



SolarEdge

StorEdge

Installation Guide

For North America

Version 1.2

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

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

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

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HANDLING AND SAFETY INSTRUCTIONS

During installation, testing and inspection, adherence to all the handling and safety instructions is mandatory. **Failure to do so may result in injury or loss of life and damage to the equipment.**

Safety 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.

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 totalement 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.

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 totalement comprises et accomplies.



NOTE

Denotes additional information about the current subject.



IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

IMPORTANT INVERTER SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS



WARNING

RISK OF ELECTRIC SHOCK AND FIRE. Use this inverter only with PV modules with a maximum system voltage rating of 600V or higher.

RISQUE DE CHOC ELECTRIQUE ET D'INCENDIE. Utilisez cet onduleur seulement avec des modules PV sécurisés pour une tension de système maximum de 600V ou plus.

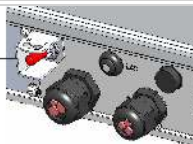


WARNING!

The inverter cover must be opened only after shutting off the inverter ON/OFF switch located at the bottom of the inverter. This disables the DC voltage inside the inverter. Wait five minutes before opening the cover. Otherwise, there is a risk of electric shock from energy stored in the capacitors.

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 que le LCD affiche une tension sécurisée (50V). Si l'affichage LCD n'est pas visible, 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.

ON/OFF switch



WARNING

Before operating the inverter, ensure that the inverter is grounded properly.

Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre.



WARNING

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

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



WARNING!

The StorEdge Connection Unit meets all requirements for a code-compliant installation of this ungrounded system. The DC section disconnects both the positive and negative conductors.

Le sectionneur externe (inclus) répond aux exigences de conformité pour l'installation de ce système non- relié à la terre. 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.

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!

The inverter must be connected to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 40 A.

Les onduleurs doivent être connectés à un branchement AC dédié avec un disjoncteur de 40A.

CAUTION!

This unit must be operated under the specified operating specifications, as described in the latest technical specification datasheet provided with the unit .

Cette unité doit être utilisée selon les spécifications de fonctionnement, comme décrit dans la dernière fiche technique des spécifications, disponible sur le site web de SolarEdge, <http://www.solaredge.us/groups/us/products/overview>.

NOTE

The StorEdge Connection Unit is NEMA type 3R rated . Unused conduit openings and glands should be sealed with appropriate seals.

CAUTION!

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

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 ou du remplacement.


NOTE

Use only copper conductors rated for a minimum of 75°C/167°F.

NOTE

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

NOTE

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

NOTE!

- Building or structures with both utility service and a PV system, complying with NEC 690.12, shall have a permanent plaque or directory including the following wording: **PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN**. The term "PHOTOVOLTAIC" may be replaced with "PV." The plaque or directory shall be reflective, with all letters capitalized and having a minimum height of 9.5mm (3/8 in.) in white on red background.
- Attention -The system status indicator shall be installed in a location in close proximity to the system actuator, where the indication of safe shutdown can be clearly seen.
- This rapid shutdown system is required to be provided with an actuating device or a status indicator which shall be installed in a location accessible to first responders, or be connected to an automatic system which initiates rapid shutdown upon the activation of a system disconnect or activation of another type of emergency system.
- Additionally, in a prominent location near the actuator device the end use installation shall be provided with a permanent marking including the following wording: **PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN** . The term "PHOTOVOLTAIC" may be replaced with "PV". The plaque or directory shall be reflective, with all letters capitalized and having a minimum height of 9.5mm (3/8 in.) in white on red background.



WARNING!

Shutting off the AC breaker does not disable the DC voltage inside the inverter. To obtain safe DC voltage, turn off the inverter ON/OFF switch and the StorEdge Connection Unit ON/OFF switch.

En mode autonome, la fermeture du coupeur CA n'élimine pas la tension CC à l'intérieur de l'onduleur. Afin d'obtenir une tension CC sécurisée, mettez l'interrupteur du coupeur CC de l'onduleur et celui du coupeur CC de l'unité StorEdge en position OFF.



WARNING!

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

Avant d'utiliser l'onduleur monophasé, assurez-vous que l'onduleur est correctement mis à la terre.



WARNING!

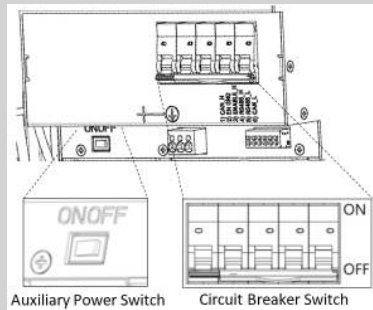
When handling the battery, adhere to all manufacturer safety instructions.

Durant la manipulation de la batterie, adhérez à toutes les instructions de sécurité du fabricant.

WARNING!

The battery should be powered OFF before and during wiring. Turn OFF:

- The auxiliary power supply switch
- The circuit breaker switch



La batterie doit être éteinte avant et pendant le câblage. Fermer:

- *Le commutateur d'alimentation auxiliaire*
- *Le commutateur du coupeur*



CAUTION!

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

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



NOTE

The battery used must be NRTL certified.



NOTE

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



NOTE

The StorEdge Connection Unit is NEMA type 3R rated . Unused conduit openings and glands should be sealed with appropriate seals.

Chapter 1: Overview

StorEdge™ is SolarEdge's all-in-one solution that uses a single phase DC optimized inverter to manage and monitor both solar power generation and energy storage. Homeowners are automatically provided with backup power in the event of grid interruption to power pre-selected loads. Solar energy can be stored in a battery for Smart Energy Management applications such as export control, offering demand response and peak shaving, and performing time of use shifting for reduced electric bills.

The StorEdge Solution Components

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

SolarEdge offers a StorEdge the following inverter types:

- StorEdge inverter for Single Battery or High Capacity
- StorEdge inverter for High Power.

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

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

The meter is required only in systems using Smart Energy Management applications (it is not required for StorEdge systems used only for backup power).

- **The Auto-transformer** - The auto-transformer handles the phase load balancing. It is required only in systems providing backup power.
- **One or two batteries** - DC coupled batteries designed to work with the SolarEdge system.

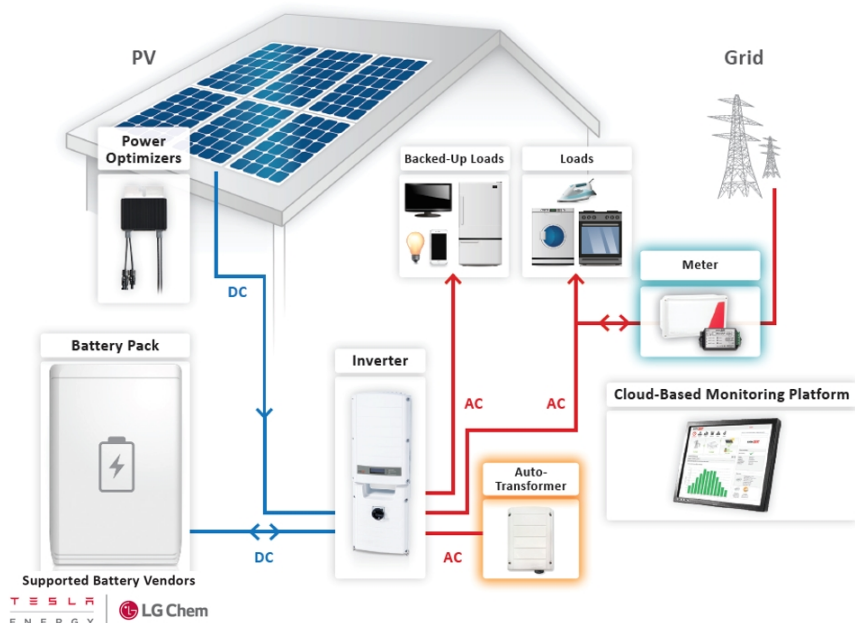


Figure 1: StorEdge system components

The following table summarizes the SolarEdge products required for the StorEdge applications:

Product	Applications		
	Grid-tied Solar Backup Power Smart Energy Management	Grid-tied Solar Backup Power	Grid-tied Solar Smart Energy Management
Single Phase StorEdge inverter	✓	✓	✓
Auto-transformer	✓	✓	X
SolarEdge Electricity Meter	✓	Optional	✓
Battery	✓	✓	✓

NOTE



- Additional SolarEdge inverters (without batteries) can be connected with RS485. The inverters will participate in export limitation and Smart Energy Management. Connecting multiple inverters with RS485 master-slave connection may require an *RS485 Expansion Kit* (available from SolarEdge).
- PV modules connected to power optimizers are not mandatory for charge/discharge profile programming and for backup power.

About this Guide

This document describes basic system connection and configuration - PV system (power optimizer strings), one inverter, one battery, backed-up loads panel and one meter.

For additional configuration options refer to the StorEdge Solution Applications - Connection and Configuration Guide, available at

http://www.solaredge.com/sites/default/files/storedge_backup_applications_connection_and_configuration_guide.pdf.



Installation Workflow

When installing the StorEdge system, follow this workflow to ensure all the components are connected and functioning correctly.

Step 1 - PV system installation - modules, power optimizers and inverter:

- Power optimizers - as described in *Installing the Power Optimizers* on page 13.
- Inverter - as described in *Installing the Inverter* on page 21.

Step 2 - SolarEdge Auto-transformer and AC load panel installation (required for Backup Power only): Refer to *Auto-transformer and Backed-up Loads Panel Installation (for Backup)* on page 28.

Step 3 - Electricity Meter installation (required for Smart Energy Management only). Refer to *Meter Installation* on page 30.

Step 4 - Connecting PV strings (DC) to the inverter - Refer to *Connecting the Strings to the Inverter* on page 33.

Step 5 - Connecting the battery to the inverter and mounting the battery. Refer to the installation information in the manufacturer documentation, and to *StorEdge Inverter Connections* on page 31.

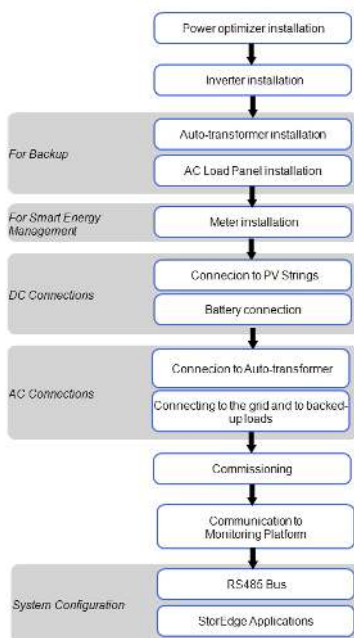
Step 6 - Connecting all components to the inverter - connect the auto transformer and loads (AC), PV strings (DC), and meter. Refer to *StorEdge Inverter Connections* on page 31.

Step 7 - Commissioning the inverter - Activate the system and pair the power optimizers. Refer to *Commissioning the Installation* on page 44.

Step 8 - Connecting to the monitoring platform. Refer to *Setting Up Communication to the Monitoring Platform* on page 69.

Step 9 - System Configuration - Configuring the RS485 bus and StorEdge applications. Refer to *System Configuration* on page 78.

The following flowchart appears throughout this Installation Guide to assist with the installation steps:



Installation Equipment List

Standard tools can be used during the installation of the SolarEdge system. The following is a recommendation of the equipment needed for installation:

- Allen screwdriver for 5mm screw type for the inverter cover, StorEdge Connection Unit cover, and inverter side screws
- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill or screwdriver and bits suitable for the surface on which the inverter will be installed and for opening the StorEdge Connection Unit knockouts
- Suitable hardware for attaching the inverter mounting bracket to the surface to which it will be connected
- 1/4" or 5/16" stainless bolts, nuts, and washers for attaching the power optimizer to the racking (not required for smart modules)
- Wire cutters
- Wire strippers
- Voltmeter

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

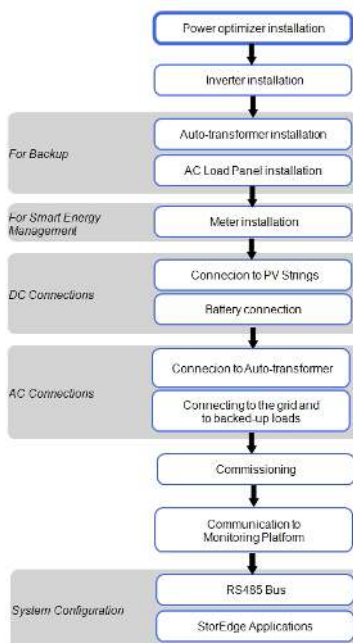
- For Ethernet:
 - CAT5/6 twisted pair Ethernet cable with RJ45 connector.
 - If using a CAT5/6 cable spool: RJ45 plug and RJ45 crimper
- For RS485:
 - Four- or six-wire shielded twisted pair cable.
 - Watchmaker precision screwdriver set

Inverter Transport and Storage

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

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

Chapter 2: Installing the Power Optimizers



Safety

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

WARNING!



The metallic enclosure of the power optimizer must be grounded in accordance with the requirements of the local and national codes.

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

WARNING!



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

Avant de faire ces étapes, éteignez l'onduleur monophasé en mettant sur OFF l'interrupteur ON/OFF situé au bas de l'onduleur.

WARNING!



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

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 IP65/NEMA4 rated. Choose a mounting location where optimizers will not be submerged in water.

Les optimiseurs de puissances sont compatibles à la norme IP65/NEMA4. Choisissez le lieu de montage tel que l'optimiseur ne puisse pas être submergé par l'eau.

**CAUTION!**

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

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

**CAUTION!**

Cutting the power optimizer input or output cable connector is prohibited and will void the warranty.

Sectionner les câbles 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.

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

**CAUTION!**

If you intend to mount the optimizers directly to the module or module frame, first consult the module manufacturer for guidance regarding the mounting location and the impact, if any, on module warranty. Drilling holes in the module frame should be done according to the module manufacturer instructions.

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 module connectors with the optimizer connectors may be unsafe and could cause functionality problems such as ground faults, resulting in inverter shut down. In order to ensure mechanical compatibility of the SolarEdge optimizers and the modules to which they are connected, use identical connectors from the same manufacturer and of the same type on both the power optimizers and on the modules.

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, il faut Utiliser des connecteurs identiques du même fabricant et du même type aussi bien pour les optimiseurs de puissance que pour les modules.

**IMPORTANT SAFETY FEATURE**

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

Package Contents

- Power optimizers
- Stainless steel grounding lock washers

Installation Guidelines

- Frame-mounted power optimizers are mounted directly on the module frame in rail-less racking systems. Mounting the power optimizers in advance saves installation time. For installation of frame-mounted power optimizers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The steps in this chapter refer to module add-on power optimizers. For smart modules, start from *Step 3: Connecting Power Optimizers in Strings* on page 18. Also refer to the documentation supplied with the smart modules.
- The power optimizer can be placed in any orientation.
- To allow for heat dissipation, maintain a 24.5 mm / 1" clearance distance between the power optimizer and other surfaces.
- If connecting more modules than optimizer inputs in parallel, use a branch cable (available from SolarEdge).
- Position the power optimizer close enough to its module so that their cables can be connected.
- Make sure to use optimizers that have the required output cable length. You cannot use extension cables between every two optimizers in a string; They may be used only to connect between rows/ arrays or between the string and the inverter.
- The minimum and maximum string length guidelines are stated in the power optimizer datasheets. Refer to the SolarEdge Site Designer for string length verification. The SolarEdge Site Designer is available on the SolarEdge website at http://www.solaredge.us/products/installer-tools/site-designer#.
- Completely shaded modules may cause their power optimizers to temporarily shut down. This will not affect the performance of the other power optimizers in the string, as long as the minimum number of unshaded power optimizers connected in a string of modules is met. If under typical conditions fewer than the minimum optimizers are connected to unshaded modules, add more optimizers to the string.
- Equipment grounding tightening torques: 4-6 AWG: 45 lb-in, 8 AWG: 40 lb-in, 10-14 AWG: 35 lb-in.



NOTE



The images contained in the following sections are for illustrative purposes only and may vary depending on product models.

Step 1: Mounting and Grounding the Power Optimizers

For each of the power optimizers¹:

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 2). For frame-mounted power optimizers follow the instructions supplied with the optimizers.
2. If required, mark the mounting hole locations and drill the hole.

CAUTION!



Do not drill through the power optimizer or through the mounting holes. The drilling vibrations can damage the power optimizer and will void the warranty.

Ne pas percer à travers la optimiseur de puissance ou ses trous de fixation. Les vibrations qui en résulteraient peuvent endommager la optimiseur de puissance.

3. Attach each power optimizer to the rack using the M6 (1/4") stainless steel bolts, nuts and washers. Apply torque of 9.5 N*m / 7 lb*ft.

For 3NA series power optimizers, SolarEdge recommends mounting the power optimizer on a rail with the smooth side facing out, so that the power optimizer body will prevent its rotation.

4. Use the following methods² to ground the power optimizer³:

WARNING!



The metallic enclosure of the power optimizer must be grounded in accordance with the requirements of the local and national codes.

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

- **For mounting on a grounded metal rail:** Use the provided 5/16" stainless steel grounding star washer between the railing and the flat side of the mounting bracket. The grounding washer should break through the anodize coating of the railing to ensure low resistive connection. Apply torque of 9.5 N*m / 7 lb*ft.

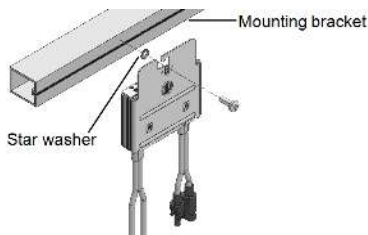


Figure 2: Power optimizer installation and grounding using a star washer

¹Not applicable to smart modules.

²These methods have been evaluated by a nationally recognized testing laboratory as part of the optimizer evaluation. The SolarEdge-supplied grounding lug kit has been evaluated only for use with SolarEdge power optimizers. It is not intended or listed to be used as a general purpose grounding lug with other electrical equipment.

³For a list of racking models and their appropriate grounding method, refer to

http://www.solaredge.us/files/pdfs/grounding_se_power_optimizers.pdf.

- **For mounting on rails with sliding nut fasteners:** If the star washer cannot be used, use the SolarEdge grounding plate (purchased separately) between the railing and the flat side of the mounting bracket. Apply torque of 9.5 N*m / 7 lb*ft.

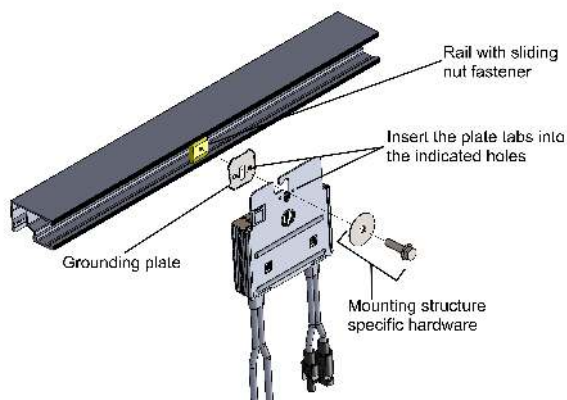


Figure 3: Power optimizer installation and grounding using a grounding plate

- **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 a wire size 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 torque of 9.5 N*m / 7 lb*ft.

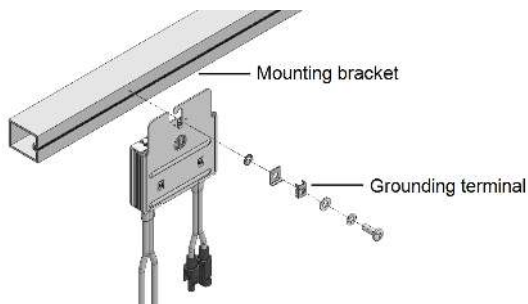


Figure 4: Power optimizer grounding terminal

5. Verify that each power optimizer is securely attached to the supporting structure or the module.



NOTE

Record power optimizer serial numbers and locations, as described in *Providing Installation Information* on page 51.

Step 2: Connecting a PV Module to a Power Optimizer



NOTE

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

For each of the power optimizers¹:

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

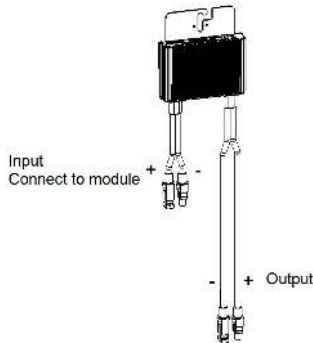


Figure 5: Power optimizer connectors

Step 3: Connecting Power Optimizers in Strings

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



IMPORTANT SAFETY FEATURE

Rapid shutdown is applicable and functions only when there are 30 optimizers or less per string.

1. Connect the Minus (-) output connector of the string's first power optimizer to the Plus (+) output connector of the string's second power optimizer.

2. Connect the rest of the power optimizers in the string in the same manner.

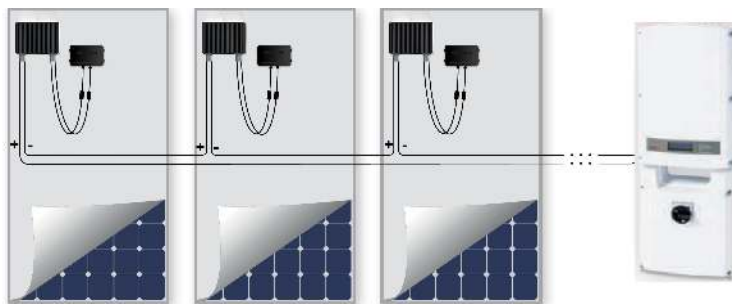


Figure 6: Power optimizers connected in series

3. If you intend to monitor the installation, using the SolarEdge monitoring platform, record the physical location of each power optimizer, as described in *Providing Installation Information* on page 51.



WARNING!

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

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.

Step 4: Verifying Proper Power Optimizer Connection

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

Make sure the modules are exposed to sunlight during this process; otherwise, the power optimizers may not be powered. If you use a tracker, the power optimizer will turn ON only if the tracker is tracking the sun and the module provides at least 2W.

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

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



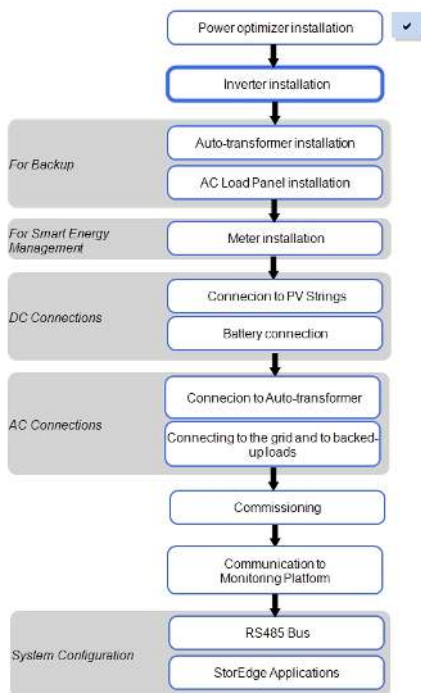
► To verify proper power optimizers connection:

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

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 90.

Chapter 3: Installing the Inverter

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



Inverter Package Contents

- One StorEdge inverter
- One mounting bracket
- Two Allen screws for fastening the inverter to the mounting bracket
- SolarEdge activation card
- One 9V battery
- Allen key for opening the StorEdge Connection Unit
- Installation guide (with activation card and instructions)

Identifying the Inverter

Refer to the sticker on the inverter that specifies its **Serial Number** and its **Electrical Ratings**. Provide the serial number when contacting SolarEdge support. The serial number is also required when opening a new site in the SolarEdge monitoring platform.

