



Installation Guide

StorEdge Solution with Backup

For North America

Version 1.5

Disclaimers

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

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

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

Revision History

Version 1.5 (Feb. 2019)

- Added Proposition 65 warning (for California).
- Addition of appendix: *External Rapid Shutdown* on page 143
- Power optimizer clearance - no clearance is required on the mounting bracket side
- Addition of new appendix: *Powering the LG Chem Battery Off and On* on page 147.
- Addition of reference to troubleshooting undetected devices application note
- Torque for grounding using the equipment grounding bus-bar: 3.4 N*M/
30 lb-in
- Update of product names
- Addition of possibility to use compatible connectors from third-party manufacturers
- Recommendation to mount the power optimizer in a location protected from direct sunlight
- Updated warning about sealing unused power optimizer input connectors
- Max distance between the battery and inverter is 70 ft / 20m
- Removal of StorEdge Connection Unit Replacement
- Addition of caution - installation in saline environment
- Update regarding use of extension cables in power optimizer installation guidelines
- Removal of recommendation to connect the battery and set DIP switch when the battery is on the floor, for easier access
- Addition of low battery SOE troubleshooting
- Addition of important safety feature: restart behavior functionality
- Addition of link to the Designer web page
- Addition of battery charge/ discharge self-test and troubleshooting

Version 1.4 (Nov. 2018)

- Changed the LG battery powering off sequence.

Version 1.3 (Oct. 2017)

- In Power Optimizer Installation chapter:
 - Added warning about grounding the power optimizer metallic enclosure
 - Added: circuit conductors must be sized according to NEC 690.9 when combining strings
 - Removed reference to racking models and their grounding methods
 - Removed mentioning of tracker
- In inverter Installation chapter:
 - Added a caution about not altering the StorEdge Connection Unit enclosure: SolarEdge does not permit opening or puncturing the StorEdge Connection Unit in any location other than the pre-defined drill guide locations, or otherwise altering the construction of the enclosure, as this may compromise safety and will void the warranty.
- Connection to/from the Connection Unit:
 - 450V DC to BAT connector (DC- and DC+ connections) corrected in the connection diagram
 - Added a diagram of LG battery connection to inverter with 3 DIP switches
- In Configuration Menu Options:
 - Power Control section:
 - Removed Phase Balance link and info
 - Added a note about compliance with UL 1741 Supplement A.
 - Added link to P(Q) diagram application note
 - Maintenance section:
 - Added links to application notes (Upgrading the inverter using SD card; Isolation fault troubleshooting; Arc fault detection)
 - Removed Optimizer Conf
- In System Configuration chapter:
 - The communication board firmware (CPU) version must be 3.xxxx and later on all SolarEdge inverters at the same site
 - Screens changed when configuring LG battery
 - StorEdge Control instructions and menu updated
- Connection Unit replacement - removed

- Updated links
- Technical specification - updated

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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 Symbols Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

WARNING!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.



AVERTISSEMENT!

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivie 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.



ATTENTION!

Dénote un risque: il attire l'attention sur une opération qui, si elle n'est pas faite ou suivie 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

CONSIGNES DE SÉCURITÉ IMPORTANTES

CONSERVEZ CES INSTRUCTIONS

WARNING!



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

AVERTISSEMENT!

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



WARNING!



Before operating the inverter, ensure that the inverter is grounded properly. This product must be connected to a grounded, metal, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal or lead on the product.

AVERTISSEMENT!

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

WARNING!



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

AVERTISSEMENT!

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

WARNING!

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

AVERTISSEMENT!

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

WARNING!

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

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

AVERTISSEMENT!

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

WARNING!

The inverter must be connected to a dedicated AC branch circuit with a maximum Overcurrent Protection Device (OCPD) of 50A.

AVERTISSEMENT!

Les onduleurs monophasé doivent être connectés à un branchement AC dédié avec un disjoncteur de 50A.

WARNING!

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

**AVERTISSEMENT!**

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

**CAUTION!**

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

ATTENTION!

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

CAUTION!

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

**ATTENTION!**

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

**NOTE**

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


**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

A SolarEdge inverter may be installed in a site with a generator, however must not operate at the same time as the generator.

Operating an inverter and a generator simultaneously will void the warranty.



SolarEdge requires installing a physical or electronic interlock, which will prevent the generator and inverter from operating simultaneously. Interlock procurement, installation, maintenance and support are the responsibility of the installer. Damage to the inverter due to incorrect interlock installation or use of an interlock that is incompatible with the SolarEdge system will render the SolarEdge warranty invalid.

**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.

AVERTISSEMENT!

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.

AVERTISSEMENT!

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.

AVERTISSEMENT!

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

WARNING!

The battery must be powered off before and during wiring.

To power off the battery:

1. Turn off the circuit breaker.



2. Turn off the disconnect/auxiliary power switch.

To power the battery back on:

1. Turn on the disconnect/auxiliary power switch.

2. Turn on the circuit breaker.

For details, see *Powering the LG Chem Battery Off and On* on page 147.

AVERTISSEMENT!

La batterie doit être éteinte avant et durant le câblage:

Pour éteindre la batterie:

1. Fermez le disjoncteur.

2. Fermez l'interrupteur auxiliaire.

Pour rallumer la batterie:

1. Ouvrez l'interrupteur auxiliaire.

2. Ouvrez le disjoncteur.

Pour plus de détails, consultez *Powering the LG Chem Battery Off and On* page 147.

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.

IMPORTANT SAFETY FEATURE



During backup, if inverter output is overloaded or output current is higher than battery max allowed output, the inverter will try to restart after 15 seconds (in DACH: 90 secnds). If this reoccurs 3 times, an error message is displayed and the inverter should be restarted by turning the ON/OFF switch OFF and then ON. Refer to *StorEdge Error Codes* on page 132.

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.
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 Energy Meter** - The meter is used by the inverter for export, import, production and 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.

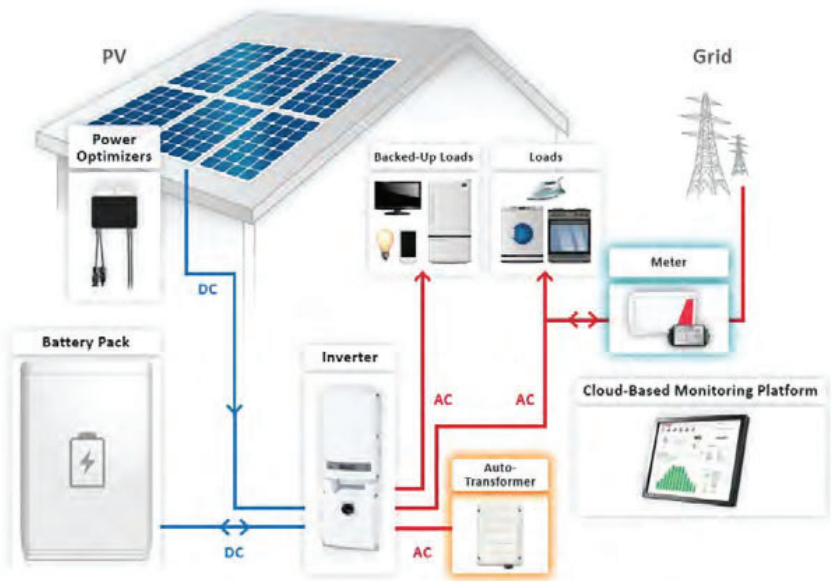



Figure 1: StorEdge system components

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
StorEdge Single Phase inverter	✓	✓	✓
Auto-transformer	✓	✓	X
SolarEdge Energy 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.

Additional Reference

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 https://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide_na.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 20.
- Inverter - as described in *Installing the Inverter* on page 31.

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 40.

Step 3 - Energy Meter installation (required for Smart Energy Management only): Refer to *Meter Installation* on page 43.

Step 4 - Connecting PV strings (DC) to the inverter - Refer to *Connecting the Strings to the Inverter* on page 58.

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 56.

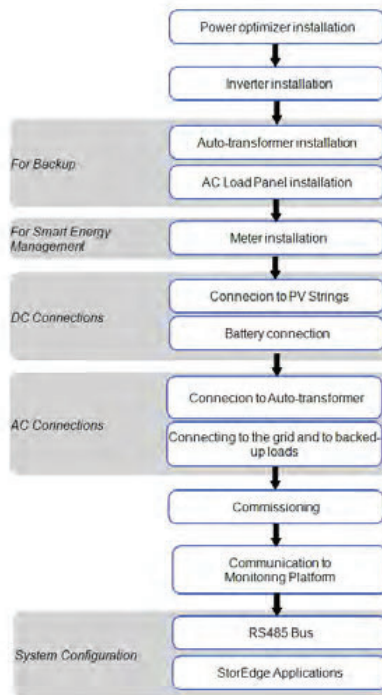
Step 6 - Connecting all components to the inverter - connect the auto transformer and loads (AC), PV strings (DC), and meter. Refer to *StorEdge Inverter Connections* on page 56. .

Step 7 - Commissioning the inverter - Activate the system and pair the power optimizers. Refer to *Commissioning the Installation* on page 45.

Step 8 - Connecting to the monitoring platform. Refer to *Setting Up Communication to the Monitoring Platform* on page 96.

Step 9 - System Configuration - Configuring the RS485 bus and StorEdge applications. Refer to *System Configuration* on page 109.

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



For additional information, refer to

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



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:

- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill (with a torque clutch) or screwdriver and bits suitable for the surface on which the inverter and optimizers will be installed and for opening the StorEdge Connection Unit drill guides. Use of an impact driver is *not* allowed.
- Appropriate mounting hardware (for example: stainless bolts, nuts, and washers) for attaching:
 - the mounting brackets to the mounting surface
 - the power optimizer to the racking (not required for smart modules)
- Wire cutters
- Wire strippers
- Voltmeter

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

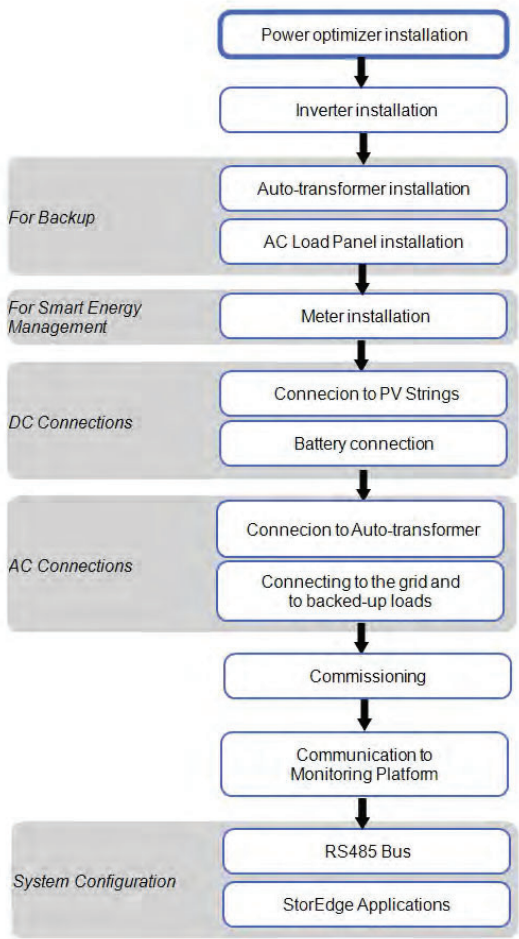
- For Ethernet:
 - CAT5/6 twisted pair Ethernet cable with RJ45 connector.
 - If using a CAT5/6 cable spool: RJ45 plug and RJ45 crimper
- For RS485:
 - Four- or six-wire shielded twisted pair cable.
 - Watchmaker precision screwdriver set

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 to 140°F / -25°C to +60°C.

Chapter 2: Installing the Power Optimizers



Safety

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



WARNING!

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

AVERTISSEMENT!

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

CAUTION!

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

ATTENTION!

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

CAUTION!

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

ATTENTION!

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

CAUTION!

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

ATTENTION!

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.

ATTENTION!

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.

ATTENTION!

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

CAUTION!

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

- Use identical connectors from the same manufacturer and of the same type on both the power optimizers and on the modules; or



- Verify that the connectors are compatible in the following way:

- The module connector manufacturer should explicitly verify compatibility with the SolarEdge optimizer connector; and
- A third-party test report by one of the listed external labs (TUV, VDE, Bureau Veritas UL, CSA, InterTek) should be obtained, verifying the compatibility of the connectors.

For more information, refer to

<https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf>



ATTENTION!

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

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

- Vérifiez que les connecteurs sont compatibles de la manière suivante:

- Le fabricant du connecteur doit explicitement vérifier la compatibilité avec le connecteur SolarEdge.

- Un rapport de test de tierce partie doit être effectué par l'un des laboratoires externes indiqués ci-dessous:(TUV, VDE, Bureau Veritas UL, CSA,Intertek), qui vérifiera la compatibilité des connecteurs.

Pour plus d'informations, consultez

<https://www.solaredge.com/sites/default/files/optimizer-input-connector-compatibility.pdf>

**IMPORTANT SAFETY FEATURE**

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

Package Contents

- Power optimizers
- Stainless steel grounding lock washers

Installation Guidelines

- The minimum and maximum string length guidelines are stated in the power optimizer datasheets. Refer to the Designer for string length verification. The Designer is available on the SolarEdge website at <https://www.solaredge.com/us/products/installer-tools/designer#/>.

- Frame-mounted power optimizers are mounted directly on the module frame, regardless of racking system (rail-less or with rails). For installation of frame-mounted power optimizers, refer to http://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
- The power optimizer can be placed in any orientation.
- If connecting more modules than optimizer inputs in parallel, use a branch cable. Some commercial power optimizer models have a dual input.
- Position the power optimizer close enough to its module so that their cables can be connected.
- Make sure to use power optimizers that have the required output conductor length:
 - *Do not* use extension cables between a module and a power optimizer, between two modules connected to the same optimizer, or between two optimizers other than in the cases specified below.
 - You can use extension cables between power optimizers only from row to row, around obstacles within a row, and from the end of the string to the inverter, as long as the maximum distance is not exceeded.
- 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.
- To allow for heat dissipation, maintain a 2.5 cm / 1" clearance distance between the power optimizer and other surfaces, on all sides except the mounting bracket side.



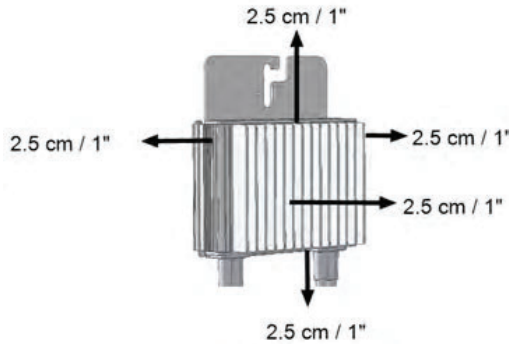


Figure 2: Power optimizer clearance

- When installing modules in a confined space, for example, if installing Building-integrated photovoltaic (BIPV) modules, ventilation measures may be needed to ensure the power optimizers are not be exposed to temperatures outside their specifications.



