped with two glands, designated for routing the communication cables in and out of the inverter. After connecting communication cables, verify that all unused openings remain sealed.

Figure 32 shows a string of SolarEdge TerraMax Inverters linked CAN or RS-485 communication network.

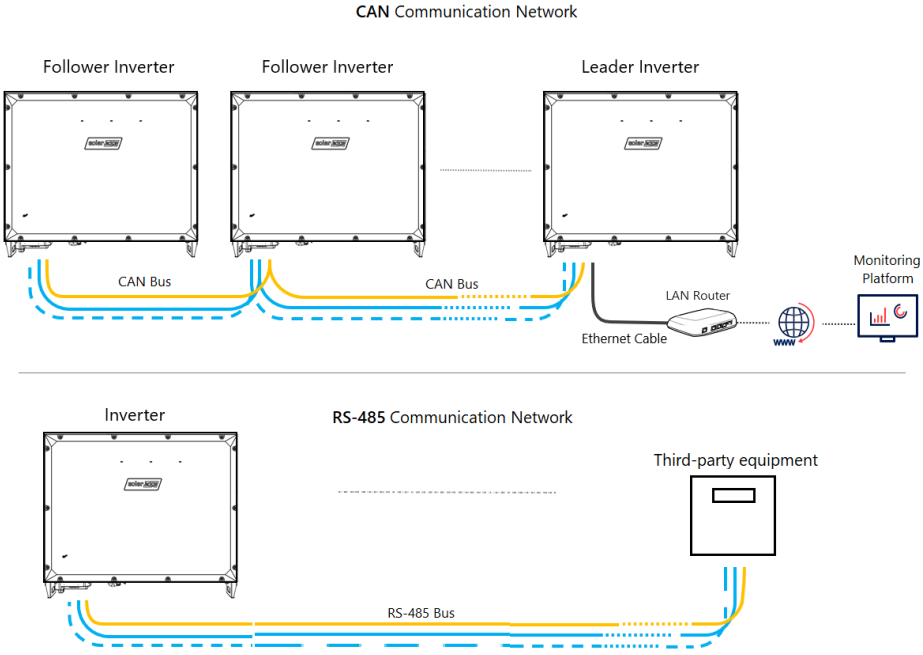

Figure 32: String of SolarEdge TerraMax Inverters linked by a CAN or RS-485 communication network

Figure 33 shows the communication compartment of the inverter.

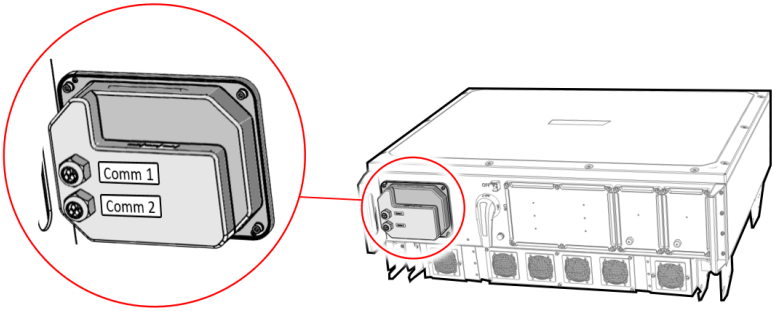

Figure 33: Communication compartment of the inverter

Connecting the CAN / RS-485 Communication Between Inverters / RS-485 Between Inverter and Third Party Device

Cable Requirements

- CAT5e or CAT6 cable type
- Shielded cable
- Twisted pair wires
- Conductor cross-section: 0.2 mm^2 to 1 mm^2
- External cable diameter 2.5 to 5 mm
- Maximum CAN cable length between all connected inverters: 2460 ft
- Total RS-485 cable length per string: 3280 ft
- 1000 V insulated
- UV-resistant for outdoor use

→ To connect the communication cables to the inverters:

1. Turn OFF the ON/OFF/P switch of the inverter.
2. Turn OFF the DC Disconnect switch of the inverter.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel and wait 5 minutes to allow the capacitors inside the Inverter to discharge.
4. Release the four Allen screws (1) of the communication compartment cover (2) and remove the cover (see *Figure 34*).