Inverter Interfaces

The following figure shows the inverter connectors and components, located at the bottom of the inverter.

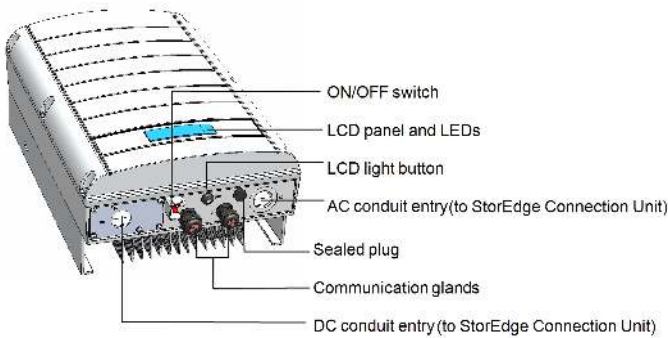


Figure 7: Inverter Interfaces

- **LCD panel:** displays inverter information and configuration parameters
- **LCD LEDs:** Three LEDs indicate the following inverter statuses:

Color	Description	Functionality
Green	Power production	On - The inverter is producing power. Blinking - Standby mode. The inverter is in Standby mode until its working voltage is reached. The inverter then enters Production mode and produces power. Off - The inverter is not producing power. This may be during Night mode, when the inverter ON/OFF switch is OFF or when an error occurs.
Yellow	Module communication and inverter shutdown	Blinking: <ul style="list-style-type: none">◦ Monitoring information is being received from a power optimizer.◦ The inverter is being shut down.
Red	Fault	On - There is an error. Refer to <i>Troubleshooting</i> on page 87 for more information. Blinking - The inverter is being shut down.

All LEDs turn on while the inverter is being configured.

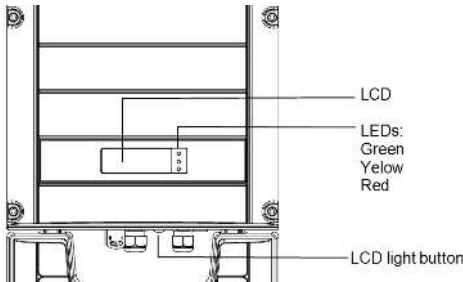


Figure 8: Inverter front view

- **AC and DC conduit entries:** Connection points of the Safety Switch.
- **AC and DC conduit entries:** Connection points of the StorEdge Connection Unit.
- **ON/OFF switch:** Turning this switch ON starts the operation of the power optimizers, enables power production and allows the inverter to begin exporting power to the utility grid/backed-up loads. Turning it 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.
- **LCD light button:** Pressing this button lights up the LCD for 30 seconds. In addition, you can press this button to view inverter status screens and access configuration menu options, as described *Configuring the Inverter Using the LCD Light Button* on page 55.
- **Two communication glands,** for connection of inverter communication options. Each gland has three openings. Refer to *Setting Up Communication to the Monitoring Platform* on page 69 for more information.

StorEdge Connection Unit

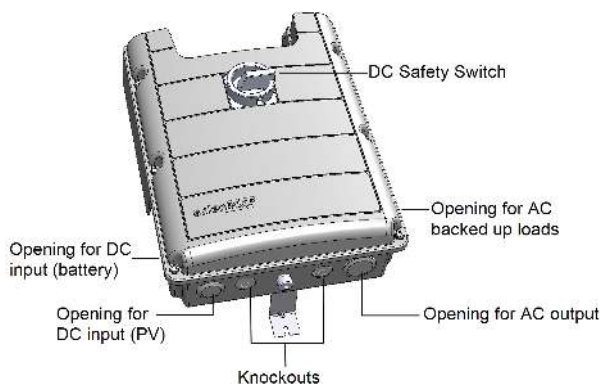


Figure 9: StorEdge Connection Unit

The StorEdge Connection Unit includes:

- **DC safety switch:** disconnects both the positive and negative conductors of the PV and the positive and negative conductors of the battery.
- **Openings for conduit entry:** Four openings are ready to use and have sealing covers. Two openings are closed with knockouts. If required, open the knockouts as described in *Opening Conduit Knockouts* on page 96.

Internal AC Breaker and Bypass Switch

The following components are part of the StorEdge Connection Unit and may be accessed for troubleshooting or maintenance by removing the internal cover.

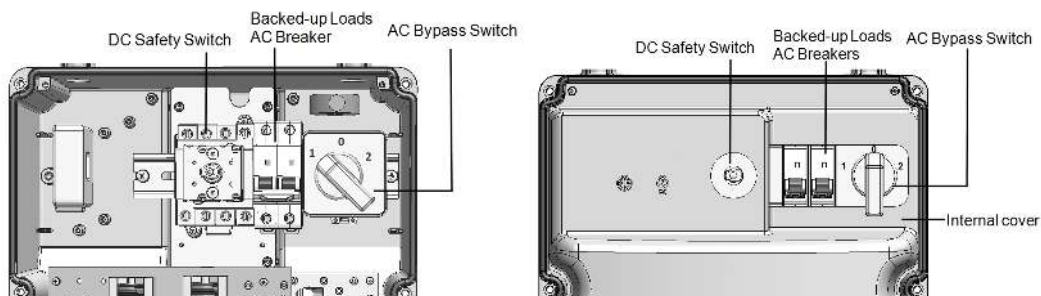


Figure 10: StorEdge Connection Unit with and without internal cover

- **Backed-up Loads AC Breaker:** Main AC breaker for the backed-up loads. Ensure this breaker is UP before starting up the system.
- **AC Bypass Switch:** This switch bypasses the inverter functionality in case of inverter malfunction. Maintaining power to the backed-up loads is enabled by connecting the loads directly to the grid.

There are three switch positions. The following table describes the functionality and use of each position:

Switch position	Use Case	Functionality
1 (left) (Default)	Normal operation	Normal operation. The backed-up loads panel is connected through the software controlled switches to the AC grid (during normal operation), or to the inverter (via auto-transformer, for backup power).
2 (right)	AC bypass	This mode disables the backup functionality. The backed-up loads panel is connected directly to the AC grid through the bypass switch. Use in case of inverter malfunction.
0	Not in use	

Mounting the Inverter

The inverter is supplied with a mounting bracket.

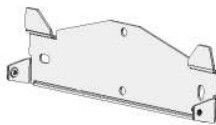


Figure 11: Mounting bracket



NOTE

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



CAUTION!

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

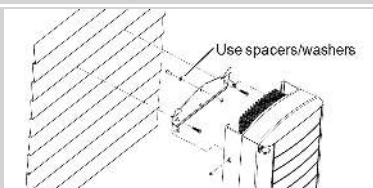
Objet lourd. Pour éviter la fatigue musculaire ou des blessures au dos, utilisez des techniques de levage appropriées et, si nécessaire - un auxiliaire de levage lors du retrait ou du remplacement.

1. Determine the inverter mounting location, on a wall, stud framing or pole. To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:
 - If installing a single inverter:
 - 8" (20 cm) to the top of the inverter.
 - 4" (10 cm) to the bottom of the StorEdge Connection Unit.
 - 4" (10 cm) to the right and left of the inverter.
 - If installing multiple inverters:
 - When installing inverters one above the other, leave at least 8" (20 cm) between the top of an inverter and the bottom of the StorEdge Connection Unit.
 - When installing inverters side by side, leave 8" (20 cm) between inverters.
2. Position the mounting bracket against the wall/pole and mark the drilling hole locations:
 - Ensure that the flat side of the bracket is at the bottom, as in Figure 12.
 - Use at least two bracket holes. Additional holes can be used to fix the bracket. Determine which and how many holes to use according to mounting surface type and material.
3. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.



NOTE

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



4. Hang the inverter on the bracket (see *Figure 12*): Lift the inverter from the sides, or hold it at the top and bottom of the inverter to lift the unit into place. Do not lift holding the StorEdge Connection Unit as it may be damaged.
5. Align the two indentations in the inverter enclosure with the two triangular mounting tabs of the bracket, and lower the inverter until it rests on the bracket evenly.

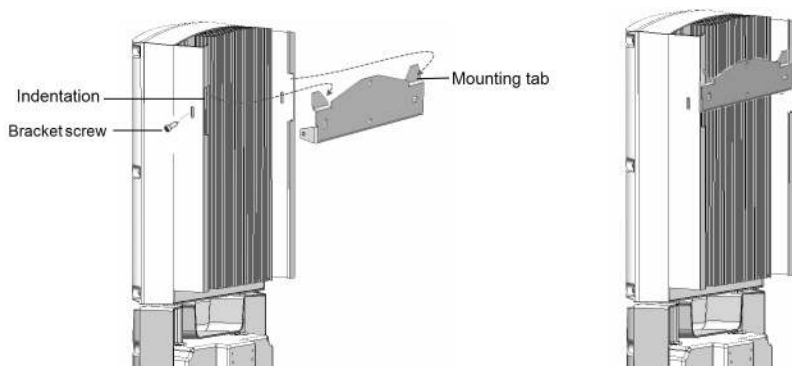


Figure 12: Hanging the inverter on the bracket

6. Secure the StorEdge Connection Unit bracket to the wall:
 - Mark the location of the bracket screw for the StorEdge Connection Unit and drill the hole.
 - Fasten the bracket using a standard bolt.
 - Verify that the bracket is firmly attached to the mounting surface.

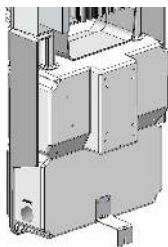


Figure 13: StorEdge Connection Unit bracket

7. Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket (see *Figure 12*). Tighten the screws with a torque of $4.0 \text{ N}\cdot\text{m}$ / $2.9 \text{ lb}\cdot\text{ft}$.
8. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

9. Remove the StorEdge Connection Unit covers:
 - a. Release the six screws attaching the StorEdge Connection Unit external cover to the enclosure and lift the cover.
 - b. Open the four internal screws securing the transparent cover to the enclosure and remove the cover.

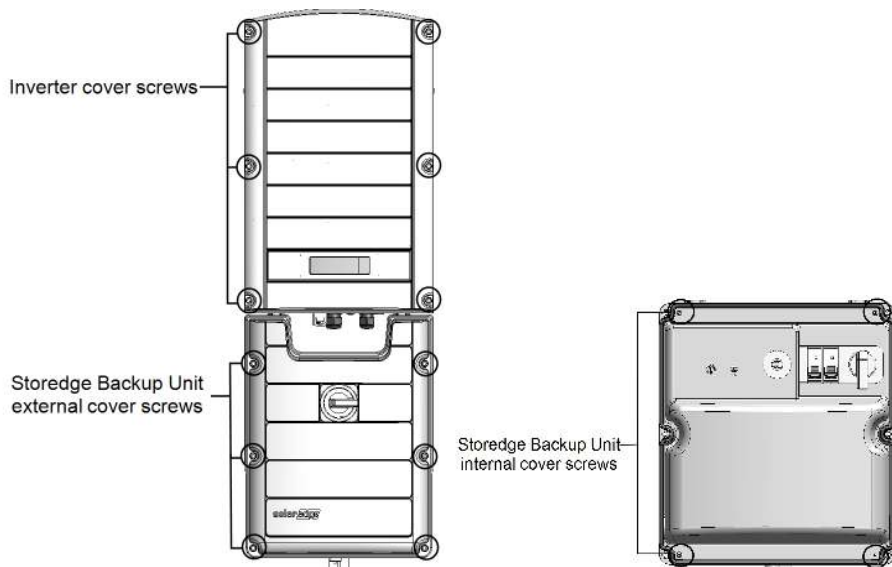
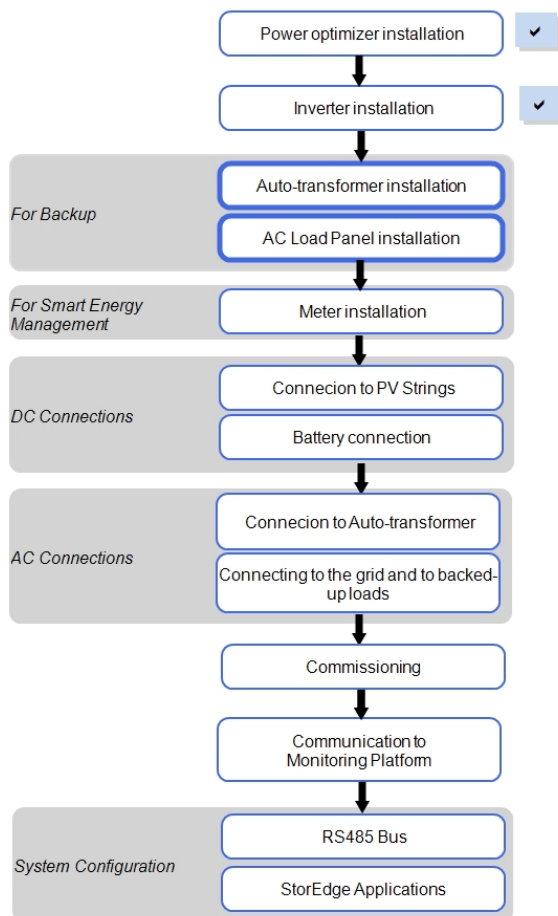


Figure 14: Inverter Covers

Chapter 4: Auto-transformer and Backed-up Loads Panel Installation (for Backup)

The auto-transformer is used for backup power only, and is not mandatory if using Smart Energy Management applications only. Refer to the table on page 10.

The auto-transformer connects to the AC side of the inverter. Since the inverter AC connections are on its right side, it is recommended to position the auto-transformer to the right of the inverter to simplify wiring.



Mounting the Auto-transformer

1. Determine the mounting location, on a wall, stud framing or pole. To allow proper heat dissipation and cable entry, maintain the following minimum clearance areas between the auto-transformer and other objects:
 - 8 in / 200 mm to the top and bottom of the auto-transformer; if conduit entry to the auto-transformer will be from the bottom, leave sufficient clearance for the conduits as well.
 - 4 in / 100 mm to the right and left of the auto-transformer.
2. Install the bracket with the flat side facing down. Verify that the bracket is firmly attached to the mounting surface.
3. Hang the auto-transformer on the bracket: Lift the auto-transformer from the sides, or hold it at the top and bottom to lift the unit into place.
4. Insert the two supplied screws through the outer heat sink fin on both sides of the auto-transformer and into the bracket. Tighten the screws with a torque of 4.0 N*m / 2.9 lb.*ft.

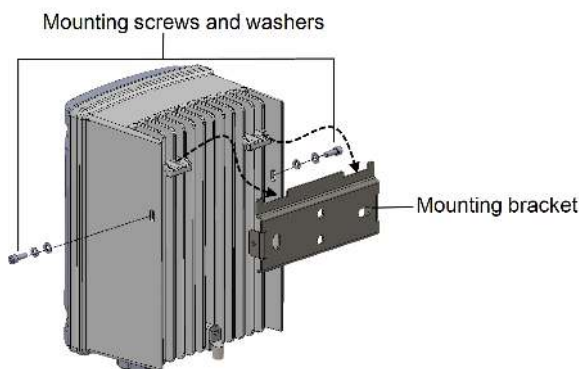


Figure 15: Installing the auto-transformer

Installing the Backed-up Loads Panel

Install a secondary AC panel for backed-up loads (not supplied by SolarEdge). Rewire the backed-up loads through this panel.

Install two poles 25A main circuit breaker on this panel, to ensure the 25A phase imbalance limit is maintained at all times.

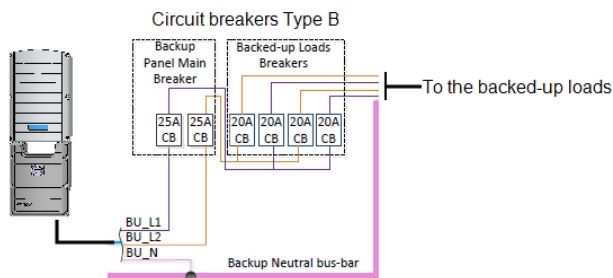
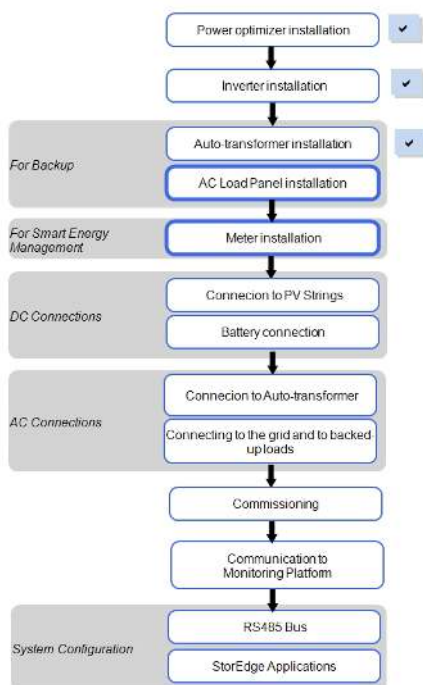


Figure 16: Backed-up Loads Panel

Chapter 4: Meter Installation



The StorEdge solution requires connecting a meter for Smart Energy Management applications, such as maximizing self-consumption. *For backup power only, installing a meter is not required.* Refer to the table on page 10.

To install the SolarEdge meter, refer to the installation guide supplied with it:
<http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide-na.pdf>.

The meter is connected to the inverter using RS485.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a shielded Ethernet cable (Cat5/5e STP) may be used)
- Wire cross-section area: 0.2-1 mm²/ 24-18 AWG (a CAT5 cable may be used)



NOTE

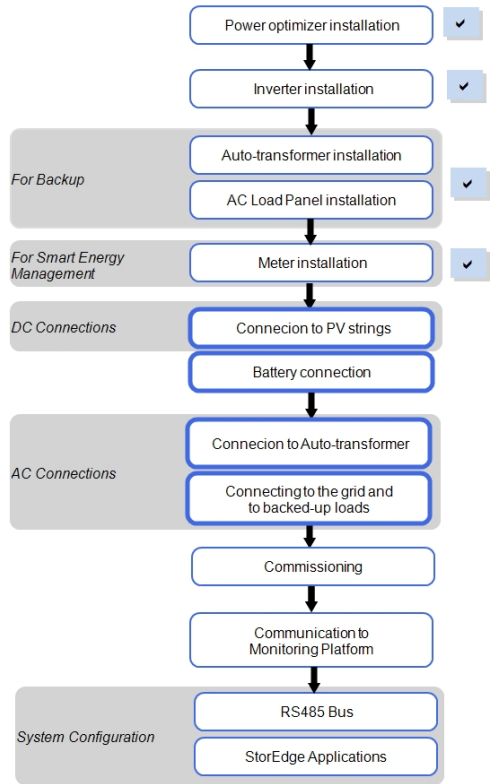
The inverter RS485 bus should be connected to the battery and meter. Connecting multiple inverters with RS485 master-slave connection may require an RS485 Expansion Kit (available from SolarEdge; Refer to http://www.solaredge.com/files/pdfs/RS485_expansion_kit_installation_guide.pdf).



For communication connection refer to *Connecting Communication to the Meter* on page 40.

Chapter 5: StorEdge Inverter Connections

Connect the system components to the StorEdge Connection Unit as described in this chapter.



NOTE



- 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.

The following figure shows the connections in the StorEdge Connection Unit:

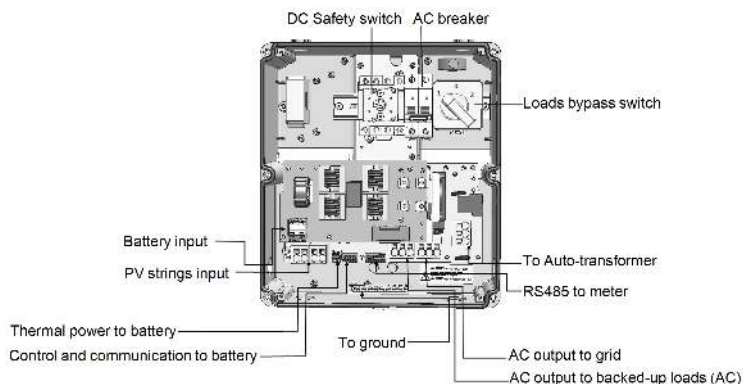


Figure 17: The StorEdge Connection Unit connections

Installing the 9V Battery and Fuses

A 9V battery is supplied with the inverter accessories. Install the 9V battery in the holder on the top board of the StorEdge Connection Unit and connect it to the battery pad.

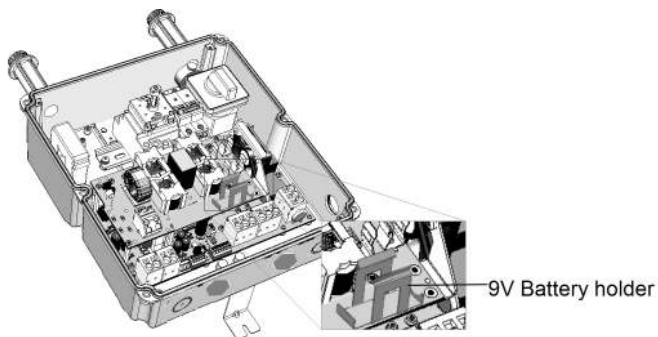


Figure 18: The battery holder

Two 25A fuses are supplied with accessories of the high power inverters. Install the fuses in the holders on the top board of the StorEdge Connection Unit

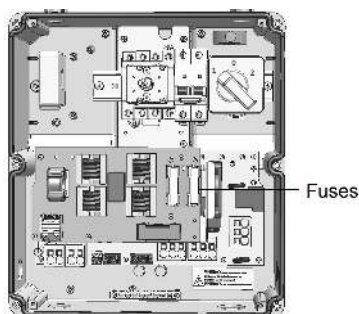


Figure 19: StorEdge Connection Unit fuses

Connecting the Strings to the Inverter

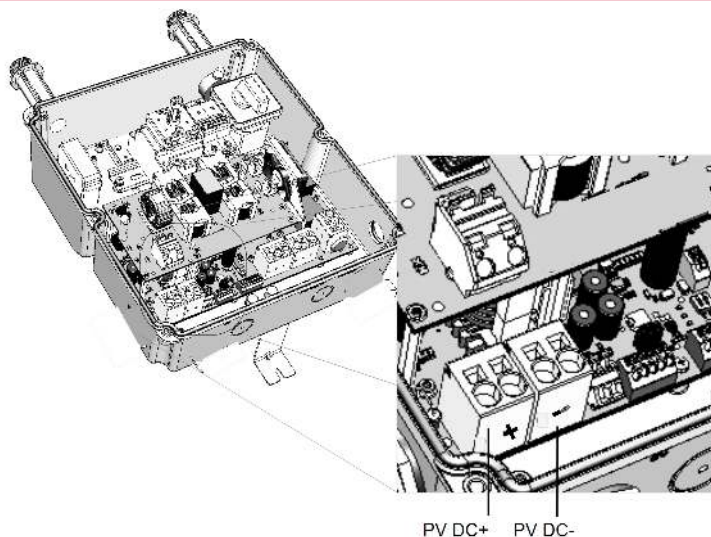


Figure 20: PV connection

1. Verify that the AC circuit breaker is OFF.
2. Strip 5/16" (8 mm) of the DC wire insulation.
3. Insert the DC conduit into the DC-side opening. Make sure the conduit is firmly attached to the inverter enclosure and sealed properly.