NOTE

The images contained herein 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 optimizers⁽¹⁾:

1. Determine the power optimizer mounting location and use the power optimizer mounting brackets to attach the power optimizer to the support structure (See *Figure 3*). It is recommended to mount the power optimizer in a location protected from direct sunlight. For frame-mounted power optimizers follow the instructions supplied with the optimizers, or refer to https://www.solaredge.com/sites/default/files/installing_frame_mounted_power_optimizers.pdf.
2. If required, mark the mounting hole locations and drill the hole.



⁽¹⁾Not applicable to smart modules.

CAUTION!

Drilling vibrations may damage the power optimizer and will void the warranty. Use a torque wrench or an electric drill with adjustable clutch that meets the mounting torque requirements. *Do not* use impact drivers for mounting the power optimizer.

Do not drill through the power optimizer or through the mounting holes.

ATTENTION!

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

3. Attach each power optimizer to the rack using M6 (1/4") stainless steel bolts, nuts and washers or other appropriate mounting hardware. Apply torque of 9-10 N*m / 6.5-7 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 methods⁽¹⁾ to ground the power optimizer:

WARNING!

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

AVERTISSEMENT!

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

⁽¹⁾These 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.

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

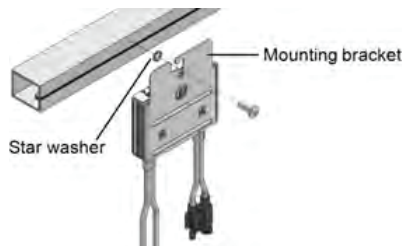


Figure 3: Power optimizer installation and grounding using a star washer

- **For mounting on rails with sliding nut fasteners:** If the star washer cannot be used, use the SolarEdge grounding plate (purchased separately) between the railing and the flat side of the mounting bracket. Use mounting specific hardware as needed. Apply torque of 9.5 N*m / 7 lb*ft. See Figure 4.

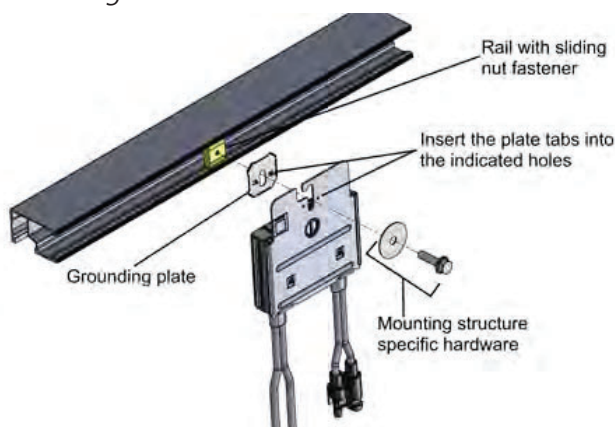


Figure 4: Power optimizer installation and grounding using a grounding plate

- **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. See Figure 5.

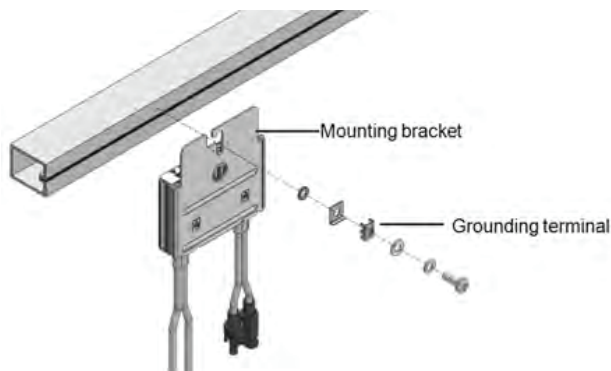


Figure 5: Power optimizer grounding terminal

5. Verify that each power optimizer is securely attached to the module support structure.
6. Record power optimizer serial numbers and locations, as described in *Step 4: Reporting and Monitoring Installation Data* on page 53.

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 optimizers:

- 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.

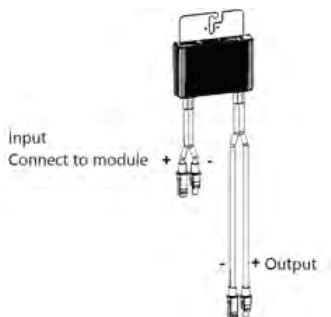


Figure 6: Power optimizer connectors

Step 3: Connecting Power Optimizers in Strings

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



1. Connect the Minus (-) output connector of the string's first power optimizer to the Plus (+) output connector of the string's second power optimizer.
2. Connect the rest of the power optimizers in the string in the same manner.

WARNING!



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

AVERTISSEMENT!

Si un optimiseur à double entrées est utilisé et que certaines entrées ne sont pas connectées, fermez ces entrées avec la paire de couvercles fournie.

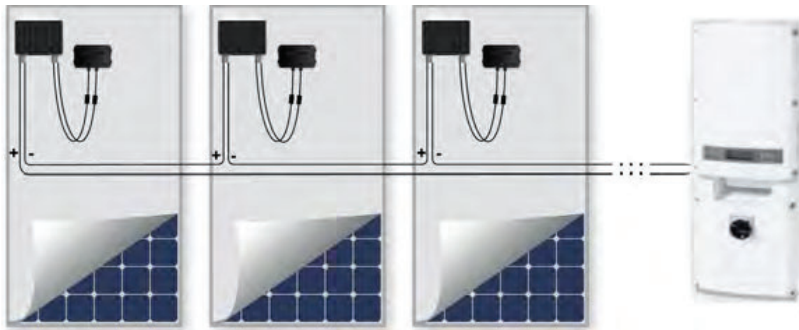


Figure 7: Power optimizers connected in series

3. If you intend to monitor the installation, using the monitoring platform, record the physical location of each power optimizer, as described in *Creating Logical and Physical Layout using Installation Information* on page 54.

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 ($\pm 0.1V$). Therefore, the total string voltage should equal 1V times the number of power optimizers connected in series in the string. For example, if 10 power optimizers are connected in a string, then 10V should be produced.

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

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

For more information about the SolarEdge system's string voltage and current, refer to the V_{OC} and I_{SC} in *SolarEdge Systems Technical Note*, available on the SolarEdge website at:

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



→ To verify proper power optimizer connection:

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



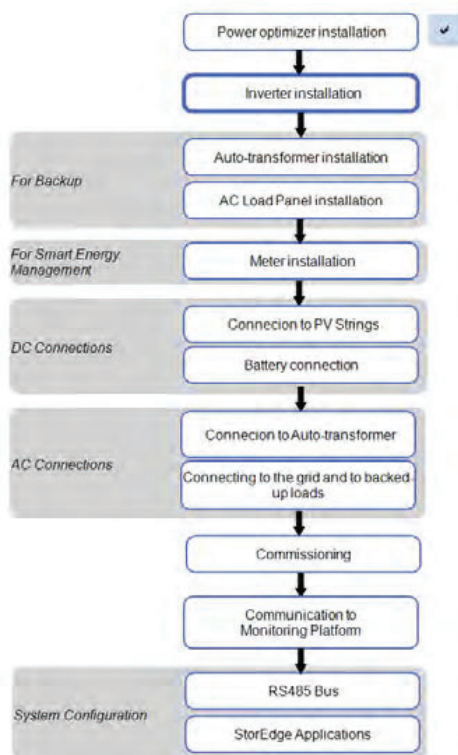
NOTE

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

For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 124.

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
- 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.

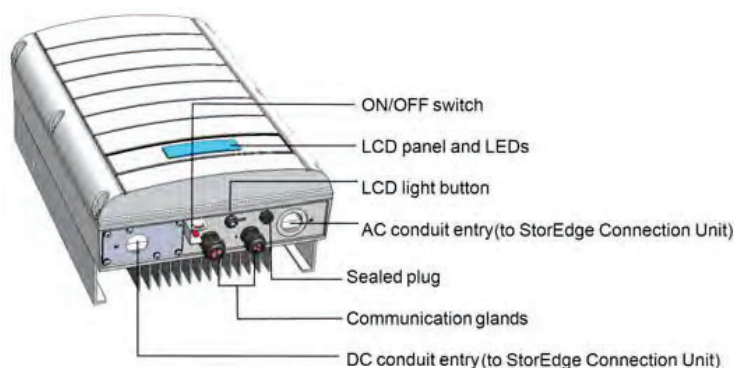


Figure 8: Inverter Interfaces

- **AC and DC conduit entries:** Connection points of the Connection Unit.
- **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 96 for more information.
- **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 75.
- **ON/OFF switch:** Turning this switch ON (after the power optimizers are paired with the inverter) 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 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 123 for more information. Blinking - The inverter is being shut down.

All LEDs turn on while the inverter is being configured.

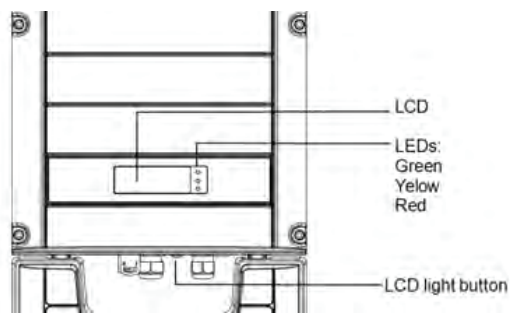


Figure 9: Inverter front view

StorEdge Connection Unit



Figure 10: 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 drill guides. If required, open the drill guides as described in *Opening Conduit Drill Guides* on page 136.

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.

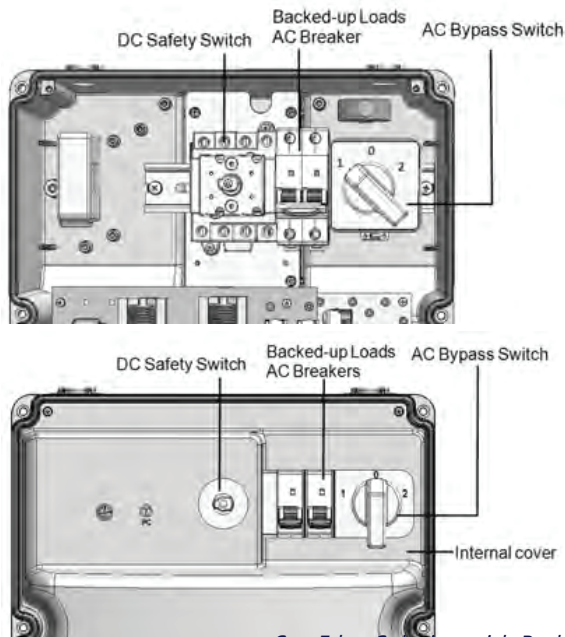


Figure 11: StorEdge Connection Unit with and without internal cover

- **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 12: 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.

**ATTENTION!**

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

CAUTION!

SolarEdge inverters and power optimizers can be installed at a minimum distance of 50 m/ 164 ft from the shoreline of an ocean or other saline environment, as long as there are no direct salt water splashes on the inverter or power optimizer.

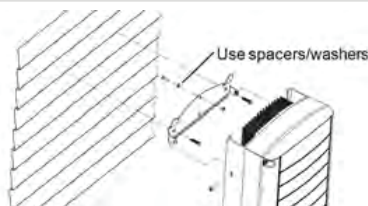
ATTENTION!

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

1. Determine the inverter mounting location, on a wall, stud framing or pole. It is recommended to mount the inverter in a location protected from direct sunlight.
2. To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:
 - If installing a single inverter:
 - 8" (20 cm) from the top of the inverter.
 - 4" (10 cm) from the bottom of the StorEdge Connection Unit.
 - 4" (10 cm) from 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.
3. Position the mounting bracket against the wall/pole and mark the drilling hole locations :
 - Ensure that the flat edge of the bracket is at the bottom, as in *Figure 13*.
 - Use at least two bracket holes. Additional holes can be used to fix the bracket. Determine which and how many holes to use according to mounting surface type and material.
4. Drill the holes and mount the bracket. Verify that the bracket is firmly attached to the mounting surface.

NOTE

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



5. Hang the inverter on the bracket (see *Figure 13*): 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.
6. Align the two indentations in the inverter enclosure with the two triangular mounting tabs of the bracket, and lower the inverter until it rests on the bracket evenly.

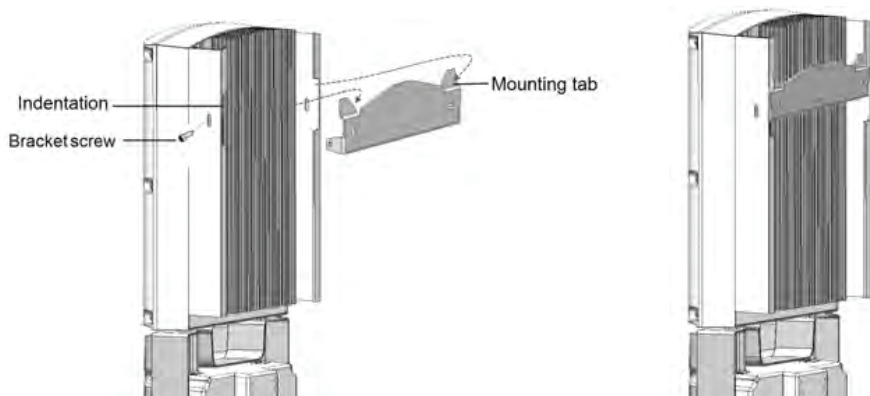


Figure 13: Hanging the inverter on the bracket

7. 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.

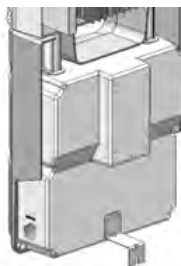
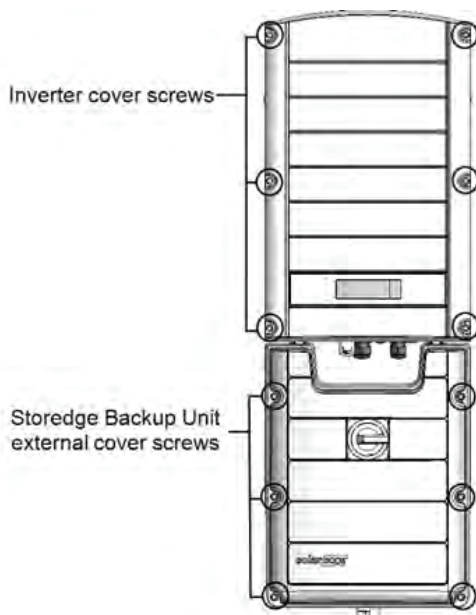


Figure 14: StorEdge Connection Unit bracket

8. Insert the two supplied screws through the outer heat sink fin on both sides of the inverter and into the bracket (see *Figure 13*). Tighten the screws with a torque of 4.0 N*m / 2.9 lb.*ft.
9. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.
10. 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.



