StorEdge Inverter

Installation Guide

For Smart Energy Management
using LG Chem batteries

For Europe, APAC, Australia and South Africa
Version 1.1

Revision History

Version 1.1 (July 2018)

- Clearance for three phase inverters installed side-by-side, outdoors: 5 cm / 2”
- Power optimizer clearance - no clearance is required on the mounting bracket side
- 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 battery connection via conduit
- Addition of link to the Designer web page
- Addition of battery charge/ discharge self-test and troubleshooting
- In Power Optimizer Installation chapter:
  - 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 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

Disclaimers

Important Notice

Copyright © SolarEdge Inc. All rights reserved.

No part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photographic, magnetic or otherwise, without the prior written permission of SolarEdge Inc.

The material furnished in this document is believed to be accurate and reliable. However, SolarEdge assumes no responsibility for the use of this material. SolarEdge reserves the right to make changes to the material at any time and without notice. You may refer to the SolarEdge web site (www.solaredge.com) for the most updated version.

All company and brand products and service names are trademarks or registered trademarks of their respective holders.

Patent marking notice: see http://www.solaredge.com/patent

The general terms and conditions of delivery of SolarEdge shall apply.

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

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

Emission Compliance

This equipment has been tested and found to comply with the limits applied by the local regulations. These limits are designed to provide reasonable protection against harmful interference 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.

Contents

Revision History ... **2**
Version 1.1 (July 2018) ... 2
Disclaimers ... **1**
Important Notice ... 1
Emission Compliance ... 1
Contents ... **2**
HANDLING AND SAFETY INSTRUCTIONS ... **5**
Safety Symbols Information ... 5
IMPORTANT INVERTER SAFETY INSTRUCTIONS ... **6**
Chapter 1: Overview ... **9**
The StorEdge Solution Components ... 9
About this Guide ... 10
Installation Workflow ... 11
Installation Equipment List ... 12
Inverter Transport and Storage ... 12
Chapter 2: Installing the Power Optimizers ... **13**
Safety ... 13
Package Contents ... 13
Installation Guidelines ... 14
Step 1: Mounting the Power Optimizers ... 15
Step 2: Connecting a PV Module to a Power Optimizer ... 15
Step 3: Connecting Power Optimizers in Strings ... 16
Step 4: Verifying Proper Power Optimizer Connection ... 17
Chapter 3: Installing the Inverter ... **18**
Inverter Package Contents ... 18
Identifying the Inverter ... 18
Inverter Interfaces ... 19
StorEdge Connection Unit ... 20
Internal AC Breaker and Bypass Switch ... 21
Mounting the Inverter ... 21
Chapter 3: Installing the Backed-up Loads Panel and Meter ... **25**
Installing the Backed-up Loads Panel ... 25
Energy Meter Installation ... 26
Chapter 4: StorEdge Inverter Connections ... **27**
Installing the 9V Battery and Fuses ... 29
Connecting the Strings to the Inverter - StorEdge Connection Unit with Glands ... 30
Connecting the Strings to the Inverter - StorEdge Connection Unit with Conduits ... 30
Connecting to the Battery ... 32
DIP Switch Setup ... 36
Connecting Communication to the Meter ... 38
Battery Grounding ... 39
Connecting to the AC Grid and to Backed-up Loads ... 40
Chapter 5: Commissioning the Installation ... **42**

Removing the Inverter Cover 42
Step 1: Activating the System 43
Step 2: Pairing Power Optimizers to the Inverter 46
Step 3: Verifying Proper Activation 47
Step 4: Reporting and Monitoring Installation Data 48
The Monitoring System 48
Providing Installation Information 48
Mapper Application 48
Creating a Site in the Monitoring Platform 49
Paper Template 49
Chapter 6: User Interface 50
LCD User Buttons 50
Inverter Configuration – Setup Mode 51
Configuring the Inverter Using the LCD User Buttons 51
Configuring the Inverter Using the LCD Light Button 54
Configuration Menu Options 57
Country and Grid 57
Language 57
Communication 57
Power Control 59
Display 61
Maintenance 61
Information 62
Status Screens - Operational Mode 63
Initial Status 63
Main Inverter Status 63
Energy Meter Status 63
Telemetry Status 64
ID Status 64
Server Communication Status 65
IP Status 65
ZigBee Status 65
Wi-Fi Status 66
GSM Status 66
Communication Ports Status 66
Smart Energy Management Status 67
Power Control Status 67
Battery Status 68
Charge/ Discharge Profile Programming Status 69
Chapter 7: Setting Up Communication to the Monitoring Platform 70
Communication Options 71
Ethernet 71
RS485 71
Wi-Fi 71
Cellular 71

ZigBee ... 72
Communication Connectors ... 72
Creating an Ethernet (LAN) Connection ... 74
Creating an RS485 Bus Connection ... 76
Verifying the Connection ... 79
Chapter 8: System Configuration ... 80
Upgrading the Inverter Firmware Version ... 80
Configuring the RS485 Bus for Battery and Meter Connection ... 81
Configuring StorEdge Applications ... 84
Backup Power Applications ... 84
System Basic Configuration ... 84
Setting Backup-Only ... 86
Setting MSC + Backup Power ... 86
Setting Charge/ Discharge Profile + Backup Power ... 87
Verifying StorEdge Components Functionality ... 88
Appendix A: Troubleshooting ... 92
Communication Troubleshooting ... 92
Device type, number and protocol are displayed incorrectly ... 92
Troubleshooting Ethernet Communication ... 92
Meter Troubleshooting ... 93
<OK> is not displayed ... 93
An error message is displayed ... 93
Power [Wh] Import value is not advancing ... 93
Battery Troubleshooting ... 94
Power Optimizer Troubleshooting ... 95
StorEdge Connection Unit LEDs ... 97
Additional StorEdge Troubleshooting ... 98
StorEdge-related Errors Codes ... 100
System Warnings ... 101
Appendix B: Opening Conduit Drill Guides ... 102
Appendix C: Replacing and Adding System Components ... 104
Replacing an Inverter ... 104
9V Battery Replacement ... 104
Fuse Replacement ... 106
Battery Replacement ... 106
Appendix D: Mechanical Specifications ... 108
Inverter Dimensions ... 108
StorEdge Inverter for High Power Technical Specifications ... 110

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.



CAUTION!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the product**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.



NOTE

Denotes additional information about the current subject.



IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

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



NOTE

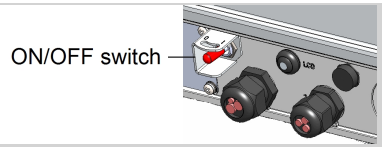
Discard this product according to local regulations or send it back to SolarEdge.

IMPORTANT INVERTER SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

WARNING!

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



WARNING!

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

WARNING!

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

WARNING!

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

WARNING!

SafeDC complies with IEC60947-3 when installing the system with a worst case SafeDC voltage (under fault conditions) < 120V.

The worst case voltage is defined as: Voc,max+ (String Length-1)*1V, where:

- Voc,max = Maximum Voc (at lowest temperature) of the PV module in the string (for a string with multiple module models, use the max value)
- String Length = number of power optimizers in the string

CAUTION!

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

CAUTION!

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

NOTE

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

NOTE

Use PV modules rated according to IEC 61730 class A.

NOTE

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

NOTE

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.

NOTE

The following warning symbols appear on the inverter warning label:



Risk of electric shock



Risk of electric shock from energy stored in the capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.



Hot surface – To reduce the risk of burns, do not touch.

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.

WARNING!

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

WARNING!

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

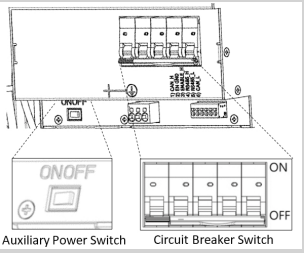
WARNING!

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

a. The circuit breaker switch
b. The auxiliary power supply switch

To reconnect power, turn ON:

a. The auxiliary power supply switch
b. The circuit breaker switch



CAUTION!

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

NOTE

The battery used must be NRTL certified.

NOTE

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

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-related Errors Codes* on page 100.

Chapter 1: Overview

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

The StorEdge Solution Components

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

  SolarEdge offers a StorEdge the following inverter types:

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

  The **StorEdge Connection Unit**, located at the bottom of the inverter, allows simple installation and connectivity to other system components and includes a DC Safety Switch.
- The **Energy Meter** - The meter is used by the inverter for export/ consumption readings, and for Smart Energy Management applications, such as: export limitation, time-of-use profile programming and maximizing self-consumption.

  The meter is required only in systems using Smart Energy Management applications (it is not required for StorEdge systems used only for backup power).
- **One or two batteries** - DC coupled batteries designed to work with the SolarEdge system.

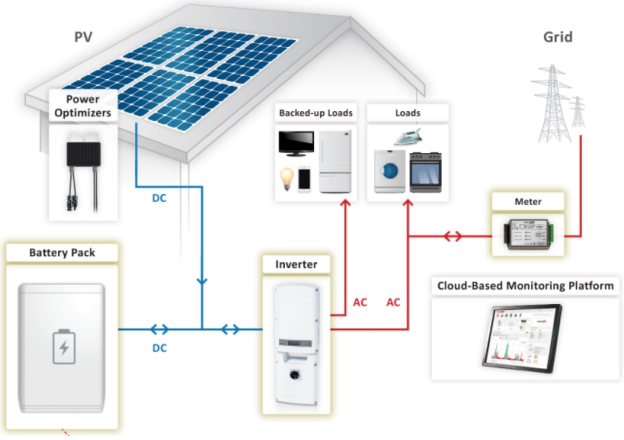


Figure 1: StorEdge system components

NOTE

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

About this Guide

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

For additional configuration options refer to the StorEdge Solution Applications - Connection and Configuration Guide, available at http://www.solaredge.com/sites/default/files/storedge_backup_applications_connection_and_configuration_guide.pdf.

Installation Workflow

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

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

- Power optimizers - as described in *Installing the Power Optimizers* on page 13.
- Inverter - as described in *Installing the Inverter* on page 18.

Step 2 - **Backed-up loads panel installation (required for Backup Power only)**: Refer to *Connecting to the AC Grid and to Backed-up Loads* on page 40.

Step 3 - **Electricity Meter installation (required for Smart Energy Management only)**. Refer to *Energy Meter Installation* on page 26.

Step 4 - Connecting PV strings (DC) to the inverter - Refer to *Connecting the Strings to the Inverter - StorEdge Connection Unit with Glands* on page 30.

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 27.

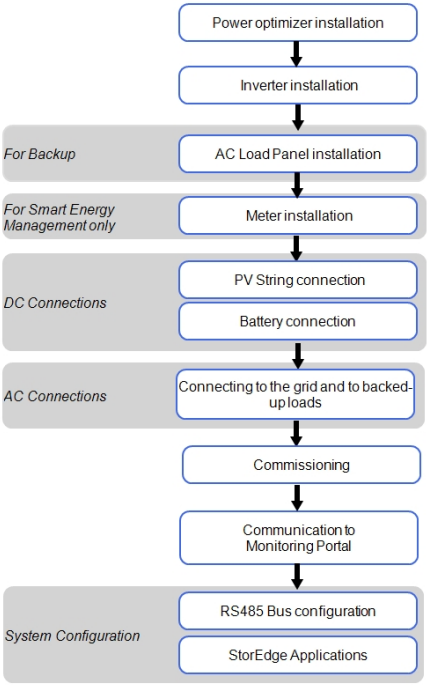
Step 6 - Connecting AC and backed-up loads to the inverter - connect the loads (AC), and meter. Refer to *StorEdge Inverter Connections* on page 27.

Step 7 - Commissioning the inverter - Activate the system and pair the power optimizers. Refer to *Commissioning the Installation* on page 42.

Step 8 - **Connecting to the monitoring platform**. Refer to *Setting Up Communication to the Monitoring Platform* on page 70.

Step 9 - **System Configuration** - Configuring the RS485 bus and StorEdge applications. Refer to *System Configuration* on page 80.

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



For additional information, refer to http://www.solaredge.com/sites/default/files/storedge__inverter_wiring_and_onsite_checklist.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:

- Allen screwdriver for 5mm screw type for the inverter cover, StorEdge Connection Unit cover (if applicable), and inverter side screws
- Allen screwdriver for M5/M6/M8 screw types
- Standard flat-head screwdrivers set
- Non-contact voltage detector
- Cordless drill or screwdriver and bits suitable for the surface on which the inverter will be installed. Use of an impact driver is not recommended.
- Appropriate mounting hardware (for example: stainless bolts, nuts, and washers) for attaching:
  - the mounting bracket to the mounting surface
  - the power optimizer to the racking (not required for smart modules)
- MC4 crimper
- 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 -25°C - +65°C / -13°F - 149°F.

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!

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

CAUTION!

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

CAUTION!

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

CAUTION!

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

CAUTION!

All PV modules must be connected to a power optimizer.

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.

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.