4. Connect the DC wires from the PV installation to the DC+ and DC- terminal blocks, according to the labels on the terminals:
 - a. Insert the wire into the round opening and push to clamp the wire.
 - b. Check that the wire is fully inserted and cannot be pulled out easily.

**CAUTION!**

Ensure that the Plus (+) wire is connected to the (+) terminal and that the Minus (-) wire is connected to the Minus (-) terminal connector.

Veillez à ce que le câble Plus (+) soit connecté au terminal (+) et que le câble (-) soit connecté au (-) terminal.

**NOTE**

For systems with three PV strings or more, fuses may need to be installed in both the positive and negative conductors as required by NEC Article 690.9.

For more information, refer to the Technical Note "String Fusing Requirements in SolarEdge Systems" at

http://www.solaredge.com/files/pdfs/string_fusing_requirements.pdf.



Connecting to the Battery

To simplify the connection process it is advised to connect the battery to the inverter *before* mounting the battery according to the manufacturer instructions.

Follow these guidelines:

- For easy access to battery connectors, it is recommended to connect the cables to the battery and to set all the battery DIP switches to their correct positions while the battery is still on the ground, *before* mounting the battery according to the manufacturer instructions). The following procedure is recommended:
 - a. Connect all the wires to the battery connection panel
 - b. Mount the battery
 - c. Assemble the conduit between the battery and the inverter
 - d. Connect to the StorEdge Connection Unit.
- Measure the necessary length between the StorEdge Connection Unit and the battery for all cables. The maximum distance between the battery and the inverter is 35 ft/ 10 m, when using 24 AWG/ 0.2 mm² cables for battery control.
- Tie and wrap the cables to avoid pulling them out during mounting.
- Be sure to adhere to all safety cautions and information in the battery documentation.
- The battery connects to the DC side of the inverter. Since the inverter DC connections are on its left side, it is recommended to position the battery to the left of the inverter to simplify wiring.

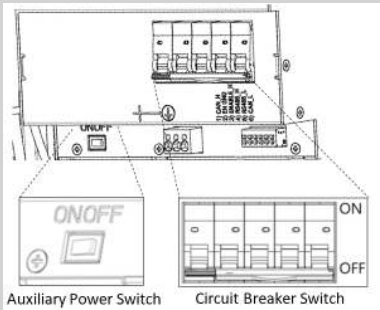
**NOTE**

For Tesla PowerWall1 - Per NEC requirements, if the battery is more than 5ft/ 1.5m away from the inverter, an additional external DC switch is required adjacent to the battery.

WARNING!

The battery should be powered OFF before and during wiring. Turn OFF:

- The auxiliary power supply switch
- The circuit breaker switch



La batterie doit être éteinte avant et pendant le câblage. Fermer:

- *Le commutateur d'alimentation auxiliaire*
- *Le commutateur du coupeur*

The following table, and *Figure 21* detail cable types and connections of one battery (LG-chem Resu10H). For additional battery types and connection options, refer to *Additional Battery Connections* on page 104 or

http://www.solaredge.com/sites/default/files/storedge_inverter_wiring_and_onsite_checklist_na.pdf. Prepare cables and connect as described in the following table:



StorEdge Connection Unit connection	LG Chem RESU10H battery connection	Connection method to the StorEdge Connection Unit	Recommended cable type (min-max AWG)
DC			
BAT + terminal block	DC+	<ul style="list-style-type: none">◦ Insert a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism.◦ Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire.	DC cable 10 AWG (10-14 AWG), 600V insulated.
BAT - terminal block	DC-		

StorEdge Connection Unit connection	LG Chem RESU10H battery connection	Connection method to the StorEdge Connection Unit	Recommended cable type (min-max AWG)
Control and monitoring			
5-pin communication terminal block:	6-pin connector	Press the protrusion at the top of the terminal block to open the connection hole, insert the wire and release to spring back and clamp the wire.	5-wire shielded twisted pair cable 24 AWG (16-24AWG), 600V insulated. CAT5 600V insulated can also be used.
En (Enable)	ENABLE_H		
V+	Not connected		
B- (RS485) ¹	RS485_L - ²		
A+ (RS485) ¹	RS485_H + ²		
G (RS485)	EN_G		

¹Must be twisted pair²Must be twisted pair

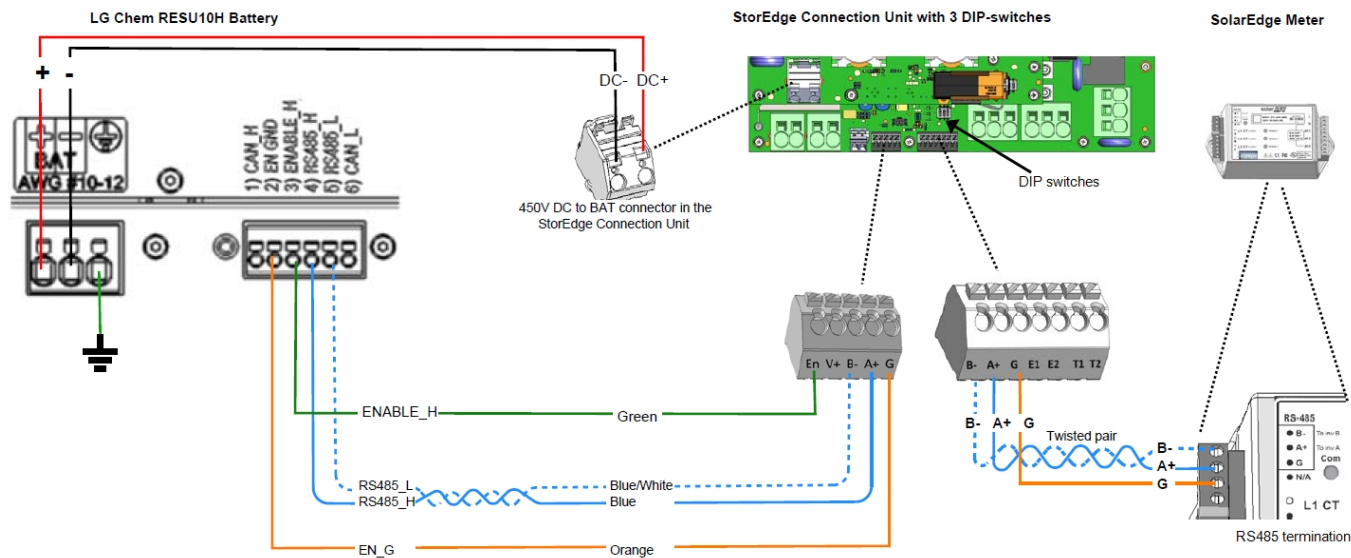


Figure 21: Connections to LG Chem RESU10H battery (StorEdge Connection Unit with three DIP-switched)

DIP Switch Setup

Verify that the DIP switches on the system components are set as described in this section, according to the system hardware configuration.

DIP Switch Setup in Meter and Inverter

Termination and bias guidelines:

- The last external meter in the RS485 chain should be terminated with 120 Ohm (either internal or external).
- Inverter communication board (Figure 22):
 - If a meter is installed: No termination - SW7 Down
 - If a meter is not installed: termination ON - SW7 Up (see also *Creating an RS485 Bus Connection* on page 74)

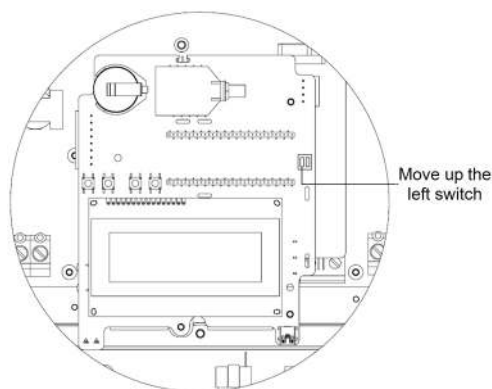


Figure 22: RS485 termination switch on the inverter communication board

DIP Switch Setup in the StorEdge Connection Unit

Verify that the DIP switches on the StorEdge Connection Unit are set as described in the following table, according to the components used in the system (see *Figure 23*):

- In StorEdge Connection Unit with two DIP switches:

Hardware configuration	Left DIP switch (SW1) setup	Right DIP switch (SW2) setup
Auto-transformer with connected over-temperature sensor	ON (up) - default	OFF (down) - default
No auto-transformer, or auto-transformer with over-temperature sensor not connected	ON (up) - default	ON (up)

- In StorEdge Connection Unit with three DIP switches:

Hardware configuration	DIP switch 1 (leftmost) setup	DIP switch 2 (center) setup	DIP switch 3 (rightmost) setup
Auto-transformer with connected over-temperature sensor	ON (up) - default	ON (up) - default	OFF (down) - default
No auto-transformer, or auto-transformer with over-temperature sensor not connected	ON (up) - default	ON (up) - default	ON (up)

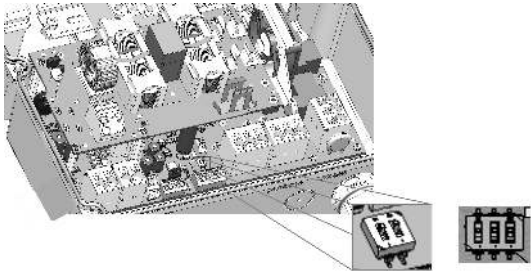


Figure 23: StorEdge Connection Unit DIP switches

Connecting Communication to the Meter

If a meter was installed, connect it to the StorEdge Connection Unit as described in the following table. For detailed information refer to the installation guide supplied with the meter.

Recommended cable type (min-max AWG)	StorEdge Connection Unit	Meter connection
RS485 24 AWG (16-24 AWG), shielded twisted pair, 600V insulated	Ext. Devices 7-pin terminal block: B, A, G	RS485 4-pin terminal block: B, A, G

Connect as illustrated below:

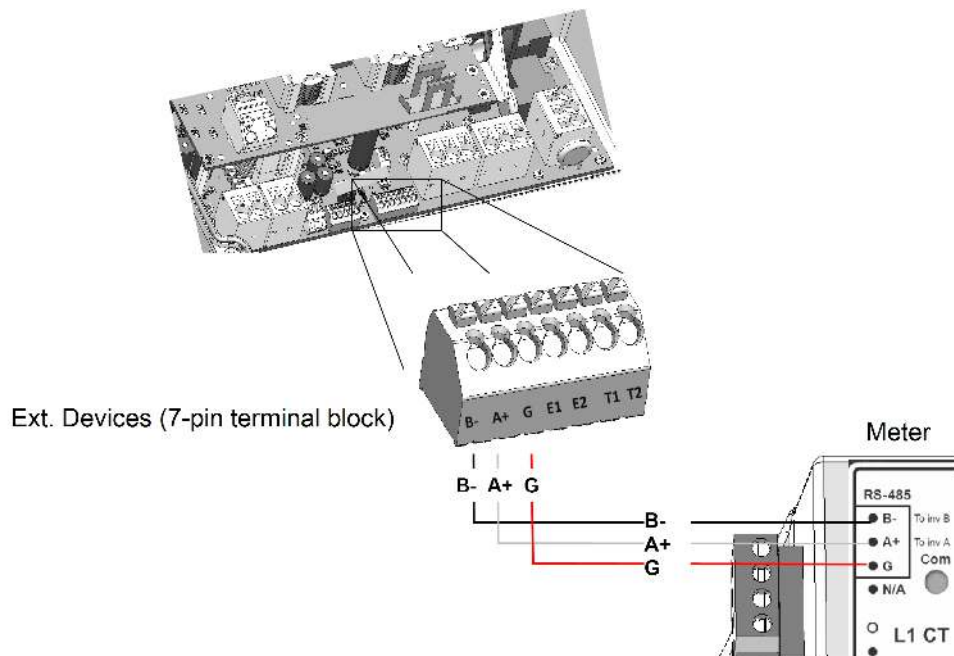


Figure 24: Connection to a meter

Connecting to AC

Connecting to the Auto-transformer

The Auto-transformer is required for Backup Power only.

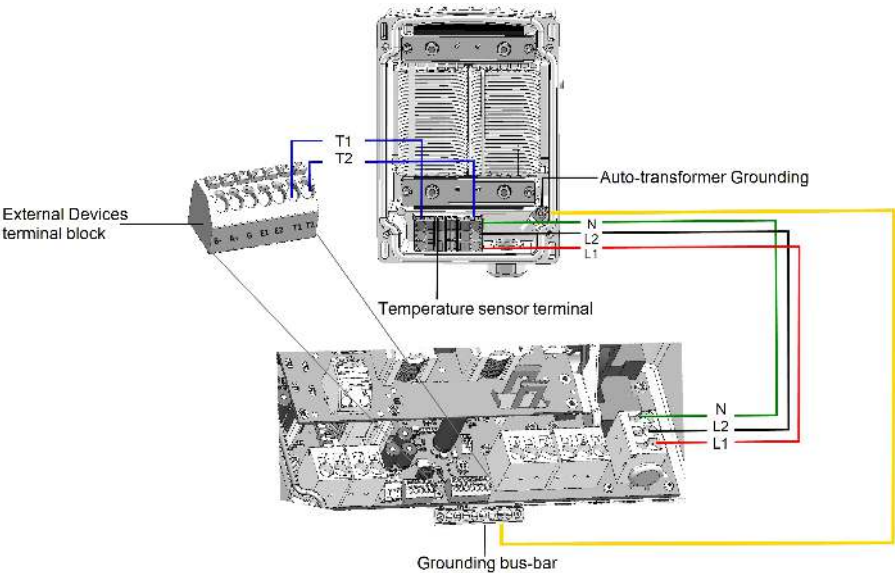


Figure 25: Connecting to the auto-transformer

- 1. Use the supplied Allen key to open the 4 screws of the auto-transformer and remove its cover.
- 2. Prepare cables and connect as described in the following table:

Recommended cable type (min-max AWG)	StorEdge Connection Unit connection	Auto-transformer connection	Connection method
AC			
8 AWG (6-20 AWG)	3-pin terminal block: L1	Line terminal: L1	Insert the wire into the round opening and push to clamp the wire.
	3-pin terminal block: L2	Line terminal: L2	
	3-pin terminal block: N	Neutral terminal: N	
Grounding			
10 AWG cable	Grounding Bus-bar	Grounding lug	

Recommended cable type (min-max AWG)	StorEdge Connection Unit connection	Auto-transformer connection	Connection method
Temperature Sensor			
Temperature sensor terminal 24 AWG (16-24 AWG), 300 Vrms insulated	External Devices 7-pin terminal block: T1	Temperature sensor terminal: T1 ¹	StorEdge Connection Unit: Press the protrusion at the top of the terminal block to open the connection hole, insert the wire and release to spring back and clamp the wire. Auto-transformer:
	External Devices 7-pin terminal block: T2	Temperature sensor terminal: T2	<ul style="list-style-type: none"> ○ Insert a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism. ○ Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire.

¹T1 and T2 are interchangeable

Connecting to the Grid and to Backed-up Loads

This section describes:

- Connection to the AC Grid.
- Connection between the inverter to the backed-up loads panel.



NOTE

If there are multiple inverters in the installation, each inverter should be connected to a separate backed-up loads panel. Do not share backup output between inverters.

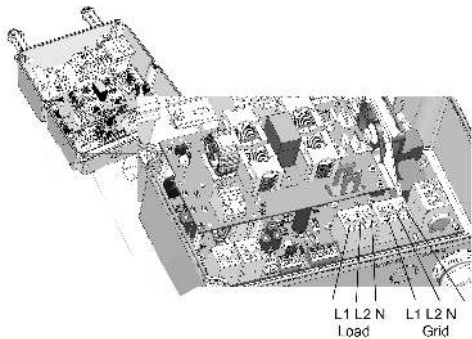


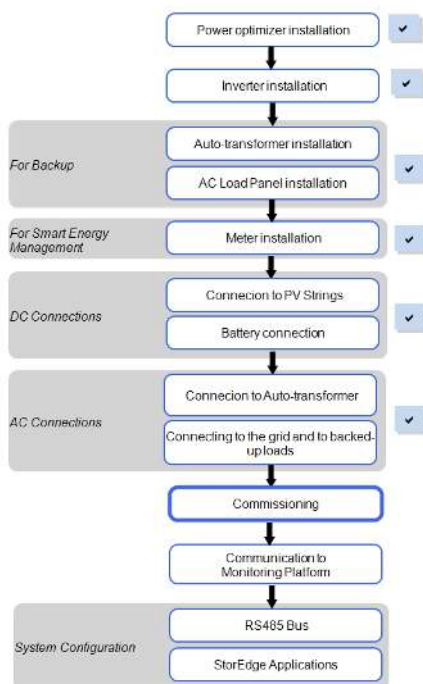
Figure 26: Connection to grid, backed-up loads

Prepare cables and connect as described in the following table:

Recommended cable type (min-max AWG)	StorEdge Connection Unit connection	External connection
Grid		
6 AWG (4-20 AWG)	3-pin terminal block: Grid L1	Main distribution panel: L1
	3-pin terminal block: Grid L2	Main distribution panel: L2
	3-pin terminal block: Grid N	Main distribution panel: N
Min. 10 AWG grounding wire		to ground
Backed-up loads panel		
6 AWG (4-20 AWG)	3-pin terminal block: L1	Backed-up loads panel: L1
	3-pin terminal block: L2	Backed-up loads panel: L2
	3-pin terminal block: N	Backed-up loads panel: N
Min. 10 AWG grounding wire		to ground

Chapter 6: Commissioning the Installation

This chapter describes how to activate the system, pair the power optimizers to the inverter and verify the proper functioning of the system.



Removing the Inverter Cover

If the inverter cover is not already removed, use the following procedure for cover removal for communication connection or maintenance purposes.

1. Turn the StorEdge Connection Unit to OFF.
2. Turn the inverter ON/OFF switch to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel. Wait 5 minutes for the capacitors to discharge.
4. Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

CAUTION!



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

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.

Step 1: Activating the System

1. Verify that the inverter ON/OFF switch is OFF.
2. Move the StorEdge Connection Unit ON/OFF switch to the OFF position.
3. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

**WARNING!**

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

RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.

4. Activate the inverter:
 - a. Verify that the card S/N matches the inverter S/N.
 - b. Insert the card into the "CARD" slot on the communication board.
 - c. Turn ON the AC switch of the main circuit board.
 - d. LCD shows: Running Script... → Done!

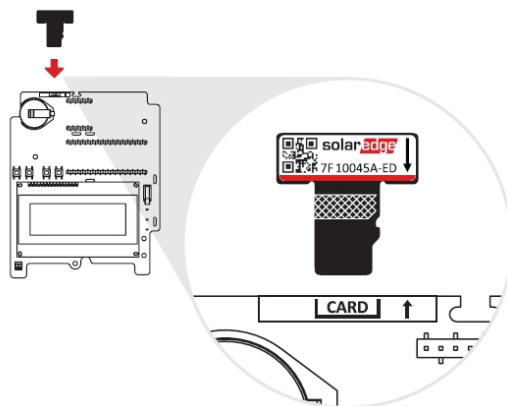


Figure 27: Activation card

If LCD shows: Failed:

- Turn AC OFF and ON (reset), and repeat the activation process.
- Use the activation code that appears on the certification inverter label to manually activate the inverter.
- If the problem persists, contact SolarEdge Support.

**NOTE**

You can use the activation code that appears on the certification inverter label to activate the inverter in case of a script error or a missing activation card.

5. Verify that the inverter is configured to the proper country: Press the LCD light button until reaching the ID status screen:

```
DSP1 / 2 : 1 . 0 2 1 0 / 1 . 0 0 3 4
CPU : 0 0 0 3 . 1 9 x x
Country : USA 1
```

6. If required, perform the following additional steps before closing the inverter cover:
- Country settings or inverter configuration using the internal LCD user buttons – refer to *Country and Grid* on page 58.
 - Communication options connection – refer to *Setting Up Communication to the Monitoring Platform* on page 69.
 - StorEdge application configuration - refer to *System Configuration* on page 78.
7. Close the inverter cover by tightening the screws with a torque of 9.0 N*m / 6.6 lb*ft. For proper sealing, first tighten the corner screws and then the two central screws. The following figure illustrates recommended order:

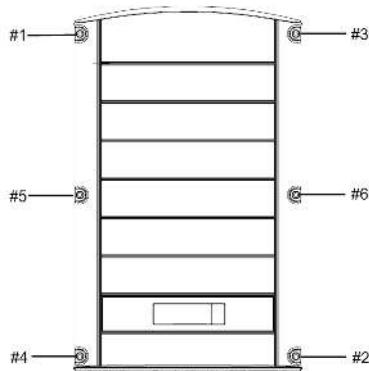


Figure 28: Tightening order of the screws

8. Close the StorEdge Connection Unit internal cover: Attach the cover and secure it by tightening the four screws with a torque of 1.2 N*m / 0.9 ft.*lb.
9. Make sure the AC Bypass switch in the StorEdge Connection Unit is switched to the left (position 1).
10. Make sure the backed-up loads AC breaker in the StorEdge Connection Unit is **UP**.

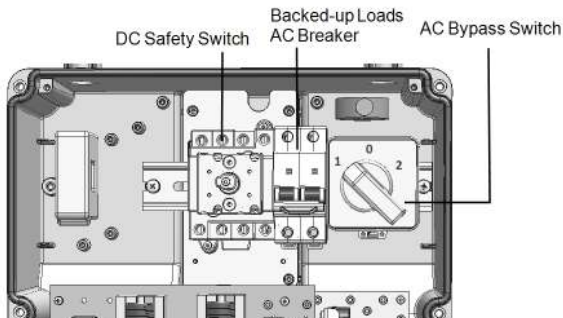


Figure 29: StorEdge Connection Unit

11. Close the StorEdge Connection Unit external cover: Attach the cover and secure it by tightening the six screws with a torque of 1.2 N*m / 0.9 ft.*lb.
12. Ensure proper conduit sealing; inspect the entire conduit run and use standard conduit sealants to avoid water penetration.
13. Turn ON the StorEdge Connection Unit switch. If an additional external DC switch is installed between the power optimizers/ battery and the inverter(s) then turn it ON.

A status screen similar to the following appears on the LCD panel:

```
V a c [ V ]   V d c [ V ]   P a c [ w ]
2 4 0 . 7     1 4 . 1     0 . 0
P _ O K :   0 0 0 / 0 0 0   < S _ O K >
                                O F F
```

14. Verify that the following information appears on the LCD panel:
 - **P_OK**: Appears only upon pairing process completion and first telemetry reception from the power optimizers. Indicates connection to the power optimizers and that at least one power optimizer is sending monitoring data. If P_OK does not appear, check the power optimizer, string and DC input connections.
 - **000/000**: Appears only upon first telemetry reception from the power optimizers. Indicates the number of power optimizers that have been paired to this inverter. At this stage, the number should be 000, since no power optimizers have been paired.
 - **S_OK**: the connection to the SolarEdge monitoring platform is successful (should appear only if the inverter is connected to the server). If S_OK is not displayed and the inverter is connected to the server, refer to *Troubleshooting* on page 87.
 - **Vac [V]**: the grid AC output voltage. Verify the correct value.
 - **Vdc [V]**: The DC input voltage of the longest string connected to the inverter. There should be a safety voltage of 1V for each power optimizer in the string.



NOTE

A measurement error on the inverter LCD of ± 3 V is acceptable.

- **Pac [w]**: the AC output power (should be **0.0** since the inverter is OFF).
- **OFF**: the inverter ON/OFF switch is in the OFF position.