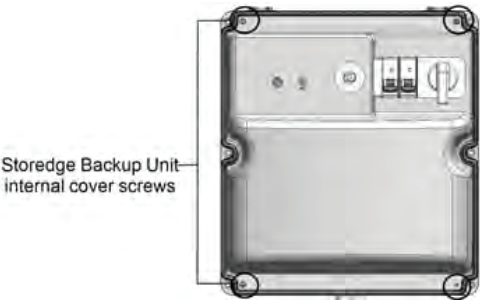
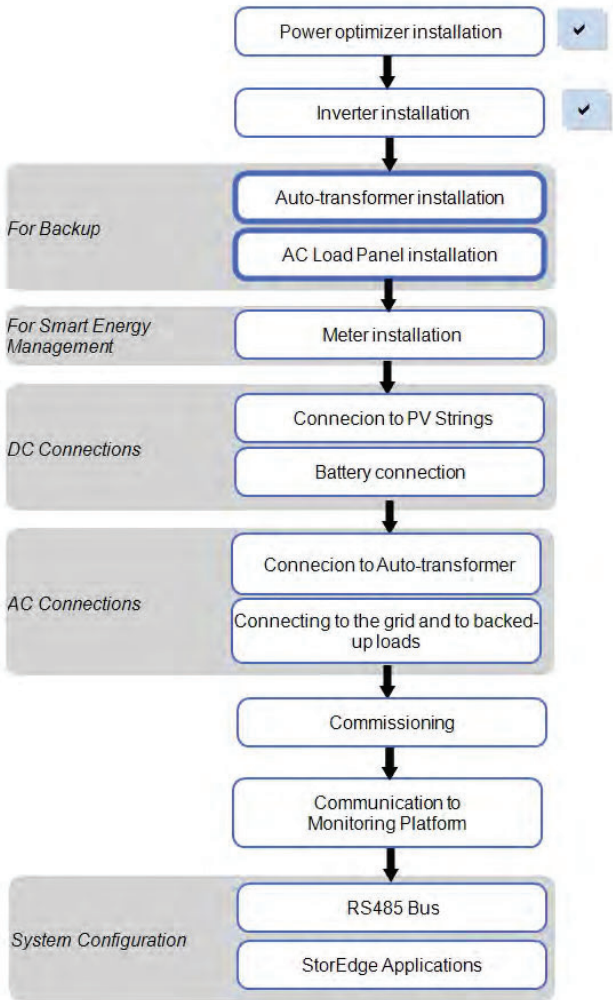


Figure 15: Inverter Covers

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 16.

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.

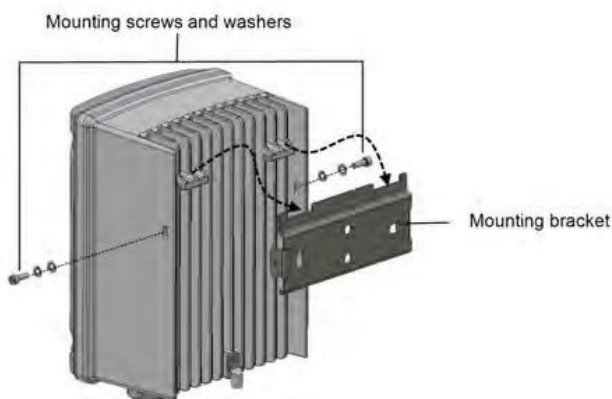


Figure 16: Installing the auto-transformer

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.
- Install a residual-current device (RCD) in accordance with the applicable local standards and directives

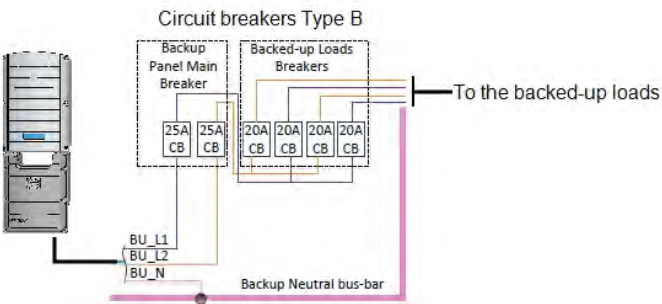
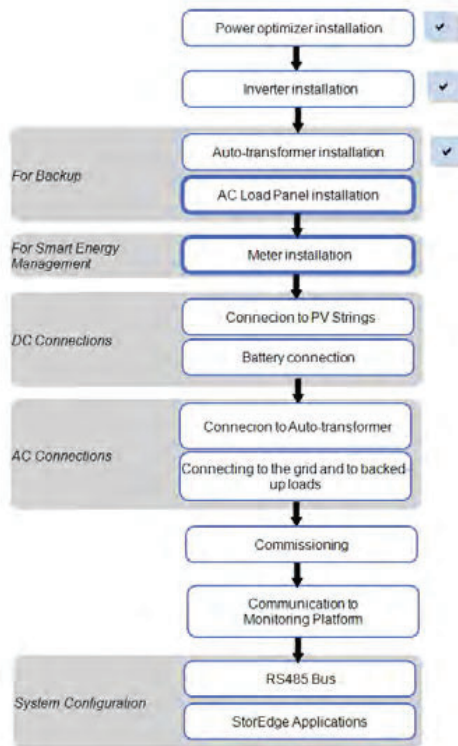


Figure 17: Backed-up Loads Panel

Chapter 5: 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 16.

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>.

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

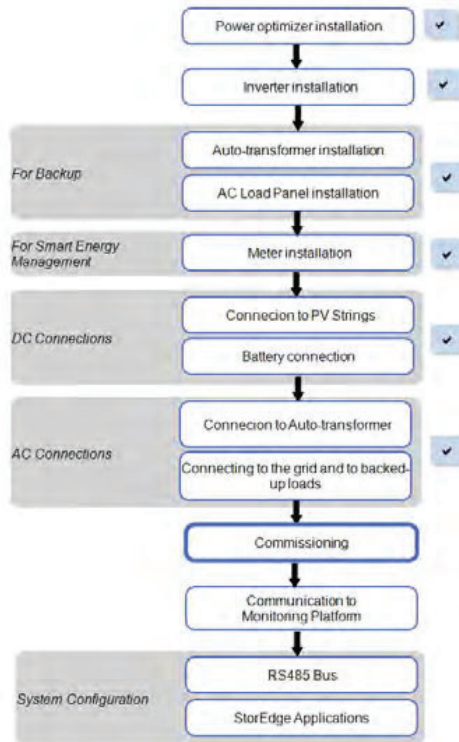
The inverter RS485 bus should be connected to the battery and meter. Connecting multiple inverters with RS485 master-slave connection may require an RS485 Plug-in (available from SolarEdge; Refer to http://www.solaredge.com/files/pdfs/RS485_expansion_kit_installation_guide.pdf).



For communication connection refer to *Connecting Communication to the Meter* on page 66.

Chapter 6: Commissioning the Installation

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



Removing the Inverter Cover

1. Switch the inverter ON/OFF/P switch to OFF. Wait 5 minutes for the capacitors to discharge.

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.

AVERTISSEMENT!

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. Turn the Connection Unit to OFF.
3. Turn the Connection Unit (if applicable) to OFF.
4. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
5. Release the Allen screws holding the inverter cover and remove the cover.
6. Open the Allen screws of the inverter cover and carefully pull the cover horizontally before lowering it.

CAUTION!

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

**ATTENTION!**

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

Step 1: Activating the System

1. Verify that the inverter ON/OFF switch is OFF.
2. Verify that the StorEdge Connection Unit ON/OFF switch is in 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.

Activate the inverter:

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

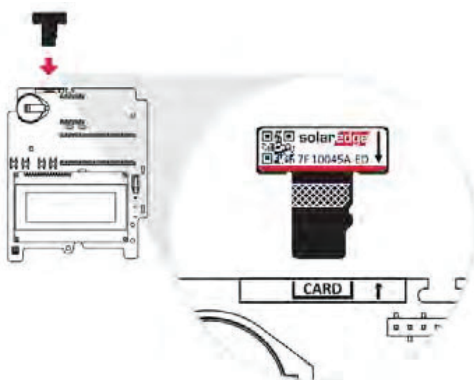


Figure 18: Activation card

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.

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

```
ID:      #####
DSP 1/2: 1.0210/1.0034
CPU:     0003.19xx
Country:  USA1
```

- 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 79.
 - Communication options connection – refer to *Setting Up Communication to the Monitoring Platform* on page 96.
 - StorEdge application configuration - refer to *System Configuration* on page 109.
- Close the inverter cover by tightening the screws with a torque of . For proper sealing, first tighten the corner screws and then the two central screws. The following figure illustrates recommended order:

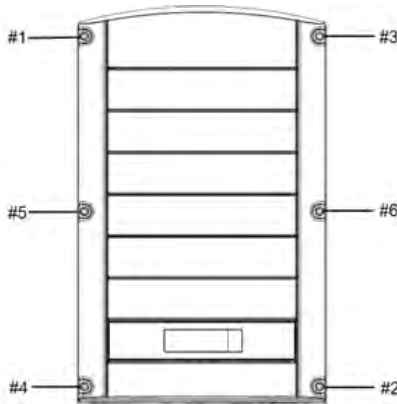


Figure 19: Tightening order of the screws

- 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.
- Make sure the AC Bypass switch in the StorEdge Connection Unit is switched to the left (position 1).
- Make sure the backed-up loads AC breaker in the StorEdge Connection Unit is **UP**.

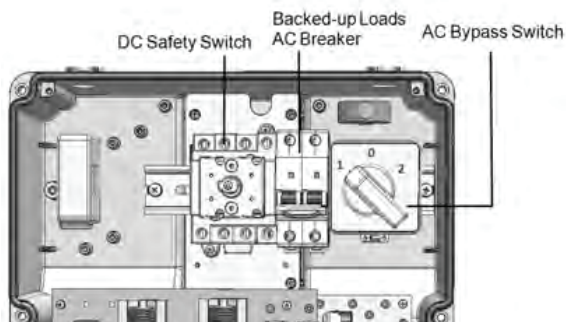


Figure 20: StorEdge Connection Unit

10. 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.
11. Ensure proper conduit sealing; inspect the entire conduit run and use standard conduit sealants to avoid water penetration.
12. 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:

```
Vac [V] Vdc [V] Pac [w]
240.7 14.1 0.0
P_OK: 000/000 <S_OK>
OFF
```

13. 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.
 - **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.
 - **S_OK:** The connection to the SolarEdge monitoring platform is successful (should appear only if the inverter is connected to the server).
 - **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. 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 124. If the problem persists, contact SolarEdge Support. When pairing succeeds, the following message is displayed:

Pairing
Pairing Completed

Upon pairing completion, the inverter continues with assigning numbers to the power optimizers and mapping them into strings:

- **Power optimizer detection** - the power optimizer IDs are detected and each optimizer is assigned a unique number, which is later used by the inverter for synchronizing telemetries. This detection is performed while the optimizers are in safe voltage .
- **String detection** - During this procedure the logical string of each optimizer is detected. This detection is performed while some optimizers are set to MaxVout mode.

The detection and assignment of power optimizers may take up to 2 minutes.

The system startup process begins:

Once 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.



AVERTISSEMENT!

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 Wakeup mode until its working voltage is reached. This mode is indicated by the flickering green inverter LED.

While the inverter is in Wakeup 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.

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 be approximately the inverter DC voltage (model dependent; refer to the inverter datasheet)
- **Pac [W]** specifies the AC output power produced.

2. Take note of the serial number 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.

Your SolarEdge power harvesting system is now operational.

Step 4: Reporting and Monitoring Installation Data

NOTE



Monitoring the site requires connecting the inverter to the monitoring platform, using any of the wired or wireless options available from SolarEdge. Refer to *Setting Up Communication to the Monitoring Platform* on page 96.

The Monitoring Platform

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

Using the platform, you can:

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

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

- **Logical Layout:** Shows a schematic tree-layout of the components in the system, such as: inverters, strings, modules, meters and sensors, as well as their electrical connectivity. This view enables you to see which modules are connected in each string, which strings are connected to each inverter, and so on.
- **Physical Layout:** Provides a bird's eye view of the actual placement of modules in the site, and allows pinpoint issues to the exact location of each module on a virtual site map.

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

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

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



Creating Logical and Physical Layout using Installation Information

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

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

Designer

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



For more information, refer to

<https://www.solaredge.com/products/installer-tools/designer#/>.

Mapper Application

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

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

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

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

- [Creating new sites using the Mapper mobile application](#)
- [Mapping existing sites using the Mapper mobile application](#)



Physical Layout Editor

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



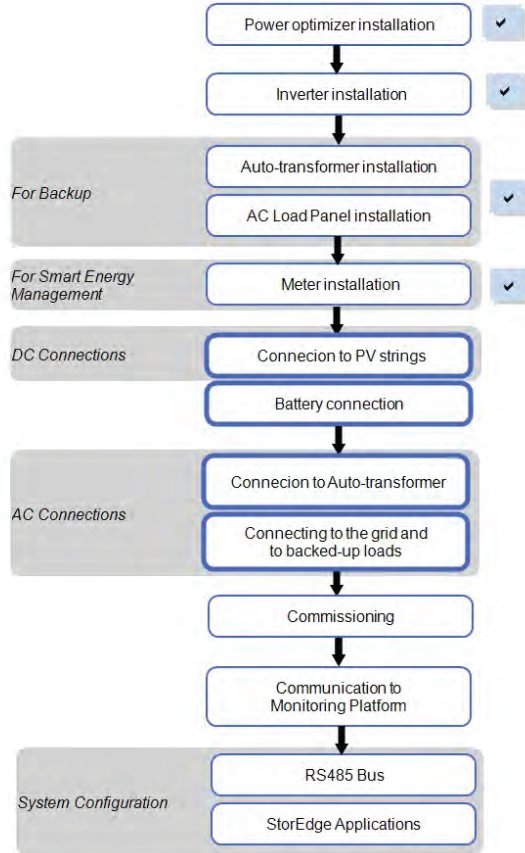
Using a Paper Template

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



Chapter 7: 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:

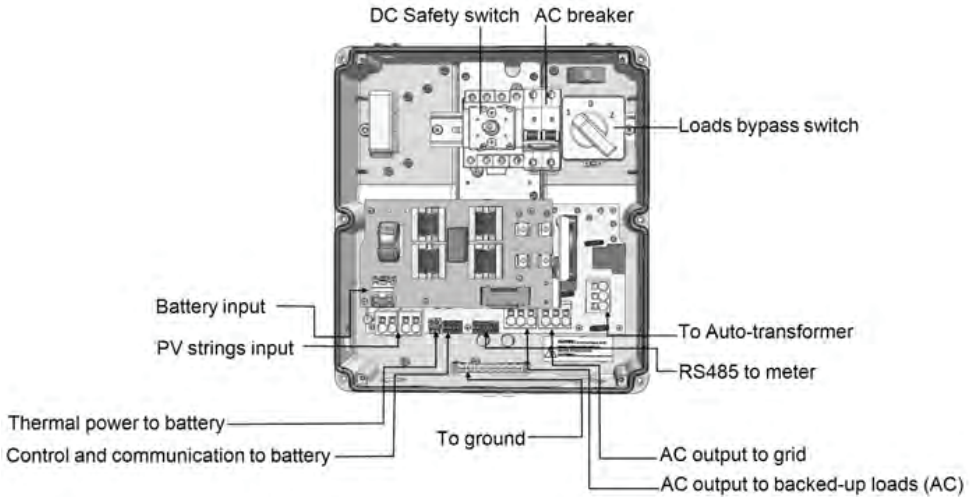


Figure 21: The StorEdge Connection Unit connections

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.