IMPORTANT SAFETY FEATURE

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

Package Contents

- Power optimizers
- Stainless steel grounding lock washers

Installation Guidelines

- Frame-mounted power optimizers are mounted directly on the module frame , 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 steps in this chapter refer to module add-on power optimizers. For smart modules, start from . Also refer to the documentation supplied with the smart modules.
- 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:
  - Minimize the use of extensions between power optimizers.
  - You can use extension cables between rows and from the end of string to the inverter.
  - *Do not* use extension cables between the modules and the power optimizers, or between two power optimizers within a string.
- 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 http://www.solaredge.com/products/installer-tools/site-designer#/.
- Completely shaded modules may cause their power optimizers to temporarily shut down. This will not affect the performance of the other power optimizers in the string, as long as the minimum number of unshaded power optimizers connected in a string of modules is met. If under typical conditions fewer than the minimum optimizers are connected to unshaded modules, add more optimizers to the string.
- 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.

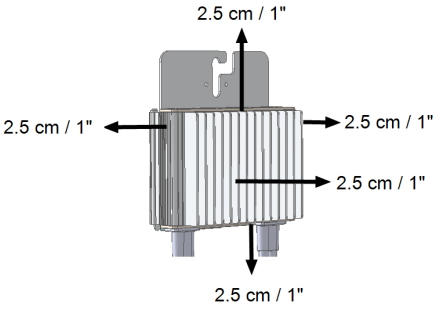


Figure 2: Power optimizer clearance

NOTE

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

Step 1: Mounting 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 . It is recommended to mount the poweroptimizer 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.

CAUTION!

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

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 9.5 N*m / 7 lb*ft.
4. Verify that each power optimizer is securely attached to the module support structure.
5. Record power optimizer serial numbers and locations, as described in *Step 4: Reporting and Monitoring Installation Data* on page 48.

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 poweroptimizers:

- 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.

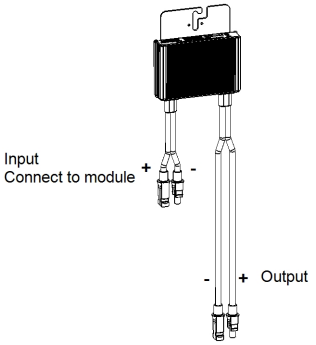


Figure 3: Power optimizer connectors

[1]Not applicable to smart modules.

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.

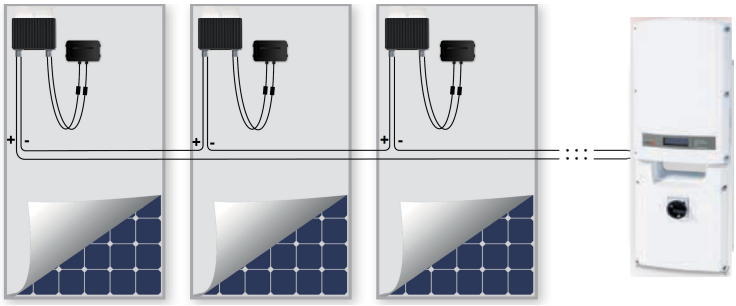


Figure 4: Power optimizers connected in series

3. If you intend to monitor the installation, using the monitoring platform, record the physical location of each power optimizer, as described in *Providing Installation Information* on page 48.

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 (±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: http://www.solaredge.com/files/pdfs/isc_and_voc_in_solaredge_systems_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 Connection Unit.

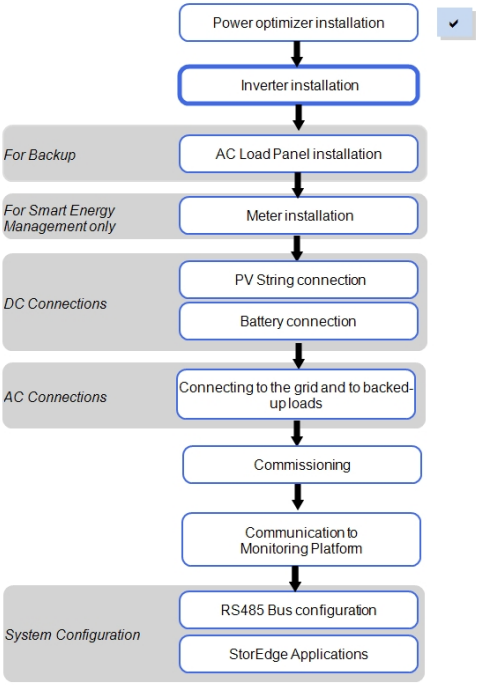
For troubleshooting power optimizer operation problems, refer to *Power Optimizer Troubleshooting* on page 95.

Chapter 3: Installing the Inverter

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

CAUTION!

Do not rest the connectors at the bottom of the inverter on the ground, as it may damage them. To rest the inverter on the ground, lay it on its back.



Inverter Package Contents

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

Identifying the Inverter

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

Inverter Interfaces

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

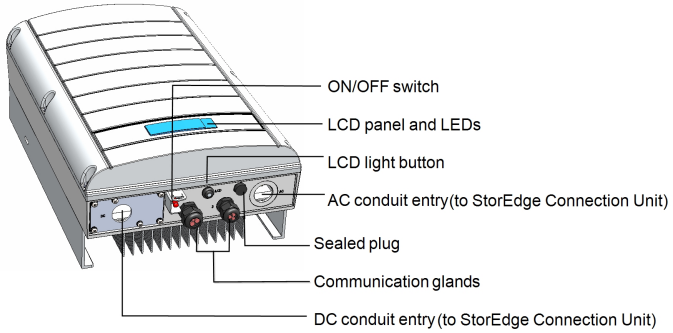


Figure 5: Inverter Interfaces

- **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 70 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 54.
- **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**: ○Monitoring information is being received from a power optimizer. ○The inverter is being shut down.
Red	Fault	**On** - There is an error. Refer to *Troubleshooting* on page 92 for more information. **Blinking** - The inverter is being shut down.

All LEDs turn on while the inverter is being configured.

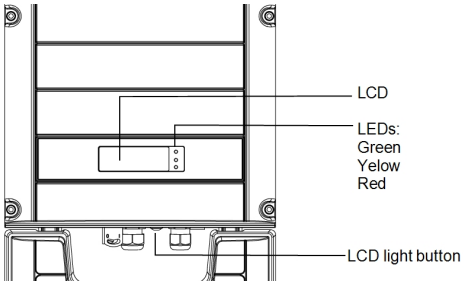


Figure 6: Inverter front view

StorEdge Connection Unit

The StorEdge Connection Unit may have either external connections (MC4 connectors and cable glands), or utilize cable conduits for connections. *Figure 7* shows both types. Connections to each of the unit types are described separately throughout this guide if the connection method is different.

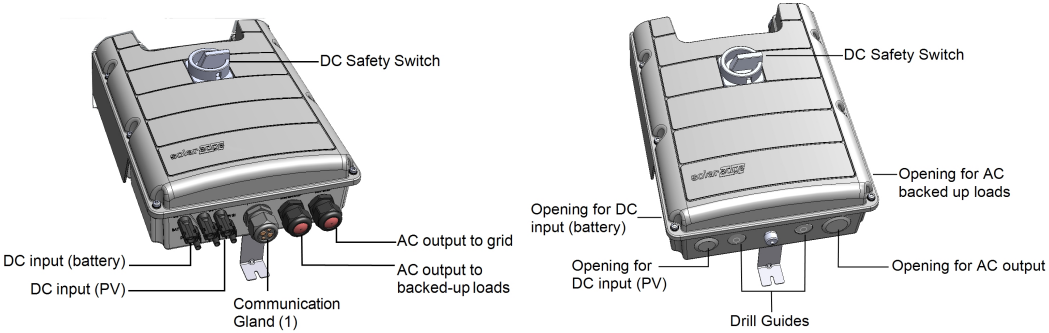


Figure 7: StorEdge Connection Unit types

The StorEdge Connection Unit *with cable glands (Figure 7-* left) includes:

- **DC safety switch**: disconnects both the positive and negative conductors of the PV and the positive and negative conductors of the battery.
- **AC output**: Cable glands for connection of grid and backed up loads
- **DC input**: Connectors for connection of the PV installation and the battery
- **Communication and control gland**, for connection of inverter communication options, meter, battery thermal power 12V and battery control.

The StorEdge Connection Unit with *conduit interfaces (Figure 7-* right) 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 102.

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.

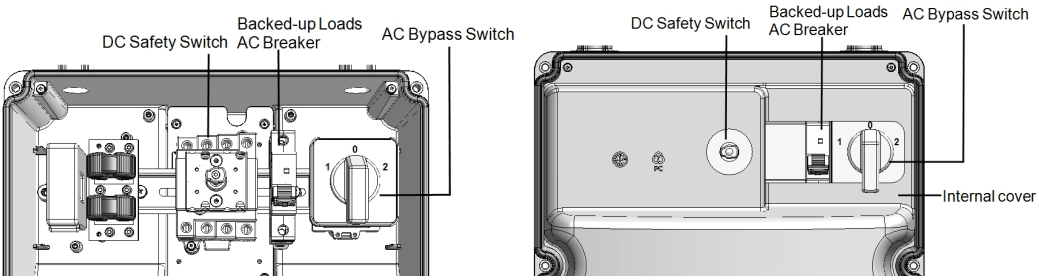


Figure 8: StorEdge Connection Unit with and without internal cover

- **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.
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.

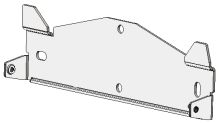


Figure 9: Mounting bracket

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.

CAUTION!

SolarEdge inverters 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.

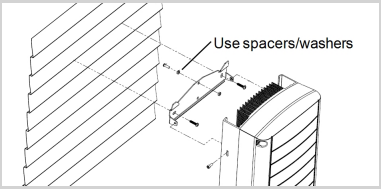
1. Determine the inverter mounting location, on a wall, stud framing or pole. It is recommended to mount the inverter in a location protected from direct sunlight.
2. To allow proper heat dissipation, maintain the following minimum clearance areas between the inverter and other objects:

- If installing a single inverter:
  - 20 cm (8") from the top of the inverter.
  - 10 cm (4") from the bottom of the StorEdge Connection Unit.
  - 10 cm (4") from the right and left of the inverter.
- If installing multiple inverters:
  - When installing inverters one above the other, leave at least 20 cm(8") between the top of an inverter and the bottom of the StorEdge Connection Unit.
  - When installing inverters side by side, leave 20 cm(8") 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 10*.
   - 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 10*): 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.

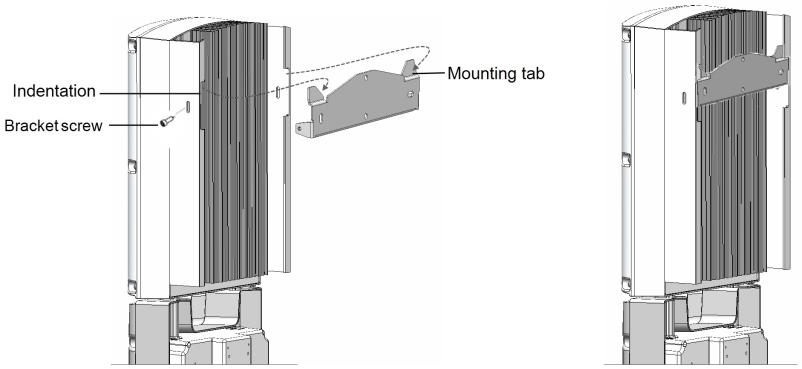


Figure 10: Hanging the inverter on the bracket

7. For inverters with DC Safety Unit - secure the DC Safety Unit bracket to the wall:
8. 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.

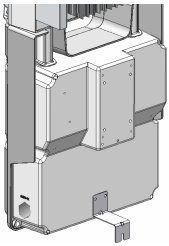


Figure 11: StorEdge Connection Unit bracket

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

11. 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.

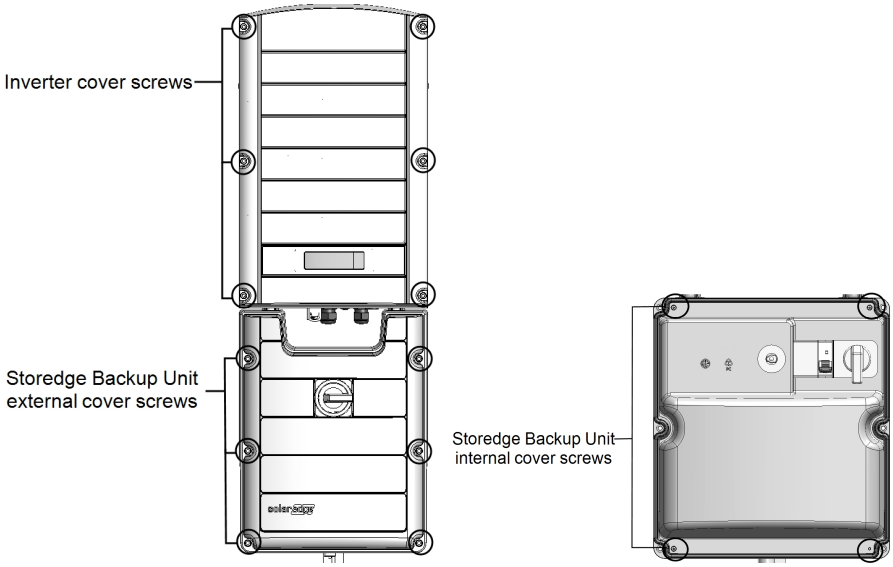
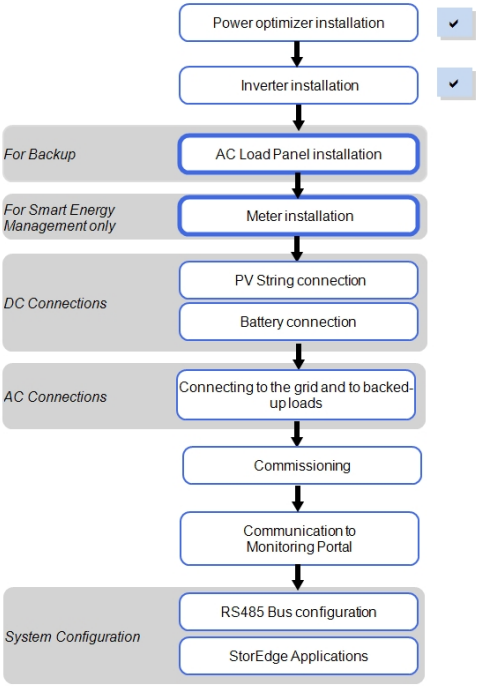


Figure 12: Inverter Covers

Chapter 3: Installing the Backed-up Loads Panel and Meter

This chapter describes installation of the backed-up loads panel and a meter.