Step 2: Pairing Power Optimizers to the Inverter

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

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

1. Perform pairing: Press and hold down the inverter LCD button for about **10 seconds**. The following message is displayed:

```
Keep holding button
for pairing, release
to enter menu...
Remaining:      3 sec
```


Keep holding for 5 seconds until the following is displayed:

```
Pairing
Turn Switch To On
```

2. Turn the inverter ON/OFF switch to ON within 5 seconds. If you wait longer than 5 seconds the inverter exits the pairing mode. The following message is displayed indicating that the inverter is performing the pairing:

```
Pairing
Remaining [sec]:180
```

3. Wait for the completion of the pairing (remaining seconds is 0). If pairing fails, an error is displayed. In this case, repeat the pairing steps, and refer to *Power Optimizer Troubleshooting* on page 90. If the problem persists, contact SolarEdge Support. When pairing succeeds, the following message is displayed:

```
Pairing
Pairing Completed
```

The system startup process begins:

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

WARNING!



When you turn ON the inverter ON/OFF switch, the DC cables carry a high voltage and the power optimizers no longer output a safe 1V output.

Après avoir mis l'interrupteur ON/OFF 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 de 1V.

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

While the inverter is in Standby mode, it monitors the grid and verifies correct grid voltage and frequency. The following message is displayed:

```
Waking Up...
Remaining: 051 Sec
```

The countdown indicates the seconds remaining until entering the Production mode. This time is in accordance with local regulations and is typically between three to five minutes.

When countdown is complete, the inverter enters Production mode and produces power. The steadily lit green inverter LED indicates this mode.

4. Enable Rapid Shutdown:
 - a. Enter Setup mode as described in *Configuring the Inverter Using the LCD Light Button* on page 55.
 - b. Scroll to the **Maintenance** menu and select **Optimizer Conf.** → **Set Rapid Shutdown** → **Enable**.

```
Set Rapid Shutdown
Exit
```

Step 3: Verifying Proper Activation

After the wake-up time is over, a status screen similar to the following appears on the inverter LCD panel:

```
Vac [ V ]   Vdc [ V ]   Pac [ W ]
240.7   371.9   2349.3
P_OK: XXX/YYY <S_OK>
                ON
```

1. Verify the following:
 - The green inverter LED is steadily lit.
 - The ON/OFF indicator on the LCD panel reads **ON**.
 - **P_OK: XXX/YYY**: There is a connection to the power optimizers and at least one power optimizer is sending monitoring data. Optimizers send telemetries in a frequency of up to 10 minutes.
 - **S_OK** appears, if the inverter is connected to the SolarEdge monitoring platform.
 - **Vac [V]** specifies the measured grid AC output voltage.
 - **Vdc [v]** : Specifies the DC input voltage, which should equal the sum of the output voltages of all modules (and should be within the operating range of the inverter).
 - **Pac [W]** specifies the AC output power produced.
2. Take note of the serial # on the inverter label using the detachable 2D barcode sticker on each device. This information is used in the SolarEdge monitoring platform to identify this inverter and is needed to open a new site in the monitoring platform.

Your SolarEdge power harvesting system is now operational.

Step 4: Reporting and Monitoring Installation Data



NOTE

This step requires connecting one of the communication options. Refer to *Setting Up Communication to the Monitoring Platform* on page 69.

The SolarEdge Monitoring System

The SolarEdge cloud-based monitoring platform (monitoring platform) enables accessing SolarEdge site information, including up-to-date information viewed in a physical or logical view. The monitoring platform is described in detail in the *SolarEdge Monitoring Platform User Guide*, available on the SolarEdge website at <http://www.solaredge.us/files/pdfs/solaredge-monitoring-platform-user-guide.pdf>. The SolarEdge monitoring platform can display logical and physical layouts of the installed system, as follows:



- **Logical Layout**: Shows a schematic logical layout of the components in the system, such as: inverters, strings and modules, as well as their electrical connectivity. This view enables you to see which modules are connected in each string, which strings are connected to each inverter, and so on.
- **Physical Layout**: Shows a schematic physical layout of the components in the system, such as: inverters, strings and modules, as well as their electrical connectivity. This view enables a bird's eye view of the actual location of a system component.

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.
- See how components are connected to each other.
- Pair power optimizers remotely.

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

To display a physical layout, you need to map the locations of the installed power optimizers. To generate a physical mapping, use either the Site Mapper application or a mapping template, which should be filled out using the detachable stickers (see *Providing Installation Information*, below).

The logical and physical mapping can be used for debugging a problem using the SolarEdge monitoring platform.

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

The inverter may be connected to the SolarEdge monitoring platform via LAN or via an external modem connected to the inverter's RS232 connector. Alternatively, you can connect the inverter to another inverter that is already connected to the server, in a master-slave configuration. Refer to *Setting Up Communication to the Monitoring Platform* on page 69.

Providing Installation Information

Use one of the following methods to connect your PV system to the SolarEdge cloud-based monitoring platform (monitoring platform).

Site Mapper Application

Android

Use the SolarEdge Site Mapper smart-phone application to scan the power optimizer and inverter 2D bar-codes, and map the system physical layout in the SolarEdge monitoring platform. This application is integrated with the SolarEdge monitoring platform and enables:

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

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

- [Creating new sites using the SolarEdge Site Mapper mobile application](#)
- [Mapping power optimizers using the SolarEdge Site Mapper mobile application](#)



iPhone

Use the SolarEdge Site Mapper smartphone application to scan the power optimizer and inverter 2D bar-codes. This application creates an XML file that can be uploaded to the SolarEdge monitoring platform during site registration. The SolarEdge Site Mapper can be downloaded from the application stores.

For detailed information, refer to the *SolarEdge Site Mapper Software Guide* or to the *Site Mapper* demo movie, available on the SolarEdge website at <http://www.solaredge.us/groups/installer-tools/site-mapper>.



Creating a Site in the SolarEdge Monitoring Platform

Create the site in the monitoring platform using the registration form available at <https://monitoring.solaredge.us/solaredge-web/p/login>. Fill out all required information in the form, which includes information about your installation, as well as details about its logical and physical mapping.



Paper Template

Fill out the Physical Layout Template (downloadable from the SolarEdge site) using the detachable 2D barcode stickers on each power optimizer. Once the form is completed, scan it and upload the scanned file to the SolarEdge monitoring platform during site registration. For an example paper template, refer to <http://www.solaredge.us/files/pdfs/physical-layout-template.pdf>.



Chapter 7: User Interface

LCD User Buttons

Four buttons are located inside the inverter above the LCD panel and are used for controlling the LCD menus, as shown below:

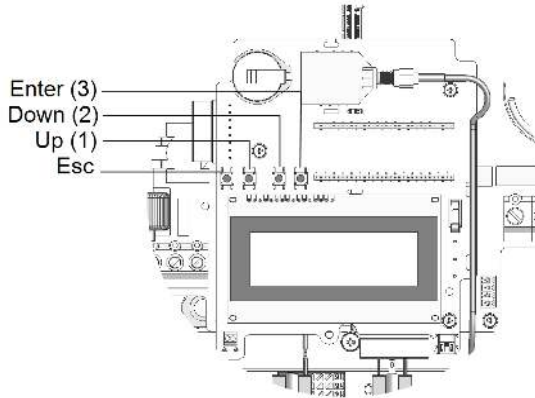


Figure 30: LCD Internal menu buttons

Use the four user buttons to control the LCD panel menus:

- **Esc:** Moves the cursor (>) to the beginning of the currently displayed parameter; goes to the previous menu, and cancels a value change with a long press (until **Aborted** is displayed).
- **Up** and **Down:** Moves the cursor from one menu option to another, moves among the characters of a displayed parameter, and toggles between possible characters when setting a value.
- **Enter:** Selects a menu option and accepts a value change with a long press (until **Applied** is displayed).

The LCD screen displays status information of the system and various menus for configuration options. The LCD panel and buttons are used during the following processes:

- **Operational mode:** The LCD panel allows checking for proper system operation. Refer to *Status Screens - Operational Mode* on page 62 for a description of this option. .
- **Setup mode:** Upon installation, an installer may perform basic configuration.
- **Error messages:** In the event of a problem, an error message may be displayed on the LCD panel. .

Inverter Configuration – Setup Mode

You can configure the inverter using one of the following:

- [The internal LCD user buttons](#). When using this option, the inverter cover is removed.
- [The external LCD light button](#). This option of configuration includes a less detailed configuration menu.

Configuring the Inverter Using the LCD User Buttons

After inverter installation, an installer may perform basic system configuration. Configuration is done when the inverter is in Setup mode.

► To enter Setup mode:

1. Turn the inverter ON/OFF switch to OFF (AC remains ON).

WARNING!



If the inverter was operating properly (power was produced by the power optimizers), the following message is displayed.

```
DC VOLTAGE NOT SAFE
DO NOT DISCONNECT
VDC: 72.0
```

This message is displayed until the DC voltage is safe (50V). Do not open the cover until the voltage is safe or until at least five minutes have passed.

La tension de sécurité par défaut est de 50V.

Ne pas ouvrir le couvercle ou les connecteurs DC jusqu'à ce que la tension soit affichée comme sécurisée ou jusqu'à ce que cinq minutes au moins se soient écoulées.

2. Press the Enter button for at least 5 seconds. The following message is displayed:

```
Please enter
Password
*****
```

3. Use the three rightmost internal LCD user buttons to type in the following password: **12312312**. The following menu is displayed:

```
Country <USA+>
Language <Eng>
Communication
Power Control
Backup Conf <Dis>
Display
Maintenance
Information
```

The inverter is now in Setup mode and all its LEDs are lit. The inverter automatically exits Setup mode if no buttons are pressed for more than 2 minutes.

The following shows a hierarchical tree of the menu options, which are described in *Configuration Menu Options* on page 58. Actual menus may vary from shown depending on the firmware version of the inverter and on the country.

Main menu:

```
Country <USA+>
Language <Eng>
Communication
Power Control
Backup Conf <Dis>
Display
Maintenance
Information
```

Country:

```
USA +
```

Language:

```
English
German
Spanish
French
Italian
```

Communication

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
RS232 Conf
Cellular Conf
GPIO Conf <MTR>
```

Power Control:

```
Grid Control <En>
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Phase Balance <Dis>
Wakeup Conf.
P(f)
Advanced
Load Defaults
```

Display:

```
Temperature <C>
LCD On Time <30>
TLM On Time <15>
```

Maintenance:

```
Date and Time
Reset Counters
Factory Reset
SW Upgrade SD-Card
AFCI <Dis>
Diagnostics
Standby Mode
Grid Protection
Board Replacement
```

Information:

```
Versions
Error Log
Warning log
Hardware IDs
```

Configuring the Inverter Using the LCD Light Button

Use the LCD light button for communication setup and for displaying the Error log and Warning Log. There are fewer menus available when using this configuration option; however, the functionality of these menus is the same as when using the internal LCD user buttons.

1. Turn the inverter ON/OFF switch to OFF.
2. Press and hold down the LCD light button until the following message is displayed:

```
Keep holding button
for pairing, release
to enter menu...
Remaining:      3 sec
```

Releasing the button displays the following menu:

```
Optimizer pairing
Language <eng>
Communication
Maintenance
Information
Exit
```

3. Short-press (one second) to scroll down to the next menu option, and long-press (three seconds) to select the item. You can use the **Exit** option in these menus to move up one menu level or to exit the Setup mode from the main menu.

The following shows a hierarchical tree of the menu options that appear when using the LCD light button:

Main menu:

```
Optimizer pairing
Language <eng>
Communication
Maintenance
Information
Exit
```

Language:

```
English
German
Spanish
French
Italian
Exit
```

Communication¹:

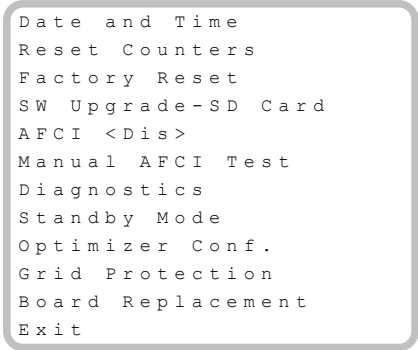
```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
Wi-Fi Conf<N/A>
GPIO Conf <MTR>
RS232 Conf
Cellular Conf
Exit
```

Information:

```
Versions
Error Log
Warning log
Hardware IDs
Exit
```

¹If Wi-Fi is connected, the ZigBee Conf menu is not displayed, and vice versa.

Maintenance:



```
Date and Time
Reset Counters
Factory Reset
SW Upgrade-SD Card
AFCI <Dis>
Manual AFCI Test
Diagnostics
Standby Mode
Optimizer Conf.
Grid Protection
Board Replacement
Exit
```

The options presented in these menus are described in the next section.

Configuration Menu Options

Country and Grid

1. Select the **Country** option to specify the country in which the inverter is installed and the grid to which it is connected. This parameter may arrive pre-configured. If so, verify that it is set to the proper country.



WARNING!

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

L'onduleur doit être configuré pour le pays approprié afin d'assurer un fonctionnement convenable avec le réseau de ce pays.

A list of countries is displayed. If no country is configured, the value is **<NONE>**.



NOTE

If an inverter is not configured to any country, it will not produce energy, and the following message will be displayed on the LCD:

No Country Selected

A plus sign (+) near the country indicates that another menu will be displayed after selection.

- When selecting **Auto**, the inverter automatically detects the used grid.
 - When selecting an option with **No Neutral** or **No N**, connection to Neutral line is not required. For any other option, you must connect the Neutral line.
2. Confirm your country selection in the confirmation screen: Toggle to **YES** and press **Enter**.

Language

1. Select the **Language** option to set the language in which the LCD should display.
2. Confirm your language selection in the confirmation screen: Toggle to **YES** and press **Enter**.

Communication

1. Select the **Communication** option to define and configure:
 - The communication option used by the inverter to communicate with the SolarEdge monitoring platform
 - The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as electricity meters or loggers.
2. Select **Server** to set which communication method is used to communicate between devices and the SolarEdge monitoring platform. Refer to *Setting Up Communication to the Monitoring Platform* on page 69 for a full description of these communication options.



NOTE

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

The following shows a hierarchical tree of the menu options in the **Communication** menu.

For detailed information about all the configuration options, refer to the *Communication Options Application Note*, available on the SolarEdge website at

http://www.solaredge.us/files/pdfs/solaredge-communication_options_application_note_v2_250_and_above.pdf.



Communication:

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
ZigBee Conf<S>
RS232 Conf
Cellular Conf
GPIO Conf <MTR>
```

Server:

```
LAN
RS485
Zigbee
Cellular
RS232
None
```

LAN Conf:

```
IP Config
Set DHCP <en>
Set IP
Set Mask
Set Gateway
Set DNS
Set Server Addr
Set Server Port
Modbus TCP<Dis>
```

RS485-1 Conf:

```
Device Type <SE>
Protocol <M>
Device ID <1>
Slave Detect <#>
Slave List <#>
```

ZigBee Conf. (enabled only if the ZigBee internal module is connected):

```
Device Type<SE>
Protocol<MPS>
Device ID<1>
PAN ID
Scan Channel
Load ZB Defaults
```

RS232 Conf:

```
Device Type<SE>
Protocol<GSM>
Set APN
Set Modem Type
Set User Name
Set Password
```

GPIO Conf:

```
Device Type <RRCR>
```

Power Control

For detailed information about active and reactive power control options refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf.



```
Grid Control <En>
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Phase Balance <Dis>
Wakeup Conf.
P ( f )
Advanced
Load Defaults
```

NOTE

Phase Balance is applicable to single phase inverters only.



The Grid Control option is disabled by default. Enabling it opens additional options in the menu, as shown on page 54.

Display

Select **Display** to set the following:

```
Temperature <C>
LCD On Time <30>
TLM On Time <15>
```

- **Temperature:** Select Celsius or Fahrenheit units.
- **LCD On Time <30>:** The number of seconds that the LCD backlight is ON after pressing the LCD light button. Set a value within the range of 10-120 seconds.
- **TLM On Time <15>:** The number of minutes that the LCD backlight is ON while viewing the Telemetry window. Set a value within the range of 1-120 minutes.

Maintenance

Select **Maintenance** to set the following options:

```
Date and Time
Reset Counters
Factory Reset
SW Upgrade SD-Card
AFCI <Dis>
Diagnostics
Standby Mode
Grid Protection
Board Replacement
```

- **Date and Time:** Set the internal real-time clock. If connected to the SolarEdge monitoring platform, the date and time are set automatically and only time zone should be set.
- **Reset Counters:** Resets the accumulated energy counters that are sent to the SolarEdge monitoring platform
- **Factory Reset:** Performs a general reset to the default device settings.
- **SW Upgrade SD-Card:** Perform a software upgrade using an SD card.
- **Diagnostics:** Displays the Isolation Status and optimizers status screens. Refer to http://www.solaredge.us/files/pdfs/application_note_isolation_fault_troubleshooting.pdf.
- **AFCI:** Enables or disables arc-fault self-test.
- **Manual AFCI Test:** Accessible from the LCD Light button menus only. Starts a self-test for arc detection. Refer to *Inverter Arc Detection and Interruption* on page 102.
- **Standby Mode:** Enables/disables Standby Mode - for remote commissioning.
- **Grid Protection:** Available in specific countries. Enables viewing and setting grid protection values.
- **Optimizer Conf.:** Opens the Rapid Shutdown menu.
- **Board Replacement:** Backs up the system parameters; Used during board replacement according to the instructions supplied with replacement kits.



Information

Select **Information** to display the following options:

```
Versions
Error Log
Warning log
Hardware IDs
```

- **Versions:** Displays inverter firmware versions:
 - **ID:** The inverter ID.
 - **DSP 1/2:** The DSP digital control board firmware version
 - **CPU:** The communication board firmware version



NOTE

Please have these numbers ready when you contact SolarEdge Support.

- **Error Log:** Displays the last five errors.
- **Warning Log:** Displays the last five warnings.

- **Hardware IDs:** Displays the following HW serial numbers (if exist, and connected to the inverter):
 - **ID:** the inverter's ID
 - **RGM1** (Revenue Grade Meter): A preassembled RGM or any external electricity meter (with lower Modbus ID)
 - **RGM2:** A second external electricity meter (with the higher Modbus ID)
 - **ZB:** Zigbee MAC address
 - **Cell:** MEID (CDMA) or IMEI (GSM)
 - **BAT1:** First battery ID
 - **BAT2:** Second battery ID

Status Screens - Operational Mode

Additional presses display the following screens one after the other.

Initial Status

```
V a c [ V ]   V d c [ V ]   P a c [ W ]
2 4 0 . 7     3 7 1 . 9     2 3 4 9 . 3
P _ O K :   X X X / Y Y Y   < S _ O K >
                                O N
```

- **Vac [V]:** The AC output voltage
- **Vdc [V]:** The DC input voltage
- **Pac [W]:** The AC output power

Main Inverter Status

```
V a c [ V ]   V d c [ V ]   P a c [ W ]
2 4 0 . 7     3 7 1 . 9   3 2 1 0 . 0
F a c [ H z ]   O P s _ O k   T e m p
5 0 . 0         1 1         2 8 . 2
```

- **Vac [V]:** The AC output voltage.
- **Vdc [V]:** The DC input voltage.
- **Pac [W]:** The AC output power.
- **Fac [Hz]:** The AC output frequency.
- **OPs_Ok:** Number of optimizers sending telemetries (indicating that they are paired)
- **Temp [C or F]:** The inverter heat sink temperature

Energy Meter Status

Displays the total energy produced during the last day, month, year and since inverter installation.

```
Day [ Wh ] :      0 . 0
Month [ KWh ] :   0 . 0
Year [ KWh ] :    0 . 0
Total [ KWh ] :   0 . 0
```

If a meter is connected to the inverter, the following status screen, showing the power and energy readings, is displayed instead of the above screen.

If the meter is set to Export +Import, there are two status screens, with the first line displaying: "Export Meter" or "Import Meter". The following is an example of an export meter status:

```
Export Meter
Status :          <OK / Error #>
Power [ W ] :      xxxxx . x
Energy [ Wh ] :    xxxxx . x
```

- **Status:** Displays OK if the meter is communicating with the communication board.
- **<Error message>:** If there is a meter error, it is displayed in this line. Refer to *Meter Troubleshooting* on page 88.
- **Power (W):** Depending on the meter type connected to the inverter, this line displays the exported or imported power in Watts.
- **Energy (Wh):** The total energy read by the meter, in Watt/hour. The value displayed in this line depends on the meter type connected to the inverter and its location:
 - If a bidirectional meter is connected at the consumption point, this value is the consumed energy.
 - If the meter is installed at the production connection point, this value is the energy produced by the site.
 - If the meter is installed at the grid connection point, this value is the energy exported to the grid.

If the inverter is connected to the SolarEdge server, this value will also be displayed in the monitoring platform.



NOTE

This data is accumulated according to an internal real-time clock.

Telemetry Status

This screen displays the last power optimizer telemetry received. The display changes as each power optimizer sends its telemetry.

In order to verify proper installation, the installer may view the Telemetry window for some time in order to observe the power optimizers' report process.

```
Module : 10288063 1B
Energy [ Wh ] : 56 . 7
Vdc_O [ V ] : 40 . 0
Vdc_I [ V ] : 38 . 3
I_in [ A ] : 7 . 8
Temp [ C ] : 28 . 0
```


- **Module:** Power optimizer serial number
- **Energy:** power optimizer energy
- **Vdc_O:** Power optimizer output voltage
- **Vdc_I:** Power optimizer input voltage (module voltage)
- **I_in:** Power optimizer input current
- **Temp:** Power optimizer temperature

ID Status

This screen displays the inverter software version and the country to which the inverter is configured.

```
DSP1/2:1.0210/1.0034
CPU:0003.19xx
Country:USA1
```

- **ID:** The inverter ID.
- **DSP 1/2:** The DSP digital control board firmware version
- **CPU:** The communication board firmware version
- **Country:** the current country setting

Server Communication Status

```
Server:LAN    <S_OK>
Status:       <OK>
             xxxxxxxx
<ERROR MESSAGE>
```



NOTE

If the connection method is CDMA (Cellular) or GSM, the server screen is replaced with the Cellular or GSM status screens (see *Cellular Status* on the facing page and *GSM Status* on the facing page).

- **Server:** The method of connection to the SolarEdge monitoring platform.
- **S_OK:** The connection to the SolarEdge monitoring platform is successful (should appear only if the is connected to the server).
- **Status:** Displays OK if the inverter established successful connection and communication with the specified server port/ (LAN, RS485 or ZigBee card).
- **xxxxxxx:** Eight-bit Ethernet communication connection status: A string of 1s and 0s is displayed. 1 indicates OK, 0 indicates an error. For a list of the possible errors and how to troubleshoot them, refer to *Communication Troubleshooting* on page 87.
- **Error message**, according to failure. Refer to *Troubleshooting* on page 87.

IP Status

This screen describes the Ethernet configuration: IP, Mask, Gateway and MAC address (Media Access Control) of the Inverter.

```
IP 192.168.2.119
MSK 255.255.255.0
GW 192.168.2.1
MAC 0-27-02-00-39-36
```

ZigBee Status

This screen describes the ZigBee configuration:

```
PAN : XXXXX
CH : XX / XXXX  RSSI : <L>
MID : XXXX  XX
```

- **RSSI:** The receive signal strength indication of the closest ZigBee in the system. L = low, M = medium, H = high and (-) = no signal.
- **PAN ID:** The ZigBee transceiver PAN ID
- **Ch.:** The ZigBee transceiver channel
- **ID:** The ZigBee transceiver ID
- **MID:** The Master ID of the coordinator (master) ZigBee card. This field is shown only in devices with router (slave) ZigBee cards, and after a successful ZigBee association. If a ZigBee card is not connected, a **No ZigBee** message is displayed instead of the **MID** field.