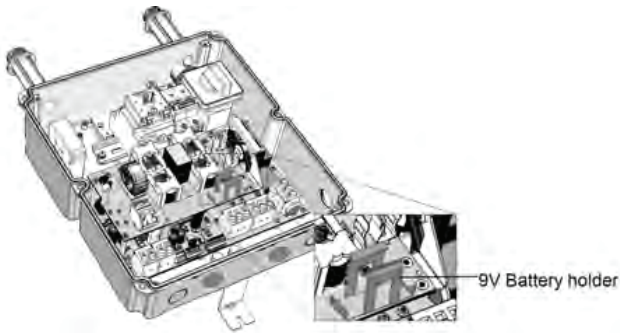


Figure 22: The battery holder

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

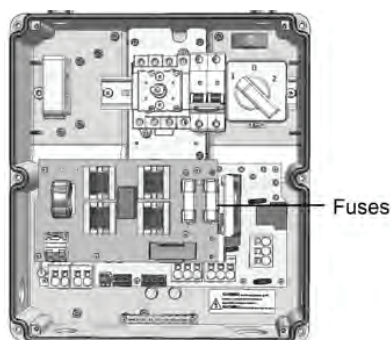


Figure 23: StorEdge Connection Unit fuses

Connecting the Strings to the Inverter

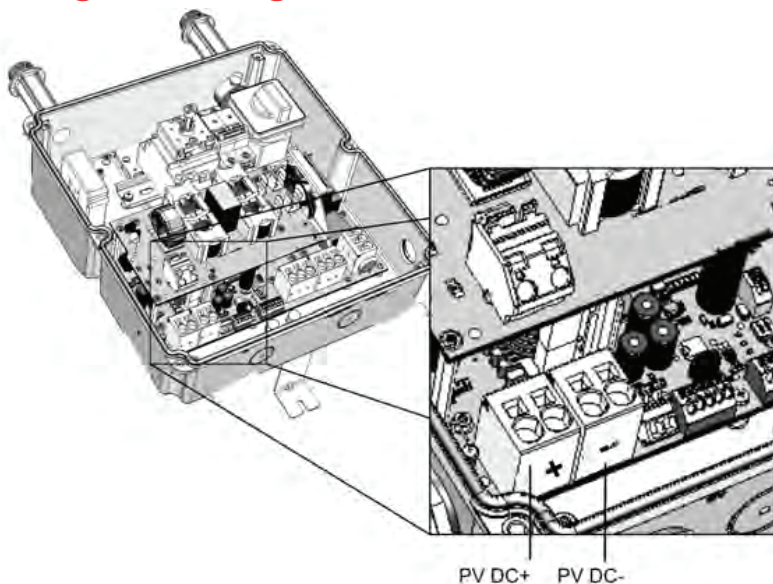


Figure 24: PV connection

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 a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism.
- b. Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire. Check that the wire is fully inserted and cannot be pulled out easily.

**CAUTION!**

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

ATTENTION!

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

NOTE

For systems with four PV strings per unit 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 "String Fusing Requirements in SolarEdge Systems" technical note 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.

In addition to the manufacturer instructions, follow these guidelines:

- Connect and mount the battery as follows:
 - Connect all the wires to the battery connection panel.
 - Mount the battery.
 - Assemble the conduit between the battery and the inverter.
 - 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 70 ft/ 20 m, when using 24 AWG/ 0.2 mm² cables for battery control.

- Tie and wrap the cables to avoid pulling them out during mounting.
- 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.

WARNING!

The battery must be powered off before and during wiring.

To power off the battery:

1. Turn off the circuit breaker.
2. Turn off the disconnect/auxiliary power switch.



To power the battery back on:

1. Turn on the disconnect/auxiliary power switch.
2. Turn on the circuit breaker.

For details, see *Powering the LG Chem Battery Off and On* on page 147.

AVERTISSEMENT!

La batterie doit être éteinte avant et durant le câblage:

Pour éteindre la batterie:

1. *Fermez le disjoncteur.*
2. *Fermez l'interrupteur auxiliaire.*

Pour rallumer la batterie:

1. *Ouvrez l'interrupteur auxiliaire.*
2. *Ouvrez le disjoncteur.*

Pour plus de détails, consultez Powering the LG Chem Battery Off and On page 147.

The following table, *Figure 25* and *Figure 26* detail cable types and connections of one battery (LG-chem Resu10H). 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+	❖ Insert a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism.	DC cable 10 AWG (10-14 AWG), 600V insulated.
BAT - terminal block	DC-	❖ Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire.	
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		

(1) Must be twisted pair

(2) Must be twisted pair

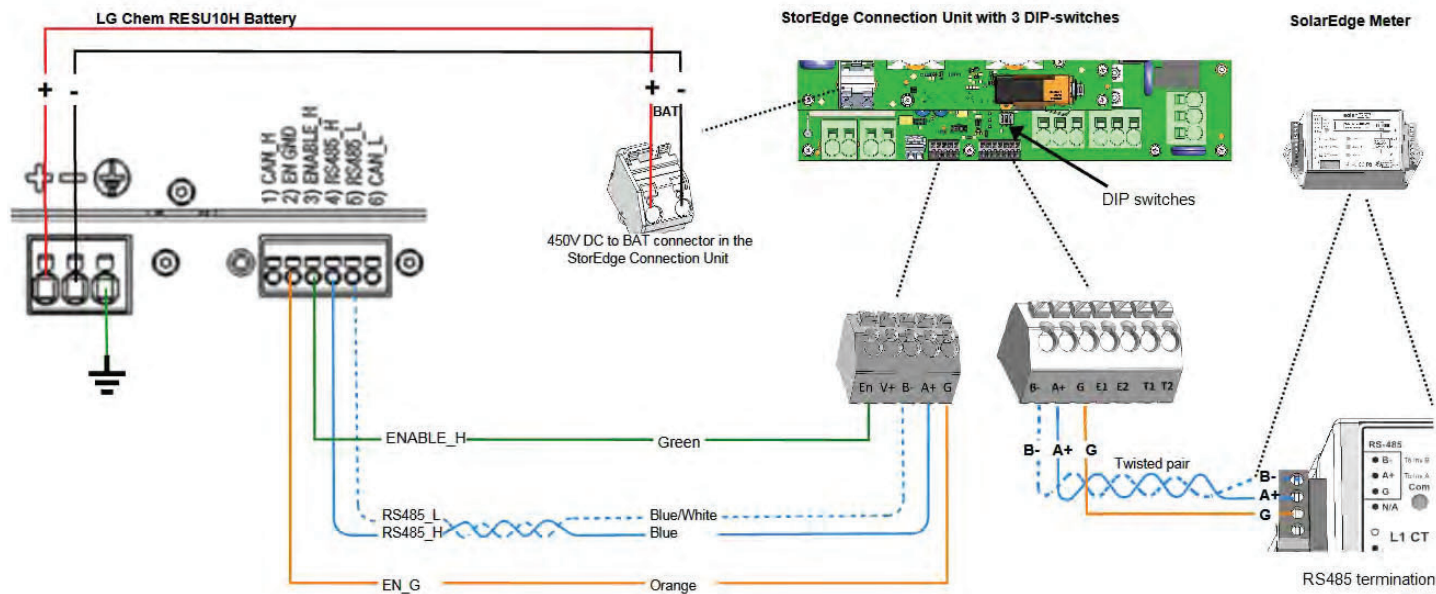


Figure 25: Connections to LG Chem RESU10H battery (StorEdge Connection Unit with three DIP-switches)

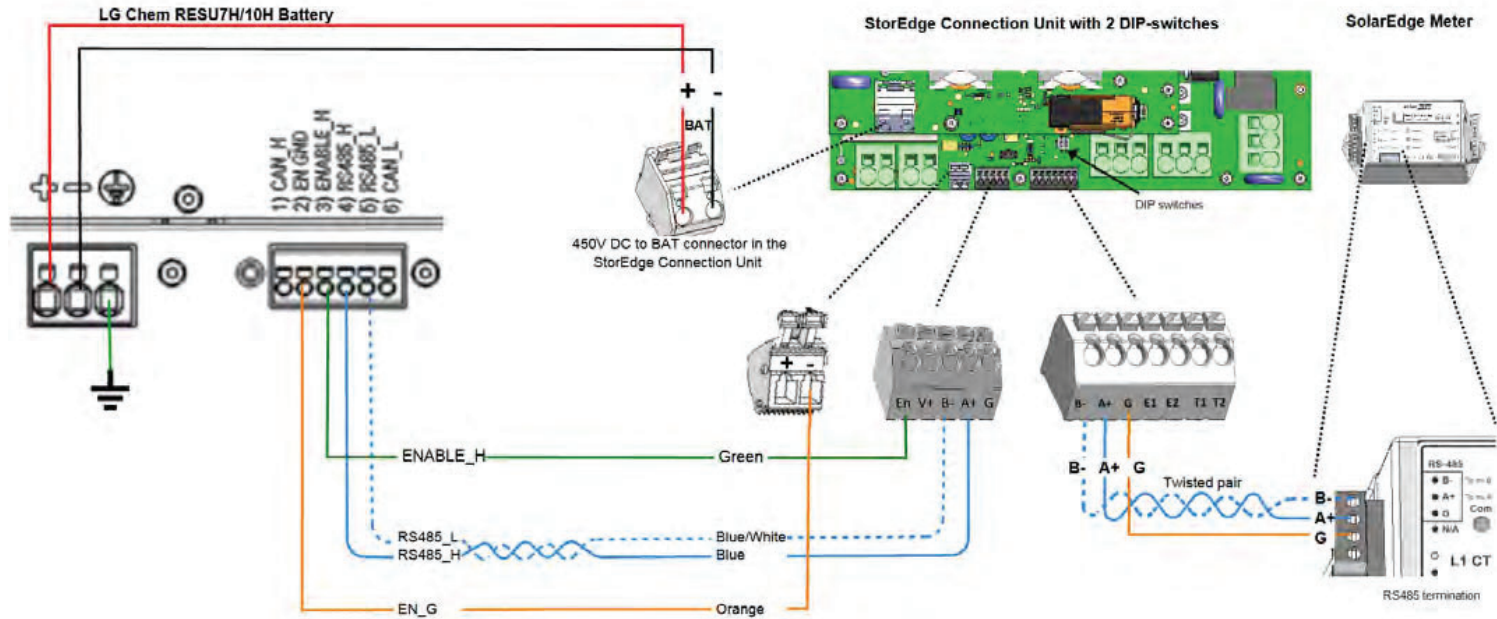


Figure 26: Connections to LG Chem battery (StorEdge Connection Unit with two DIP-switches)

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 27*):
 - If a meter is installed: No termination - Left SW7 switch Down
 - If a meter is not installed: termination ON - Left SW7 switch Up (see also *Creating an RS485 Bus Connection* on page 104)

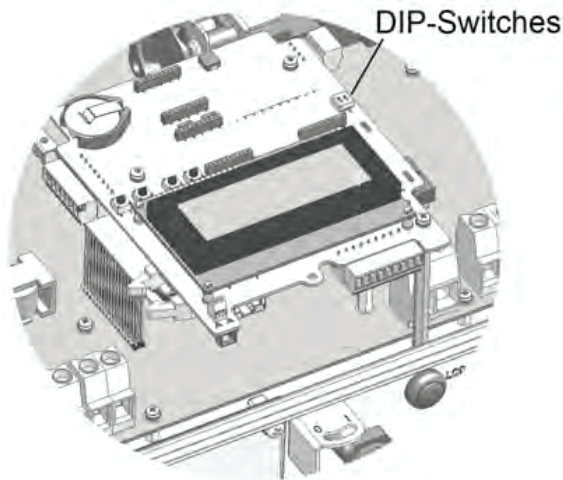



Figure 27: RS485 termination switch on the inverter communication board

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 28*):

 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)
No external emergency stop button	ON (up) - default	
External stop button (if installed, must be normally-closed)	OFF (down)	

 In StorEdge Connection Unit with three DIP switches:

Hardware configuration	DIP switch 1 (leftmost) setup	DIP switch 2 (middle) 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)
No external stop button	ON (up) - default	ON (up)	
External stop button (if installed, must be normally-closed)	OFF (down)	OFF (down)	

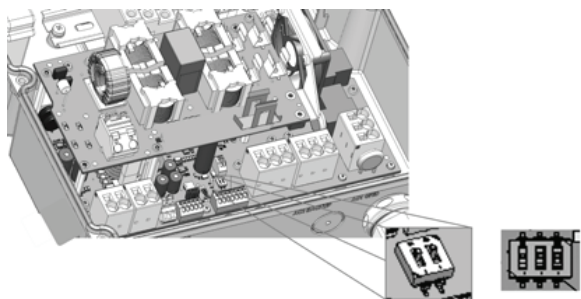


Figure 28: StorEdge Connection Unit DIP switches

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:

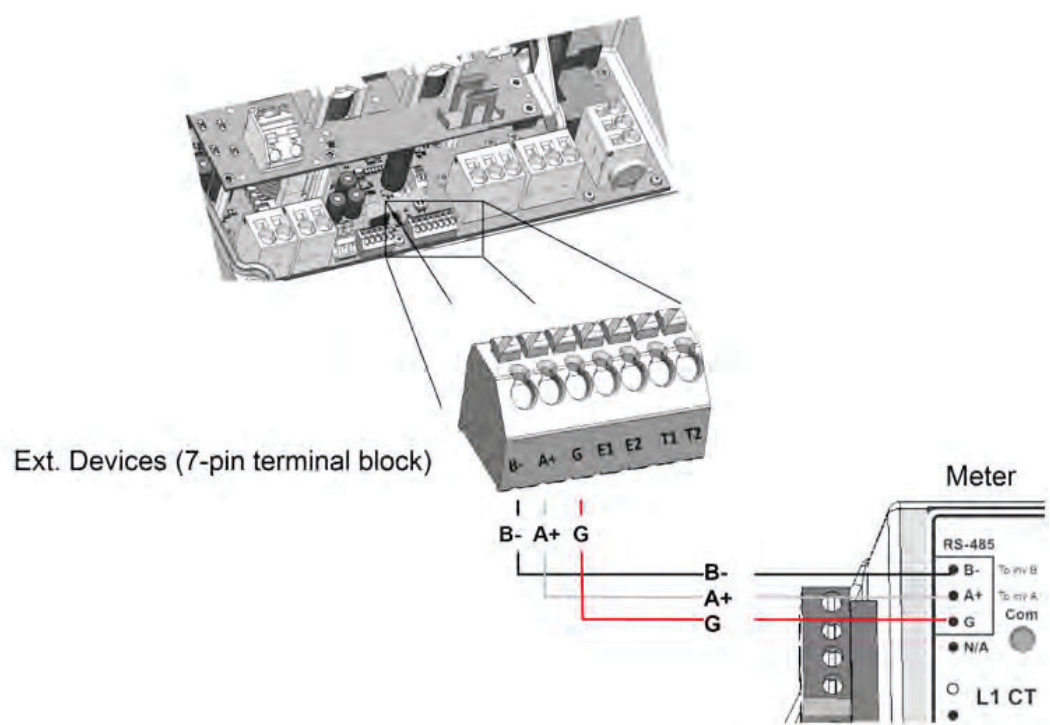


Figure 29: Connection to a meter

Connecting to AC

Connecting to the Auto-transformer

The Auto-transformer is required for Backup Power only.