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 one pole 25A as the main circuit breaker.
- Install a residual-current device (RCD) in accordance with the applicable local standards and directives

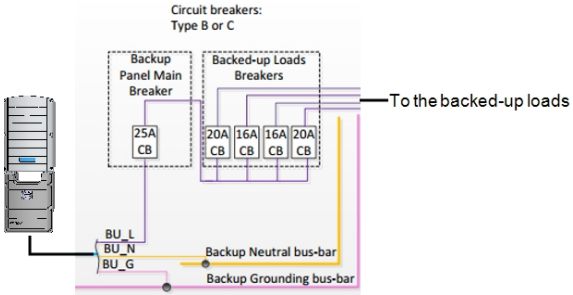


Figure 13: Backed-up Loads Panel

Energy 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.*

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

The meter is connected to the inverter using RS485.

RS485 wiring specifications:

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

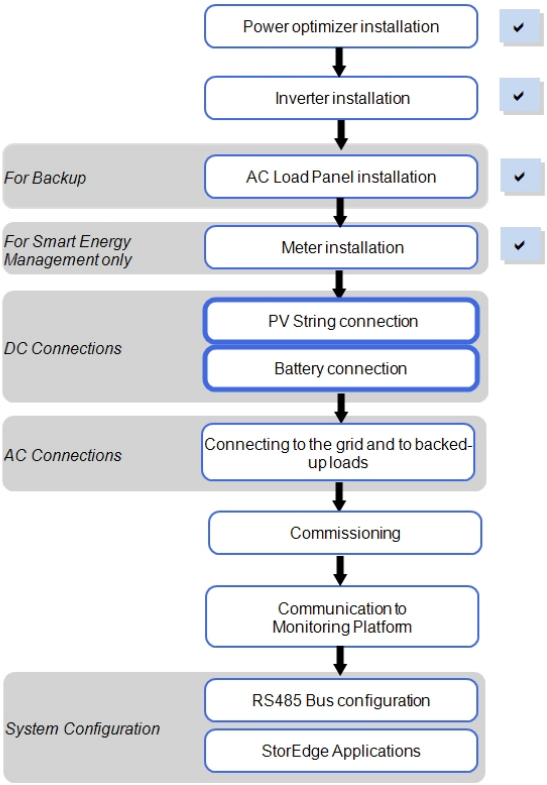
NOTE

The inverter RS485 bus should be connected to the battery and meter. Connecting multiple inverters with RS485 master-slave connection may require an RS485 Plug-in (available form 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 38.

Chapter 4: StorEdge Inverter Connections

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



The following figures show the connections in the StorEdge Connection Unit:

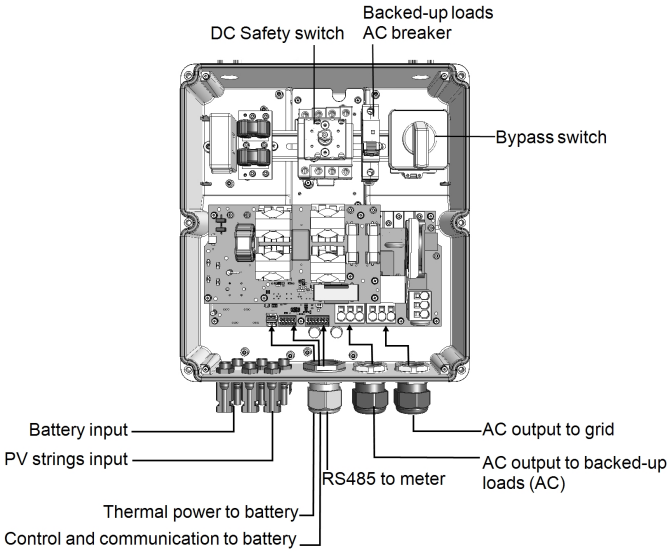


Figure 14: The StorEdge Connection Unit (with glands) connections

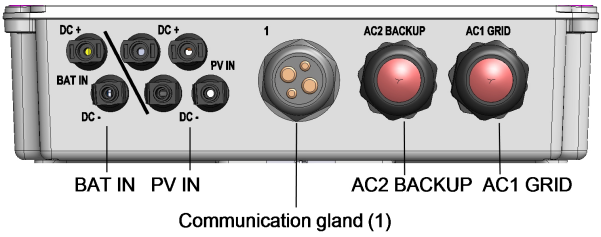


Figure 15: The StorEdge Connection Unit (with glands) connectors

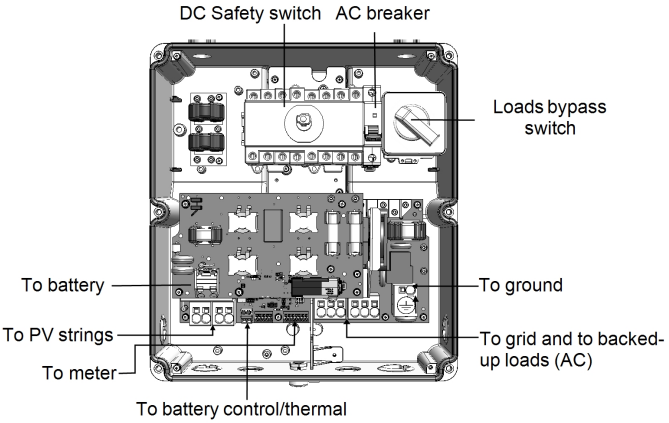


Figure 16: The StorEdge Connection Unit (with conduit entries) connections

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.

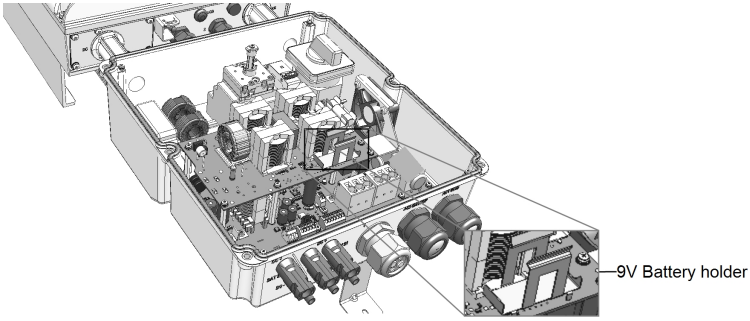


Figure 17: The battery holder

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 .

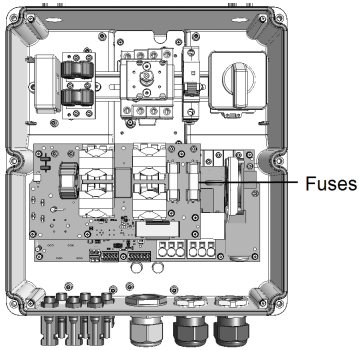


Figure 18: StorEdge Connection Unit fuses

Connecting the Strings to the Inverter - StorEdge Connection Unit with Glands

Connect the string to the DC input pairs. If required, connect additional strings in parallel using an external combiner box/branch cables before connecting to the inverter.

NOTE

Functional electrical earthing of DC-side negative or positive poles is prohibited because the inverter has no transformer. Grounding (earth ground) of module frames and mounting equipment of the PV array modules is acceptable.

NOTE

SolarEdge's fixed input voltage architecture enables the parallel strings to be of different lengths. Therefore, they do not need to have the same number of power optimizers, as long as the length of each string is within the permitted range.

Connect the DC connectors of each string to the DC+ and DC- connectors .

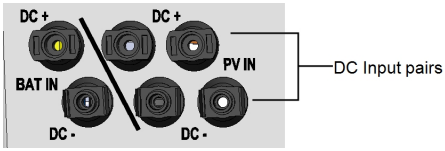


Figure 19: Inverter DC Connections

Connecting the Strings to the Inverter - StorEdge Connection Unit with Conduits

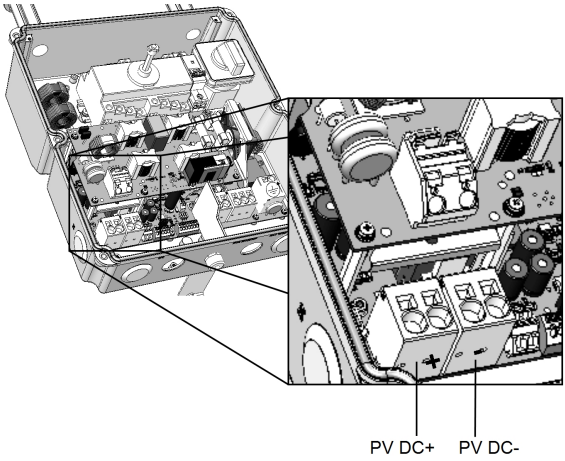


Figure 20: PV connection

1. Verify that the AC circuit breaker is OFF.
2. Strip 8 mm(5⁄16') 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.

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 Technical Note "String Fusing Requirements in SolarEdge Systems" at http://www.solaredge.com/files/pdfs/string_fusing_requirements.pdf.

Connecting to the Battery

Follow these guidelines:

- The following procedure is recommended:
  a. Connect all the wires to the battery connection panel.
  b. Mount the battery.
  c. 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 mm^2 cables for battery control.
- Tie and wrap the cables to avoid pulling them out during mounting.
- Be sure to adhere to all safety cautions and information in the battery documentation.
- The battery connects to the DC side of the inverter. Since the inverter DC connections are on its left side, it is recommended to position the battery to the left of the inverter to simplify wiring.

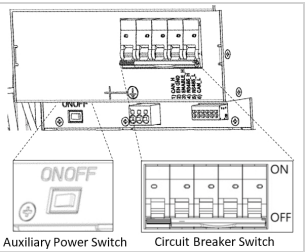
WARNING!

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

a. The circuit breaker switch
b. The auxiliary power supply switch

To reconnect power, turn ON:

a. The auxiliary power supply switch
b. The circuit breaker switch



The following table and figures detail cable types and connections of one battery (LG Chem RESU7/ RESU10). Prepare cables and connect as described in the following table :

Recommended cable type (min-max cross section)	StorEdge Connection Unit connection	LG Chem battery connection	Connection method to the StorEdge Connection Unit
DC			
DC cable 6mm^2 (2.5-10 mm^2), 600V insulated.	*BAT IN DC +*	DC +	Inverter with MC4 connectors (*Figure 14*): Connect to the BAT IN connectors. Inverter with conduits (*Figure 16*): ○ Insert the cable through the conduit ○ Insert a flat blade screwdriver into the square opening at the top of the terminal block and press to open clamp mechanism. ○ Insert the wire into the round opening and release the screwdriver to spring back and clamp the wire.
	BAT IN DC -	DC -	
12V thermal power input			
2-wire shielded pair cable 1.5 mm^2 (1.5 - 2.5 mm^2), 600V insulated	Battery Thermal V- (white)	N/A	Insert the cable through one of the large openings in the communication gland (*Figure 15*). Push the lever to open the connection, insert the wire and release the lever when the wire is clamped.
Control and monitoring			
5-wire shielded twisted pair cable 0.2 mm^2 (0.2 - 1.5 mm^2), 600V insulated. A CAT5 600V insulated can also be used.	5-pin communication terminal block:	6-pin connector	Insert the cable through one of the large openings in the communication gland (*Figure 15*). 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.
	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