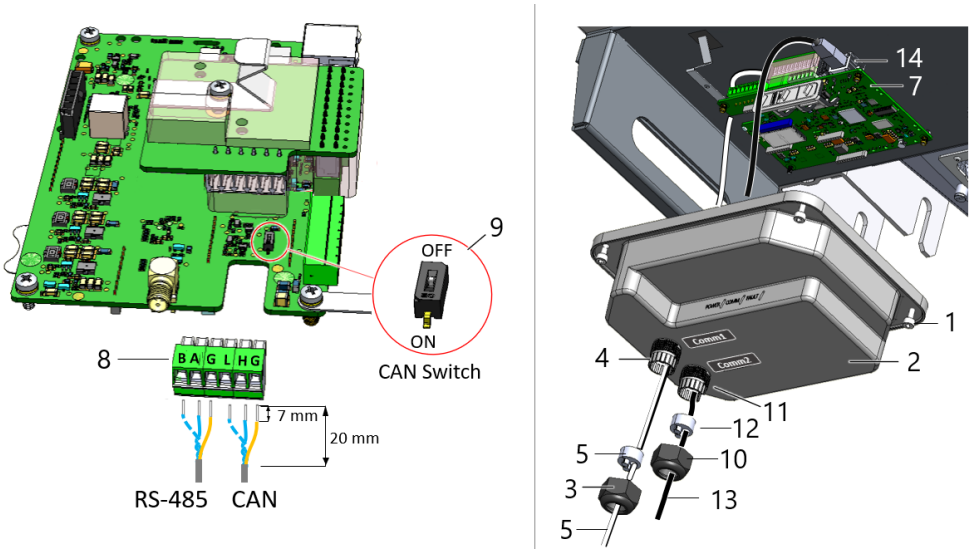

Figure 34: Connecting the communication cables

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.

ATTENTION!

Lors du retrait du couvercle, assurez-vous de ne pas endommager les composants internes. SolarEdge ne peut être tenue pour responsable des composants endommagés à la suite d'une imprudence dans le retrait du couvercle.

5. Loosen the nut (3) of Comm 1 gland (4) and remove the rubber seal (5).
6. Route the communication cable (6) via one of openings in the rubber seal, through the gland and communication compartment cover (2).
7. Pull down to remove the communication board (7) from the enclosure.
8. Strip about 20 mm from the protection layer of the communication cable and expose 7 mm of conductor from each wire.
9. Secure the wires to the terminal screws of the connector (8) and plug the connector to the communication board (7). Connect the other end of the cable to the same terminals of the next inverter. Make sure the resistance between H and L is 120Ω.

10. Terminate the first and last inverters on the communication bus by moving the CAN Switch (9) to ON. All other inverters on the bus must be switched to OFF.
11. Install the communication board (7) back onto the enclosure.
12. Place the communication compartment cover (2) and secure the four Allen screws (1) to a torque of 3.9 N*m/34 lb*in (see *Figure 34*).
13. Place the rubber seal (4) inside the gland nut (3) of Comm1 gland (13) and fasten the nut to a torque of 5.5 N*m/49 lb*in.

Connecting the LAN Communication Between the LAN Router and the Leader Inverter

Ethernet Cable Requirements

- CAT5e or CAT6 cable type
- Shielded cable
- RJ45 connector
- UV-resistant for outdoor use
- Maximum cable length: 330 ft

NOTE

If an Ethernet cable longer than 33 ft must be used in areas where there is a risk of induced Voltage surges by lightning, it is recommended to use external surge protection devices. For details refer to: http://www.solaredge.com/files/pdfs/lightning_surge_protection.pdf

CAT6 or CAT5e cables have eight wires (four twisted pairs), as shown in the pin layout of the Ethernet connector in *Figure 35*. Wire colors may differ from one cable to another. You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding.

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

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

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

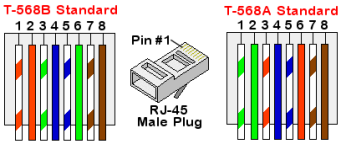

Figure 35: Ethernet connector - pin layout

→ To connect a LAN cable between the Leader inverter and an internet router:

1. Loosen the nut (10) of Comm2 gland (11) and remove the rubber seal (12) from within (see *Figure 34*).
2. Route the Ethernet cable (13) through one of openings in the rubber seal, and through the gland, into the enclosure.
3. Connect the CAT5e/CAT6 cable to the RJ45 connector.
4. Plug the Ethernet cable (13) into the LAN port (14).
5. Attach the communication board (7) to the enclosure.
6. Insert the rubber seal (12) into the Comm2 gland (11) and tighten the nut to 5.5 N*m/49 lb*in.
7. Place the communication compartment cover (2) and secure the four Allen screws (1) to a tourqu of 3.9 N*m/34 lb*in.