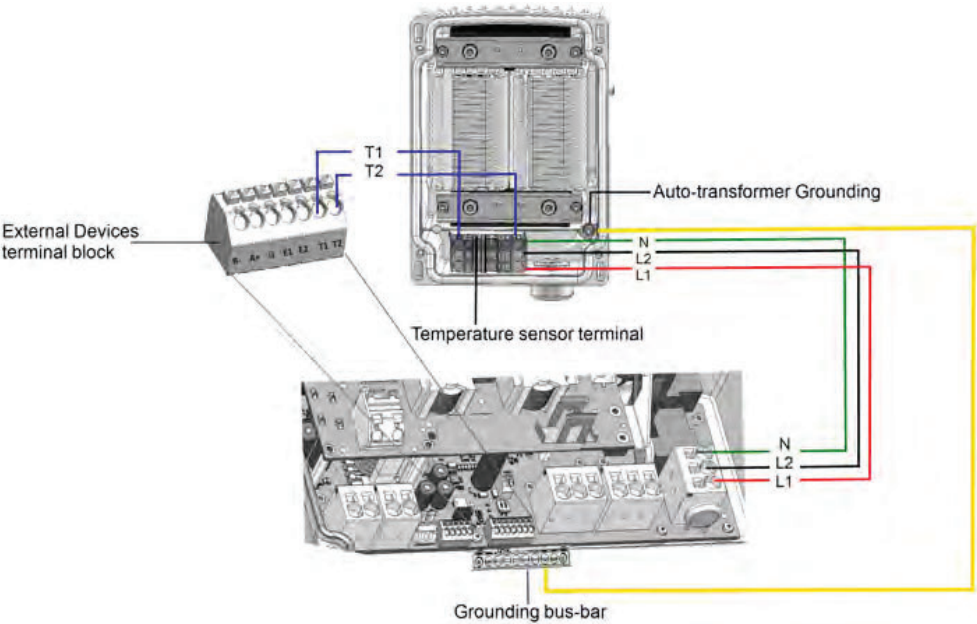


Figure 30: Connecting to the auto-transformer

- 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	
Temperature Sensor			

Recommended cable type (min-max AWG)	StorEdge Connection Unit connection	Auto-transformer connection	Connection method
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: <ol style="list-style-type: none">1. Insert a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism.
	External Devices 7-pin terminal block: T2	Temperature sensor terminal: T2	<ol style="list-style-type: none">2. Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire.

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.

⁽¹⁾T1 and T2 are interchangeable

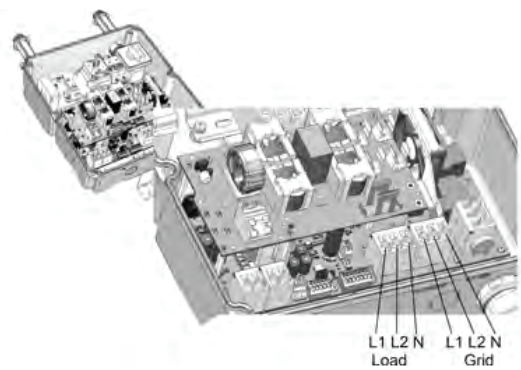


Figure 31: Connection to grid, backed-up loads

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 8: 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:

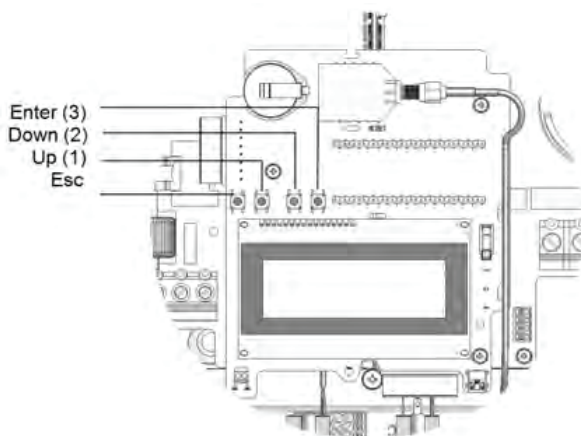


Figure 32: LCD Internal menu buttons

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 (1) and Down (2):** 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 (3):** 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 86 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.

For more information, refer to

https://www.solaredge.com/sites/default/files/troubleshooting_for_se_inverter_insallation_guide_addendum_na.pdf and *Inverter Configuration – Setup Mode* on page 72.



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 set of menus.

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.

AVERTISSEMENT!

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 79. 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>  
RS485-2 Conf<S>  
ZigBee Conf<S>  
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  
FW Upgrade  
AFCL <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
```

Communication⁽¹⁾:

```
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
```

Maintenance:

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

```
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 or region 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 or region.

WARNING!



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

AVERTISSEMENT!

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 energy meters or loggers.
2. Select **Server** to set which communication method is used to communicate between devices and the monitoring platform. Refer to *Setting Up Communication to the Monitoring Platform* on page 96 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⁽¹⁾,⁽²⁾:

```
Server < LAN >
LAN Conf
RS485-1 Conf < S >
RS485-2 Conf < S >
ZigBee Conf < S >
Cellular Conf
GPIO Conf < MTR >
```

Server:

(1) When using the SolarEdge Cellular Plug-in with the provided SIM card, the Cellular Conf menu is unavailable.

(2) When using the SolarEdge GSM products, RS232 Conf menu is unavailable.

```
LAN
RS485
Zigbee
Cellular
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 <#>
Cluster SLV Detect
Long Slave Detect <#>
Slave List <#>
Multi-Inv. Set
```

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

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

GPIO Conf:

```
Device Type <RRCR>
```

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
```

Power control options are detailed in the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.us/files/pdfs/application_note_power_control_configuration.pdf.

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



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



For P(Q) diagram refer to

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

NOTE



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

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
FW Upgrade
AFCL <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.
- **FW Upgrade:** Perform a software upgrade by using an SD card. Refer to [upgrading_an_inverter_using_micro_sd_card.pdf](#).



- **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. Refer to http://www.solaredge.com/sites/default/files/arc_fault_detection_application_note_na.pdf.



- **Manual AFCI Test:** Accessible from the LCD Light button menus only. Starts a self-test for arc detection. Refer to http://www.solaredge.com/sites/default/files/arc_fault_detection_application_note_na.pdf.
- **Standby Mode:** Enables/disables the Standby Mode - for remote commissioning. After you set the inverter to the Standby Mode, the batteries will charge until reaching an SOE of 100% to prevent a critically low SOE. Only then will the inverter enter the Standby Mode. Each battery charge may take approximately two hours.
- **Grid Protection:** Available in specific countries. Enables viewing and setting grid protection values.
- **Optimizer Conf.:** Opens the Rapid Shutdown menu, to enable/disable PVRSS.

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 Energy Meter
- ▀ **RGM2:** A second external Energy Meter
- ▀ **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

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

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

Main Inverter Status

```
Vac[V] Vdc[V] Pac[W]
240.7 371.9 3210.0
Fac[Hz] OPs_Ok Temp
50.0 11 28.2
```

- **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
```

- **Day:** since midnight
- **Month:** since 1st of the current month until today (inclusive)
- **Year:** since January 1st until today (inclusive)

If a meter (RGM) is connected to the inverter, the following status screen, showing the power and energy readings, is displayed in addition to 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 ] :      x x x x x . x
Energy [ Wh ] :    x x x x x . 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 *Troubleshooting* on page 123.
- **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.

```

ID:      ##### ##
DSP 1/2: 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>
             x x x x x x x x
<ERROR MESSAGE>

```

NOTE



If the connection method is CDMA (referred to as "Cellular" in the status screens) or GSM, the server screen is replaced with the Cellular or GSM status screens (see *Cellular Status* on page 90 and *GSM Status* on page 90).

- **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 inverter is connected to the server).
- **Status:** Displays OK if the inverter established successful connection and communication with the specified server port/device (LAN, RS485 or ZigBee Plug-in).
- **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 *Troubleshooting* on page 123. For a list of the possible errors and how to troubleshoot them, refer to *Errors and Troubleshooting* on page 1.
- **Error message,** according to failure. Refer to .

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:XXXXXX
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 (Personal Area Network Identification), the ID uniquely represents a device in a Zigbee network.
- **Ch.:** The ZigBee transceiver channel
- **ID:** The ZigBee transceiver ID

- **MID:** The Master ID of the coordinator (master) ZigBee Plug-in. This field is shown only in devices with router (slave) ZigBee cards, and after a successful ZigBee association. If a ZigBee Plug-in is not connected, a **No ZigBee** message is displayed instead of the **MID** field.

Cellular Status

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

```
Server: Cell      <S_OK>
Status:           <OK>
MNO: <XXXXXX>   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 Cellular Plug-in.
- **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 Plug-in. A value between 0-5, (0 = no signal, 5 = excellent signal).
- **Error message** per communication connection status failure

GSM Status

If a GSM Plug-in is connected, this screen replaces the Server status screen:

```
Server: Cell      <S_OK>
Status:           <OK>
MNO: <xxxxxxxx>   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 86.
- **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
- **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 ZigBee 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

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



Fan Status

This screen is applicable to inverters equipped with external or internal fans, and provides information about the fan status:

```
Fan Status:
Fan1: Not Working
Fan2: Operating
```

or

```
Fan Status:
Int: Not Working
Ext: Operating
```

Each fan can have one of the following statuses:

- **Operating:** Fan OK
- **Not Working:** This status may indicate a system error and not necessarily a faulty fan. Turning AC OFF and ON again may clear this status. If the status does not change, replace the fan.

For more information, refer to *External Fan Maintenance and Replacement* on page 1.

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: XXXXXXXXXX ID:15  
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 9: Setting Up Communication to the Monitoring Platform

The inverter sends the following information to the monitoring platform:

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

This chapter describes setting up communication between:

- The inverter and the monitoring platform through the Internet (wired/ wireless), or through a cellular connection.
- Multiple inverters for a master/slave configuration.

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

CAUTION!

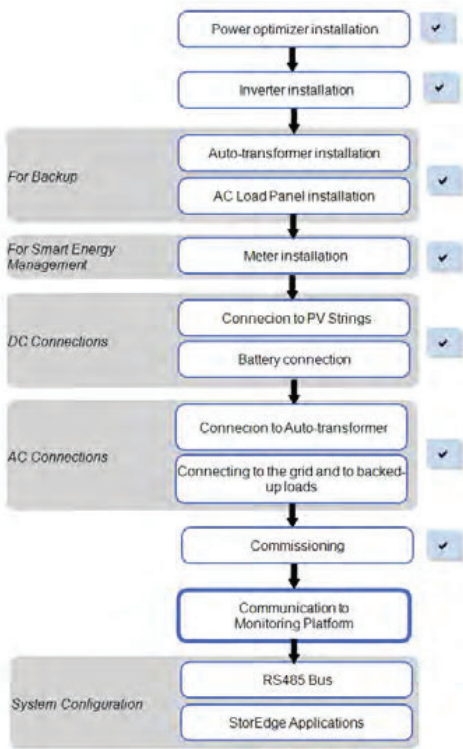


When connecting the communication cables, make sure that the ON/OFF switch on the StorEdge Connection Unit is turned OFF, and the AC is turned OFF.

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

ATTENTION!

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

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

Only communication products offered by SolarEdge are supported.

Always connect the communication options when the relevant devices are powered down - Commercial Gateway, inverter, etc.

Ethernet

Ethernet is used for a LAN connection. For connection instructions refer to *Creating an Ethernet (LAN) Connection* on page 101.

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.

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

For connection instructions refer to *Creating an RS485 Bus Connection* on page 104

Cellular (GSM, CDMA)

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

The GSM/CDMA Plug-in is provided with a user manual, which should be reviewed prior to connection. Refer to

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

and https://www.solaredge.com/sites/default/files/cellular_cdma_kit_installation_guide_na.pdf.



ZigBee

This option enables wireless connection of one or several devices to a ZigBee Gateway, for wireless communication to the monitoring platform. The ZigBee Gateway is provided with an installation guide, which should be reviewed prior to connection. Refer to <https://www.solaredge.com/sites/default/files/se-zigbee-home-gateway-installation-guide.pdf>.



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, or Cellular	4.5-7 mm
2 (PG13.5)	All three	RS485	2.5-5 mm



Figure 33: 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:

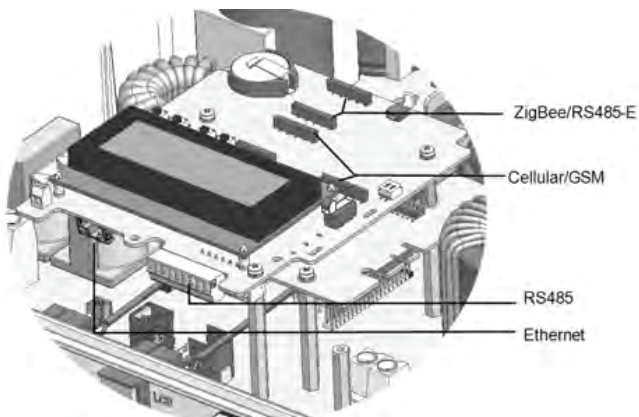


Figure 34: Internal connectors

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 – a shielded Ethernet cable (Cat5/5E STP) may be used
- Maximum distance between the inverter and the router – 100 m/ 330 ft.