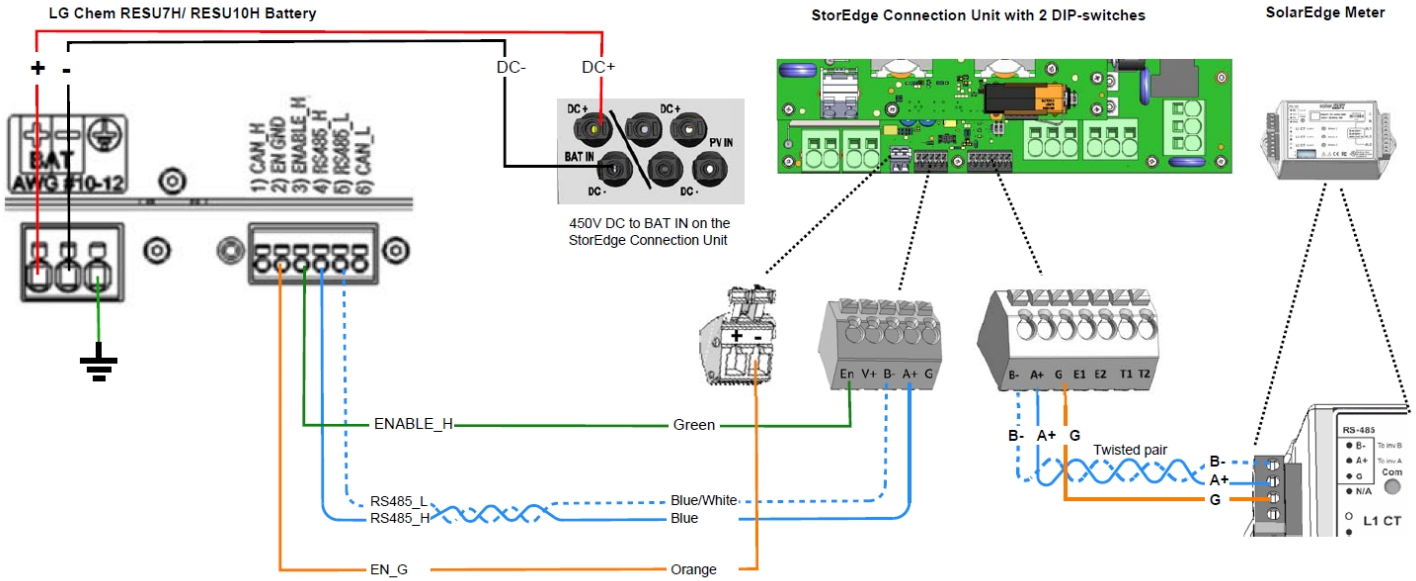


Figure 21: Connections to LG Chem RESU7H/ RESU10H battery (StorEdge Connection Unit with glands and two DIP-switches)

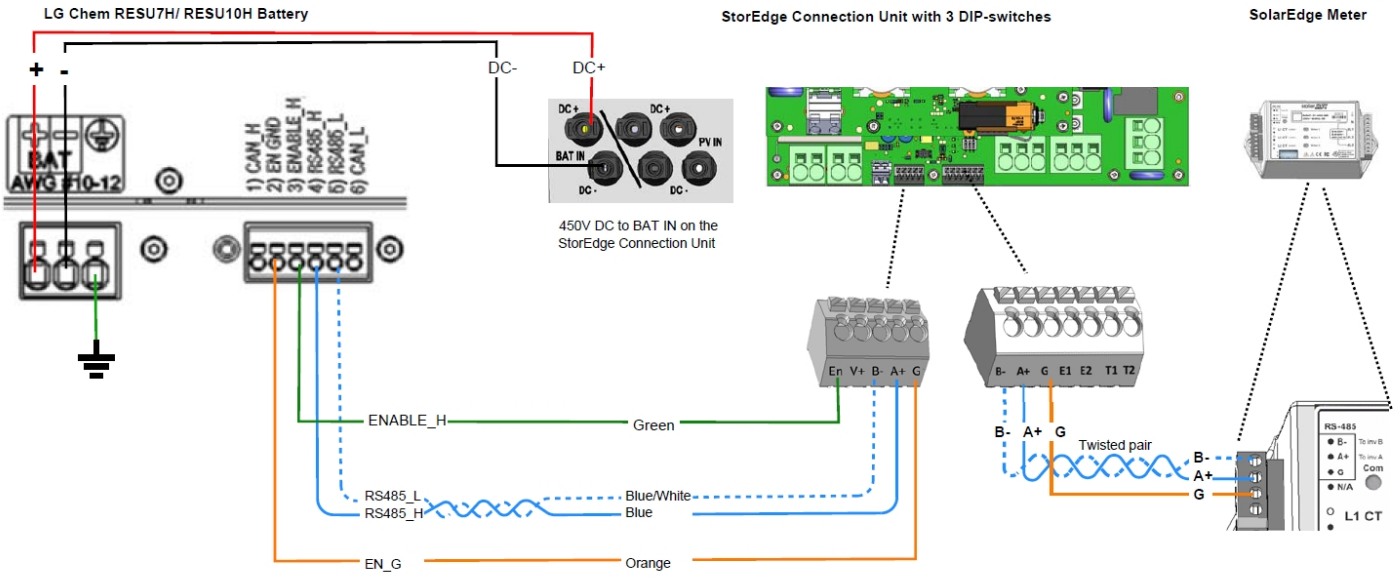


Figure 22: Connections to LG Chem RESU7H/ RESU10H battery (StorEdge Connection Unit with glands and three DIP-switches)

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.

Termination and bias guidelines:

- The last meter in the RS485 chain should be terminated with 120 Ohm (either internal or external).
- Inverter communication board should not have termination if external meter is installed, otherwise ON.

Verify that the DIP switches of all the devices are set as described in the following table, according to the components used in the system and their location:

System Component	Communication and Termination Switches	Address Switches
Batteries		
LG Chem RESU7/ RESU10	N/A	N/A
Meter		
SolarEdge Meter (*Figure 24*)	*Communication*: ○ If the meter is not the last in the chain - No termination ○ Single meter or the meter is the last in the RS485 chain - 120 Ohm termination[1] on the last meter connected on the chain	Meter 1 address: ○ **Switch 1**: Up ○ Other: Down Meter 2 address: ○ **Switch 2**: Up ○ Other: Down
Inverter		
Inverter communication board (*Figure 23*)	*Termination*: ○ If a meter is installed: No termination - SW7 Down ○ If a meter is not installed: termination ON - SW7 Up (see also *Creating an RS485 Bus Connection* on page 76)	N/A
StorEdge Connection Unit (*Figure 25*)	Two or three DIP switches - All in Up position	N/A

[1] For installing an external 120 Ohm termination plug, contact SolarEdge Support .

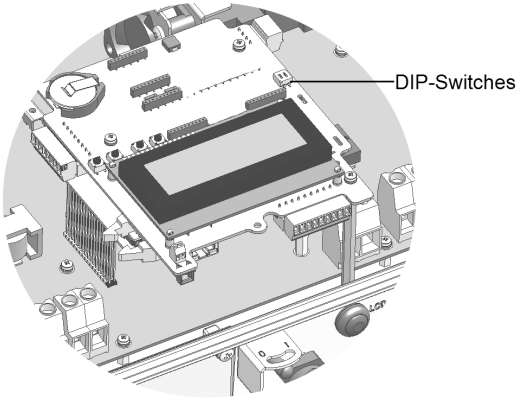


Figure 23: RS485 termination switch on the inverter communication board



Figure 24: SolarEdge Meter DIP Switches

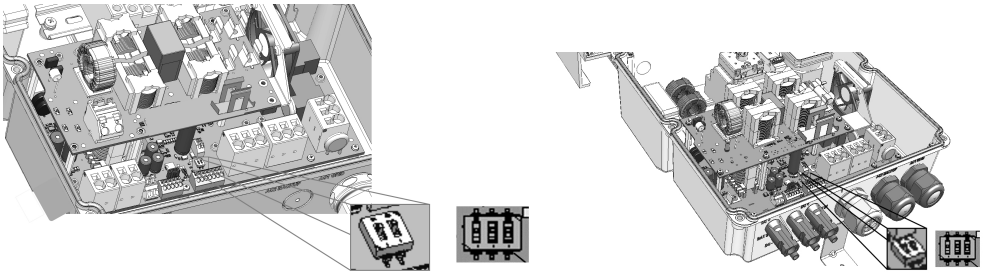


Figure 25: StorEdge Connection Unit DIP switches

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 mm^2)	StorEdge Connection Unit	Meter connection
RS485 0.2 mm^2 (0.2 - 1.5 mm^2), shielded twisted pair, 600V insulated	Ext. Devices 7-pin terminal block: B, A, G	RS485 4-pin terminal block: B, A, G

Insert the cable from the meter through the communication gland (labeled **1**).

Connect as illustrated below:

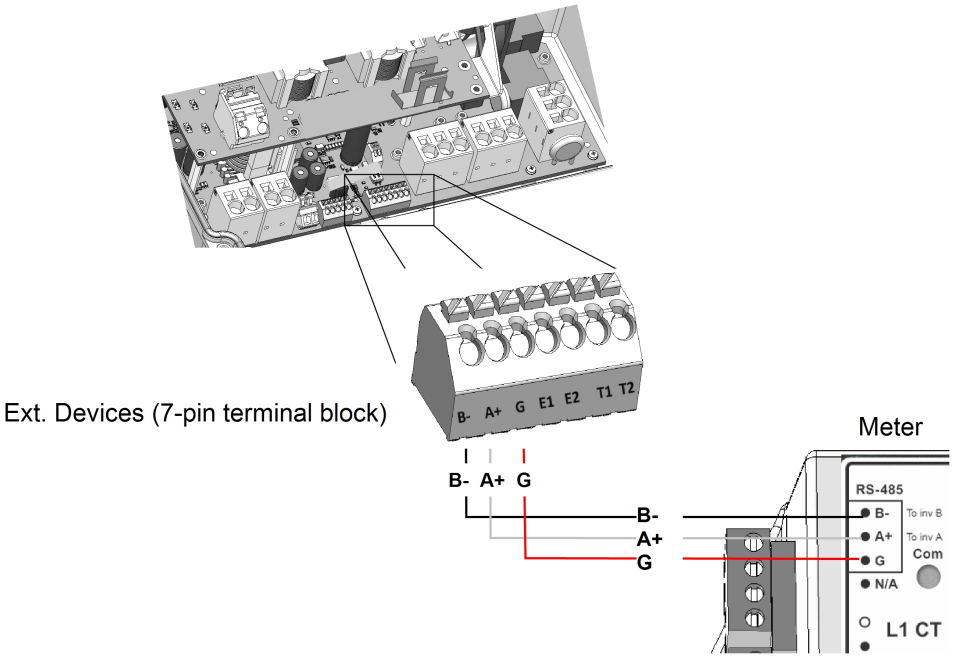


Figure 26: Connection to a meter

Battery Grounding

You can connect battery grounding cable either to local ground or to the inverter grounding terminal on the AC side. If connecting to the inverter, follow the procedures herein.

To connect grounding to the inverter:

1. If not removed, remove the StorEdge Connection Unit internal cover .
2. Insert the grounding cable through one of the openings at the AC side.
3. Connect the cable to the terminal block labeled ⏚↑ in the StorEdge Connection Unit.

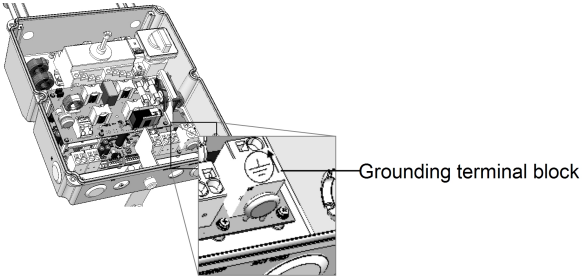


Figure 27: Grounding the battery

Connecting to the AC Grid and to Backed-up Loads

Use a 6 mm² 3-wire cable. The maximum wire size for the input terminal blocks is 10 mm².

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.

NOTE

StorEdge inverters require neutral connection at all times (only grids with neutral connection are supported).

To prepare the AC cables:

1. Turn OFF the AC before connecting the AC terminals.

   WARNING!

   If connecting equipment grounding wire, connect it before connecting the AC Line and Neutral wires.

2. Strip 58 mm / 2.32" of the external cable insulation and strip 8 mm / 0.32" of the internal wire insulation.

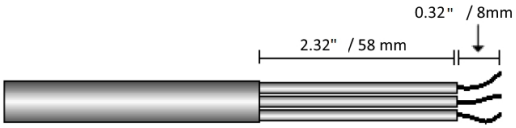


Figure 28: Insulation stripping – AC (3-wire cable)

To connect the AC cables - StorEdge Connection Unit with glands:

1. Insert the cable through the appropriate cable gland:
   - For grid connection (from the main distribution panel) and for grounding: insert through the gland labeled *AC1 GRID*
   - For backed-up loads connection (from a backed-up loads panel): insert through the gland labeled AC2 BACKUP
2. Connect the AC wires according to the labels on the terminal blocks: Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals:
   a. Insert the 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.
3. Tighten the AC cable gland with a torque of 2.8-3.3 N*m / 2.0-2.4 lb*ft.

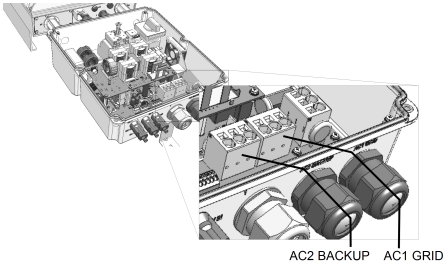


Figure 29: Connection to grid and backed-up loads (StorEdge Connection Unit with glands)

To connect the AC cables - StorEdge Connection Unit with conduits:

NOTE

For Australia: Use 10mm^2 wire to connect the inverter to ground.