LAN Configuration

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

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

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)
- LAN can also be configured manually after commissioning the inverter. From the **Commissioning** screen, tap **Site Communication**. Select **Configure Ethernet**, to configure the connection.

Chapter 5: Activating, Commissioning and Configuring the System

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

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

Before starting the activation and commissioning, verify all the communication hardware is properly connected.

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

Before activation and commissioning, download the SetApp application from:

For downloading SetApp, Internet connection, one-time registration and logging are required. No registration is required for using the SetApp.

IMPORTANT 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 SolarEdge SetApp mobile application.

Activating the Installation

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

Before activation

- Download, register (first time only) and login to SetApp on your mobile device. Verify that the application is updated with the latest version.
- If applicable, turn on all devices (battery, Energy Meter, 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.
3. Open SetApp and follow the on-screen instructions (scan the inverter barcode; move the ON/OFF/P switch to P position for 2 seconds and release).

   SetApp creates a Wi-Fi connection, upgrades the inverter firmware, activates the inverter, and performs pairing.
4. When the activation is completed, tap **Continue**.
5. Once pairing is completed, **Pairing Completed** will be displayed on top banner of the SetApp Commissioning screen. Perform the following:
   - Tap and set **Country & Grid**.
   - Tap and set any other configuration parameters as required.
6. From the Commissioning screen, tap **Central Commissioning** for follower inverters detection, pairing and central firmware upgrade and activation for all followers at once.

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, tap **Continue** to access the commissioning screen. To start central commissioning tap it on the menu and follow the on-screen instructions.
- If the inverter has already been activated and commissioned:
  - If not already ON - turn ON the inverter by turning ON the circuit breaker on the main distribution panel.
  - Open SetApp and follow the on-screen instructions (scan the inverter QR code, move the ON/OFF/P switch to P position for 2 seconds and release).

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

Setting Country and Grid

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 during 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** and wait for pairing to complete.
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 ON/OFF/P switch, the DC wires carry a high Voltage and the Power Optimizers no longer output a safe output.

   AVERTISSEMENT!

   Après avoir mis l'interrupteur ON/OFF/P de l'onduleur monophasé sur ON, les câbles DC portent une haute tension et les optimiseurs de puissance ne génèrent plus la tension de sécurité.

   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.

- 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 C&I One User Guide available on the SolarEdge website at: https://utility.solaredge.com/hub/ci_one_user_guide.pdf

Power Control

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

NOTE

SolarEdge inverters with "Grid Support" functionality (as marked on the inverter certification label), are compliant with UL 1741 Supplement B. The functionality is built into the inverter and no additional external device is required.

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. Make sure that **S_OK** is displayed under Server Comm. section.
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.

Central Commissioning

After commissioning an inverter and defining the inverter as a Leader, a central commissioning process can be done.

Central commissioning enables the configuration settings of the Leader inverter to be applied at once to all Follower inverters in a significantly short time and with fewer configuration errors.

To start the central commissioning process, from the SetApp **Commissioning** screen select **Central Commissioning** and follow the on-screen instructions.

Central commissioning is activated based on the on-site communication performance.

In some cases, SetApp might guide you to commission each inverter individually.

DC Commissioning

DC commisioning enables to commision the inverter before connecting the inverter to the grid.

→ To perform DC commissioning:

1. Turn OFF the AC circuit breaker on the main distribution panel.
2. Verify that the DC Disconnect Switch of all inverters are in ON position. The green and blue LED indication lights should alternate, indicating pre-commissioning.
3. Run SetApp and follow the on-screen instructions to scan the inverter barcode, move the ON/OFF/P switch to P position for 2 seconds and release. SetApp creates a Wi-Fi connection, upgrades the inverter firmware, activates the inverter and performs pairing. During the process "DC Commissioning" will appear on the top banner of screen.

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.

The Monitoring Platform

The monitoring platform provides enhanced PV performance monitoring and inverter yield assurance through immediate fault detection and alerts at the module, PV array and system level.

Using the platform, you can:

- View the latest performance of specific components.
- Find under-performing components, such as modules, by comparing their performance to that of other components of the same type.
- Pinpoint the location of alerted components using the physical layout.