NOTE

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

For details refer to:

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

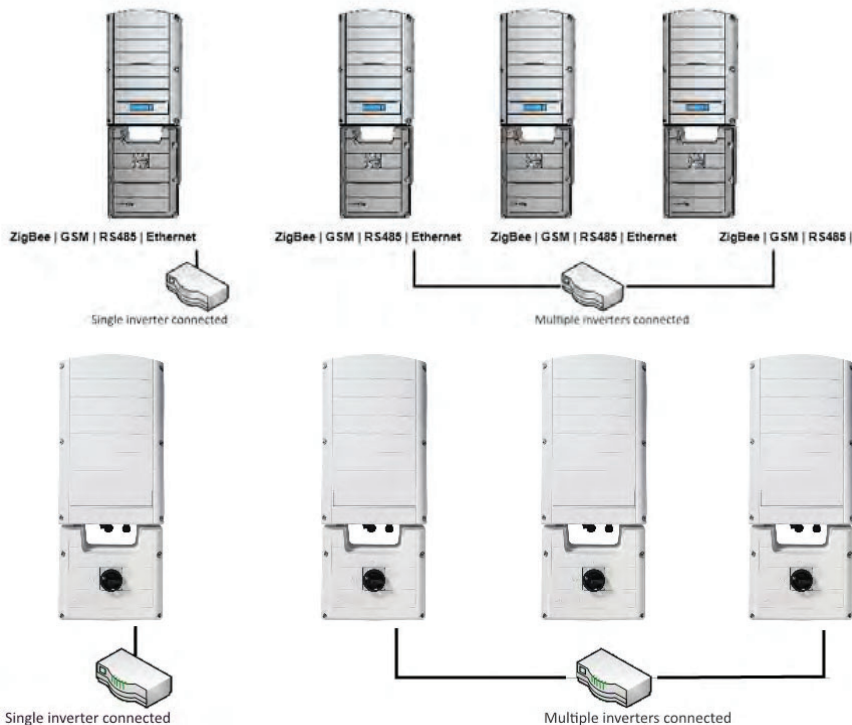


Figure 35: Example of Ethernet connection

→ To connect the Ethernet cable:

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 45.
2. Open the communication gland #1.



CAUTION!

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

ATTENTION!

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

3. Remove the plastic seal from one of the large opening .
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.

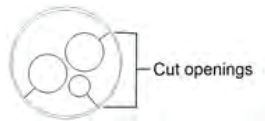


Figure 36: Rubber fitting

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

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

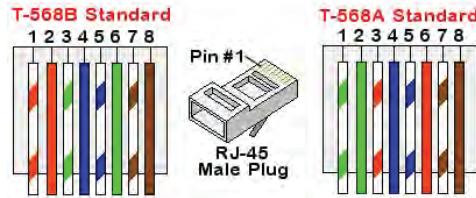


Figure 37: Standard cable wiring

6. Use a pre-crimped cable to connect via gland #1 to the RJ45 plug on the inverter's communication board or, if using a spool of cable, connect as follows:
 - a. Insert the cable through 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 37*.
 - d. Use a crimping tool to crimp the connector.
 - e. Connect the Ethernet connector to the RJ45 port on the communication board.

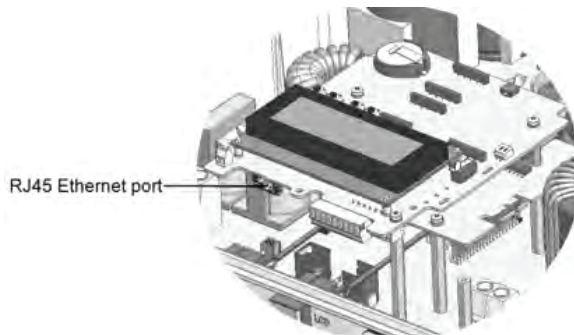


Figure 38: The RJ45 Ethernet connection

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 37*).
8. Connect the cable RJ45 connector to the RJ45 port of the Ethernet switch or router. You can connect more than one inverter to the same switch/router or to different switches/routers, as needed. Each inverter sends its monitored data independently to the monitoring platform.
9. The inverter is configured by default to LAN. If reconfiguration is required:

- a. Make sure the ON/OFF switch is OFF.
- b. Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel.
- c. Use the internal user buttons to configure the connection, as described in *Communication* on page 80.

NOTE

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

- Destination Address: prod2.solaredge.com
- TCP Port: 22222, 22221, or 80 (for incoming and outgoing data)

10. Verify the connection, as described in *Verifying the Connection* on page 108. *Verifying the Connection* on page 108.

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 as described on page 107.

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)
- 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 recommend to use external surge protection devices. For details refer to:



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



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

If not using surge protection, connect the grounding wire to the first inverter

in the RS485 chain; ensure it is not in contact with other wires. Connect the grounding wire to the grounding bus-bar in the StorEdge Connection Unit.

NOTE

An additional RS485 port (RS485-Plug-in) is available from SolarEdge, allowing the creation of RS485 Bus Connection; Refer to



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 45.
2. Remove the seal from one of the openings in communication gland and insert the wire through the opening.
3. Pull out the 9-pin RS485 terminal block connector, as shown below:

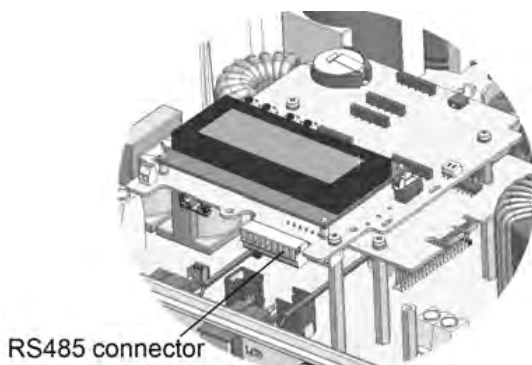


Figure 39: The RS485 terminal block

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

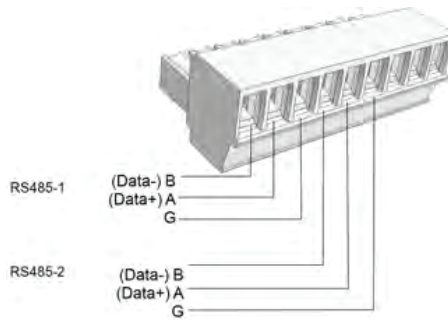


Figure 40: RS485 terminal block

5. Insert the wire ends into the **G**, **A** and **B** pins shown above. Use Four- or six-wire twisted pair cable for this connection.

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

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

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

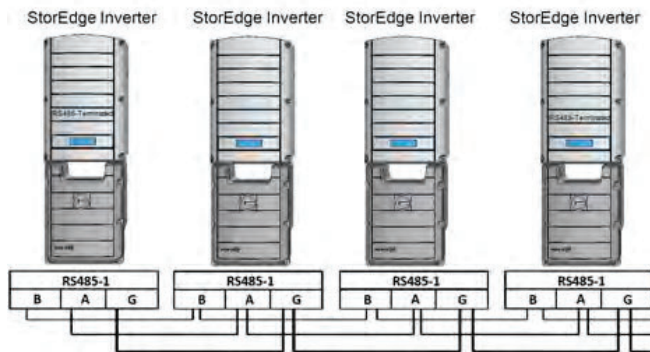


Figure 41: Connecting the inverters in a chain

**NOTE**

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

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

of the communication board.

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

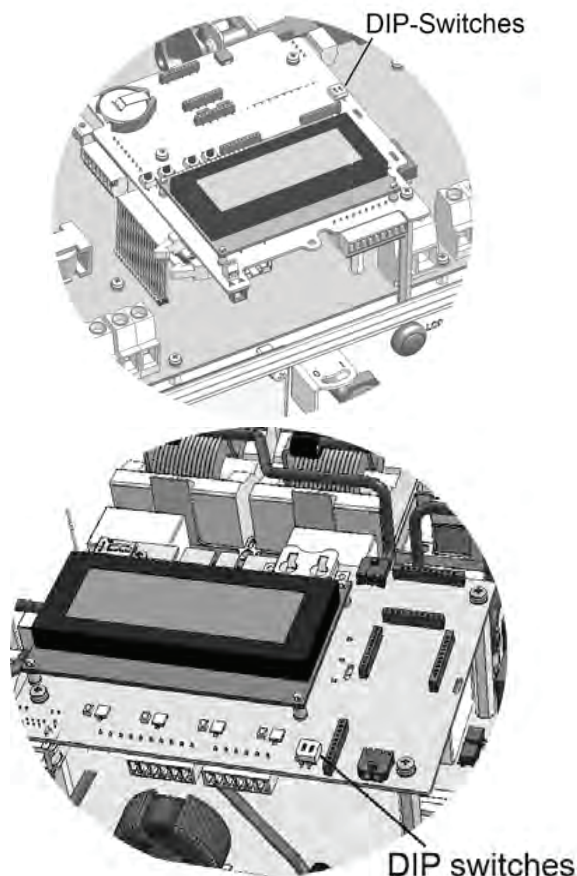


Figure 42: RS485 termination switch

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).

11. If not using surge protection, connect the grounding wire to the first inverter in the RS485 chain; make sure the grounding wire is not in contact with other wires. For inverters with a StorEdge Connection Unit, connect the grounding wire to the grounding bus-bar in the StorEdge Connection Unit.

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. If not already ON - Turn ON the AC to the inverter by turning ON the circuit breaker on the main distribution panel and turning on the Connection Unit.
3. Wait for the inverter to connect to the SolarEdge monitoring platform. This may take up to two minutes.

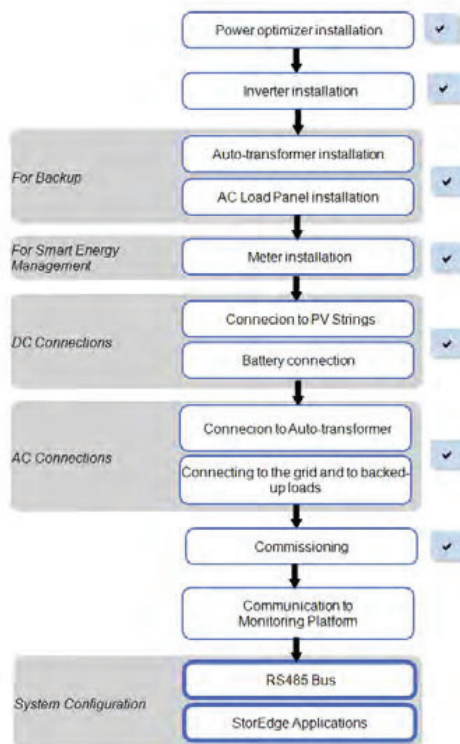
A status screen similar to the following appears on the LCD panel:

```
V a c [ V ]   V d c [ V ]   P a c [ w ]  
240.7      14.1      0.0  
P _ O K : 000/000 < 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 *Errors and Troubleshooting* on page 1.

Chapter 10: 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 communication board firmware (CPU) version must be 3.xxxx and later on all SolarEdge inverters at the same site. The latest firmware version is available for download at <http://solaredge.com/storeedge/firmware>.



Upgrading the Inverter Firmware Version

Upgrade the inverter firmware using the card supplied with the StorEdge Interface.

Upgrade the inverter firmware using a MicroSD card with the latest firmware version downloaded from the above link.

→ To upgrade the inverter firmware:

1. Make sure that:

- The inverter has been activated using the activation card supplied with the inverter
 - The inverter ON/OFF switch is OFF
 - The AC voltage to the inverter is OFF
2. Remove the inverter cover.
 3. Make sure the RS485 Plug-in kit is installed in the inverter. This is indicated on the inverter label.
 4. Insert the card into the communication board slot marked "CARD".

1Ph/3Ph inverters

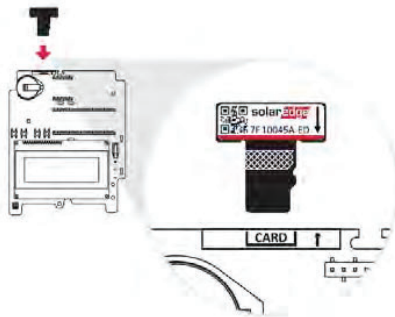


Figure 43: Inserting the upgrade card

5. Power on the battery, as explained in *Powering the LG Chem Battery Off and On* on page 147. Wait 1 minute before proceeding.
6. Turn ON AC to the inverter.

WARNING!

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



AVERTISSEMENT!

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

7. The upgrade starts automatically. Wait for the message **Done** to be displayed on the LCD.
8. Remove the card from the inverter.
9. Enter the inverter Setup mode: Press the internal Enter button for 5-10 seconds and release. Enter the password **12312312**.

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 communication with the battery over RS485:

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 <SE, 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>
Secondary CT <5>
VT Rating <None>
Secondary VT <110>
Meter Func. <None>
Meter Commission
Topology <Wye>
```

5. Configure the meter:

- a. Select **Device Type** → **Revenue Meter**
- b. Select **Protocol** → **WattNode**
- c. Verify that **Device ID** is set to **2**.
- d. 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.
- e. For a meter installed at the grid connection point select **Meter Func.** → **Export+Import**.

```
Export+Import
Export
Consumption
Production
Ext. Production
Import
None
```

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

- f. Select the grid **Topology** (**WYE** or **Delta**).
6. Select **Communication** → **RS485-1 Conf** → **Device Type** → **Multi Devices** → **Battery 1**. The battery configuration screen is displayed:

```
Device Type <BAT>
Protocol <LG Battery>
Device ID <15>
Battery Info < >
```

7. Select **Device Type** → **Battery Pack**.
8. 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>
Nameplate[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:
 - a. 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 123.

- b. 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 123.

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

```
BSN: XXXXXXXXXXXX ID:15
SOE: 89% PWR: 2W
Total: <x> Wh
State: Charging
```

If **Comm. Error** appears, refer to *Troubleshooting* on page 123.

Configuring StorEdge Applications

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
- I: Minimum import
- Dis: Disabled - no limit

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

Storage Control: Enables reserving a minimum battery charge level.

Advanced: For enabling external production

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:

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

- b. 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.

If you set the Backup Rsvd to a value other than 0%, the following is displayed:

```
Backup Rsvd <20%>
Grid Charge <En>
AC Charge Li<None>
```

- c. Select **Grid Charge** and one of the following options:

- **Enable:** Charge from both PV and grid to reach backup reserved value
- **Disable:** Charge from PV only to reach backup reserved value

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 https://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**. The following is displayed:

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

- b. 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 123.

→ To test the battery:

The test is available in CPU version 3.24xx and higher (but not in version 4.x.xxx).