1. Insert the cable through the appropriate conduit opening:
   - For grid connection (from the main distribution panel) and for grounding: insert through the bottom opening labeled *AC1 GRID*
   - For backed-up loads connection (from a backed-up loads panel): insert through the side opening labeled *BACKUP*
2. Connect the grounding cable to the terminal block lableled ⏚.
3. Connect the AC wires according to the labels on the terminal blocks: Use a standard flat-blade screwdriver to connect the wires to the spring-clamp terminals:
   a. Insert the 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.

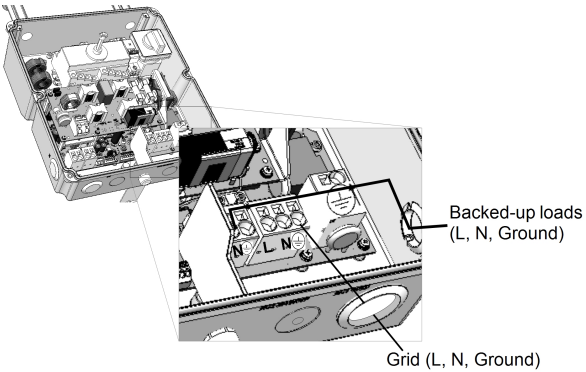
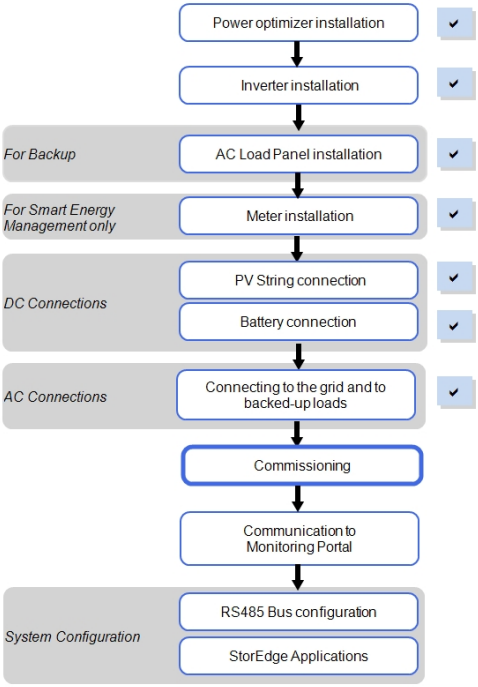


Figure 30: Connection to grid and backed-up loads (StorEdge Connection Unit with conduits)

Chapter 5: 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

If the inverter cover is not already removed, use the following procedure for cover removal.

To remove the inverter cover

1. Turn the inverter ON/OFF 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.

2. Turn the Connection Unit (if applicable) to OFF.
3. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.
4. Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.

CAUTION!

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

Step 1: Activating the System

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

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

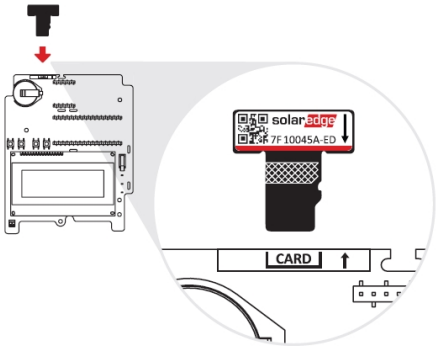


Figure 31: Activation card

If LCD shows: `Failed`:

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

NOTE

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

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

```
ID:  ########  ##
DSP1/2:1.0210/1.0034
```

```
CPU:0003.19xx
Country:ESP
```

6. If required, perform the following additional steps before closing the inverter cover:
   - Country settings or inverter configuration using the internal LCD user buttons – refer to *Country and Grid* on page 57.
   - Communication options connection – refer to *Setting Up Communication to the Monitoring Platform* on page 70.
   - StorEdge application configuration - refer to *System Configuration* on page 80.
7. Close the inverter cover by tightening the screws with a torque of 9.0 N*m/ 6.6 lb*ft. For proper sealing, first tighten the corner screws and then the two central screws. The following figure illustrates recommended order:

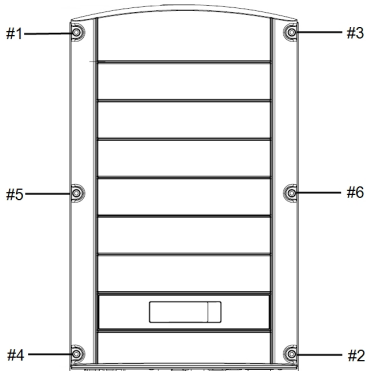


Figure 32: Tightening order of the screws

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

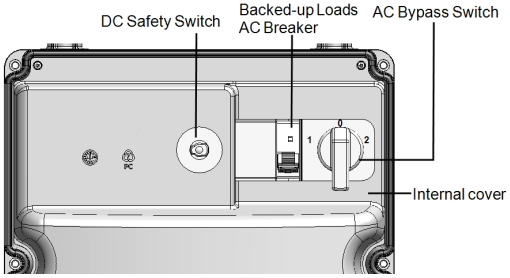
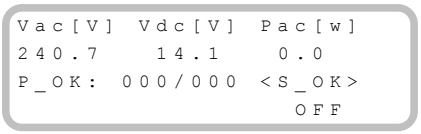


Figure 33: StorEdge Connection Unit

11. Close the StorEdge Connection Unit external cover: Attach the cover and secure it by tightening the six screws with a torque of 1.2 N*m / 0.9 ft.*lb.

12. Turn ON the StorEdge Connection Unit. 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:



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 95. If the problem persists, contact SolarEdge Support. When pairing succeeds, the following message is displayed:

   ```
   Pairing

   Pairing Completed
   ```

The system startup process begins:

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

WARNING!

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

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:

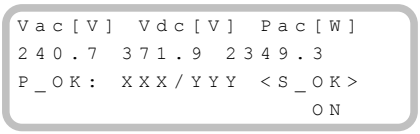
```
Waking Up...
Remaining: 051 Sec
```

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:



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

This step requires connecting one of the communication options. Refer to *Setting Up Communication to the Monitoring Platform* on page 70.

The Monitoring System

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

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

Using the platform, you can:

- View the latest performance of specific components.
- Find under-performing components, such as modules, by comparing their performance to that of other components of the same type.
- Pinpoint the location of alerted components using the physical layout.
- See how components are connected to each other.
- Pair power optimizers remotely.

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

To display a physical layout, you need to map the locations of the installed power optimizers. To generate a physical mapping, use either the Site Mapper application or the physical layout editor in the monitoring platform.

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

If you do not report the physical and logical mapping of the installed power optimizers to SolarEdge, 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 inverter may be connected to the monitoring platform via LAN or by using a ZigBee Gateway system or a Cellular Plug-in. Alternatively, you can use RS485 chain (bus) connection to connect multiple SolarEdge devices to one inverter that is already connected to the server, in a master/slave configuration. Refer to *Setting Up Communication to the Monitoring Platform* on page 70 .

Providing Installation Information

Use one of the following methods to connect your PV system to the monitoring platform.

Mapper Application

Android

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

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

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

- Creating new sites using the Mapper mobile application



- Mapping power optimizers using the Mapper mobile application



iPhone

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

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



Creating a Site in the Monitoring Platform

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



Paper Template

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



Chapter 6: 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:

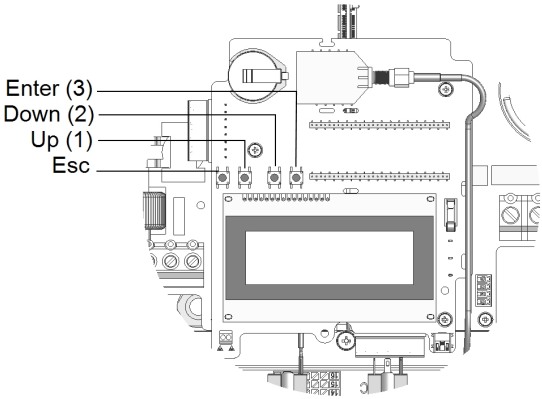


Figure 34: LCD Internal menu buttons

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.
- : 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 63 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 http://www.solaredge.com/sites/default/files/se-inverter-installation-guide-error-codes.pdf and *Inverter Configuration – Setup Mode* on page 51.

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.

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 <Italy>
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 57. Actual menus may vary from shown depending on the firmware version of the inverter and on the country.

Main menu:

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

Country:

```
Germany+
Spain
France
.
.
.
```

Language:

```
English
German
Spanish
French
Italian
```

Communication[1]:

```
Server<LAN>
LAN Conf
RS485-1 Conf<S>
RS485-2 Conf<S>
ZigBee Conf<S>
Wi-Fi Conf<N/A>
Cellular Conf
GPIO Conf <MTR>
```

[1]If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A>.

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
Diagnostics
Grid Protection
Board Replacement
Optimizer Conf.
```

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
```

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

Maintenance:

```
Date and Time
Reset Counters
Factory Reset
SW Upgrade-SD Card
Diagnostics
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.

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.

2. Confirm your country selection in the confirmation screen: Toggle to **YES** and press **Enter**.

Language

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

Communication

1. Select the **Communication** option to define and configure:
   - The communication option used by the inverter to communicate with the SolarEdge monitoring platform
   - The communication option used to communicate between multiple SolarEdge devices or other external non-SolarEdge devices, such as electricity meters or loggers.
2. Select **Server** to set which communication method is used to communicate between devices and the SolarEdge monitoring platform. Refer to *Setting Up Communication to the Monitoring Platform* on page 70 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.com/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>
Wi-Fi Conf<N/A>
Cellular Conf
GPIO Conf <MTR>
```

Server:

```
LAN
RS485
Zigbee
Wi-Fi
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
```

[1]If ZigBee is connected, the Wi-Fi Conf menu is not displayed. If ZigBee is not connected, ZigBee Conf and Wi-Fi Conf are both displayed with <N/A> and their menus are not accessible.

[2]When using the SolarEdge GSM products, RS232 Conf menu is unavailable.

```
Scan Channel
Load ZB Defaults
```

Wi-Fi Conf (enabled only if the internal card is connected):

```
Scan Networks
Set key
Load Defaults
```

RS232 Conf[1]:

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

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.com/files/pdfs/application_note_power_control_configuration.pdf.

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



[1]When using the SolarEdge GSM products this menu is unavailable.

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 http://www.solaredge.com/files/pdfs/products/feed-in_limitation_application_note.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
Diagnostics
Grid Protection
Board Replacement
Optimizer Conf.
```

- **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 www.solaredge.com/files/pdfs/application_note_isolation_fault_troubleshooting.pdf.



- **Standby Mode**: Enables/disables Standby Mode - for remote commissioning.
- **Grid Protection**: Available in specific countries. Enables viewing and setting grid protection values.
- **Optimizer Conf.**: Opens the Rapid Shutdown menu, to enable/disable PVRSS.
- **Board Replacement**: Backs up the system parameters; Used during board replacement according to the instructions supplied with replacement kits.

Information

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



- **Versions**: 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): Energy Meter with Modbus Connection
  - **RGM2**: A second external Energy Meter with Modbus Connection
  - **ZB**: ZigBee MAC address
  - **Cell**: MEID (CDMA) or IMEI (GSM)
  - **WiFi**: Wi-Fi MAC address
  - **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 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]:        xxxxx.x
Energy[Wh]:      XXXXX.X
```

- **Status**: Displays OK if the meter is communicating with the communication board.
- **<Error message>**: If there is a meter error, it is displayed in this line. Refer to *Meter Troubleshooting* on page 93.
- **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: ######## ##
DSP1/2:1.0210/1.0034
CPU:0003.19xx
Country:ESP
```

- **ID**: The inverter ID.
- **DSP 1/2**: The DSP digital control board firmware version

- **CPU**: The communication board firmware version
- **Country**: the current country setting

Server Communication Status

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

NOTE

If the connection method is CDMA (referred to as "Cellular" in the status screens) or GSM, the server screen is replaced with the Cellular or GSM status screens (see *Status Screens - Operational Mode* on page 63 and *GSM Status* on page 66).

- **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, Wi-Fi or ZigBee Plug-in).
- **xxxxxxxx**: Eight-bit Ethernet communication connection status: A string of 1s and 0s is displayed. 1 indicates OK, 0 indicates an error. For a list of the possible errors and how to troubleshoot them, refer to *Communication Troubleshooting* on page 92.
- **Error message**, according to failure. Refer to http://www.solaredge.com/sites/default/files/se-inverter-installation-guide-error-codes.pdf*Troubleshooting* on page 92.

IP Status

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

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

ZigBee Status

This screen describes the ZigBee configuration:

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

- **RSSI**: The receive signal strength indication of the closest ZigBee in the system. L = low, M = medium, H = high and (-) = no signal.
- **PAN ID**: The ZigBee transceiver PAN ID (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.

Wi-Fi Status

This screen describes the Wi-Fi configuration:

```
IP:  192.168.2.119
GW:  192.168.2.1
SSID:  xxxxxxxx
RSSI:  <L/M/H/->
```

- **IP**: The DHCP provided address
- **GW**: The gateway IP address
- **SSID**: Service Set Identifier - the name of a wireless local area network (WLAN). All wireless devices on a WLAN must employ the same SSID in order to communicate with each other.
- **RSSI**: The receive signal strength indication of the closest Wi-Fi in the SolarEdge system. L = low, M = medium, H = high and - = no signal.

GSM Status

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

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

- **Server**: The method of communication to the SolarEdge monitoring platform. Should display **Cell**.
- **Status**: Displays OK if the inverter established a successful physical connection to the modem.
- **S_OK**: The last communication to the SolarEdge monitoring platform was successful (appears if the inverter is connected to the platform). If S_OK is not displayed, refer to *Status Screens - Operational Mode* on page 63.
- **MNO**: The mobile network operator name
- **Sig**: The signal strength, received from the modem. A value between 0-5, (0 = no signal; 5 = excellent signal)
- **Error message**: per communication connection status failure

Communication Ports Status

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

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

- **PROT**: The protocol type to which the port is set:
  - For a SolarEdge device:

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

  - For electricity meters, refer to the *application note - Connecting an Electricity Meter to SolarEdge Devices* at http://www.solaredge.com/files/pdfs/solaredge-meter-installation-guide.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:      7.0kW
Site Prod:      10.0kW
Site Export:     4.0kW
Self-consume:    6.0kW
```

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

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

Power Control Status

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

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

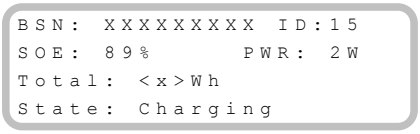
- **PWR CTRL**: The power control status:
  - **REMOTE** - Communication with the RRCR or smart energy manager is confirmed/validated.
  - **LOCAL** - The power is controlled locally (e.g. by a fixed limit), or this inverter limits the PV power production to its relative portion of the feed-in power limit, as a result of disconnected communication with the smart energy manager. If this status appears, check the communication to the smart energy manager or the communication to the meter.