The monitoring platform enables accessing site information, including up-to-date information viewed in a physical or logical view:

- **Logical Layout**: Shows a schematic tree-layout of the components in the system, such as: inverters, Power 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/products/pv-monitoring#/.

Creating Logical and Physical Layout using Installation Information

To display a logical layout, insert in the new site created in the monitoring platform. When the communication between the 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://monitoring.solaredge.com/solaredge-web/p/createSelfNewInstaller.
2. Fill out all the required information in the screen, which includes information about your installation, as well as details about its logical and physical mapping.

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 in SetApp and alerts displayed in the monitoring platform, refer to https://knowledge-center.solaredge.com/sites/kc/files/se-troubleshooting-terramax-inverter-alerts-application-note.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 ON/OFF/P switch to **P** position for **2 seconds** and release it.
2. Observe the LED lights and use the following table to identify the error type. For more information, refer to: https://www.solaredge.com/us/leds.

Error Type	Inverter LED Color and State		
	Green	Blue	Red
Isolation or RCD problem	OFF	OFF	Blinking
Grid error	ON	OFF	OFF
High temperature	Blinking	OFF	OFF
Pairing failed	OFF	ON	OFF
Other issue	OFF	Blinking	OFF

→ 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.

Power Optimizer Troubleshooting

Malfunction	Possible Cause and Corrective Action
Pairing failed	Power Optimizers are shaded. Retry pairing (during sunlight). Make sure that the ON/OFF/P switch of the inverter is ON and that S_OK appears in the Status screen of the SetApp mobile application.
PV string Voltage is 0V	Power Optimizer (s) output is disconnected. Connect all Power Optimizer outputs.
PV string voltage not 0V but lower than number of Power Optimizers	Power Optimizer(s) not connected in the PV string. Connect all Power Optimizers.
	Panel(s) not connected properly to Power Optimizer inputs (not applicable to smart modules). Connect the modules to the Power Optimizer inputs.
	PV string reverse polarity. Check PV string polarity using a voltmeter and correct if needed.

Malfunction	Possible Cause and Corrective Action
PV string Voltage is higher than number of Power Optimizers WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of ±1% per PV string is reasonable. AVERTISSEMENT! *Si la tension mesuree est trop haute, la tension basse de securite pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION. Une deviation de ±1% par string est raisonnable.*	Extra Power Optimizer(s) connected in the PV string (not applicable to smart modules). Check if an extra Power Optimizer is connected in the PV string. If not – proceed to next solution. A module is connected directly to the PV string, without a Power Optimizer (not applicable to smart modules). Verify that only Power Optimizers are connected in the PV string and that no module outputs are connected without a Power Optimizer. If the problem persists, proceed to the next step. Power Optimizer(s) malfunction. 1. Disconnect the wires connecting the Power Optimizers in the PV string. 2. Measure the output voltage of each Power Optimizer to locate the Power Optimizer that does not output 1V safety Voltage. If a malfunctioning Power Optimizers located, check its connections, polarity, module, and Voltage. 3. Contact SolarEdge Support. Do not continue before finding the problem and replacing the malfunctioning Power Optimizer. If a malfunction cannot be bypassed or resolved, skip the malfunctioning Power Optimizer, thus connecting a shorter PV string.

Troubleshooting Communication

Troubleshooting Ethernet (LAN) Communication

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

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

Troubleshooting CAN Bus Communication

- If after follower detection the number of followers displayed for the leader under CAN menu> **Followers** 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.

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/se-terramax-inverter-isolation-fault-troubleshooting-application-note.pdf

Appendix B: Maintenance

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

CAUTION!

Neglecting required maintenance on the inverter can lead to overheating and power loss due to derating. In some cases, lack of maintenance may also damage the inverter itself. To prevent these issues, be sure to perform all maintenance procedures detailed in this appendix.

ATTENTION!

Négliger l'entretien requis sur l'onduleur solaire peut entraîner une surchauffe et une perte de puissance due au déclassement. Dans certains cas, le manque d'entretien peut également endommager l'onduleur solaire lui-même. Pour éviter ces problèmes, veillez à effectuer toutes les procédures de maintenance détaillées dans cette annexe.

Routine Maintenance of the System

Once every six months, perform a maintenance inspection of the site to ensure its proper and efficient functioning and prolonging its lifespan.

NOTE

The frequency of maintenance inspections may vary according to the environmental conditions. A dusty environment may require more frequent inspections.

