



Installation Guide

Communication Options

Version 1.3

Version History

Version 1.3 (November 2018)

- Editorial modifications

Version 1.2 (February 2018)

- Changed SolarEdge Logger to Non SolarEdge Logger in figure 'multiple inverters, RS485 bus, RS485-E, wired Ethernet (LAN) , non SE logger and modified procedure in SE Inverters Configuration after the 'Multiple Inverters with RS485-E connections ' image

Version 1.1 (November 2017)

- Added communication options:
 - RS485-X
 - RS485 Plug-in
 - Wi-Fi
 - Cellular Connectivity
 - Smart Energy ZigBee Plug-in
- Updated configurations:
 - Multiple Devices, RS485 Bus, Wired Ethernet (LAN) Connection
 - Multiple Inverters, RS485 Bus, Non-SolarEdge Logger
 - Multiple Devices, RS485 Bus, ZigBee Connection
- Added configurations:
 - Multiple Inverters, RS485 Bus, RS485-E Bus, CCG, Meter, Non-SolarEdge Logger
 - Multiple Inverters, RS485 Bus, RS485-E, Wired Ethernet (LAN), Non-SolarEdge Logger
 - High Bandwidth Mode - Third Party SIM Card
 - Multiple devices with a second RS485 port connection interface with Modbus devices

Version 1.0 (2012)

Initial release

Contents

Version History	1
Chapter 1: Introduction	3
Communication Types and Functionality	3
Communication Connectors	3
Chapter 2: Ethernet	6
Single Device, Wired Ethernet (LAN) Connection	6
Multiple Devices, RS485 Bus, Wired Ethernet (LAN) Connection	7
Chapter 3: RS485 Plug-in Kit	8
Multiple devices with a second RS485 port connection interface with Modbus devices	8
Multiple Inverters with RS485-Plug-in connections	9
Chapter 4: ZigBee Wireless Connection Options	11
Single Device, ZigBee Connection	11
Multiple Devices, ZigBee Connection	12
Multiple Devices, RS485 Bus, ZigBee Connection	13
Chapter 5: Wi-Fi Connection (EU & APAC)	15
Single or Multiple Devices, Wi-Fi Connection	15
Multiple Devices, RS485 Bus, Wi-Fi Server Connection	16
Chapter 6: Cellular Connectivity	18
Low Bandwidth Mode - Single Device	18
Low Bandwidth Mode - Multiple Devices	19
High Bandwidth Mode - Third Party SIM Card	19
Chapter 7: Non SolarEdge Monitoring Connection Options	21
Multiple Inverters, RS485 Bus, Wired Ethernet (LAN), Non-SolarEdge Logger	21
Multiple Inverters, RS485 Bus, Non-SolarEdge Logger	22
Multiple Inverters, RS485 Bus, RS485-E, Wired Ethernet (LAN), Non-SolarEdge Logger	23
Multiple Inverters, RS485 Bus, RS485-E Bus, CCG, Meter, Non-SolarEdge Logger	25

Chapter 1: Introduction

This document provides an overview of the communication options supported by SolarEdge devices. SolarEdge devices are categorized as follows: Inverter, Safety and Monitoring Interface (SMI) or Control and Communication Gateway (CCG). For a detailed description of how to install and set up communications between the SolarEdge devices and the SolarEdge monitoring server, refer to the specific SolarEdge device installation manual.

This document describes each communication scenario, lists the required equipment and provides the configuration sequence required for each scenario after the physical connection is done.

Communication Types and Functionality

The following describes the various types of communication options supported by SolarEdge devices and their functionality.

- **Ethernet** (Built-in): Used for a LAN connection. Enables communication to the SolarEdge monitoring server.
- **RS485-X;RS485-E** (Built-in; X can be 1, 2): The RS485-X port supports the following functionality:
 - Connecting multiple SolarEdge devices through the same bus in a master/slave configuration.
 - Connecting to a third-party logger using the SunSpec protocol.
 - Connecting to a SolarEdge electricity meter.
- **RS485 Plug-in Kit** (Optional): The RS485 Plug-in Kit provides an additional RS485 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.
- **Wireless Communication ZigBee Kit** (Optional): Enables wireless connection of one or several devices to a ZigBee gateway, for wireless communication to the SolarEdge monitoring server.
- **Wi-Fi** (Optional): Enables wireless connection of one or several devices for wireless communication to the SolarEdge monitoring server.
- **Cellular Connectivity** (Optional): Enables cellular connection of one or several devices for wireless communication to the SolarEdge monitoring server.
- **Smart Energy ZigBee Plug-in** (Optional): Enables wireless connection of one or several devices to Smart Energy products, which automatically divert PV energy to home appliances (home automation). Smart Energy is not covered in this document. Refer to the relevant product installation guides.