- **PWR Limit**: The inverter maximum output power set by one of the power limiting options:
  - RRCR
  - Smart energy manager (Feed-in limitation)
  - P(f)
  - P(U)
  - Q(U)
- **Cos Phi**: The ratio between active to reactive power
- **Power Prod**: The power produced by the inverter

For more information, refer to the *Power Control Application Note*, available on the SolarEdge website at http://www.solaredge.com/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**: 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 7: Setting Up Communication to the Monitoring Platform

The inverter sends the following information to the monitoring platform:

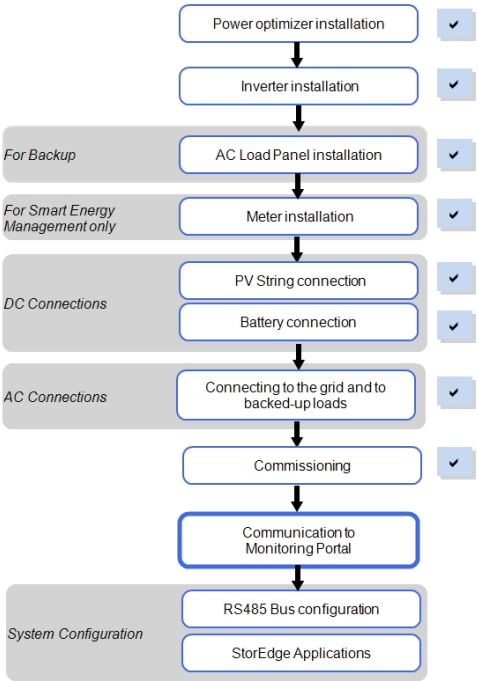
- Power optimizer information received via the DC power lines (the PV output circuit)
- Inverter information
- Information of any other connected devices

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!



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 74.

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 non-SolarEdge devices.
- RS485 Plug-in: The RS485 Plug-in provides an additional RS485 port for the inverter for enhanced communications. The kit contains a module, which is installed on the communication board, and has a 3-pin RS485 terminal block. This kit is provided with an installation guide, which should be reviewed prior to connection see, https://www.solaredge.com/sites/default/files/RS485_expansion_kit_installation_guide.pdf

For connection instructions refer to *Creating an RS485 Bus Connection* on page 76.

Wi-Fi

This communication option enables using a Wi-Fi connection for connecting to the monitoring platform.

The Wi-Fi station is built into the inverter. An antenna is required and available from SolarEdge for connection to the monitoring platform.

The Wi-Fi option requires a Wi-Fi Plug-in and an external antenna, available from SolarEdge in a kit, which can be purchased separately and assembled during system installation. The Wi-Fi Plug-in kit is provided with a user manual, which should be reviewed prior to connection. Refer to http://www.solaredge.com/sites/default/files/se_wifi_communication_solution_installation_guide.pdf

Cellular

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 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

ZigBee

This option enables wireless connection to one or several Smart Energy products, which automatically divert PV energy to home appliances.

This option enables wireless connection, and requires a ZigBee Plug-in and an external antenna. ZigBee connection is used for:

- *Monitoring* - connection of one or several devices to a SolarEdge ZigBee Gateway, for wireless communication to the SolarEdge 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.

- *Smart Energy Management* - wireless connection to one or several Smart Energy products, which automatically divert PV energy to home appliances.

  The Smart Energy products are provided with an installation guide, which should be reviewed prior to connection. Refer to https://www.solaredge.com/products/device-control#/.

  The ZigBee Plug-in for Smart Energy is are provided with an installation guide, which should be reviewed prior to connection. Refer to https://www.solaredge.com/sites/default/files/se-device-control-zigbee-module-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 Wi-Fi	4.5-7 mm
2 (PG13.5)	All three	RS485, power reduction	2.5-5 mm

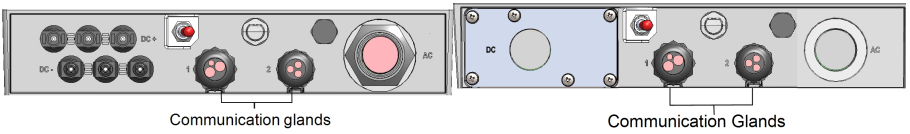


Figure 35: Communication Glands

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

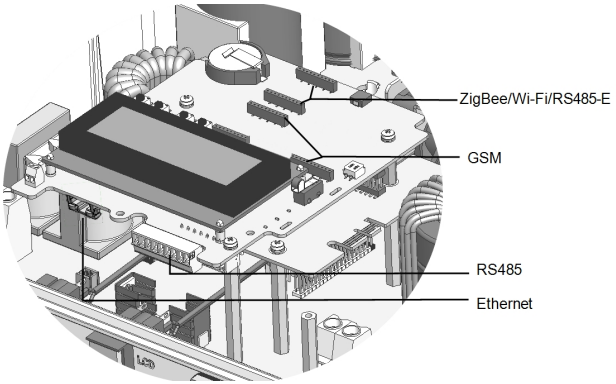


Figure 36: Internal connectors

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

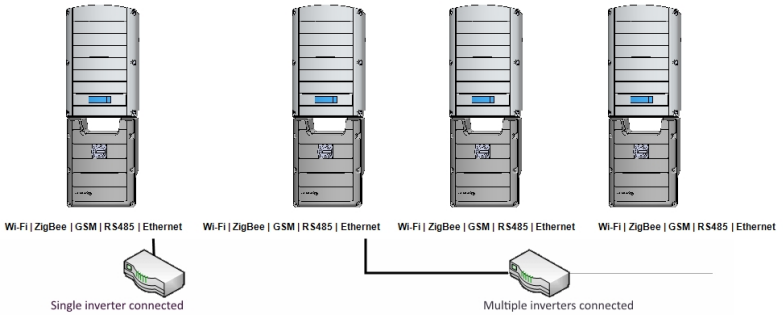


Figure 37: Example of Ethernet connection

To connect the Ethernet cable:

1. Remove the inverter cover .
2. Open the communication gland #1.

CAUTION!

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

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

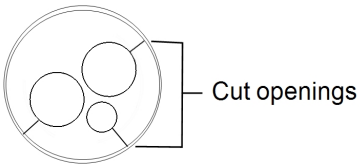


Figure 38: Rubber fitting

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

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

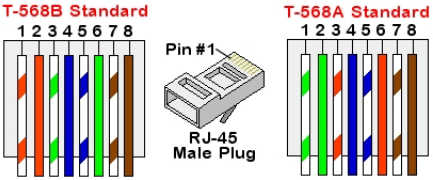


Figure 39: Standard cable wiring

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 39*.
   d. Use a crimping tool to crimp the connector.
   e. Connect the Ethernet connector to the RJ45 port on the communication board.

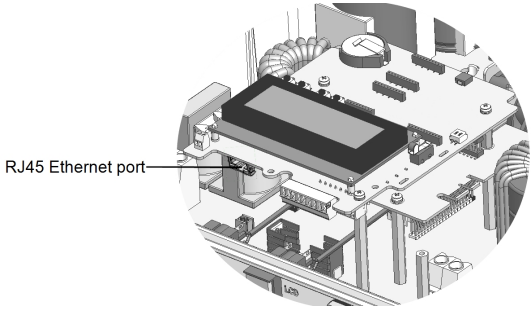


Figure 40: The RJ45 Ethernet connection

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

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 39*).
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 57.

NOTE

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

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

10. Verify the connection, as described in *Verifying the Connection* on page 79.

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 78.

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/lightning_surge_protection.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; 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.

NOTE

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

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

To connect the RS485 communication bus:

1. Remove the inverter cover as described in *Removing the Inverter Cover* on page 42.
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:

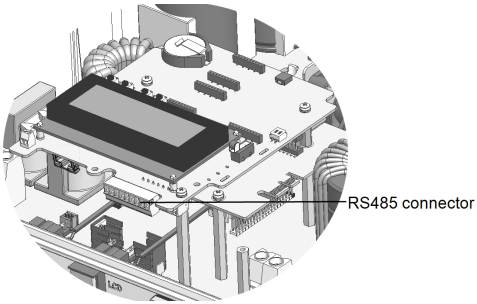


Figure 41: The RS485 terminal block

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

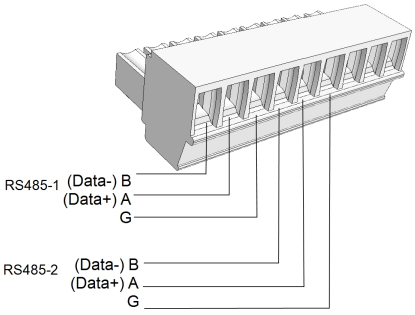


Figure 42: RS485 terminal block

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:

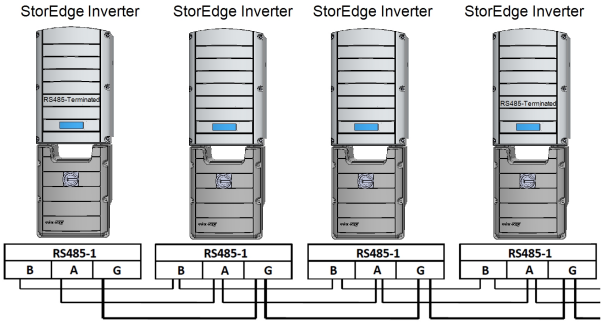


Figure 43: Connecting the inverters in a chain

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.

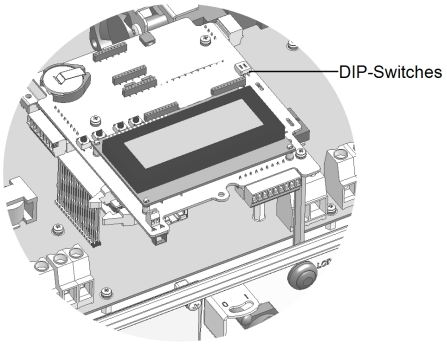


Figure 44: RS485 termination switch

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).

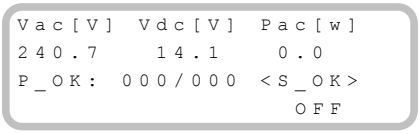
11. If not using surge protection, connect the grounding wire to the first inverter in the RS485 chain; make sure the grounding wire is not in contact with other wires. For inverters with a StorEdge Connection Unit, connect the grounding wire to the grounding bus-bar in the StorEdge Connection Unit.

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 StorEdge Connection Unit (if applicable).
3. Wait for the inverter to connect to the SolarEdge monitoring platform. This may take up to two minutes.

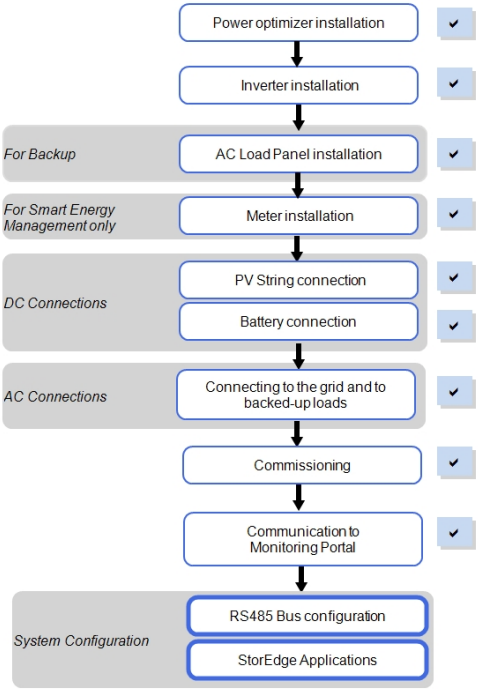
A status screen similar to the following appears on the LCD panel:



S_OK: Indicates that the connection to the SolarEdge monitoring platform is successful. If S_OK is not displayed, refer to *"Troubleshooting" on page 92*.