Cellular Status

If a cellular (CDMA) modem is connected, this screen replaces the Server status screen:

```
Server: Cell      <S_OK>
Status:  <OK>      Sig: 5
MNO:
<Error message>
```

- **Server:** The method of communication to the SolarEdge monitoring platform. Should display Cell.
- **Status:** Displays OK if the inverter established a successful physical connection to the Cellular modem.
- **S_OK:** The last communication to the SolarEdge monitoring platform was successful (appears if the inverter is connected to the platform).
- **Sig:** The signal strength, received from the cellular modem. A value between 0-5, (0 = no signal, 5 = excellent signal).
- **Error message** per communication connection status failure

GSM Status

If a GSM modem is connected, this screen replaces the Server status screen:

```
Server: Cell      <S_OK>
Status:           <OK>
MNO:  <xxxxxxx>  Sig: 5
<Error message>
```

- **Server:** The method of communication to the SolarEdge monitoring platform. Should display Cell.
- **Status:** Displays OK if the inverter established a successful physical connection to the modem.
- **S_OK:** The last communication to the SolarEdge monitoring platform was successful (appears if the inverter is connected to the platform). If S_OK is not displayed, refer to *Status Screens - Operational Mode* on page 62.
- **MNO:** The mobile network operator name
- **Sig:** The signal strength, received from the modem. A value between 0-5, (0 = no signal; 5=excellent signal).
- **Error message:** per communication connection status failure

Communication Ports Status

```

      Dev  Prot  ##
RS485-1<SE><S> <-->
ZigBee <SE><MPS><-->
    
```

- **##**: The total number of slaves detected on the specific port
- **Dev**: The type of device that was configured to a specific port (based on the port's functionality), as follows:
 - **SE**: SolarEdge device (default)
 - **LGR**: Non-SolarEdge logger
 - **MLT**: Multiple devices, such as meters and batteries
 - **HA**: Home automation devices (for load management)
- **PROT**: The protocol type to which the port is set:
 - For a SolarEdge device:

RS485 protocol	ZigBee protocol
S : SolarEdge slave	
M : SolarEdge master	
	P2P : ZigBee point-to-point
	MPM : ZigBee multipoint master (for the SolarEdge ZigBee home gateway or for load management by the inverter)
	MPS : ZigBee multipoint slave (for a ZigBee router card)

- For electricity meters, refer to the *application note - Connecting an Electricity Meter to SolarEdge Devices* at <http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide-na.pdf>.
- **SS**: SunSpec - for a non-SolarEdge logger (monitoring and control)



Smart Energy Management Status

This screen is displayed only when Smart Energy Management is enabled. The screen shows energy details of the site:

```

Site Limit:      7.0 kW
Site Prod:       10.0 kW
Site Export:     4.0 kW
Self-consume:    6.0 kW
    
```

- **Site Limit**: The limit that was defined for the site
- **Site Prod**: The power produced by the site
- **Site Export**: The power that is fed into the grid
- **Self-consume**: The PV power consumed by the site

For more information, refer to the *Export Limitation Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/products/feed-in_limitation_application_note.pdf.



Power Control Status

This screen is displayed only when Power Control is enabled (available from communication board (CPU) firmware version 2.7xx/3.7xx and later).

```
PWR CTRL: REMOTE
PWR Limit: 10.04 kW
CosPhi: 0.9
Power Prod: 7000W
```

- **PWR CTRL:** The power control status:
 - **REMOTE** - Communication with the RRCR or smart energy manager is confirmed/validated.
 - **LOCAL** - The power is controlled locally (e.g. by a fixed limit), or this inverter limits the PV power production to its relative portion of the feed-in power limit, as a result of disconnected communication with the smart energy manager. If this status appears, check the communication to the smart energy manager or the communication to the meter.
- **PWR Limit:** The inverter maximum output power set by one of the power limiting options:
 - RRCR
 - Smart energy manager (Feed-in limitation)
 - P(f)
 - P(U)
 - Q(U)
- **Cos Phi:** The ratio between active to reactive power
- **Power Prod:** The power produced by the inverter

For more information, refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf.



Battery Status

This screen is displayed only when the battery is configured, and shows the battery identification information, its charging status and power, and the operating mode.

```
BSN: XXXXXXXXXXXX ID: 24
SOE: 89% PWR: 2W
Total: <x>Wh
State: Charging
```

- **BSN:** Battery serial number
- **ID:** Battery identification - should be 24 as set up above
- **SOE:** State of Energy - the battery capacity percentage (calculated as Available Energy\Max. Energy)
- **PWR:** The charging or discharging power (in Watts) according to the battery state (see below)
- **Total:** The total discharged energy in Watt/hour
- **State:** The battery status: Charging/ Discharging, Idle, Init (pre-heating) or Fault <error code>.

Charge/ Discharge Profile Programming Status

This screen is displayed only if Charge/ Discharge Profile Programming [Time-of-Use (TOU)] is configured, and shows information about the TOU settings for the site.

```
Name : xxxx
Last Sync : <Date>
Source : <Remote>
Set Until : <date>
```

- **Name:** The TOU profile file name
- **Last Sync:** Date when the time-of-use profile was loaded from the monitoring platform
- **Source:** the source from which the TOU profile was uploaded:
 - Remote - Profile uploaded from the SolarEdge monitoring platform
 - Local - Profile uploaded from an SD card
- **Set Until:** The date until the current profiles applicable

Chapter 8: Setting Up Communication to the Monitoring Platform

Power optimizers send information to the inverter via the DC power lines (the PV output circuit). The information is sent from the inverter to the SolarEdge monitoring platform through the Internet. In order to send the data from the inverter, a communication connection must be set up, as described in this chapter.

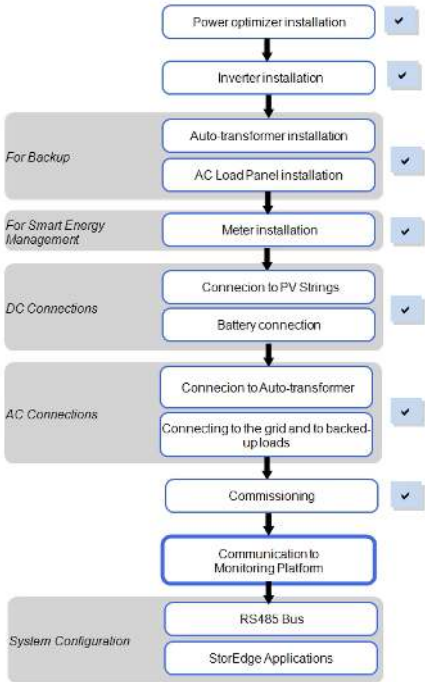


CAUTION!

When connecting the communication cables, make sure that the ON/OFF switch at the bottom of the inverter is turned OFF, and the AC is turned OFF.

When configuring the communication parameters, make sure that the ON/OFF switch is OFF, and the AC is turned ON.

Lors de la connexion des câbles de communication, assurez-vous que l'interrupteur MARCHE/ARRÊT à la base de l'onduleur soit en position ARRÊT, et le CA est en position ARRÊT. Lors de la configuration des paramètres de communication, assurez-vous que l'interrupteur MARCHE/ARRÊT soit en position ARRÊT, et le CA est en position MARCHE.



Communication Options

Ethernet

Ethernet is used for a LAN connection. For connection instructions refer to *Creating an Ethernet (LAN) Connection* on page 72.

RS485

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

For connection instructions refer to *Creating an RS485 Bus Connection* on page 74.

ZigBee

This wireless communication option (purchased separately), enables using a ZigBee connection to connect one or several devices to the SolarEdge monitoring platform. The ZigBee device is provided with a user manual, which should be reviewed prior to connection. Information is available on the SolarEdge website at <http://www.solaredge.com/sites/default/files/se-zigbee-kit-wireless-communication-datasheet-na.pdf> and <http://www.solaredge.us/groups/us/products/communication> (under Home Gateway).



GSM

This wireless communication option (purchased separately) enables using a GSM connection to connect one or several devices to the SolarEdge monitoring platform. The GSM cellular modem is provided with a user manual, which should be reviewed prior to connection. More information is available on the SolarEdge website at refer to the supplied manual, also available at [http://www.solaredge.us/products/communication/gsm-modem#/.](http://www.solaredge.us/products/communication/gsm-modem#/)



CDMA/Cellular

This wireless communication option enables using a cellular CDMA connection for connecting to the SolarEdge monitoring platform.

The cellular kit can be purchased separately and assembled during system installation. The kit is provided with a user manual, which should be reviewed prior to connection. It is available on the SolarEdge website at <http://www.solaredge.us/groups/us/products/communication> (under Cellular).

Only communication products offered by SolarEdge are supported.

Always connect the communication options when the inverter is OFF.



Communication Connectors

Two communication glands are used for connection of the various communication options. Each gland has three openings. The table below describes the functionality of each opening. Unused openings should remain sealed.

Gland#	Opening	Functionality	Cable Size (diameter)
1 (PG16)	One small	External antenna cable	2-4 mm
	Two large	Ethernet connection (CAT5/6), ZigBee, Cellular	4.5-7 mm
2 (PG13.5)	All three	RS485, power reduction	2.5-5 mm

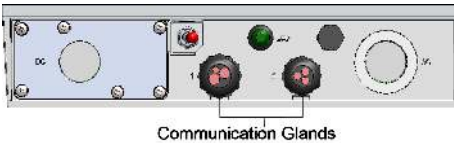


Figure 31: Communication Glands

The communication board has a standard RJ45 terminal block for Ethernet connection, and a 9-pin terminal block for RS485 connection, as shown below:

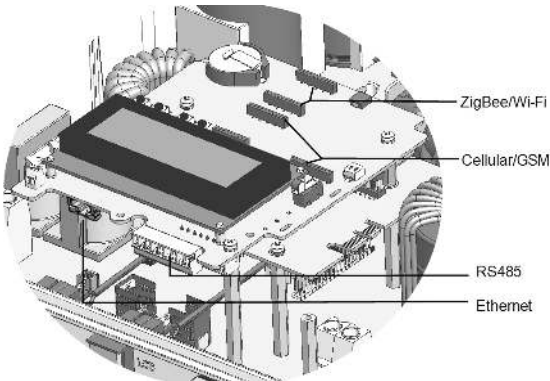


Figure 32: Internal connectors

Creating an Ethernet (LAN) Connection

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

Ethernet cable specifications:

- Cable type – CAT5/CAT6
- Maximum distance between the inverter and the router – 100 m/ 330 ft.

NOTE

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

http://www.solaredge.us/files/pdfs/lightning_surge_protection.pdf. If grounded metal conduits are used for routing the communication wires, there is no need for a lightning protection device.

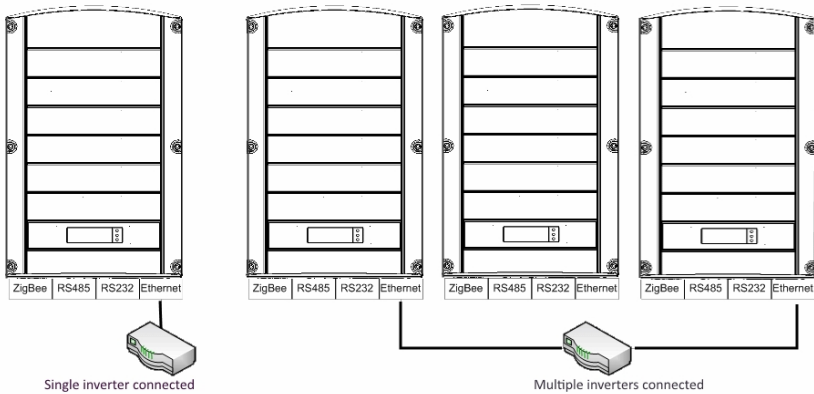


Figure 33: Example of Ethernet connection

► To connect the Ethernet cable:

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 44.
2. Open the communication gland #1.



CAUTION!

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

Le cote interne du gland contient une rondelle qui doit être utilisée pour une bonne étanchéité.

3. Remove the plastic seal from the large opening that has a cut in the rubber fitting .
4. Remove the rubber fitting from the gland and insert the CAT5/6 cable through the gland and through the gland opening in the inverter .

5. Push the cable into the cut opening of the rubber fitting.

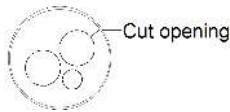


Figure 34: Rubber fitting

CAT5/6 standard cables have eight wires (four twisted pairs), as shown in the diagram below. Wire colors may differ from one cable to another. You can use either wiring standard, as long as both sides of the cable have the same pin-out and color-coding.

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

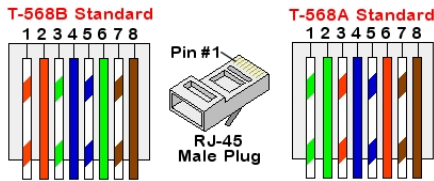


Figure 35: Standard cable wiring

6. Use a pre-terminated cable to connect via gland #1 to the RJ45 plug on the inverter's communication board or, if using a spool of cable, connect as follows:
- a. Insert the cable through gland #1.
 - b. Remove the cable's external insulation using a crimping tool or cable cutter and expose eight wires.
 - c. Insert the eight wires into an RJ45 connector, as described in Figure 35
 - d. Use a crimping tool to crimp the connector.
 - e. Connect the Ethernet connector to the RJ45 port on the communication board.

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

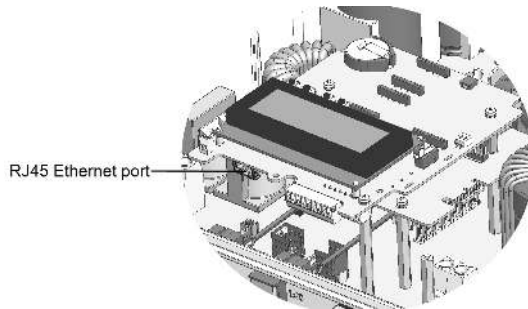


Figure 36: The RJ45 Ethernet connection

7. For the switch/router side, use a pre-crimped cable or use a crimper to prepare an RJ45 communication connector: Insert the eight wires into the RJ45 connector in the same order as above (Figure 35).
8. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router.
You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the SolarEdge monitoring platform.
9. The inverter is configured by default to LAN. If reconfiguration is required:
 - a. Make sure the ON/OFF switch is OFF.
 - b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
 - c. Turn ON the StorEdge Connection Unit.

WARNING!



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

RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.

- d. Use the internal user buttons to configure the connection, as described in *Communication* on page 58.

NOTE



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

- Destination Address: prod.solaredge.com
- TCP Port: 22222 (for incoming and outgoing data)

10. Verify the connection, as described in *Verifying the Connection* on page 77.

Creating an RS485 Bus Connection

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

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
- Wire cross-section area: 0.2- 1 mm² / 24-18 AWG (a CAT5 cable may be used)

- Maximum nodes: 32
- Maximum distance between first and last devices: 1 km /3300 ft.

NOTE

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

http://www.solaredge.us/files/pdfs/lightning_surge_protection.pdf. If grounded metal conduits are used for routing the communication wires, there is no need for a lightning protection device.

**NOTE**

An additional RS485 port (RS485-E) is available from SolarEdge, allowing configuration of multiple RS485 buses for communications in large sites; Refer to http://www.solaredge.us/files/pdfs/RS485_expansion_kit_installation_guide.pdf.



The following sections describe how to physically connect the RS485 bus and how to configure the bus.

► **To connect the RS485 communication bus:**

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 44.
2. Remove the seal from one of the openings in communication gland and insert the wire through the opening.
3. Pull out the RS485 terminal block connector, as shown below:

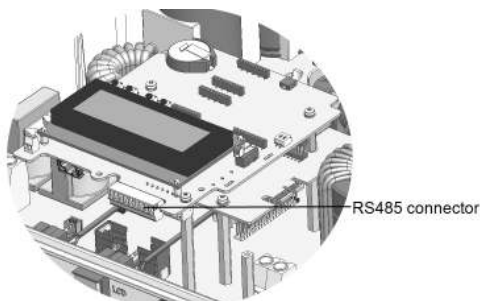


Figure 37: The RS485 terminal block

- Loosen the screws of pins A(+), B(-), and G on the left of the RS485 terminal block (RS485-1 or RS485-2).

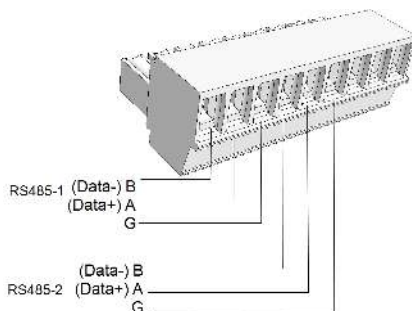


Figure 38: RS485 terminal block

- Insert the wire ends into the **G**, **A** and **B** pins shown above. Use Four- or six-wire twisted pair cable for this connection. You can use any color wire for each of the **A**, **B** and **G** connections, as long as the same color wire is used for all A pins, the same color for all B pins and the same color for all G pins.
- For creating an RS485 bus - connect all B, A and G pins in all inverters. The following figure shows this connection schema:

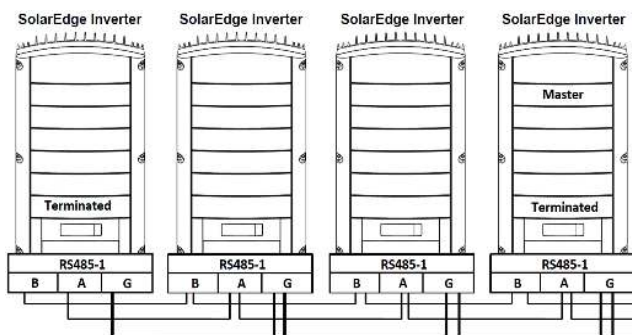


Figure 39: Connecting the inverters in a chain



NOTE

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

- Tighten the terminal block screws.
- Check that the wires are fully inserted and cannot be pulled out easily.
- Push the RS485 terminal block firmly all the way into the connector on the right side of the communication board.

10. Terminate the first and last SolarEdge device (inverter/Control and communication gateway, etc.) in the chain by switching a termination DIP-switch inside the inverter to ON (move the switch up). The switch is located on the communication board and is marked SW7.

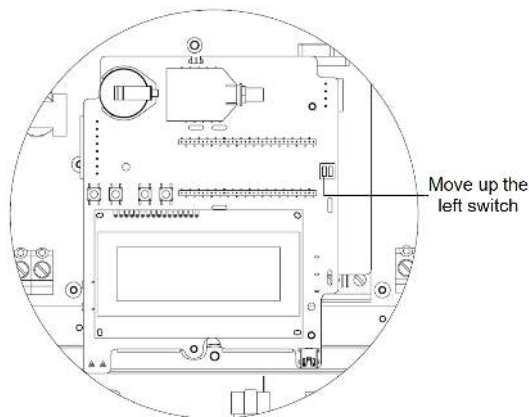


Figure 40: RS485 termination switch



NOTE

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

Verifying the Connection

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

1. Close the inverter cover: Attach the inverter cover and secure it by tightening the screws with a torque of 9.0 N*m/6.6 lb.*ft. For proper sealing, first tighten the corner screws and then the two central screws.
2. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel and turning on the StorEdge Connection Unit.
3. Wait for the inverter to connect to the SolarEdge monitoring platform. This may take up to two minutes.

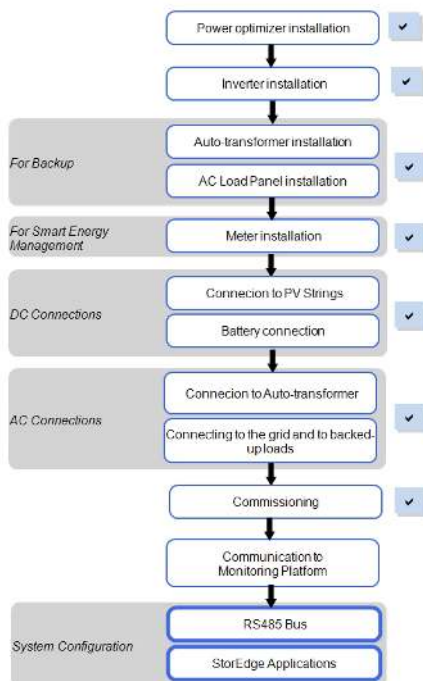
A status screen similar to the following appears on the LCD panel:

```
V a c [ V ]   V d c [ V ]   P a c [ w ]
2 4 0 . 7     1 4 . 1     0 . 0
P _ O K :   0 0 0 / 0 0 0   < S _ O K >
                        O F F
```

S_OK: Indicates that the connection to the SolarEdge monitoring platform is successful. If S_OK is not displayed, refer to "Troubleshooting" on page 87.

Chapter 9: System Configuration

This chapter describes how to configure your StorEdge system by setting up the communication between the system components and setting up the required application. To use the StorEdge applications, the inverter communication board firmware (CPU) version must be 3.xxxx and later. The latest firmware version is available for download at <http://solaredge.com/storedge/firmware>.



Configuring the RS485 Bus for Battery and Meter Connection

This section describes how to set up the RS485 communication between the inverter, meter and one battery. For information on configuring two batteries, refer to the *StorEdge Applications Connection and Configuration Guide* available at http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf.



Some inverters are equipped with a built-in Revenue Grade Meter (RGM), which is located in the StorEdge Connection Unit. When an additional meter is installed for these inverters, the second meter is connected to the existing RGM in a daisy chain.

► To configure the RS485 bus:

1. Turn OFF or verify that the StorEdge Connection Unit switch is OFF.
2. Turn the inverter ON/OFF switch to OFF.

3. Select **Communication** → **RS485-1 Conf** → **Device Type** → **Multi Devices**. A list of devices is displayed.

```
Device Type <MLT>
Meter 1 <--->
Meter 2 <--->
Meter 3 <--->
Battery 1 <--->
Battery 2 <--->
```

If an RGM is installed, it is pre-configured to Meter 1:

```
Device Type <MLT>
Meter 1 <WN, 1>
Meter 2 <--->
Meter 3 <--->
Battery 1 <--->
Battery 2 <--->
```

4. Select **Meter 2**. The meter configuration screen is displayed (SolarEdge meters are pre-configured to Device ID 2):

```
Device Type <MTR>
Protocol <WN>
Device ID <2>
CT Rating <0>
Meter Func. <None>
```

5. Configure the meter:

- Select **Device Type** → **Revenue Meter**
- Select **Protocol** → **WattNode**
- Verify that **Device ID** is set to **2**.
- Set the CT value that appears on the CT label: **CT Rating** → **<xxxxA>**.

If CT resets to 0, check the communication as described in step b of verify the connection:below.

- For a meter installed at the grid connection point select **Meter Func.** → **Export+Import**.

```
Export+Import
Export
Consumption
Production
Import
None
```

The selected option is displayed in the RS485 Conf screen as <E+I>.

6. Select **Communication** → **RS485-1 Conf** → **Device Type** → **Multi Devices** → **Battery 1**. The battery configuration screen is displayed:

```
Device Type <BAT>
Protocol <T74 Battery>
Device ID <24>
Battery Info < >
```

7. Select **Device Type** → **Battery Pack**.

8. Select the battery protocol and ID:

Battery type	Protocol	Device ID
Tesla Powerwall	T74 Battery	24
LG Chem RESU	LG Battery	15

9. To verify battery connection, select **Battery Info** and check that the battery information is displayed. If not, check the wiring to the battery:

```
SN: <serial #>
Model: <XXXXXX>
Rated PWR[kWH]: N/A
FW Ver. <XXXXXX>
```

Make sure to have the battery serial number and firmware version at hand whenever contacting support.