Inspection Type	Description	Pass	Fail
On-going site-related issues	Review any outstanding issues or alarms from monitoring system. Check grid status, circuit isolation, and other factors that could be impacting system.		
Visual inverter surrounding	Look for any signs of damage, corrosion, overheating around the inverter. Document any concerning issues.		
Cables, conduit, and glands	Visually inspect electrical cables, conduits, and glands for fraying, cracking, loose connections, or other damage.		
Inverter fans	Visually inspect fans for dust buildup. Clean fan blades and vents if excessive		

Inspection Type	Description	Pass	Fail
	debris is present.		
Signs of overheating	Use infrared camera to check for hot spots on connectors, terminals, busbars, and other components indicating overheating issues.		

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 metal fixture 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 enclosure. 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 fans, 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.
5. Check the wiring glands: Check that the unused openings / glands at the bottom of the Inverter, are sealed.
6. Check the wiring: Check that cables and wires are not damaged. If wires are disconnected, immediately power-off 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.

Use a continuity tester to check the continuity between the metal fixture of the inverter, the inverter's enclosure, metal conduits, and the grid earth. The tester should indicate a continuous circuit.

Fan Maintenance

Each inverter has cooling fans 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, clean the accumulated dust using a brush.

Check each 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 fans of the inverter:

1. Turn ON/OFF/P Switch of the inverter to OFF (0).

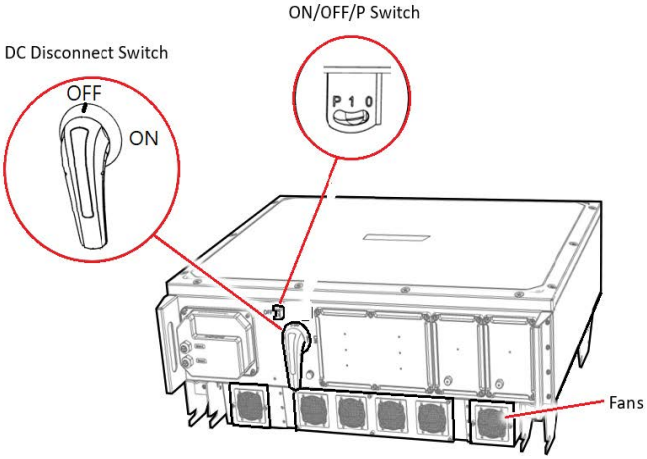

Figure 36: Removing the Fans

2. Turn OFF the DC Disconnect Switch on the bottom of the inverter.

WARNING!

Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

AVERTISSEMENT!

Attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.

3. Turn OFF the AC circuit breaker on the distribution panel.
4. Clean the accumulated dust on the fan and screen using a brush.
5. Turn ON the AC circuit breaker on the distribution panel.
6. Turn ON the DC Disconnect Switch at the bottom of the inverter.
7. Turn ON(I) the ON/OFF/P Switch of the inverter.
8. 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

→ To maintain the wire connections of the inverter:

1. Turn the ON/OFF/P Switch of the inverter to OFF (0) and wait for five minutes for the DC Voltage, inside the inverter, to drop to a safe value before proceeding to the next step.

WARNING!

Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

AVERTISSEMENT!

Attendre cinq minutes avant d'ouvrir le couvercle. Sinon, il y a un risque de choc électrique provenant de l'énergie stockée dans le condensateur.

2. Turn OFF the DC Disconnect Switch on the bottom of the inverter of the inverter.
3. Turn OFF the AC circuit breaker on the distribution panel.
4. Remove the front cover of the inverter.
5. 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. Torque the nuts of the AC, DC and Ground (PE) terminals to a as described in "Installing the Inverter" on page 41.
   If you find any issues, repair, or replace the wire as necessary.
6. Attach the inverter cover and secure the four screws to 3.9 N*m/34 lb*in in a crossed pattern.
7. Turn ON the AC circuit breaker on the distribution panel.

8. Turn ON the DC Disconnect Switch on the front cover of the inverter.
9. Turn ON(I) the ON/OFF/P Switch of the inverter.

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. 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 does not match the expected performance. This could be due to shading, soiling, a malfunction, or other factors that are affecting the performance of the panel.

   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
2. 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.

   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

Appendix C: Interconnection Standards

The information in this appendix complies with the IEEE 1547-2018 standard. The IEEE 1547-2018 standard, establishes criteria and requirements for interconnection of distributed energy resources (DER) with electric power systems (EPS) and associated interfaces.