Chapter 8: 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/storedge/firmware.



Upgrading the Inverter Firmware Version

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. Insert the card into the communication board slot marked “CARD”.

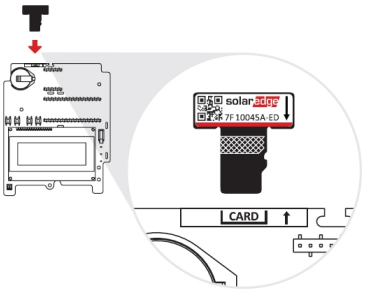


Figure 45: Inserting the upgrade card

4. Turn ON the battery AUX switch and circuit breaker. Wait 1 minute before proceeding.
5. Turn ON AC to the inverter.

WARNING!

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

6. The upgrade starts automatically. Wait for the message **Done** to be displayed on the LCD.
7. Remove the card from the inverter.

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.pdf.

To configure the RS485 bus:

1. Turn OFF or verify that the StorEdge Connection Unit switch is OFF.
2. Turn the inverter ON/OFF switch to OFF.
3. Select **Communication ➔ RS485-1 Conf ➔ Device Type ➔ Multi Devices**. A list of devices is displayed.

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

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 <11000>
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
```

   f. The selected option is displayed in the RS485 Conf screen as <E+I>.
   g. 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. Select the battery protocol and ID(s):

Battery type	Protocol	Default Device ID
LG Chem RESU7/ RESU10	LG Battery	15

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

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

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 the number of devices under Prot does not match the number under ##, refer to *Troubleshooting* on page 92.

   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 92.

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

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

   If **Comm. Error** appears, refer to *Communication Troubleshooting* on page 92.

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 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.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 <Italy>
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.com/files/pdfs/products/feed-in_limitation_application_note.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 Rsved 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.com/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 92.

To check the battery:

The test is available in CPU version 3.24xx and later (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 check the meter and inverter:

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

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

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

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

To check Backup:

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

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

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

2. Press the external LCD light button to display the battery status screen, and check that:
   - The battery State is: Discharging / Charging
   - The SOE percentage is decreasing/ increasing. If SOE is below 10%, refer to *Additional StorEdge Troubleshooting* on page 98.
   - The PWR value is greater than 0

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

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

To check Maximize Self-consumption mode:

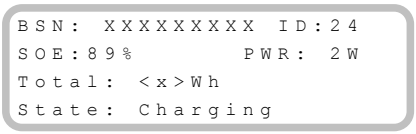
1. Verify the inverter ON/OFF switch is ON.
2. Turn on as many loads so that consumption is greater than the inverter's maximum AC power.
3. Press the inverter LCD light button to display the Meter status screen and check that import power is greater than zero:

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

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

   ```
   BSN:  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



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 81.
- 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>
     xxxxxxxx
<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
2nd	DHCP Failed, or Invalid DHCP Config	IP settings issue. Check the router and inverter configuration. Consult your network IT.
3rd	Gateway Ping Failed	Ping to router failed. Check the physical connection to the switch/router. Check that the link LED at the router /switch is lit (indicating phy-link). If OK - contact your network IT, otherwise replace the cable or change it from cross to straight connection.
4th	G Server Ping Failed	Ping to google.com failed. Connect a laptop

Bit Location	Error Message	Cause and Troubleshooting
		For Wi-Fi networks, ensure that username and password are as defined in the internet provider AP/router.For Wi-Fi networks, ensure that username and password are as defined in the internet provider AP/router.
5th	Server x Ping Failed	Ping or connection to SolarEdge server failed. Check the SolarEdge server address, under **LAN Conf** submenu: Address: prod.solaredge.com Port: 22222 Check with your network administrator whether a firewall or another device is blocking transmission.
6th		
7th		
8th	Tcp Connect. Failed	

Meter Troubleshooting

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

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

<OK> is not displayed

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

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

An error message is displayed

If error code **3x6E** (or **Error 185**) - **Meter Comm. Error** is displayed in the meter status screen, verify proper connection of:

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

Power [Wh] Import value is not advancing

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

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

- White CT wire is connected to L1 white
- Black CT wire is connected to L1 black

- CT direction is towards the grid and the green power LEDs are ON. If the LEDs are not green indicating import power - the CTs are reversed.

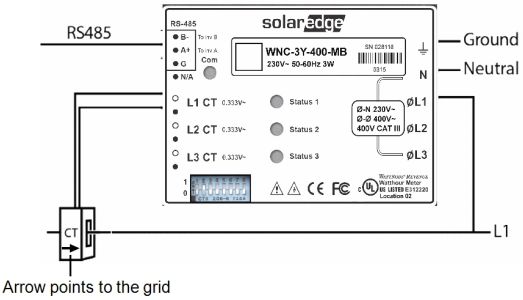


Figure 46: Meter with CT

Battery Troubleshooting

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

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

- If error code **3x6B** (or **Error 186**) - **Battery Comm. Error** appears, the battery communication is disconnected. Check the following:
  - The RS485 control connection to the battery
  - The communication DIP switches settings on the battery
  - The ID DIP switches setting on the battery
- If the state **Idle** is displayed instead of Charging/Discharging, check the following:
  - The system configuration
  - The DC connection
  - The LEDs in the StorEdge Connection Unit - refer to *StorEdge Connection Unit LEDs* on page 97
- If **Battery Internal Fault** is displayed, refer to the battery documentation supplied with it. The following is an example fault screen.

```
Battery Internal
Fault <#>(ID: 15)
<xxxx>
```

Fault # - according to battery

ID - The Modbus ID of the battery

<xxx> - text

Power Optimizer Troubleshooting

If the inverter status screen indicates that not all power optimizers are paired or not all are reporting (P_OK xxx/yyy, and x<y), those optimizers can be identified through the LCD. Refer to https://www.solaredge.com/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
String voltage is higher than number of optimizers **WARNING!** If the measured voltage is too high, the installation may not have a safe low voltage. PROCEED WITH CARE! A deviation of ±1% per string is reasonable.	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.
	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.
	Power optimizer(s) malfunction. ○ Disconnect the wires connecting the power optimizers in the string. ○ Measure the output voltage of each power optimizer to locate the power optimizer that does not output 1V safety voltage. If a malfunctioning power optimizeris located, check its connections, polarity, module, and voltage. ○ 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:

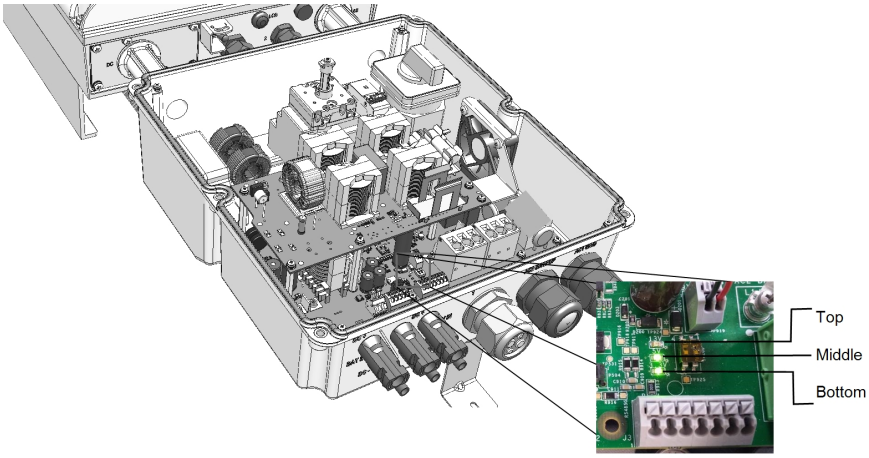


Figure 47: StorEdge Connection Unit LEDs

- 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 42.

WARNING!

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

Problem	Description or Possible Cause	Troubleshooting
Battery SOE (state of energy) is below 10%	Continuous discharge; No charging	Charge the battery via the inverter until the battery reaches SOE > 30%. If the battery cannot be charged, check battery manufacturing date: ○ Identify battery PN. For example: R15563P3SSEG1**1703**177032 (R15563P3SSEG1 **YYMM**DDLNNN); ○ 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 *Figure 8*)
	The inverter is malfunctioning	Restart the inverter
		If the problem persists, move the AC bypass switch in the StorEdge Connection Unit to position 2 (see *Figure 8*) to supply power to the loads until the inverter problem is solved (contact SolarEdge support if required). Then move to position 1.
No power to the backup loads while grid is OFF (power outage)	The backed-up loads are not backed up	○ 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

Problem	Description or Possible Cause	Troubleshooting
		○ 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 *Figure 8*) ○ Check that the AC bypass switch in the StorEdge Connection Unit is set to position 1 (see *Figure 8*) .
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**	○ 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-related Errors Codes

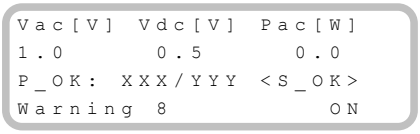
This section describes the error messages that are specific to the StorEdge solution. For troubleshooting errors that are not listed below, refer to http://www.solaredge.com/sites/default/files/se-inverter-installation-guide-error-codes.pdf contact SolarEdge support. For the general SolarEdge troubleshooting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

Error code CPU v3.18 and below	Error code CPU v3.19 and above	LCD Message	Cause and Troubleshooting
179, 180	2xB3, 2xB4	Backup Consumption Too High	Inverter production stopped due to backed-up loads' consumption exceeding product rating. Shutdown non-essential loads to reduce power consumption.
181	2xB5	Connection Unit HW Error	Check all the communication cable between the StorEdge Connection Unit and the digital board in the inverter.
183	2xB7	Connection Unit Communication Error	There is a faulty wire connection or an internal error. ○ Check the communication cable between the StorEdge Connection Unit and the digital board in the inverter. ○ Check that the StorEdge Connection Unit LEDs are ON.
184	2xB8	Connection Unit Temp. Too High	Inverter production stopped due to StorEdge Connection Unit overheating or due to internal fan malfunction. ○ Clean the StorEdge Connection Unit fan ○ If the fan is malfunctioning, replace the fan
185	3x6B	Meter Comm. Error	Refer to *Meter Troubleshooting* on page 93.
186	3x6B	Battery Comm Error	○ Check the wiring to the battery and the battery DIP switch configuration (refer to *Connecting to the Battery* on page 32 and *DIP Switch Setup* on page 36. ○ Check the termination DIP switches on the inverter communication board (refer to *DIP Switch Setup* on page 36 . ○ Check the battery setup in the RS485-Conf screen (refer to *Configuring the RS485 Bus for Battery and Meter Connection* on page 81).

Error code CPU v3.18 and below	Error code CPU v3.19 and above	LCD Message	Cause and Troubleshooting
193	3x6A	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.
196	2xC4	Backup init over voltage	○ External voltage source on backed-up loads when operating in Backup mode. Disconnect all external voltage sources on backed-up loads. ○ Inverter internal error. Contact SolarEdge support.
	0x2010	Internal CB down	Make sure that the loads do not consume higher current than the inverter max output current. Open the inverter StorEdge Connection Unit and switch the main circuit breaker to the ON position.

System Warnings

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



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

The following is a list of system warnings:

Warning # CPU v3.18xx and before	Warning # CPU v3.19xx and later	LCD text	Comments and troubleshooting
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 *9V Battery Replacement* on page 104.

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.

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.

NOTE

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

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



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

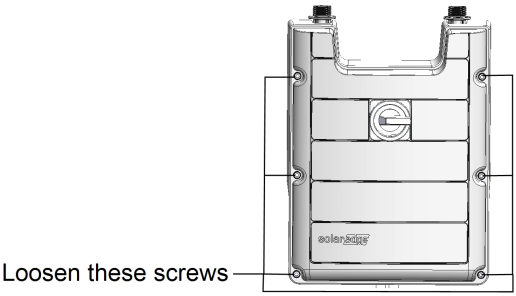


Figure 48: Opening the StorEdge Connection UnitDC Safety Unit cover

3. Remove the StorEdge Connection UnitDC Safety 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: ¾" 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.

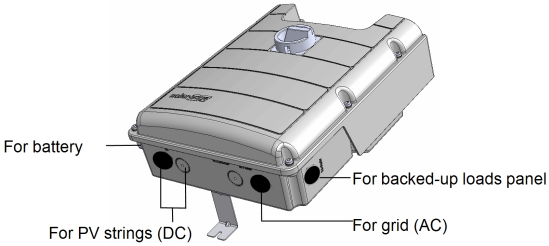


Figure 49: StorEdge Connection UnitDC Safety Unit drill guides

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.