▶ To verify the connection:

1. Press the inverter external LCD light button to display the status screens one after the other:
- Check the RS485 communication status:

```
Dev Prot ##
RS485-1<MLT><02><02>
```

- The **MLT** under **Dev** denotes that the configuration is for multiple devices.
- The number under **Prot** (protocol) should display the number of *configured* devices.
- The number under **##** should display the number of *detected* devices.

The above screen shows an example of 2 devices on the same bus (for example: meter and battery). If RGM is pre-installed, and a battery and an external meter are also installed, the screen should show <3><3>.

If the number of devices under Prot does not match the number under ##, refer to *Troubleshooting* on page 87.

- Check the meter(s): In the meter(s) status screen check that the status is **OK**. The following is an example of the status of an Export (or Export+Import) meter:

```
Export Meter
Status: <OK/Error#>
Power[W]: xxxxx.x
Energy[Wh]: XXXXX.X
```

If **Comm. Error** appears, refer to *Troubleshooting* on page 87.

- Check the battery information: identification, charging status and power, and the operating mode.

```
BSN: XXXXXXXXXXXX ID: 24
SOE: 89% PWR: 2W
Total: <x>Wh
State: Charging
```

If **Comm. Error** appears, refer to *Troubleshooting* on page 87.

Configuring StorEdge Application

This section describes the StorEdge applications and how to configure the system.

Backup Power Applications

The produced power is stored in the battery to be used during power outages. The StorEdge inverter senses the grid voltage, and when it is down it automatically switches to Backup mode, disconnecting from the grid and supplying power to the backed-up loads. This application requires connection to the SolarEdge Auto-transformer and a backed-up loads panel.

This application can be used in one of two ways:

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

For more information, refer to the StorEdge Applications Connection and Configuration Guide available at

http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.pdf.



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

System Basic Configuration

This section describes:

- How to enable the *Backup Configuration* functionality, so that the system can be set up to the available applications (Backup-only or Backup+Smart Energy Management); If Backup Conf is disabled, the system will use the battery energy when PV production is not sufficient in MSC, or when using one of charge/discharge profiles that requires battery discharge. However stored energy will not be used to back up the loads in case of power outage.
- How to access use the **Energy Ctrl** menu; This menu is the base for setting up StorEdge applications available for the inverter.

► To enable the Backup Configuration functionality:

1. Enter Setup mode to display the main menu:

```
Country <USA+>
Language <Eng>
Communication
Power Control
Backup Conf <Dis>
Display
Maintenance
Information
```

2. From the main menu select **Backup Conf**.

```
Backup <Dis>
```

3. Select **Backup** ➔ **Enable**.

► To access the Energy Ctrl menu:

1. Enter Setup mode, scroll down to the **Power Control** menu and select it. A menu similar to the following is displayed:

```
Grid Control <En>
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Phase Balance <Dis>
Wakeup Conf.
P(f)
Advanced
Load Defaults
```

2. Select **Energy Manager**. The following screen is displayed:

```
Limit Control<Dis>
Energy Ctrl <Dis>
Storage Ctrl
Advanced
```

Limit Control: For power limitation (including export limitation) configuration. This option can be used in parallel to energy control. For more information refer to http://www.solaredge.us/files/pdfs/products/export_limitation_application_note_NA.pdf.

- **E:** Export limit
- **P:** Production limit
- **Dis:** Disabled - no limit

Energy Control: The method by which to manage the energy.

Storage Control: Enables reserving a minimum battery charge level.

3. Select **Energy Ctrl..** The following is displayed, showing the SolarEdge applications:

```
Max Self-consume
Time of Use
Backup Only
Disable
```

Max Self-consume (MSC): Maximize Self-consumption

Time of Use (TOU): Charge/Discharge Profile Programming

Backup Only: Supply power to loads during power outage

Disable: No energy control, that is, the battery is not used



Setting Backup-Only

When the inverter is set to Backup-only mode, the battery will discharge to supply power to the backed-up loads only upon power outage.

► To set up Backup-only:

1. Access the **Energy Ctrl** menu as described above.

2. Select **Backup only**. The Energy Manager screen changes to display the following:

```
Limit Control<Dis>
Energy Ctrl <BU>
Storage Control
```

Setting MSC + Backup Power

In this mode, you first set the system to maximize self-consumption (MSC), and then the level of stored energy to be reserved for backup.

► To set up MSC + Backup Power:

1. Access the **Energy Ctrl.** menu as described above.
2. For maximizing self consumption, select **Max Self-Consume**. The Energy Manager screen changes to display the following:

```
Limit Control<Dis>
Energy Ctrl <MSC>
Set Operation
Storage Ctrl
```

3. Optionally, set the battery OFF periods as follows:
 - a. Select **Set Operation**. A list is displayed, allowing 12 monthly profile setup:

```
Jan <ON>
Feb <ON>
Mar <ON>
Apr <ON>
```

- b. Select a month. A list of options is displayed.

```
Start Time <00:00>
End Time <00:00>
Always ON
Always OFF
```

- c. Select one of the options:
 - Select **Always OFF** to avoid battery usage entirely (for example during winter)
 - Set **Start Time** and **End Time** to set battery usage in specific hours and avoid usage during specific hours throughout the month (for example at night). This sets the periods during which the battery will be in the OFF state.
 - Select **Always ON** to use battery at all times for charging/ discharging.
4. To set a minimum battery level used for backup, so that the battery will always have energy stored in case backup power is needed, do the following:
 - a. Select **Energy Manager → Storage Control**. The following is displayed:

```
AC Charge <Dis>
Backup Rsvd<N/A>
```

- b. Select **AC Charge → Enable**.
- c. Select **Backup Rsvd** and set the required level of reserved energy as percentage of the battery capacity:

- For backup power + Smart Energy Management - according to user requirement
- For backup-only - according to battery manufacturer recommendation, if provided.

Setting Charge/Discharge Profile + Backup Power

In this mode, you first set the system to charge/ discharge profile (for time-of-use arbitrage) and the level of charging the battery from AC. Then, you set up the level of stored energy to be reserved for backup.

► To set up Charge/Discharge Profile (TOU) + Backup Power:

1. Access the **Energy Ctrl.** menu as described above.
2. Select **Time of Use**. The Energy Manager screen changes to display the following:

```
Limit Control <Dis>
Energy Ctrl <TOU>
Set Calendar
Storage Control
```

3. From the **Energy Manager** menu select **Set Calendar**. The following screen is displayed, showing options for calendar setting:

```
Server Sync <Dis>
Load SD <N/A>
```

4. Do one of the following:

- To load a time-of-use table from the monitoring platform, refer to http://www.solaredge.us/sites/default/files/storedge_charge_discharge_profile_programming.pdf.
- To load a time-of-use table from the SolarEdge SD card (contact SolarEdge to obtain it), insert the card to the slot labeled "Card" on the communication board and select **Load SD**. From the displayed list select the directory and the table (filename).



5. To set up the level of charging from AC, do the following:

- a. Select **Energy Manager → Storage Control**.
- b. Select **AC Charge → Enable**. An additional menu is added to the StorEdge Control menu: **AC Charge Li<None>**

```
AC Charge <EN>
AC Charge Li <None>
Backup Rsvd <N/A>
```

- c. Select **AC Charge Li → Limit Type**, and set one of the following limits:
 - Set **%PV** to enter a limit as a percentage of year-to-date energy production.
 - Set **kWh** to enter a fixed annual energy limit.
 - Set **None** to unlimit the charging.
6. To set a minimum battery level used for backup, so that the battery will always have energy stored in case backup power is needed, select **Backup Rsvd** and set the required level of reserved energy as percentage of the battery capacity
 - For backup power + Smart Energy Management - according to user requirement
 - For backup-only - according to battery manufacturer recommendation, if provided.

Verifying StorEdge Components Functionality

Upon installation and configuration completion, the system should be operating according to the selected StorEdge application.

This section describes how to verify that all system components are functioning as expected. If not, refer to *Troubleshooting* on page 87.

► To check the meter and inverter:

1. Verify that AC is ON.
2. Check the meter (installed in export or consumption position, CT arrows point to the grid):
 - a. Turn the inverter ON/OFF switch to OFF.
 - b. Connect loads on one of the measured phases.
 - c. Press the external LCD light button to display the Import or Consumption meter status screen, and check that the import or consumption energy (Energy[Wh]) is greater than 0 (may take a few minutes, depending on the loads size):

```

Import Meter
Status:      <OK / Error#>
Power [W]:   xxxxx.x
Energy [Wh]:  XXXXX.X
  
```

- d. Press the LCD light button to display the Export meter status screen, and check that the Export power is equal to zero. If it is not zero, check the CT direction on all connected phases.
3. Turn the inverter ON/OFF switch to ON.
4. Turn the StorEdge Connection Unit switch to ON.
5. While the modules are exposed to sunlight (PV system is connected to the grid and the inverter is producing power), press the inverter LCD light button to display the power status screen, and check that the grid AC output (Vac) increases to 220-240V, and the total AC output power produced (Pac):

```

Vac [V]  Vdc [V]  Pac [W]
240.7    371.9    2349.3
P_OK:    XXX / YYY <S_OK>
                      ON
  
```

► To check Backup:

1. Disconnect the AC power by shutting off the AC at the main distribution panel. The inverter should disconnect from the grid, and continue supplying power to the backed-up loads.

Switching to Backup mode takes a few seconds. The LCD screen will show tha Backup mode is ON:

```

Vac [V]  Vdc [V]  Pac [W]
240.7    371.9    2349.3
P_OK:    XXX / YYY <S_OK>
Backup Mode      ON
  
```

2. Press the external LCD light button to display the battery status screen, and check that:

- The battery State is: Discharging / Charging
- The SOE percentage is decreasing/increasing
- The PWR value is greater than 0

```
BSN: XXXXXXXXXXXX ID: 24
SOE: 89%           PWR: 3W
Total: <x>Wh
State: Discharging
```

3. Turn the AC back ON from the main distribution panel. The inverter should reconnect loads back to the grid.

► To check Maximize Self-consumption mode:

1. Verify the inverter ON/OFF switch is ON.
2. Turn on as many loads so that consumption is greater than the inverter's maximum AC power.
3. Press the inverter LCD light button to display the Meter status screen and check that import power is greater than zero:

```
Import Meter
Status: <OK/Error#>
Power[W]: xxxxx.x
Energy[Wh]: XXXXX.X
```

4. Press the inverter LCD light button to display the Smart Energy Management and the Battery status screens, and check that:
 - **State** = Discharging (assuming consumption > PV production ; inverter maximum AC power > PV production).
 - **PWR** > 0

```
BSN: XXXXXXXXXXXX ID: 24
SOE: 89%           PWR: 2W
Total: <X>Wh
State: Discharging
```

5. While the PV modules are exposed to sunlight , verify that the battery is charging properly:
 - a. Minimize consumption by turning off all the load circuit breakers, except for the inverter.
 - b. In the inverter LCD check that the Meter status screen is displaying import power close to zero.
 - c. Press the external LCD light button to display the Battery status screen, and check that:
 - **State** = Charging
 - **SOE** percentage is increasing
 - **PWR** > 0

```
BSN: XXXXXXXXXXXX ID: 24
SOE: 89%           PWR: 2W
Total: <x>Wh
State: Charging
```

Appendix A: Troubleshooting

This appendix describes how to troubleshoot StorEdge related errors.

Communication Troubleshooting

When a battery and a meter are connected (2 devices connected to the same bus), the following should appear in the Communication status screen:

```
Dev Prot ##
RS485-1<MLT><02><02>
ZigBee<---><---><--->
```

Device type, number and protocol are displayed incorrectly

If one or more of the following occurs, the meter(s) or the battery are not communicating with the inverter:

- If **Dev** is not **MLT** (Multi) , the system is not pre-configured and requires full configuration. Configure the system as described in *Configuring the RS485 Bus for Battery and Meter Connection* on page 78.
- If **##** < **02**, the meter and/or the battery are not configured correctly. Check the configuration.
- If **Prot** < **02**, the meter and/or the battery is not communicating correctly. Check the configuration and wiring connection.

If Prot = **##**– the battery and meter are configured and communicating properly.

Troubleshooting Ethernet Communication

When using Ethernet communication, use the **Server Communication Status** window to identify the location of the error:

```
Server:LAN <S_OK>
Status: <OK>
xxxxxxx
<ERROR MESSAGE>
```

xxxxxxx is a string of 1s and 0s showing an eight-bit communication connection status. 1 indicates OK and 0 indicates an error.

Bit Location	Error Message	Cause and Troubleshooting
1st	LAN Disconnected	Physical connection fault. Check the cable pin-out assignment and cable connection. Refer to
2nd	DHCP Failed, or Invalid DHCP Config	IP settings issue. Check the router and configuration. Consult your network IT.
3rd	Gateway Ping Failed	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.

Bit Location	Error Message	Cause and Troubleshooting
4th	G Server Ping Failed	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.
5th	Server x Ping Failed	Ping or connection to SolarEdge server failed. Check the SolarEdge server address, under LAN Conf submenu: Address: prod.solaredge.com Port: 22222 Check with your network administrator whether a firewall or another device is blocking transmission.
6th		
7th		
8th	Tcp Connect. Failed	

Meter Troubleshooting

For troubleshooting a built-in meter, refer to http://www.solaredge.com/files/pdfs/built-in_rgm_troubleshooting.pdf.

When a meter is connected, there will be a status screen for each meter function. The following is an example of the export meter function status:

```

Production Meter
Status:          <OK / Error>
Power [ W ] :    x x x x x . x
Energy [ Wh ] :  x x x x x . x
  
```

<OK> is not displayed

If **<OK>** is not displayed in the Status line of the status screens, the meter is not communicating with the inverter communication board. Check the following:

- There are no loose connections at the inverter communication board and at the meter.
- The wiring between the 4-pin terminal block on the meter and the RS485 terminal block on the StorEdge Connection Unit is correct (refer to *Figure 21*).

An error message is displayed

If **Error 185 Meter Comm. Error** is displayed in the meter status screen, verify proper connection of:

- The RS485 cables and connectors
- The AC connection of the meter

Power [Wh] Import value is not advancing

If the inverter is not producing power, and there is power consumption by the loads, check the following:

- The meter status LEDs are lit. If the LEDs are all OFF, the meter is not connected to a power source.
 - Check the meter AC connection (10-pin terminal block)
 - Check that the meter breaker is ON
- There are no loose connections at the 10-pin AC wiring of the meter.
- The CT black and white cables are correctly connected to the 6-pin connector on the meter:

- White CT wire is connected to L1 white
- Black CT wire is connected to L1 black
- CT direction is towards the grid and the green power LEDs are ON. If the LEDs are not green indicating import power - the CTs are reversed.

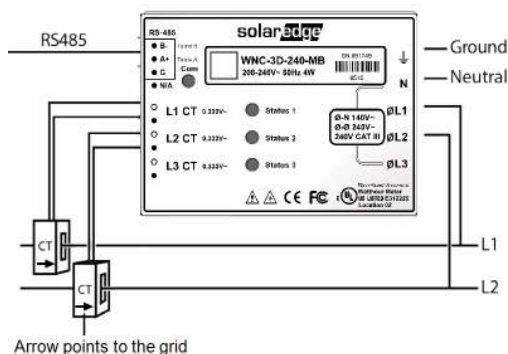


Figure 41: Meter with CTs

Battery Troubleshooting

The State line in the battery status screen should display one of the following: Charging, Discharging, Idle, Off, Init.:

```
BSN: XXXXXXXXXXX ID: 24
SOE: 89% PWR: 2W
Total: <x>Wh
State: Charging
```

- If **Error 186 Battery Comm. Error** appears, the battery communication is disconnected. Check the following:
 - The RS485 control connection to the battery
 - The communication DIP switches settings on the battery
 - The ID DIP switches setting on the battery
- If the state **Idle** is displayed instead of Charging/Discharging, check the following:
 - The system configuration
 - The DC connection
 - The LEDs in the StorEdge Connection Unit - refer to *StorEdge Connection Unit LEDs* on page 91
- If **Battery Internal Fault** is displayed, refer to the battery documentation supplied with it. The following is an example fault screen.

```
Battery Internal
Fault <#> (ID : 24)
<xxxx>
<xxxx>
```

Fault # - according to battery

ID - The Modbus ID of the battery

<xxx> - text

Power Optimizer Troubleshooting

If the inverter status screen indicates that not all power optimizers are paired or not all are reporting (P_OK xxx/yyy, and x<y), those optimizers can be identified through the LCD. Refer to http://www.solaredge.us/sites/default/files/non_reporting_power_optimizers.pdf



Problem	Possible cause and troubleshooting
Pairing failed	Power optimizers are shaded. If you connected the inverter to the SolarEdge monitoring platform, retry pairing remotely (during sunlight). Make sure to leave the inverter ON/OFF switch ON and that S_OK appears on the LCD..
String voltage is 0V	Power optimizer(s) output is disconnected. Connect all power optimizer outputs
String voltage not 0V but lower than number of optimizers	Power optimizer(s) not connected in the string. Connect all power optimizers
	Module(s) not connected properly to power optimizer inputs (not applicable to smart modules). Connect the modules to the optimizer inputs
	String reverse polarity. Check string polarity using a voltmeter and correct if needed.
	Extra power optimizer(s) connected in the string (not applicable to smart modules). Check if an extra power optimizer is connected in the string. If not – proceed to next solution.
String voltage is higher than the number of optimizers	A module is connected directly to the string, without a power optimizer (not applicable to smart modules). Verify that only power optimizers are connected in the string and that no module outputs are connected without a power optimizer. If the problem persists, proceed to the next step.
WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of $\pm 1\%$ per string is reasonable. <i>Si la tension mesurée est trop haute, la tension basse de sécurité pourrait manquer dans l'installation. REDOUBLEZ DE PRECAUTION. Une déviation de $\pm 1\%$ par string est raisonnable.</i>	Power optimizer(s) malfunction.
	<ul style="list-style-type: none"> ○ Disconnect the wires connecting the power optimizers in the string. ○ Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizer is located, check its connections, polarity, module, and voltage. ○ Do not continue before finding the problem and replacing the malfunctioning power optimizer. If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string.

StorEdge Connection Unit LEDs

There are three LEDs on the lower board of the StorEdge Connection Unit, near the DIP switches:

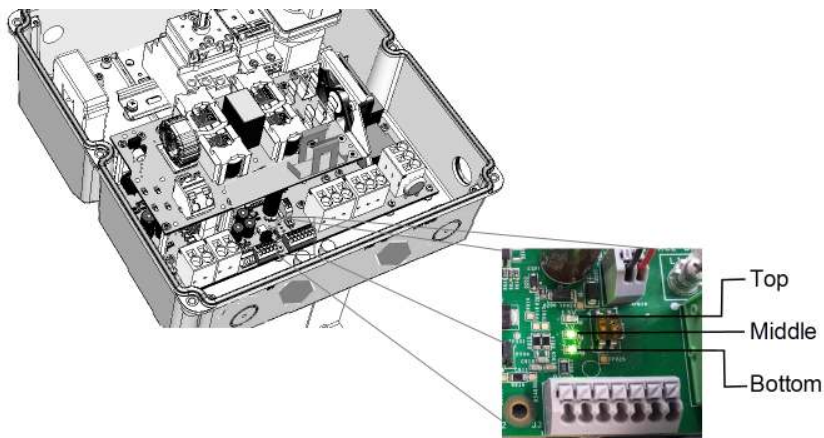


Figure 42: StorEdge Connection Unit LEDs

- In normal operation, the middle and bottom LEDs indicate auxiliary voltages (13V from DC/DC, 5V and 3.3V) and should always be lit.
- The top LED should be lit when the inverter DC voltage is at least 200 Vdc (check when both inverter ON/OFF switch and StorEdge Connection Unit switch are ON). You can check the status screen for the Vdc value.
- If all LEDs are OFF:
 - Check that AC voltage exists in the inverter
 - Check that the communication cable between the StorEdge Connection Unit and the digital board is properly connected.
- If the top LED is ON, and middle and bottom LEDs are off - an internal failure has occurred. Contact SolarEdge support.

Additional StorEdge Troubleshooting

Some of the troubleshooting procedure may require removing the covers of system components (inverter, battery, StorEdge Connection Unit, or meter). Be sure to disconnect all power sources to avoid electrocution.

For opening the cover refer to *Removing the InverterCover* on page 44



WARNING!

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

RISQUE D'ÉLECTROCUTION, ne touchez pas les fils non isolés lorsque le couvercle de l'onduleur est retiré.

Problem	Description or possible cause	Troubleshooting
During normal operation (grid supplies power), no power to the backup loads while the inverter is producing power	The main circuit breakers or loads circuit breakers in the backed up loads panel have been triggered	Check that the backed-up loads breakers on the CB panel are in the UP position
	Internal circuit breaker has been triggered	Check that the AC circuit breaker in the StorEdge Connection Unit is in the UP position (see <i>Figure 10</i>)
	The inverter is malfunctioning	Restart the inverter
		If the problem persists, move the AC bypass switch in the StorEdge Connection Unit to position 2 (see <i>Figure 10</i>) to supply power to the loads until the inverter problem is solved (contact SolarEdge support if required). Then move to position 1.

Problem	Description or possible cause	Troubleshooting
No power to the backup loads while grid is OFF (power outage)	The backed-up loads are not backed up	<ul style="list-style-type: none"> Check that the inverter is producing power Check that the Backup function is enabled (Backup conf → Backup → Enable). Check that there are no errors on the inverter LCD Check the circuit breakers on the backed-up loads AC panel Check that the AC breaker in the StorEdge Connection Unit are in the UP position (see <i>Figure 10</i>) Check that the AC bypass switch in the StorEdge Connection Unit is set to position 1 (see <i>Figure 10</i>) .
Inverter without auto-transformer (On-grid only) - The inverter does not start production and Error 182 Auto-Transformer Temp. Too High is displayed	The thermal sensor cables are not connected.	Move the DIP switch SW2 in the StorEdge Connection Unit to the UP position (ON) (refer to <i>DIP Switch Setup</i> on page 38).
A battery internal fault is displayed on the LCD: Battery Internal Fault XXXX (ID: XX)	Fault # –according to battery model. ID – battery's Modbus ID.	Contact SolarEdge Support

StorEdge-related Errors Codes

This section describes the error messages that are specific to the StorEdge solution. For troubleshooting errors that are not listed below, contact SolarEdge support. For the general SolarEdge troubleshooting refer to the codes in the previous section.