Performance Categories and Interconnection Standards

Description	Category / Standard
Normal Operating Performance Category	A[1], B
Abnormal Operating Performance Category	3
Additional Abnormal Categories	1[1], 2[1]
Interconnection Standards	UL 1741 Ed. 3 (SA), UL 1741 Ed. 3 (SB), IEEE 1547-2018, IEEE 1547.1-2020, IEEE 1547a-2020, IEEE 1547.1 2020 SRD 2.0 (HECO), CA Rule 21 2017, CSA 22.3 No 9

Utility authorization is required to change abnormal voltage and frequency set-points. Response to abnormal conditions and unintentional islanding results in a disconnect of the equipment from the area EPS.

Enter Service Settings

Function	IEEE 1547 Default Settings[2]	Range
Enter Service Delay	300[3]	0-1000 seconds
Enter Service Ramp Period	100	1-1000 seconds
Minimum voltage	0.917	0.88-0.95 p.u.
Maximum voltage	1.05	1.05 -1.05 p.u.
Minimum frequency	59.5	59.0-59.9 Hz
Maximum Frequency	60.1	60.1-61.0 Hz

[1] Units meet the highest performance category B, 3 and may be configured to operate at lower categories if required by the EPS.

[2] Settings will be specified by the regional EPS (electric power system) operator.

[3] Changes to this setting should not be made without approval from the area EPS operator

Grid Support Functions

Function	IEEE 1547 Default Settings (1)	Range
Constant Power Factor mode	1	0-1
Constant Reactive power mode	Disabled	+/- 1 nameplate Var p.u.
Voltage-Reactive power mode	Disabled	
V2	0.98	0.92 -1.05 V p.u.
Q2	0	+/- 1 nameplate Var p.u.
V3	1.02	0.95 -1.08 V p.u.
Q3	0	+/- 1 nameplate Var p.u.
V1	0.92	0.77-1.03 V p.u.
Q1	0.44	0-1 nameplate Var p.u.
V4	1.08	0.97-1.23 V p.u.
Q4	-0.44	(-1)-0 nameplate Var p.u.
OLRT	5	1-90 seconds
Active Power-Reactive power mode(1)	Disabled	
P3	1	0.5-1 nameplate power p.u.
P2	0.5	0.4-0.8 nameplate power p.u.
P1	0.2	0-0.7 nameplate power p.u.
P'1	-0.2	-0.7-0 nameplate load p.u.
P'2	-0.5	-0.4-(-0.8) nameplate load p.u.
P'3	-1	-1-(-0.5) nameplate load p.u.
Q3	-0.44	+/- 1 nameplate Var p.u.
Q2	0	+/- 1 nameplate Var p.u.
Q1	0	+/- 1 nameplate Var p.u.
Q'1	0	+/- 1 nameplate Var p.u.

(1)Load parameters P' and Q' apply to single phase energy storage inverters only.

Function	IEEE 1547 Default Settings (1)	Range
Q'2	0	+/- 1 nameplate Var p.u.
Q'3	0.44	+/- 1 nameplate Var p.u.
Voltage Active power mode(1)	Disabled	
V1	1.06	1.05-1.09 V p.u.
P1	1	nameplate power p.u.
V2	1.1	1.06-1.10 V p.u.
P2	0	0-1 nameplate power p.u.
P'2	0	-1-0 nameplate load p.u.
OLRT	10	0.5-60 seconds
Frequency-droop mode	Disabled	
DBOF	0.036	0-1 Hz
DBUF	0.036	0-1 Hz
KOF	0.05	0.02-0.07
KUF	0.05	0.02-0.07
OLRT	5	0.2-10 seconds
Normal Ramp Rate(1)	100	1-100%/ seconds

(1)California rule 21 function.

Appendix D: Immunity Standards

The information in this appendix complies with the IEEE 1547-2018 standard. The IEEE 1547-2018 standard, establishes criteria and requirements for interconnection of distributed energy resources (DER) with electric power systems (EPS) and associated interfaces.

Test type	Test method	Test Level
Radiated Immunity	IEEE C37.90.2	20 V/m
EFT	IEEE C37.90.1, C62.45, C62.41.2	+3 kV
		+4 kV
Surge	IEEE C62.45, C62.41.2, UL 1741	+3 kV
		+6 kV
Oscillatory Test	IEEE C37.90.1	2.5 kV