3. Turn OFF the AC switch at the distribution panel.
4. Turn OFF the battery auxiliary power switch and the circuit breaker switch.
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, use insulation tape to isolate each of the AC and DC wires

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 27 and *Commissioning the Installation* on page 42.
11. Configure the system to the required application as described in *System Configuration* on page 80

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.

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.

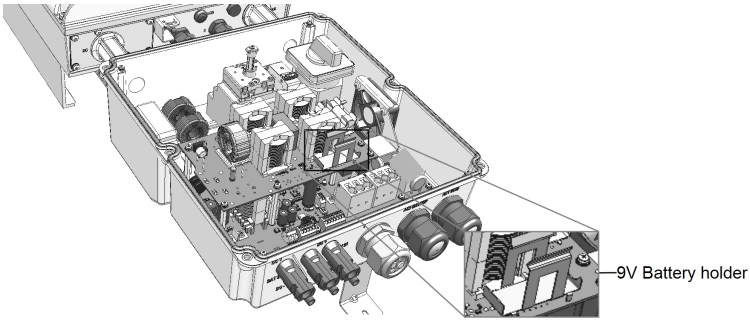


Figure 50: The battery holder

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.

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).

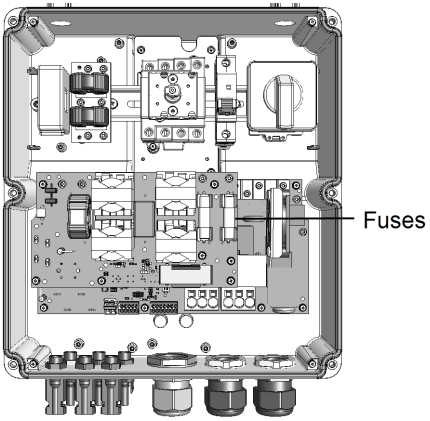


Figure 51: StorEdge Connection Unit fuses

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.

3. Turn OFF the AC switch at the distribution panel.

4. On LG Chem batteries - turn OFF the auxiliary power switch and the circuit breaker switch.

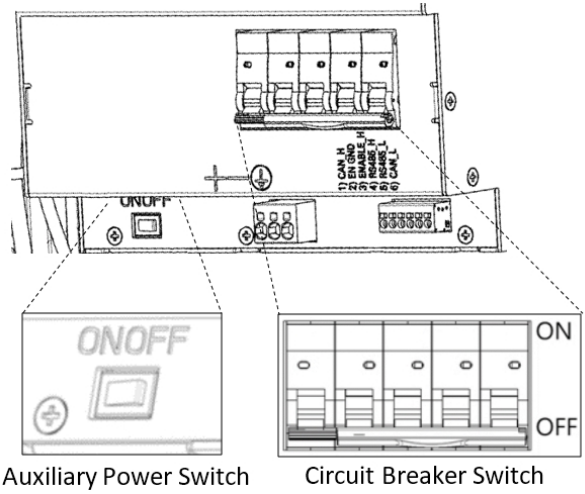


Figure 52: LG Chem switches

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 32.

Appendix D: Mechanical Specifications

Inverter Dimensions

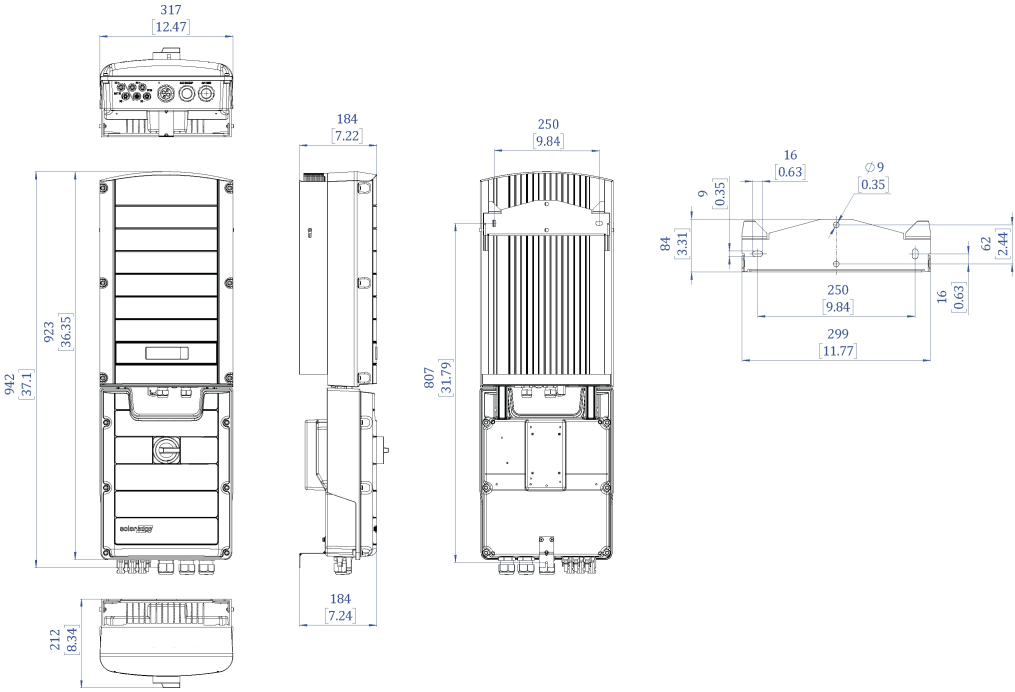


Figure 53: Inverter dimensions - StorEdge Connection Unit with glands

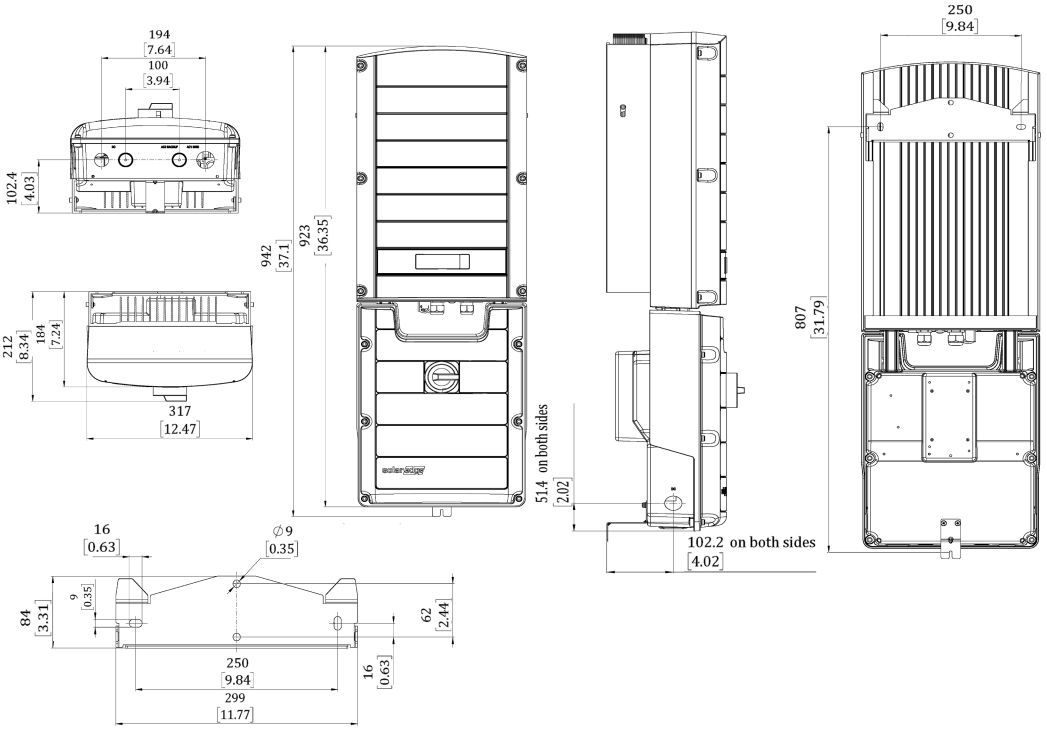


Figure 54: Inverter dimensions - StorEdge Connection Unit with conduit openings

StorEdge Inverter for High Power Technical Specifications

	SE5000-xxS2	SE6000-xxS2	Unit
OUTPUT - AC (LOADS/GRID)			
Rated AC Power Output	5000[1]	6000	VA
Max AC Power Output	5000[1]	6000	VA
AC Output Voltage (Nominal)	220 / 230		Vac
AC Output Voltage Range	184 - 264.5		Vac
AC Frequency	50 / 60 ± 5		Hz
Maximum Continuous Output Current	27		A
Residual Current Detector / Residual Current Step Detector	300 / 30		mA
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes		
Charge Battery from AC (if allowed)	Yes		
THD	<5		%
Power factor with rated power	>0.99 (configurable; 0.9 leading to 0.9 lagging)		
Typical Nighttime Power Consumption	<5		W
OUTPUT - AC (BACKUP POWER)[2]			
Rated AC Power Output	5000[1]		VA
Max AC Power Output - Surge	6600		VA
AC Output Voltage (Nominal)	220 / 230		Vac
AC Output Voltage Range	184 - 264.5		Vac
AC Frequency	50 / 60 ± 5		Hz
Maximum Continuous Output Current	22		A
AC Breaker	Yes		
THD	<3		%
Power factor with rated power	0.2 leading to 0.2 lagging		
Automatic switchover time	<2		sec
Typical Nighttime Power Consumption	<5		W
INPUT - DC (PV and BATTERY)			
Transformer-less, Ungrounded	Yes		
Max Input Voltage	500		Vdc
Nom DC Input Voltage	400		Vdc

[1] Limited to 4600VA where required. Limited to 4985VA in Australia.

[2] Not designed for standalone applications and requires AC for commissioning.

	SE5000-xxS2	SE6000-xxS2	Unit
Reverse-Polarity Protection	Yes		
Ground-Fault Isolation Detection	600kΩ Sensitivity		
Maximum Inverter Efficiency	97.6		%
European Weighted Efficiency	97.4		%
INPUT - DC (PV)			
Maximum DC Power (STC)	6750	8100	W
Max Input Current	19.5	23	Adc
2-pole Disconnection	Yes		
INPUT - DC (BATTERY) - FOR HIGH POWER			
Continuous Peak Power	6600		W
Number of Batteries per Inverter	2, for high power		
Max Input Current	17.5		Adc
2-pole Disconnection	Yes		
DC Fuses on Plus and Minus	25A (field replaceable)		
ADDITIONAL FEATURES			
Supported Communication Interfaces	RS485 for battery, RS485, Ethernet, ZigBee (optional), Wi-Fi (optional)		
Battery Power Supply	Yes, 12V / 53W		
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 VDE 2100-712 (pending)		
STANDARD COMPLIANCE (PENDING)			
Safety	IEC-62103 (EN50178), IEC-62109		
Grid Connection Standards[1]	VDE 0126-1-1, NRS 097-2-1, AS4777		
Emissions	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12		
INSTALLATION SPECIFICATIONS			
StorEdge Connection Unit with Glands			
AC Output (Loads/Grid) gland cable diameter / wire cross section	9-16 / 2-14		mm/mm^2
AC Output (Backup) gland cable diameter / wire cross section	9-16 / 2-14		mm/mm^2
DC Input (PV)	2 MC4 pairs		
DC Input (Battery)	1 MC4 pair		
Dimensions with Connection Unit (HxWxD)	962 x 315 x 184		mm

[1] For all standards refer to Certifications category in Downloads page: http://www.solaredge.com/downloads/.

	SE5000-xxS2	SE6000-xxS2	Unit
StorEdge Connection Unit with Conduit Openings			
AC Output (Loads/Grid) conduit size / wire cross section	32 (1) / 2-14		mm(in) / mm^2
AC Output (Backup) conduit size / wire cross section	25 (3/4) / 2-14		mm(in) / mm^2
DC Input (PV) conduit size / wire cross section	25 (3/4) / 4-6		mm(in) / mm^2
DC Input (Battery) conduit size / wire cross section	25 (3/4) / 2.5-6		mm(in) / mm^2
Dimensions with Connection Unit (HxWxD)	940 x 315 x 184		mm
ADDITIONAL SPECIFICATIONS			
Weight with Connection Unit	26.5		kg
Cooling	Natural convection and internal fan (user replaceable)		
Noise	<50		dBA
Min - Max Operating Temperature[1]	-20 to +60		°C
Protection Rating	IP65 - Outdoor and Indoor		

[1] Power derating from 50° C

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

Australia (+61)	1800 465 567
APAC (Asia Pacific) (+972)	073 240 3118
Benelux NL (+31)	0800-7105
BE (+32)	0800-76633
China (+86)	21 6212 5536
France (+33)	0800 917 410
DACH and Rest of Europe (+49)	089 454 59730
Italy (+39)	0422 053700
Japan (+81)	03 6262 1223
New Zealand (+64)	0800 144 875
US & Canada (+1)	510 498 3200
United Kingdom (+44)	0800 028 1183
Greece (+49)	89 454 59730
Israel (+972)	073 240 3122
Middle East & Africa (+972)	073 240 3118
South Africa (+27)	0800 982 659
Turkey (+90)	216 706 1929
Worldwide (+972)	073 240 3118

Email to: support@solaredge.com

solaredge

www.solaredge.com