Error code		LCD message	Cause and Troubleshooting
CPU v3.18 and below	CPU v3.19 and above		
178	3x6D	Internal RGM Error	Check the CTs connections and direction.
179, 180	2xB3, 2xB4	Backup Consumption Too High	Inverter production stopped due to backed-up loads' consumption exceeding product rating. Shutdown non-essential loads to reduce power consumption.
181	2xB5	Connection Unit HW Error	Check all the communication cable between the StorEdge Connection Unit and the digital board in the inverter.
182	2xB6	Auto-Transformer Temp. Too High	Inverter production stopped due to auto-transformer overheating. Shutdown non-essential loads to reduce the phase imbalance. If you use the inverter for on-grid applications only (without auto-transformer) - move SW2 to the UP position (ON) (refer to <i>DIP Switch Setup</i> on page 38).
183	2xB7	Connection Unit Communication Error	There is a faulty wire connection or an internal error. <ul style="list-style-type: none"> Check the communication cable between the StorEdge Connection Unit and the digital board in the inverter. Check that the StorEdge Connection Unit LEDs are ON.
184	2xB8	Connection Unit Temp. Too High	Inverter production stopped due to StorEdge Connection Unit overheating or due to internal fan malfunction. <ul style="list-style-type: none"> Clean the StorEdge Connection Unit fan If the fan is malfunctioning, replace the fan
185	3x6B	Meter Comm. Error	Refer to <i>Meter Troubleshooting</i> on page 88.
186	3x6B	Battery Comm Error	<ul style="list-style-type: none"> Check the wiring to the battery and the battery DIP switch configuration (refer to <i>Connecting to the Battery</i> on page 34 and <i>DIP Switch Setup</i> on page 38). <i>Connecting to the Battery</i> on page 34 Check the battery setup in the RS485-Conf screen (refer to <i>Configuring the RS485 Bus for Battery and Meter Connection</i> on page 78).

Error code		LCD message	Cause and Troubleshooting
CPU v3.18 and below	CPU v3.19 and above		
196	2xC4	Backup init over voltage	<ul style="list-style-type: none"> External voltage source on backed-up loads when operating in Backup mode. Disconnect all external voltage sources on backed-up loads. Inverter internal error. Contact SolarEdge support.
	0x2010	Internal CB down	Make sure that the loads do not consume higher current than the inverter max output current. Open the inverter StorEdge Connection Unit and switch the main circuit breaker to the ON position.

System Warnings

Warnings are displayed in the initial status screen with the format: <Warning X>. For example:

```
Vac[V]  Vdc[V]  Pac[W]
1.0      0.5      0.0
P_OK: XXX/YYY <S_OK>
Warning 8              ON
```

The warning is a status screen. To view the warning description, press the LCD button.

The following is a list of system warnings:

Warning #		LCD text	Comments and troubleshooting
CPU v3.18xx and before	CPU v3.19xx and later		
1-4, 6-7	8x66 - 8x69 8x6A - 8x6F	Fan # Failure	Clean or replace the fan
5		Turn Switch Off to Configure	Appears when trying to access the Setup menus during production
8	2x111	Connection Unit Low 9V Battery	Replace the 9V battery in the StorEdge Connection Unit. Refer to <i>9V Battery Replacement</i> on page 99.

Appendix B: Opening Conduit Knockouts

This step may be performed before or after mounting the inverter.

The knockouts for AC grid, PV DC and battery DC are already open. If required, use this procedure for opening additional knockouts.

For AC connections you can use one of the following conduit openings options:

- Option 1 - Connect the AC grid and backup loads wires using the AC opening (knockout already open; no need to open an additional knockout). In this case use minimum 1"(32 mm) conduit for inserting all wires.
- Option 2 - Use two separate conduits: minimum 1" (32 mm) conduit for the AC grid connection and 3/4"(25 mm) conduit for the load backup connection. In this case, an additional knockout should be opened for the backed-up loads.

► To open conduit knockouts:

1. Move the StorEdge Connection Unit safety switch and the inverter ON/OFF switch to OFF.

NOTE

When the StorEdge Connection Unit safety switch is OFF (for example during maintenance) it may be locked to prevent safety hazard:

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



Lock here



2. Loosen the screws on the front cover of the StorEdge Connection Unit using the supplied Allen key, as shown below:

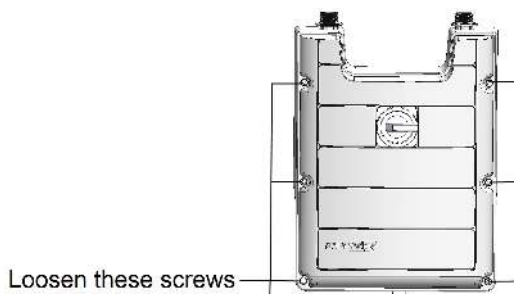


Figure 43: Opening the StorEdge Connection Unit cover

3. Remove the StorEdge Connection Unit cover.

4. Open the required conduit knockouts according to the conduits used in the installation (refer to the figure below for required knockouts; some of the knockouts may already be open but sealed): The knockouts are located at the bottom and sides of the enclosure, each with two sizes: $\frac{3}{4}$ " and 1". Open the required knockouts, taking care not to interfere with any of the internal components. A Unibit drill may be used.

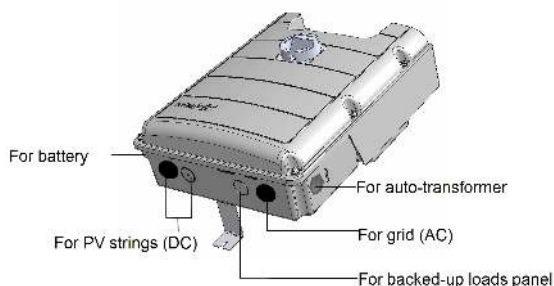


Figure 44: StorEdge Connection Unit knockouts



NOTE

Unused conduit openings and glands should be sealed with appropriate seals.

Appendix C: Replacing and Adding System Components



NOTE

If you are permanently disassembling the installation or part of it, make sure to use the disposal methods dictated by local regulations.

CAUTION!



Do not remove the six screws on the DC conduit metal panel as it may harm the inverter sealing and void the warranty.

Ces vis ne doivent pas être retirées. Les enlever est susceptible d'endommager l'étanchéité de l'onduleur et annuler la validité de la garantie.



Replacing an Inverter

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!



If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the .
3. Turn OFF the StorEdge Connection Unit.
4. Open the StorEdge Connection Unit cover.
5. Turn the Bypass switch inside the StorEdge Connection Unit to position 2, in order to maintain power to the backed-up loads.
6. Open the inverter cover as described in *Removing the Inverter Cover* on page 44.
7. Disconnect the DC and AC wires from the inverter. Open the DC and AC wires ferrite beads and set them aside.
8. Disconnect the cable connecting the inverter digital board to the StorEdge Connection Unit.
9. Unscrew the two conduit nuts in the inverter securing the StorEdge Connection Unit to the inverter.

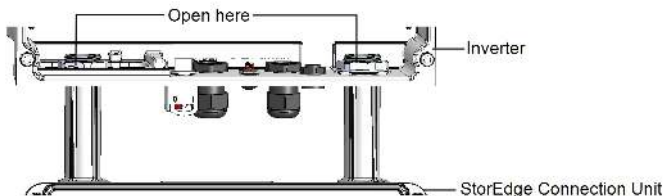


Figure 45: Conduit nuts

10. Remove the screws securing the inverter to the mounting bracket and remove the inverter from the mounting bracket.

NOTE

If you remove the old inverter and do not immediately install a new one, then:

- Lock the StorEdge Connection Unit in the OFF position using a lock on the switch.
- Use insulation tape to isolate each of the AC and DC wires.
- Seal the open conduits using duct tape.

11. Place the new inverter on the mounting bracket; insert the screws securing the inverter to the mounting bracket.
12. Screw the two conduit nuts in the inverter securing the StorEdge Connection Unit to the inverter.
13. Connect the DC and AC wires to the inverter.
14. Place the ferrite beads on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.
15. Close the inverter cover.
16. Configure the system to the required application as described in *System Configuration* on page 78
17. Perform the commissioning steps as described in *Commissioning the Installation* on page 44.

9V Battery Replacement

If Warning 8: **Connection Unit Low 9V Battery** is displayed in the main status screen, replace the 9V battery in the StorEdge Connection Unit.

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!

If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the StorEdge Connection Unit and the AC switch of the distribution panel.
3. Open and remove the StorEdge Connection Unit cover.
4. Open and remove the transparent internal cover.
5. Remove the battery from the upper board of the StorEdge Connection Unit and replace with a new standard 9V battery.
6. Close the StorEdge Connection Unit covers.

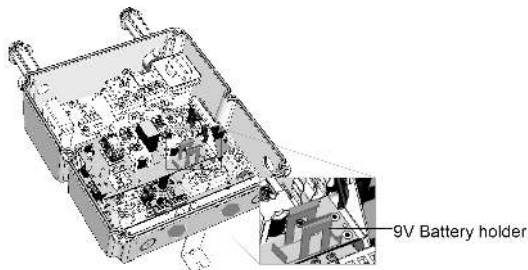


Figure 46: The battery holder

Fuse Replacement

Replacement kits are available from SolarEdge or you can use other fuses with identical ratings.

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!



If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the StorEdge Connection Unit and the AC switch of the distribution panel.
3. Open and remove the StorEdge Connection Unit cover.
4. Open and remove the internal transparent cover.
5. Remove the faulty fuse from the upper board of the StorEdge Connection Unit and replace with a new fuse.
6. Close the StorEdge Connection Unit covers.

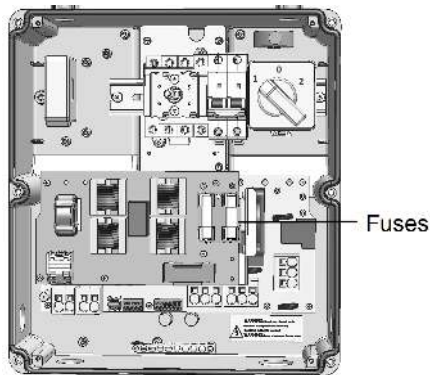


Figure 47: StorEdge Connection Unit fuses

StorEdge Connection Unit Replacement

Removing the Existing StorEdge Connection Unit

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

WARNING!



If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.

Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.

2. Turn OFF the StorEdge Connection Unit and the AC switch of the distribution panel.
3. Disconnect the DC and battery cables from the StorEdge Connection Unit.
4. Open the inverter cover.
5. Disconnect the DC and AC wires from the inverter. Open the DC and AC wires ferrite beads and set them aside.
6. For RGM inverter - Disconnect the RS485 connector from the inverter communication board.
7. Disconnect the cable connecting the inverter digital board to the StorEdge Connection Unit.
8. Unscrew the two conduit nuts in the inverter securing the StorEdge Connection Unit to the inverter.
9. Open the StorEdge Connection Unit cover and disconnect:
 - PV DC wires
 - Battery wires
 - Auto-transformer wires, if connected
 - Backed-up loads panel wires, if connected
 - External meter, if connected
10. Unscrew the two conduit nuts securing the StorEdge Connection Unit to the external conduits.

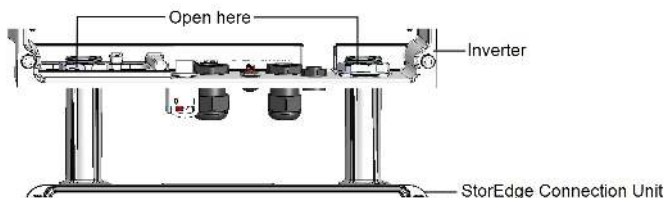


Figure 48: Conduit nuts

11. Release the bracket securing the StorEdge Connection Unit to the wall.
12. Carefully remove the StorEdge Connection Unit with its mounting bracket from the wall.

Installing a New StorEdge Connection Unit

1. Open the conduit knockouts of the new StorEdge Connection Unit (refer to *Opening Conduit Knockouts* on page 96).
2. Open the StorEdge Connection Unit cover.
3. Position the new StorEdge Connection Unit below the inverter and from the inside of the inverter grab the AC and DC wires extending from the unit conduits.
4. Attach the StorEdge Connection Unit with its bracket to the wall and slightly close the screws. Do not over tighten.
5. Reconnect the cable from the inverter digital board to the StorEdge Connection Unit.
6. Reconnect all the external wires and ferrite beads.
7. Securely screw the two conduit nuts onto the conduit ends in the inverter. Verify proper conduit sealing.
8. Close the StorEdge Connection Unit cover. Attach the cover and secure it by tightening the six screws with a torque of 1.2 N*m / 0.9 ft.*lb.

Appendix D: Inverter Arc Detection and Interruption

An electric arc is an ongoing high-energy discharge, resulting from a current through a normally non-conductive material such as air.

When connectors or cables in a PV system are improperly connected or are damaged, the electric current may pass through the air, causing an electric arc. Arcs generate heat which can cause fires and they also pose an electrocution risk to those working near them.

SolarEdge inverters can detect arcs and interrupt production. A qualified person must re-enable the inverter after properly checking the installation.


The arc detection option is disabled by default. It must be enabled when UL1699B compliance is required.

▶ To enable/disable arc detection:

1. Enter Setup mode and scroll to the **Maintenance** menu.
2. Select **AFCI → Enable** or **Disable**.

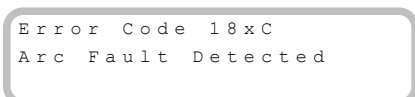
▶ To manually test the arc detection functionality:

1. Make sure the inverter ON/OFF switch is turned ON.
2. Use the LCD light button to select **Maintenance → Manual AFCI Test**.
 - If the test is successful, the following message is displayed:



Manual Test PASS

The inverter production is then interrupted (as if a real arc detection has occurred), and the following error message is displayed (numbered either 150 or 151):



Error Code 18xC
Arc Fault Detected

Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then to ON. The inverter performs an arc detection self-test and starts normal operation.

- If the test fails, contact SolarEdge support.

► To troubleshoot arc-fault failures:

The inverter continuously performs arc detection while producing power. If an electric arc occurred in the PV system, the inverter detects it and stops producing power. The following error message is displayed (numbered either 150 or 151):

```
Error Code 18xC
Arc Fault Detected
```

If this message is displayed:

1. Turn the inverter ON/OFF switch to OFF.
2. Check all PV strings for the correct open-circuit voltage:
 - Inspect all connections and cables between the power optimizers in the strings: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
 - Inspect all connections and cables between the PV modules and the power optimizers: Verify they are connected properly by firmly pushing the plugs and verifying the connectors are locked.
 - Verify that the strings are firmly attached to the StorEdge Connection Unit terminal blocks.
3. Perform manual restart to resume system operation: Turn the inverter ON/OFF switch to OFF and then ON. The inverter performs an arc detection self-test and starts normal operation.

► To troubleshoot self-test failures:

If the self-test fails, the inverter displays an error message indicating that the arc detector hardware failed during wake-up tests:

```
Error Code 18x8D
AFCI
self-test failed
```

The inverter transmits an error message to the monitoring platform, and continuously repeats the arc detection self-test until it is successful.

If the problem persists, contact SolarEdge support.

Appendix E: Additional Battery Connections

This appendix provides additional options for connecting batteries to the inverter.

Pay attention to the wire colors and DIP switch setup of the batteries (refer to *DIP Switch Setup* on page 38). Make sure the first and last device on the RS485 bus is terminated.

Connection with One Battery

LG Chem RESU10H (StorEdge Connection Unit with 2 DIP Switches)

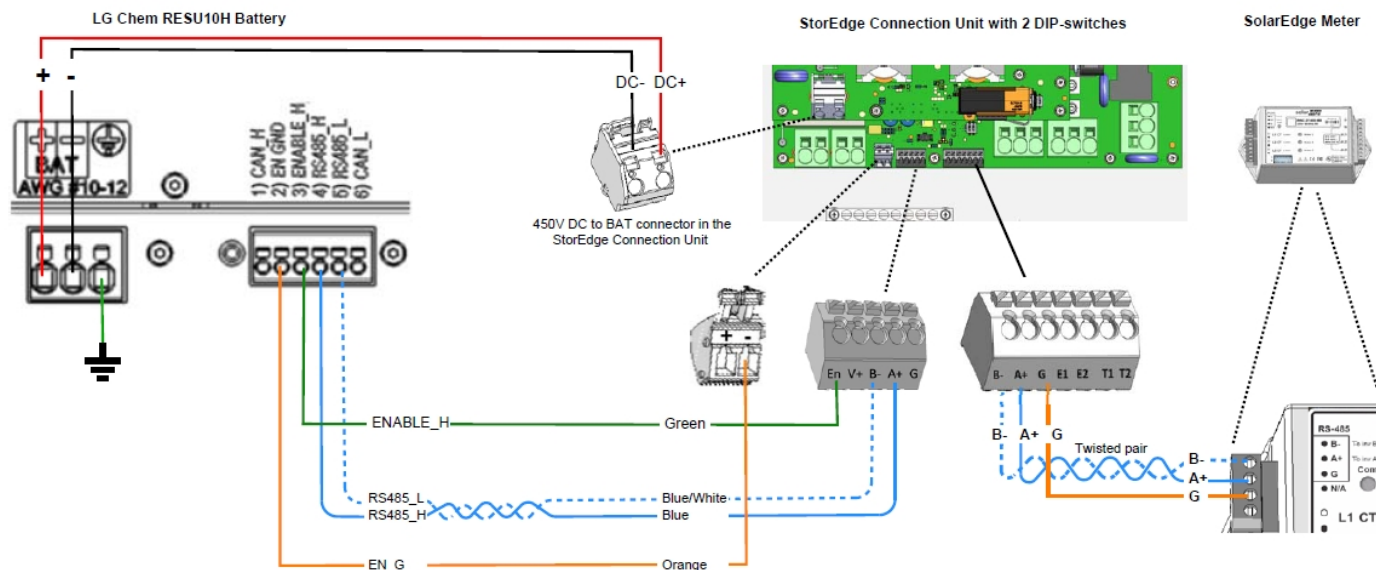


Figure 49: Connections to LG Chem RESU10H battery (StorEdge Connection Unit with two DIP-switches)