If two batteries are installed, the active battery will be tested first, and then the standby battery. If the active battery fails the test, the test will stop and the standby battery will not be tested.

1. Verify that AC is ON.
2. Turn the inverter ON/OFF switch to ON.
3. Make sure the Connection Unit is ON.
4. Enter Setup mode and select **Maintenance → StorEdge Self-Test → Start Test**. The battery charges and discharges within approximately two minutes to check performance.

During the test, the following message is displayed:

```
Short test in  
progress...  
  
Any button to stop
```

Upon the test completion, the following message is displayed:

```
Self-test completed
successfully

Any button to cont.
```

If an error message is displayed during the test, use the following table to resolve the error.

Error	Solution
Bat 1 charge failed	Check that the power and communication cables between the battery and inverter are properly connected.
Bat 1 discharge failed	Check that the power and communication cables between the battery and inverter are properly connected.
Low SOE	Charge the battery to 20 percent SOE at least.
Battery comm. error	Check that the communication cables between the battery and inverter are properly connected.
Turn switch to On	Turn the inverter ON/OFF switch to ON.

→ To test 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]:    x x x x x . x
Energy[Wh]:  X X X X X . 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):

```
V a c [ V ]   V d c [ V ]   P a c [ W ]
240.7       371.9   2349.3
P _ O K :   X X X / Y Y Y   < S _ O K >
                                O N
```

→ **To test 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 the Backup mode is ON:

```
V a c [ V ]   V d c [ V ]   P a c [ W ]
240.7       371.9   2349.3
P _ O K :   X X X / Y Y Y   < S _ O K >
B a c k u p   M o d e           O N
```

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. If SOE is below 10%, refer to *Additional StorEdge Troubleshooting* on page 128.
- The PWR value is greater than 0

```
B S N :   X X X X X X X X   I D : 24
S O E : 89 %           P W R : 3 W
T o t a l :   < x > W h
S t a t e :   D i s c h a r g i n g
```