Tesla Powerwall1

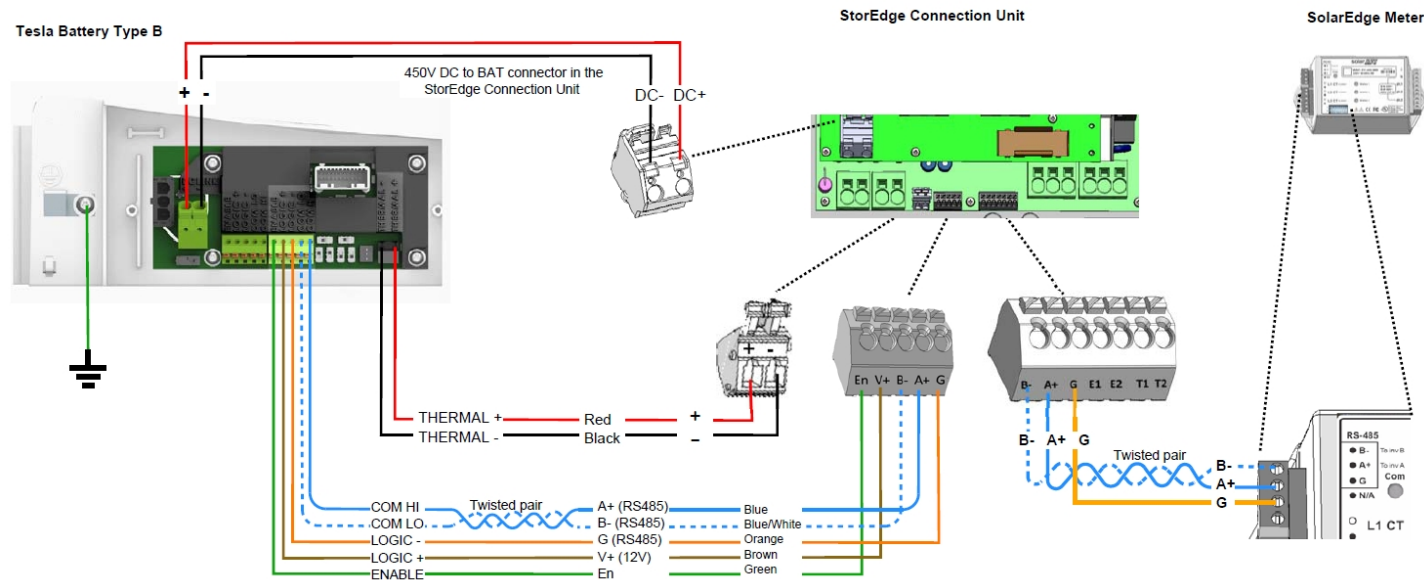


Figure 50: Connections to Tesla Powerwall1 Battery Type B

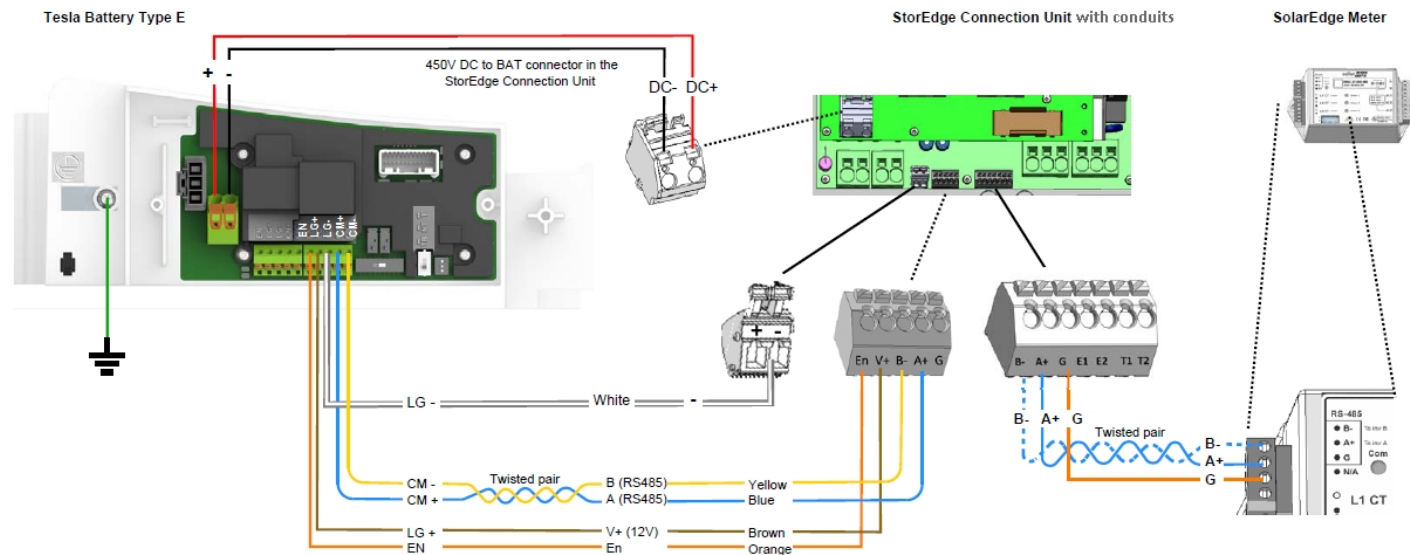


Figure 51: Connections to Tesla Powerwall1 Battery Type E

Connections with Two Batteries

Two Tesla Powerwall1 Batteries

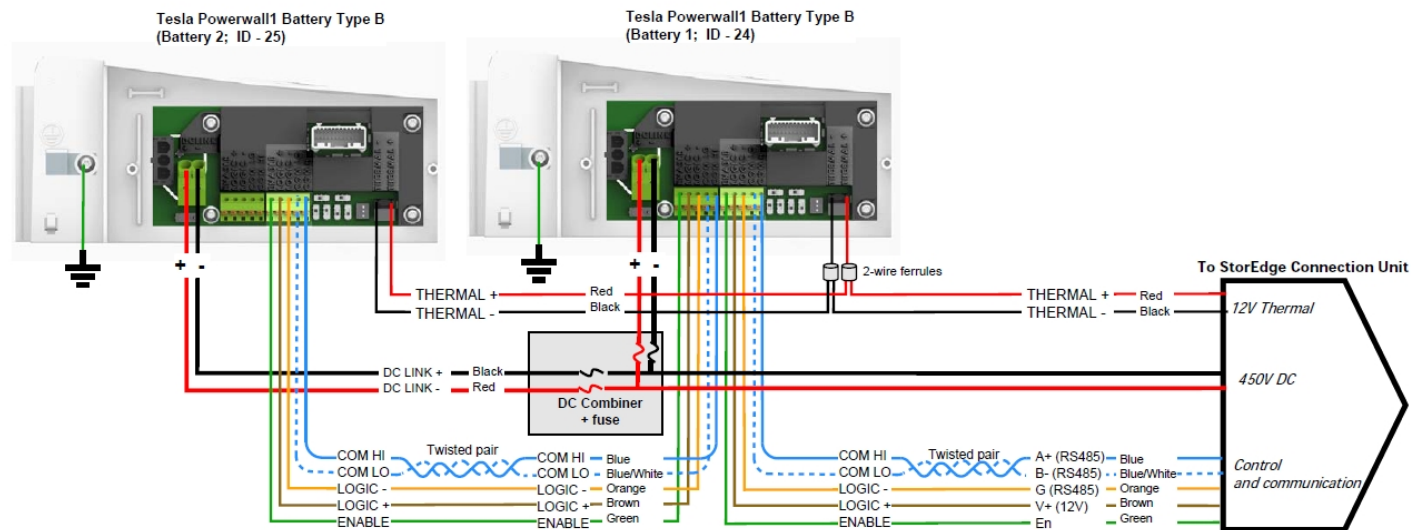


Figure 52: Two Tesla Powerwall1 batteries Type B

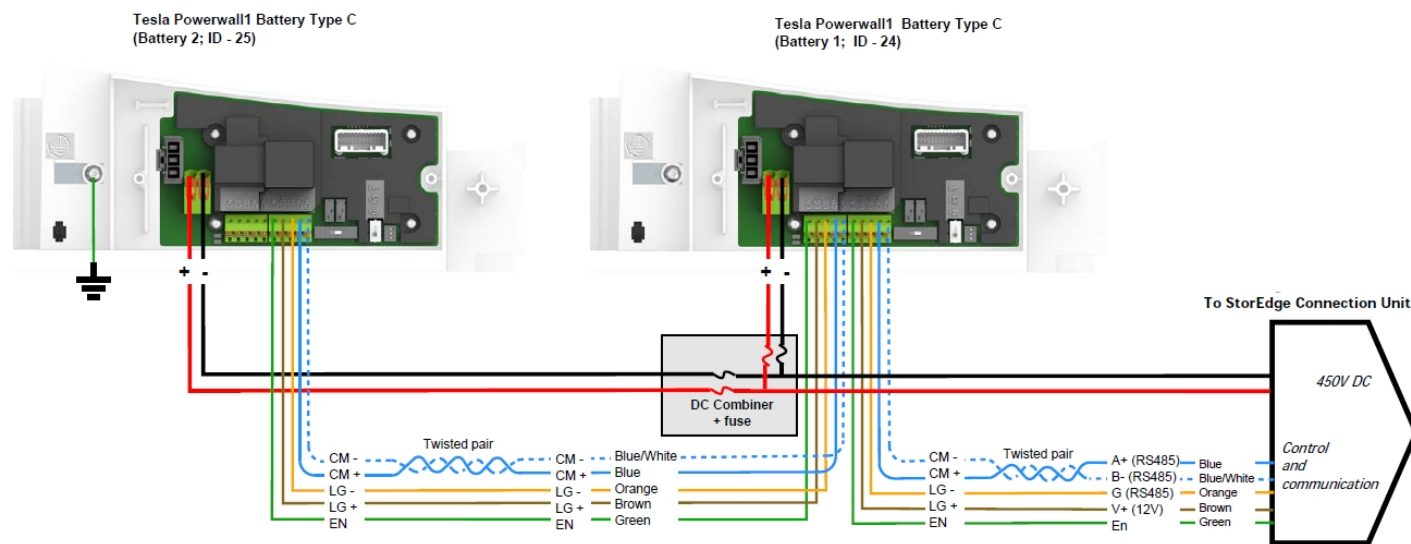


Figure 53: Two Tesla Powerwall1 batteries Type C or E

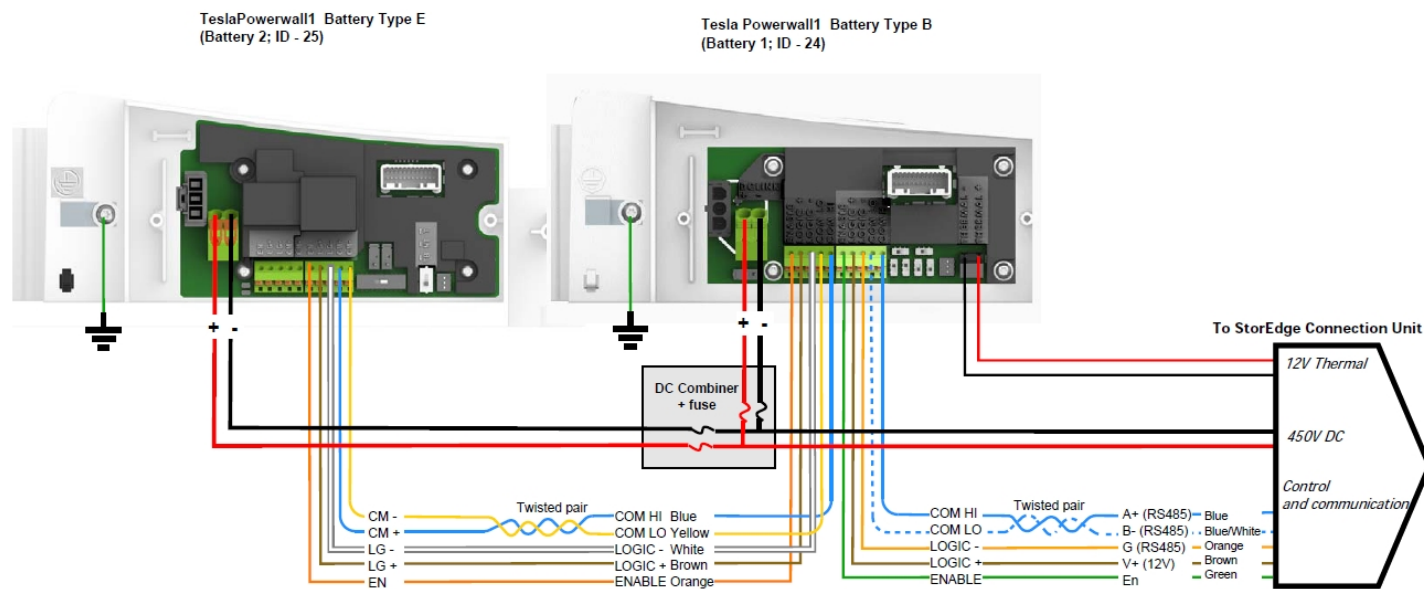


Figure 54: Two Tesla Powerwall1 batteries Type E and Type B

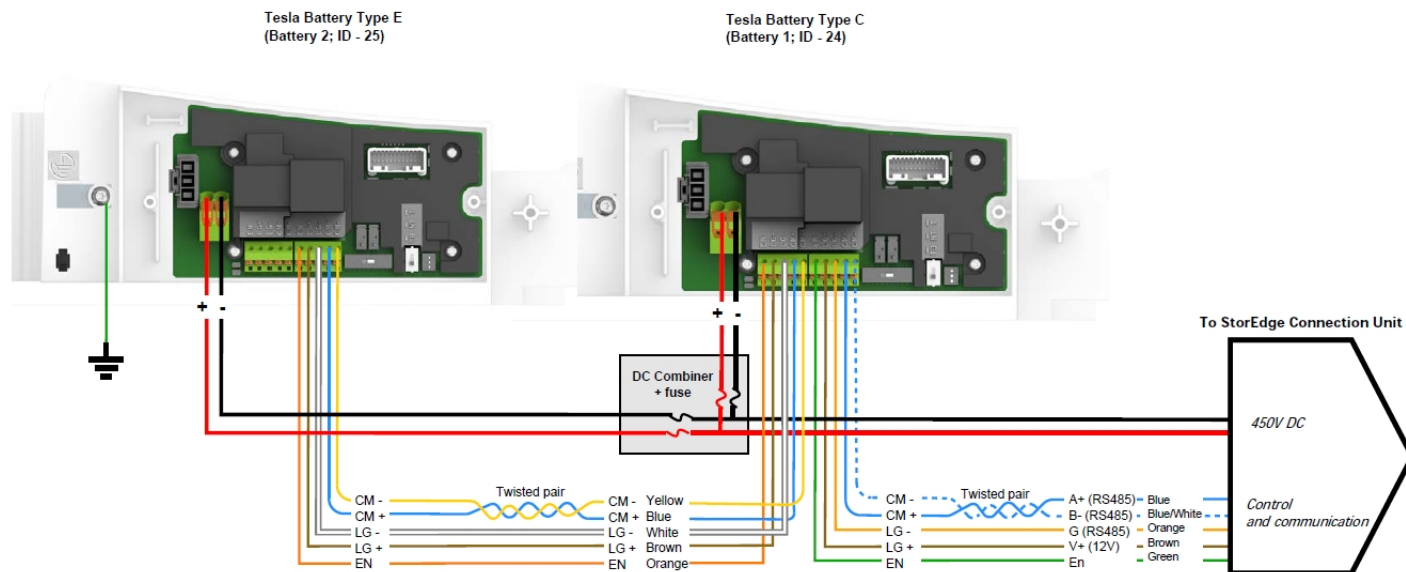


Figure 55: Two Tesla Powerwall1 batteries Type E and Type C

DIP-Switch Setup - Two Powerwall1 Batteries

System Component	Communication and Termination Switches	Address Switches
Batteries		
Tesla Powerwall1 batteries Type B (Figure 56)	<p><i>Modbus protocol:</i></p> <ul style="list-style-type: none"> Single battery or the battery is the last in the chain (termination): <ul style="list-style-type: none"> S2, S6: Left S1, S5: Down S3, S4: UP If the battery is not the last in the chain (no termination): <ul style="list-style-type: none"> S2, S6: Left S1, S5: Down S3, S4: Down 	<p>Battery 1 - located closest to the inverter (address ID 24):</p> <ul style="list-style-type: none"> Switch 1: Right Switch 2: Right Switch 3: Right <p>Battery 2 - at the end of chain (address ID 25) :</p> <ul style="list-style-type: none"> Switch 1: Left Switch 2: Right Switch 3: Right
Tesla Powerwall1 batteries Type C, E (Figure 57)	<p><i>Termination:</i></p> <ul style="list-style-type: none"> If the battery is not the last in the chain: Middle - No termination Single battery or the battery is the last in the chain: Bottom - Termination (with bias) <p><i>Modbus protocol:</i></p> <ul style="list-style-type: none"> Right (RS485) 	<p>Battery 1 - located closest to the inverter (address ID 24):</p> <ul style="list-style-type: none"> Switch 1: Right Switch 2: Right Switch 3: Right <p>Battery 2 - at the end of chain (address ID 25) :</p> <ul style="list-style-type: none"> Switch 1: Left Switch 2: Right Switch 3: Right

System Component	Communication and Termination Switches	Address Switches
Meter		
SolarEdge Meter	External 120 Ohm termination on the last meter connected on the RS485 chain	Meter 1 address: <ul style="list-style-type: none"> ◦ Switch 1: Up ◦ Other: Down Meter 2 address: <ul style="list-style-type: none"> ◦ Switch 2: Up ◦ Other: Down
Inverter		
Inverter communication board (Figure 22)	Termination: <ul style="list-style-type: none"> ◦ If a meter is installed: SW7 Down - No termination ◦ If a meter is not installed: SW7 Up - termination ON. (see also <i>Creating an RS485 Bus Connection</i> on page 74) 	N/A

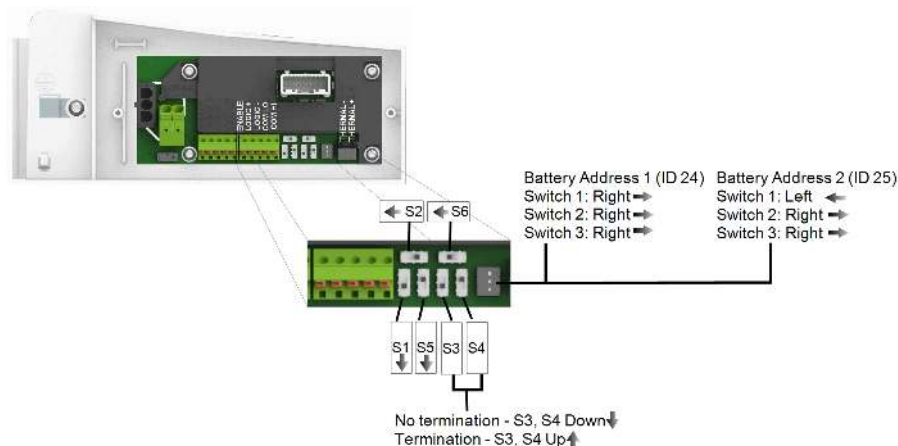


Figure 56: Tesla Powerwall1 battery Type B DIP switches

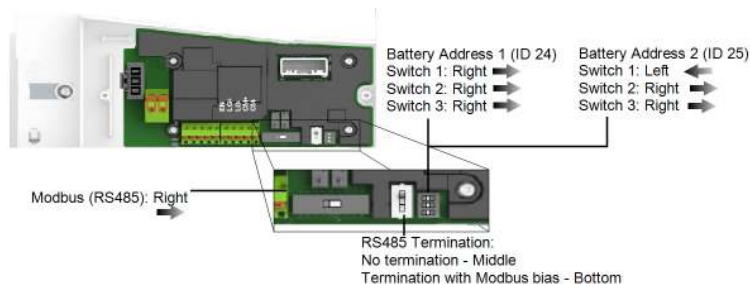


Figure 57: Tesla Powerwall1 battery Type C/E DIP switches



StorEdge Single Phase Inverter with Connection Unit for High Power - Technical Specifications

	SE7600A-US ¹		Unit
	Lower Power Output	Higher Power Output	
OUTPUT - AC (LOADS/GRID)			
Rated AC Power Output	7600		VA
Max AC Power Output	8350		VA
AC Output Voltage Min-Nom-Max (L-L) ²	211-240-264		Vac
AC Frequency Min-Nom-Max (1)	59.3 - 60 - 60.5		Hz
Maximum Continuous Output Current @240V	32		A
GFDI	1		A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes		
Charge Battery from AC (if Allowed)	Yes		
THD	< 3		%
Power factor with rated power	>0.99 (configurable; 0.9 leading to 0.9 lagging)		
Typical Nighttime Power Consumption	<5		W
OUTPUT - AC (BACKUP POWER)³			
Rated AC Power Output	5000 ⁴		VA
Max AC Power Output - Surge	6600 ⁴		VA
AC Output Voltage Min-Nom-Max (L-L)	211-240-264		Vac
AC Output Voltage Min-Nom-Max (L-N)	105-120-132		Vac
AC Frequency Min-Nom-Max	55 - 60 - 65		Hz
Maximum Continuous Output Current @240V - Backup Mode	21		A
Max Continuous Output Current per Phase @120V	25		A
GFDI	1		A
AC Circuit Breaker	Yes		
THD	< 5		%
Power factor with rated power	0.2 leading to 0.2 lagging		

¹These specifications apply to inverters with part numbers SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

²For other regional settings, contact SolarEdge Support.

³Not designed for standalone applications and requires AC for commissioning.

⁴The rated AC power output is the minimum between the AC Power Output and the battery continuous peak power.

	SE7600A-US ¹		Unit
	Lower Power Output	Higher Power Output	
Automatic switchover time	<2		sec
Typical Nighttime Power Consumption	<5		W
INPUT - DC (PV and BATTERY)			
Transformer-less, Ungrounded	Yes		
Max Input Voltage	500		Vdc
Nom DC Input Voltage	400		Vdc
Reverse-Polarity Protection	Yes		
Ground-Fault Isolation Detection	600kΩ Sensitivity		
Maximum Inverter Efficiency	98		%
CEC Weighted Efficiency	97.5		%
INPUT - DC (PV)			
Maximum DC Power (STC)	10250		W
Max Input Current ²	23		Adc
2-pole Disconnection	Yes		
INPUT - DC (BATTERY) - FOR HIGH POWER			
Continuous Peak Power	3300	6600	
Number and types of Batteries per Inverter	Up to 2 for high capacity - Tesla Powerwall 1	<ul style="list-style-type: none">◦ 1 - LG Chem RESU10H◦ 2 (for high power and high capacity) - Tesla Powerwall1 (any combination other than type B+B)	
Max Input Current	8.5	17.5	
DC Fuses on Plus and Minus	12A (field replaceable)	25A (field replaceable)	
2-pole Disconnection	Yes		
ADDITIONAL FEATURES			
Supported Communication Interfaces	RS485 for battery, RS485, Ethernet, ZigBee (optional)		
Battery Power Supply	Yes, 12V / 53W		
Revenue Grade Data, ANSI C12.1	Optional ³		
Integrated AC, DC and Communication Connection Unit	Yes		
AC Disconnect	Yes		
Manual Inverter Bypass Switch	Yes		

¹These specifications apply to inverters with part numbers SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

²A higher current source may be used; the inverter will limit its input current to the values stated.

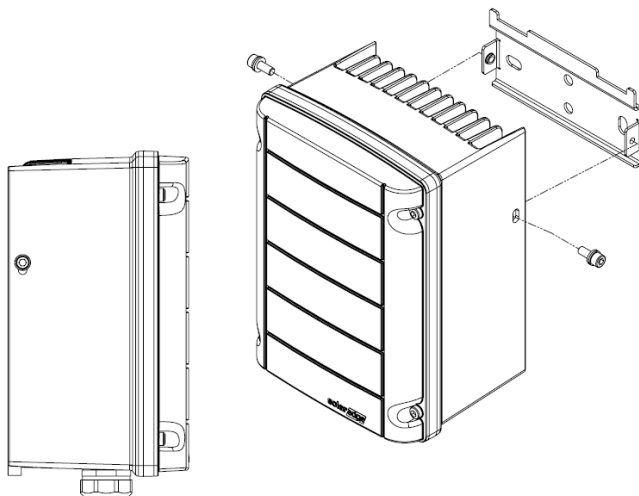
³Revenue grade inverter P/N: SE7600A-USS20NNM2

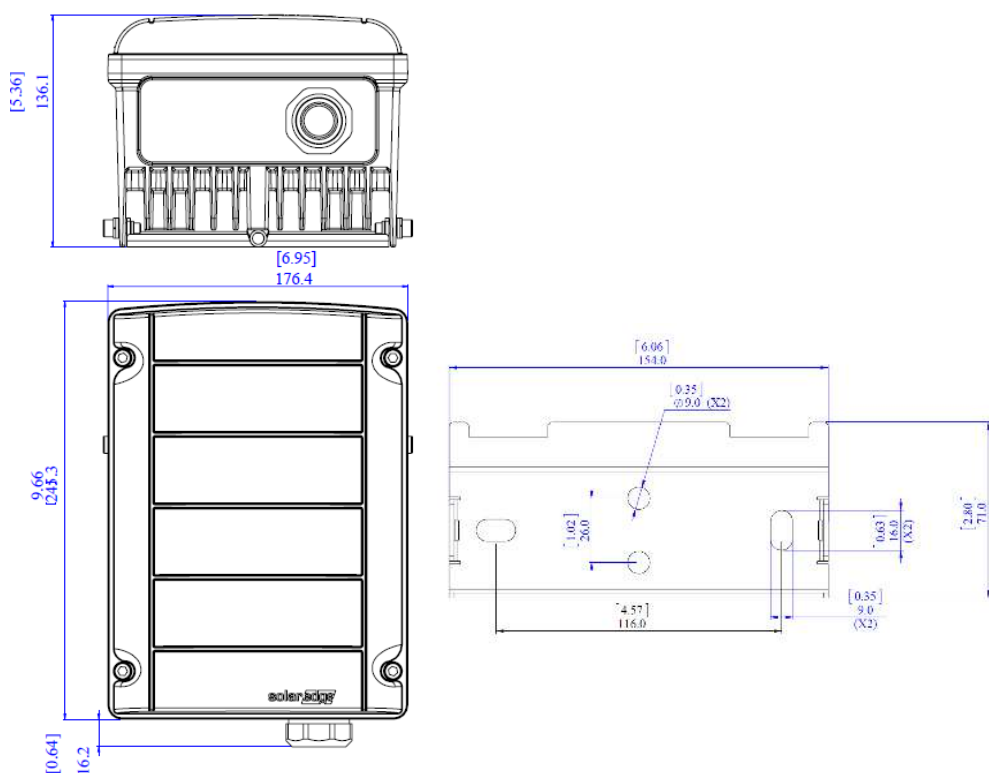
	SE7600A-US		Unit
	Lower Power Output	Higher Power Output	
DC Voltage Rapid Shutdown (PV and Battery)	Yes, according to NEC 2014 690.12		
Auto-transformer thermal protection	Yes		
STANDARD COMPLIANCE (PENDING)			
Safety	UL1741, UL1699B, UL1998, CSA 22.2		
Grid Connection Standards	IEEE1547, Rule 21, Rule 14		
Emissions	FCC part15 class B		
INSTALLATION SPECIFICATIONS			
AC Output (Loads/Grid) conduit size / AWG range	1 / 14-6		in/AWG
AC Output (Backup) conduit size / AWG range	0.75-1 knockouts / 14-6		in/AWG
AC Input (Auto-transformer) conduit size / AWG range	0.75-1 / 14-6		in/AWG
DC Input (PV) conduit size / AWG range	0.75 / 14-8		in/AWG
DC Input (Battery) conduit size / AWG range	0.75 / 16-10		in/AWG
Dimensions with Connection Unit (HxWxD)	37 x 12.5 x 7.2 / 940 x 315 x 184		in / mm
Weight with Connection Unit	58.5 / 26.5		lb / kg
Cooling	Natural convection and internal fan (user replaceable)		
Noise	< 50		dBA
Min - Max Operating Temperature	-13 to +140 / -25 to +60		°F / °C
Protection Rating	NEMA 3R		



SolarEdge Auto-Transformer Technical Specifications

	SEAUTO-TX-5000		
ELECTRICAL RATINGS			
Rated Power - Continuous	5000		VA
Rated Power - Peak	7600 for 10 sec		VA
Output Voltage	120/ 240 Split Phase		V
Max Continuous Output Current per Phase @120V	25		A
Split Phase Imbalance (@ Rated Power)	Up to 25A difference between phases		
Thermal Protection	Yes		
INSTALLATION SPECIFICATIONS			
AC Output conduit size / AWG range	0.75 / 14-10		in/ AWG
Dimensions (HxWxD)	6.7 x 7.9 x 5.5 / 170 x 200 x 140		in / mm
Weight	29.7 / 13.5		lb / kg
Min - Max Operating Temperature	-13 to +140 / -25 to +60		°F / °C
Protection Rating	NEMA 3R		
Installation	Wall mounted		





Auto-transformer dimensions (mm [in])

If you have technical queries concerning our products, please contact our support through SolarEdge service portal:

<http://www.solaredge.com/groups/support/services>

USA and Canada: + 1 (0) 510 498 3200

Worldwide: + 972 (0) 73 240 311 8

Fax: + 1 (0) 530 273 276 9

Email to: support@solaredge.us

www.solaredge.us

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