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

→ **To test the 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: XXXXXXXXX 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: XXXXXXXXX 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 111.
- 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>
      x x x x x x x x
<ERROR MESSAGE>
```

xxxxxxxx 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 <i>Creating an</i>

Bit Location	Error Message	Cause and Troubleshooting
2nd	DHCP Failed, or Invalid DHCP Config	<p><i>Ethernet (LAN) Connection</i> on page 101 IP settings issue. Check the router and inverter configuration. Consult your network IT.</p> <p>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.</p> <p>Ping to google.com failed. Connect a laptop and check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider.</p> <p>Ping or connection to SolarEdge server failed. Check the SolarEdge server address, under LAN Conf submenu:</p> <p>Address: prod.solaredge.com</p> <p>Port: 22222</p> <p>Check with your network administrator whether a firewall or another device is blocking transmission.</p>
3rd	Gateway Ping Failed	
4th	G Server Ping Failed	
5th		
6th	Server x Ping Failed	
7th		
8th	Tcp Connect. Failed	


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

https://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 monitoring platform, retry pairing remotely (during sunlight). Make sure to leave the inverter ON/OFF switch ON and that S_OK appears in the status screen.
String voltage is 0V	Power optimizer (s) output is disconnected. Connect all power optimizer outputs.
String voltage not 0V but lower than number of optimizers	Power optimizer(s) not connected in the string. Connect all power optimizers
	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.

Problem	Possible cause and troubleshooting
<p>String voltage is higher than number of optimizers</p> <p>WARNING! If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of $\pm 1\%$ per string is reasonable.</p> <p> AVERTISSEMENT! <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></p>	<p>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.</p> <p>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.</p> <p>Power optimizer(s) malfunction.</p> <ol style="list-style-type: none"> 1. Disconnect the wires connecting the power optimizers in the string. 2. Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizer is located, check its connections, polarity, module, and voltage. 3. Contact SolarEdge Support. Do not continue before finding the problem and replacing the malfunctioning power optimizer. If a malfunction cannot be bypassed or resolved, skip the malfunctioning power optimizer, thus connecting a shorter string.

StorEdge Connection Unit LEDs

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

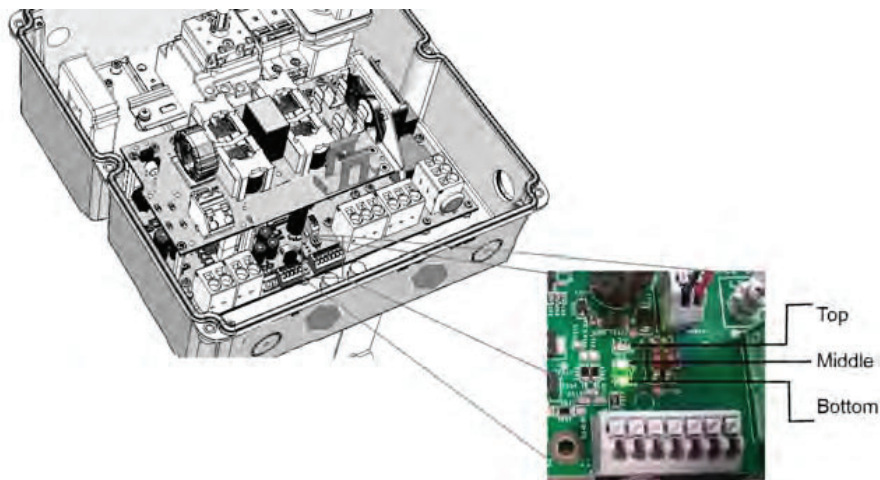


Figure 44: StorEdge Connection Unit LEDs

- 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 on page 45.

WARNING!

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



AVERTISSEMENT!

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

Problem	Description or Possible Cause	Troubleshooting
Battery SOE (state of energy) is below 10%	Continuous discharge; No charging	<p>Charge the battery via the inverter until the battery reaches SOE > 30%.</p> <p>If the battery cannot be charged, check battery manufacturing date:</p> <ul style="list-style-type: none"> Identify battery PN. For example: R15563P3SSEG11703177032 (R15563P3SSEG1YYMMDDLNNN); From battery PN identify the production date: In the example above, the manufacturing date is YY = 17, MM = 03, DD = 17 Contact LG Chem regional customer service to get technical assistance.
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 11</i>)

Problem	Description or Possible Cause	Troubleshooting
	The inverter is malfunctioning	<p>Restart the inverter</p> <p>If the problem persists, move the AC bypass switch in the StorEdge Connection Unit to position 2 (see <i>Figure 11</i>) to supply power to the loads until the inverter problem is solved (contact SolarEdge support if required). Then move to position 1.</p>
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 11</i>) ▪ Check that the AC bypass switch in the StorEdge Connection Unit is set to position 1 (see <i>Figure 11</i>) .
Inverter without auto-transformer (On-grid only) - The inverter does not start production and Error 182 Auto-Transformer Temp. Too High is	The thermal sensor cables are not connected.	Move the DIP switch SW2 in the StorEdge Connection Unit to the UP position (ON) (see <i>DIP Switch Setup</i> on page 64).

Problem	Description or Possible Cause	Troubleshooting
displayed		
The inverter does not turn on.	The short circuit jumper has been removed from the external devices terminal block, but no external shutdown switch has been connected.	Reconnect the short circuit jumper or make sure the external shutdown switch is properly connected (see "External Rapid Shutdown" on page 143).
	The external shutdown switch (if connected) is in the Off position.	Turn on the external shutdown switch (see "External Rapid Shutdown" on page 143).
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
Battery self test failed. One of the following messages is displayed for BAT 1 or BAT 2 (if applicable): N/A / FAILED / FAILED CHARGE / FAILED DISCHARGE	<ul style="list-style-type: none"> ▪ N/A - battery not tested. ▪ FAILED - both charge and discharge failed. ▪ FAILED CHARGE / FAILED DISCHARGE - one of these functions failed. 	Check the battery connections.

StorEdge Error Codes

This section describes the error messages that are specific to the StorEdge solution. For troubleshooting errors that are not listed below, refer to https://www.solaredge.com/sites/default/files/troubleshooting_for_se_inverter_installation_guide_addendum_na.pdf, or contact SolarEdge support. For the general SolarEdge troubleshooting refer to the codes in the previous section.



Error Code	LCD Message	Cause and Troubleshooting
51	Reverse Polarity_PV Charge	Check string polarity using a voltmeter and reconnect as required.
52	Reverse Polarity_Battery Precharge	Check battery's DC cables polarity using a voltmeter and reconnect as required.
3x6D	Internal RGM Error	Check the CTs connections and direction.
1Dx15	Connection Unit HW Error	Check all the communication cable between the StorEdge Connection Unit and the digital board in the inverter.
1Dx16	Auto-Transformer Temp. Too High	<p>Inverter production stopped due to auto-transformer overheating.</p> <p>Shut down non-essential loads to reduce the phase imbalance.</p> <p>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 64).</p>
1Dx26	Connection Unit Communication Error	<p>There is a faulty wire connection or an internal error.</p> <ul style="list-style-type: none"> Check the communication cable between the StorEdge Connection Unit and the

Error Code	LCD Message	Cause and Troubleshooting
		<p>digital board in the inverter.</p> <ul style="list-style-type: none"> ▪ Check that the StorEdge Connection Unit LEDs are ON.
1Dx27	Connection Unit Temp. Too High	<p>Inverter production stopped due to StorEdge Connection Unit overheating or due to internal fan malfunction.</p> <ul style="list-style-type: none"> ▪ Clean the StorEdge Connection Unit fan ▪ If the fan is malfunctioning, replace the fan
1Dx2D	Meter Comm. Error	<p>Refer to <i>Troubleshooting</i> on page 123.</p>
1Dx2E	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 59 and <i>DIP Switch Setup</i> on page 64). ▪ <i>Connecting to the Battery</i> on page 59 ▪ Check the battery setup in the RS485-Conf screen (refer to <i>Configuring the RS485 Bus for Battery and Meter Connection</i> on page 111).

Error Code	LCD Message	Cause and Troubleshooting
1Dx31	Power overload OFF and ON to resume	Inverter output is overloaded or output current is higher than battery max allowed output. The inverter tried to restart 3 times.
1Dx32	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.
1Dx35	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 139.

Appendix B: Opening Conduit Drill Guides

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

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

CAUTION!

SolarEdge does not permit opening or puncturing the StorEdge Connection Unit in any location other than the pre-defined drill guide locations, or otherwise altering the construction of the enclosure, as this may compromise safety and will void the warranty. This includes, but is not limited to, the use of fasteners like rivets, screws, nails, inserts, or pins.





For jurisdictions requiring field applied markings on the Connection Unit enclosure, such as labels or placards that display PV system information, adhesive labels or placards that comply with ANSI Z535 and are compatible with the enclosure material may be used.

ATTENTION!

SolarEdge n'autorise pas l'ouverture ou la perforation du commutateur de sécurité à tout endroit autre que les emplacements de perforation guidés prédéfinis, ou la modification de l'enceinte électrique, car cela compromettrait la sécurité et annulerait la garantie. Ceci inclus, sans être limité à, l'utilisation de fixations comme des rivets, vis, clous, inserts ou des broches.

Pour les juridictions où un marquage de sécurité est requis sur le couvercle du coupeur DC, tels que des labels ou étiquettes qui figurent des informations du système PV, des labels ou étiquettes adhésifs compatibles avec ANSI Z535 peuvent être utilisés qui sont compatibles avec le matériau du couvercle.

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 (drill guide already open; no need to open an additional drill guide). 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 drill guide should be opened for the backed-up loads.

→ To open conduit drill guides:

1. Move the StorEdge Connection Unit safety switch and the inverter ON/OFF switch to OFF.
2. Loosen the screws on the front cover of the StorEdge Connection Unit using the supplied Allen key, as shown below:

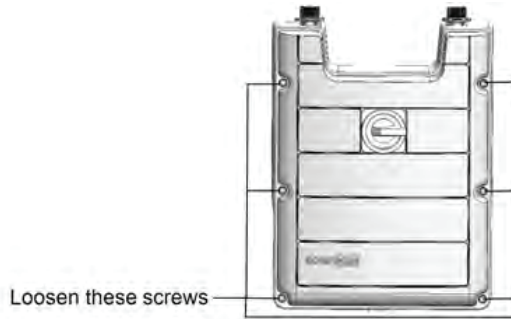


Figure 45: Opening the StorEdge Connection Unit cover

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

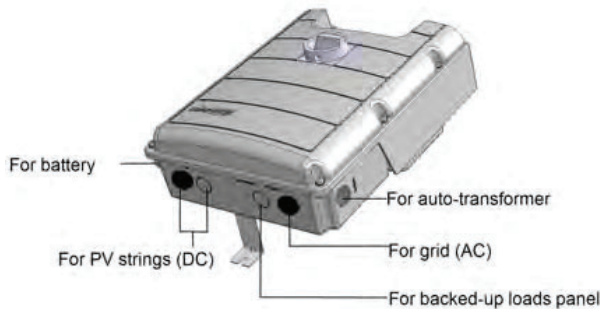


Figure 46: StorEdge Connection Unit drill guides



NOTE

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

Appendix C: Replacing and Adding System Components

This appendix includes replacement procedures for the SolarEdge 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.

Replacing an Inverter

1. Turn OFF the StorEdge Connection Unit.
2. 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.



AVERTISSEMENT!

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.

3. Turn OFF the AC switch at the distribution panel.
4. Power off the battery, as explained in "Powering the LG Chem Battery Off and On" on page 147.
5. Open the StorEdge Connection Unit cover.
6. Turn the Bypass switch inside the StorEdge Connection Unit to position 2, in order to maintain power to the backed-up loads.
7. Disconnect the meter, battery, AC and DC wires from the StorEdge Connection Unit.
8. Remove the screws securing the inverter to the mounting bracket and remove the inverter (with the StorEdge Connection Unit) 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.

9. Place the new inverter on the mounting bracket; insert the screws securing the inverter to the mounting bracket.
10. Connect all the wires to the inverter: Follow the instructions of *StorEdge Inverter Connections* on page 56 and *Commissioning the Installation* on page 45.
11. Configure the system to the required application as described in *System Configuration* on page 109

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.

**AVERTISSEMENT!**

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.

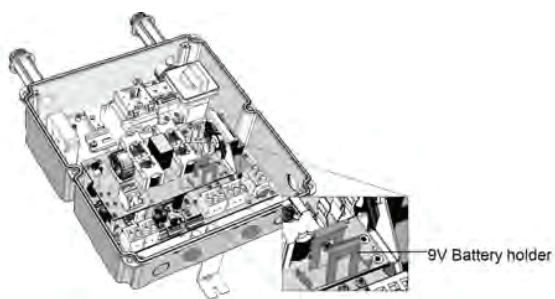


Figure 47: The battery holder

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.



AVERTISSEMENT!

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. For StorEdge Connection Unit - 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 cover(s).

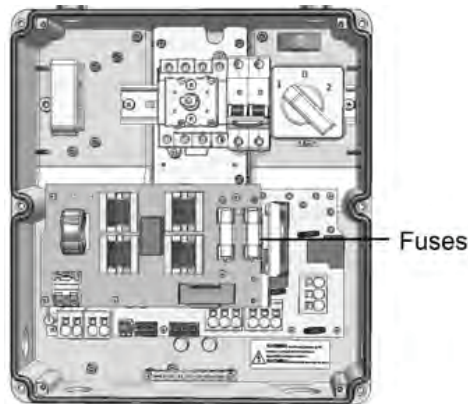


Figure 48: StorEdge Connection Unit fuses

Battery Replacement

→ To disconnect or replace a battery:

1. Turn OFF the StorEdge Connection Unit ON/OFF switch.
2. 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.



AVERTISSEMENT!

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.

3. Turn OFF the AC switch at the distribution panel.
4. Power off the battery, as explained in "Powering the LG Chem Battery Off and On" on page 147.
5. Use a multimeter to verify that DC voltage is below 50V at the battery connection.
6. Disconnect the cables from the battery side and replace the battery.
7. Connect the battery to the system as described in *Connecting to the Battery* on page 59.

Appendix D: External Rapid Shutdown

Normally, a StorEdge inverter can be shut down by turning off the Safety Switch. However, if the inverter is located in a place that is not easily accessible by emergency responders, an external shutdown switch must be installed. The switch (not supplied by SolarEdge) is connected to the inverter to shut down the PV system in case of emergency. Use a switch that plainly indicates whether it is in the off or on position (NEC 2017, 690.12 (C)).

For connecting an external shutdown switch to the inverter, use a 16-24 AWG/0.2-1.3 mm² wires pair, up to 300ft/ 90m long.

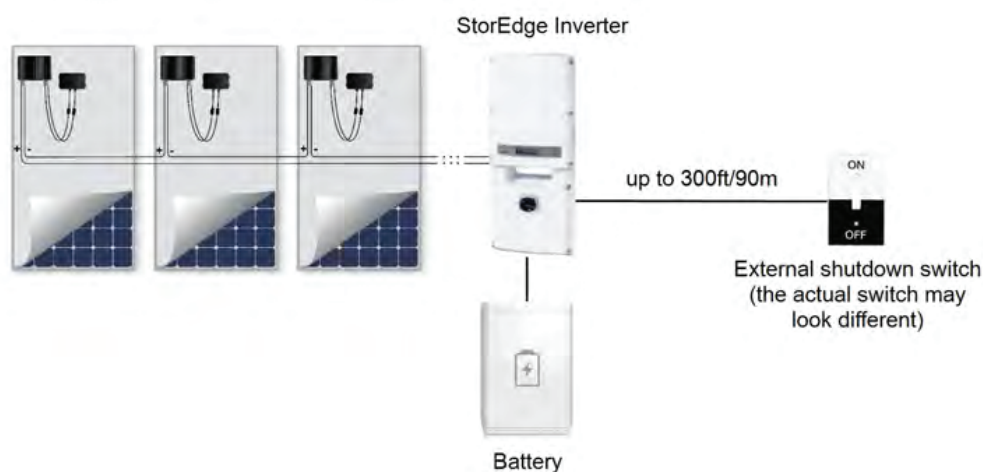


Figure 49: System connected to an external shutdown switch

→ To connect an external shutdown switch:

1. Remove the Connection Unit cover as described in the *Mounting the Inverter - Remove the StorEdge Connection Unit covers*: on page 38.
2. Remove the short circuit jumper from the terminals labeled RSD E1 and E2 on the external devices terminal block.

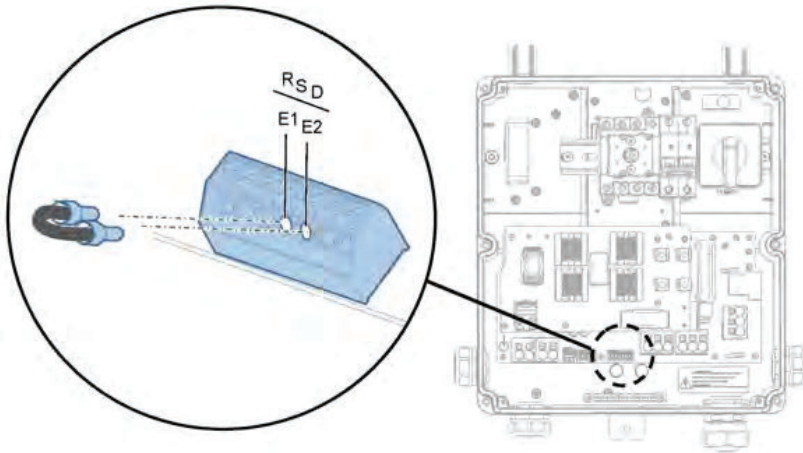


Figure 50: External shutdown switch connection

3. Connect the external shutdown switch wires to the E1 and E2 terminals.
4. Close the StorEdge Connection Unit cover.
5. Turn on the external shutdown switch.
6. Turn on AC.
7. Enable remote shutdown:
 - a. Enter Setup mode.
 - b. Select **Maintenance** → **Power Control** → **Remote Shutdown** → **Enable**.

→ To check the external shutdown switch operation:

1. Turn on the inverter *Remove the StorEdge Connection Unit covers:* on page 38
2. Turn off the inverter's AC circuit breaker on the main distribution panel.
3. Make sure the inverter switches to Backup mode.
4. Turn off the external shutdown switch.
5. Check that the DC voltage (displayed on the inverter's LCD) decreases to 30V within 30 seconds.
6. Turn on the external shutdown switch.

Auto-transformer Dimensions

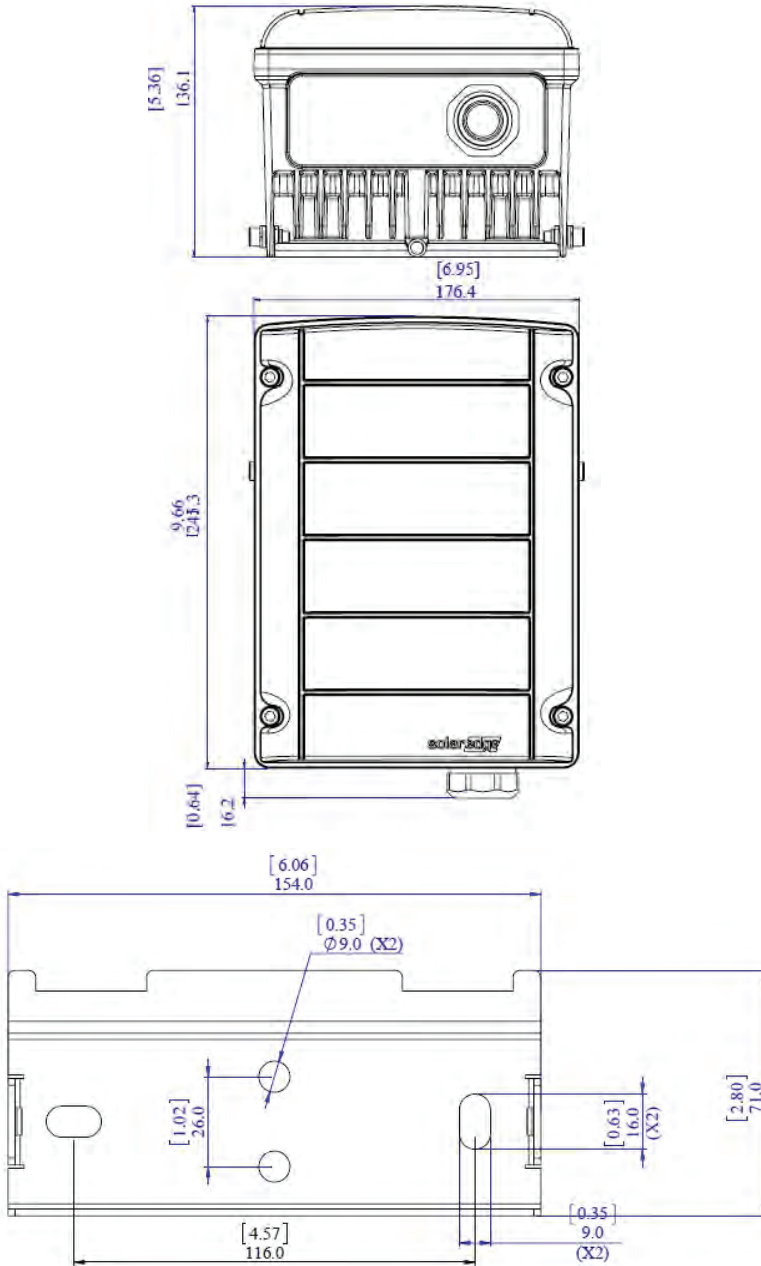


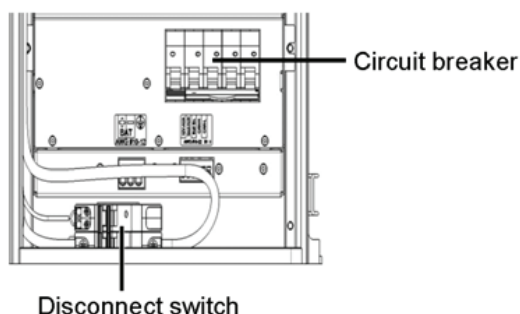
Figure 52: Auto-transformer dimensions (mm [in])

Appendix F: Powering the LG Chem Battery Off and On

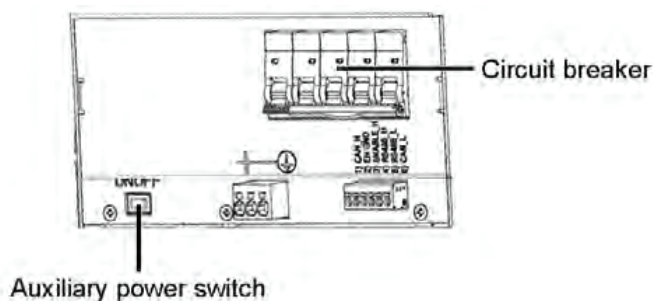
The LG Chem battery must be powered off and on at different stages of the inverter installation.

LG Chem batteries are available with either of the following two types of powering mechanism design:

- With the **disconnect** switch (requires Firmware version 3.24xx or later):



- With the **auxiliary power** switch:



➔ To power off the battery:

1. Turn off the circuit breaker.
2. Turn off the disconnect/auxiliary power switch.

➔ To power the battery back on:

1. Turn on the disconnect/auxiliary power switch.
2. Turn on the circuit breaker.

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

StorEdge Inverter

	SE3800A-US ⁽¹⁾	SE7600A-US ⁽¹⁾	Unit
OUTPUT - AC (LOADS/GRID)			
Rated AC Power Output	3800	7600	VA
Max AC Power Output	4175	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	16	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	1 (adjustable from -0.85 to +0.85)		
OUTPUT - AC (BACKUP POWER) ⁽³⁾			
Rated AC Power Output	5000 ⁽⁴⁾		VA
Max AC Power Output - Surge	7000 for 10 sec ⁴		VA
AC Output Voltage Min-Nom-Max (L-L)	211-240-264		Vac

(1)These specifications apply to inverters with part numbers SE3800A-USS2XXXXX or SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

(2)For other regional settings, contact SolarEdge Support.

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

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

	SE3800A-US ⁽¹⁾	SE7600A-US ⁽¹⁾	Unit
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		
Automatic switchover time	< 2		sec
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	600k Ω Sensitivity		
Maximum Inverter Efficiency	98		%
CEC Weighted Efficiency	97.5		%

(1)These specifications apply to inverters with part numbers SE3800A-USS2XXXXX or SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

	SE3800A-US ⁽¹⁾	SE7600A-US ⁽¹⁾	Unit
INPUT - DC (PV)			
Maximum DC Power (STC)	5100	10250	W
Max Input Current ⁽²⁾	13	23	Adc
2-pole Disconnection	Yes		
INPUT - DC (BATTERY)			
Supported Battery Types	LG Chem RESU10H		
Number of Batteries per Inverter	1 or 2 ⁽³⁾		
Continuous Power	5000		W
Peak Power	7000		W
Max Input Current	17.5		
DC Fuses on Plus and Minus	25A (field replaceable)		
2-pole Disconnection	Yes		
ADDITIONAL FEATURES			
Supported Communication Interfaces	RS485 for battery, RS485, Ethernet, Cellular, ZigBee (optional)		
Revenue Grade Data, ANSI C12.1	Optional ⁽⁴⁾		
Integrated AC, DC and Communication Connection Unit	Yes		
AC Disconnect	Yes		
Manual Inverter Bypass Switch	Yes		
DC Voltage Rapid Shutdown (PV and Battery)	Yes, according to NEC 2014 and 2017 690.12 ⁽⁵⁾		
Auto-transformer thermal protection	Yes		

(1) These specifications apply to inverters with part numbers SE3800A-USS2XXXXX or SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

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

(3) When connecting two LG Chem batteries, each battery must have a different part number; supporting SolarEdge firmware is required.

(4) Revenue grade inverter P/N: SExxxxA-USS2xxxYx or SExxxxA-USS2xxxMx

(5) If the inverter is located in a place that is not easily accessible by emergency responders (according to the National Electrical Code, 2017), an external shutdown switch must be installed. Use inverters with PN SExxxxA-USS2R.

	SE3800A-US ⁽¹⁾	SE7600A-US ⁽¹⁾	Unit
STANDARD COMPLIANCE			
Safety	UL1741,UL1741 SA, UL1699B, UL1998, CSA 22.2		
Grid Connection Standards	IEEE1547, Rule 21, Rule 14H		
Emissions	FCC part15 class B		
INSTALLATION SPECIFICATIONS			
AC Output (Loads/Grid) conduit size / AWG range	1" / 14-6 AWG		in/AWG
AC Output (Backup) conduit size / AWG range	0.75-1" drill guides / 14-6 AWG		in/AWG
AC Input (Auto-transformer) conduit size / AWG range	0.75-1 " / 14-6 AWG		in/AWG
DC Input (PV) conduit size / AWG range	0.75 " / 14-8 AWG		in/AWG
DC Input (Battery) conduit size / AWG range	0.75" / 12-10 AWG		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		

(1) These specifications apply to inverters with part numbers SE3800A-USS2XXXXX or SE7600A-USS2XXXXX and connection unit model number BCU-1PH-USS.

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	

If you have technical queries concerning our products,
please contact our support through SolarEdge service portal:
www.solaredge.com/service/support

US & Canada (+1)	(0) 510 498 3200
Worldwide (+972)	(0) 073 240 3118
Fax (+1)	(0) 530 273 2769
Email	ussupport@solaredge.com