Communication Connectors

Single Phase Inverters/ Three Phase Inverters/ SMI

The inverter and SMI have two communication glands which 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), Cellular, ZigBee, or Wi-Fi	4.5-7 mm
2 (PG13.5)	All three	RS485, power reduction	2.5-5 mm

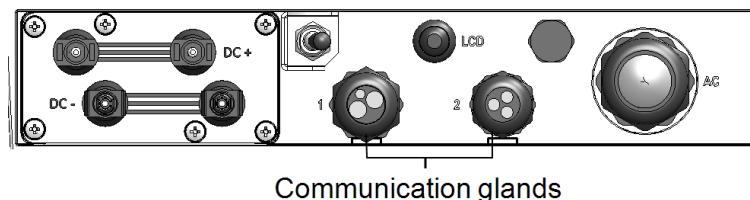


Figure 1: Single phase Inverters/Three Phase Inverters/SMI Communication glands

The SolarEdge devices have a standard RJ45 terminal block for Ethernet connection, a 9-pin terminal block for RS485 connection, a connector for a ZigBee Plug-in /Wi-Fi/RS485 Plug-in and a connector for a cellular modem. The positions of these connectors on the inverter communication board are shown below.

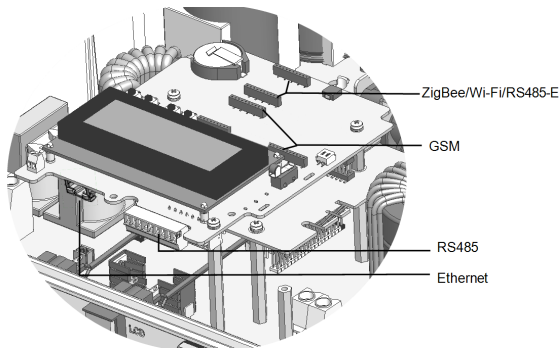


Figure 2: Inverter internal connectors

Single Phase Inverters with HD-Wave Technology

A communication gland with multiple openings is used for connection of the various communication options. The table below describes the functionality of each gland opening. Unused openings should remain sealed.

Opening for cable size (diameter)	Connection type
2.5 - 5 mm	RS485
4.5 - 7 mm, with cut	Ethernet (CAT5/6)
2 - 4 mm, with cut	ZigBee or Wi-Fi antenna cable

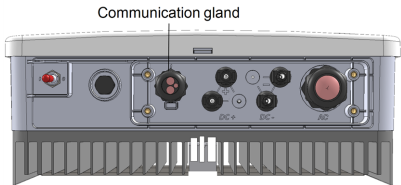


Figure 3: Communication Gland

This inverter has a standard RJ45 terminal block for Ethernet connection, a 9-pin terminal block for RS485 cconnectors for a ZigBee Plug-in /Wi-Fi/RS485 Plug-in and a cellular module. The positions of these connectors on the inverter communication board are shown below.

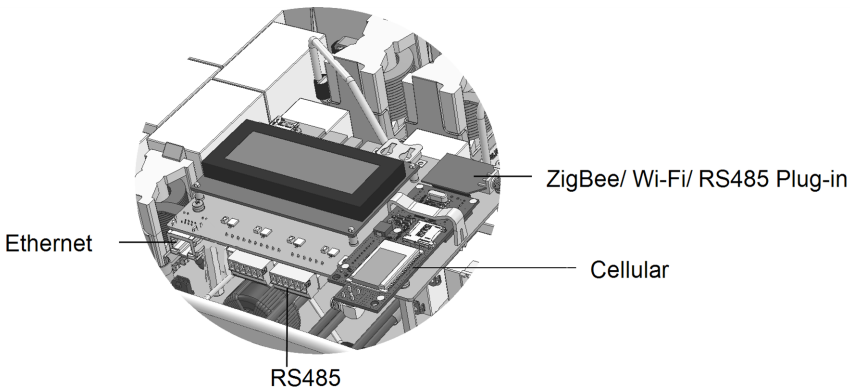


Figure 4: Single phase inverter with HD-Wave technology internal connectors



NOTE
All the illustrations in the following scenarios show the inverter as an example. The settings apply to all SolarEdge devices unless otherwise explicitly stated.

Commercial Gateway

Connection of the various communication options to the Commercial Gateway is done directly. The Commercial Gateway has two RS485 buses for enhanced communication. This allows daisy chain configuration of multiple RS485 buses for communication in commercial installations.

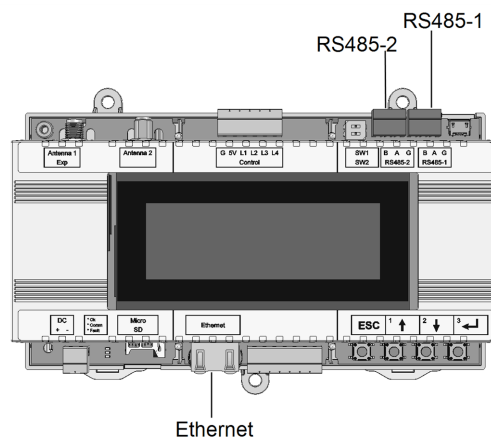


Figure 5: Commercial Gateway communication connections

Chapter 2: Ethernet

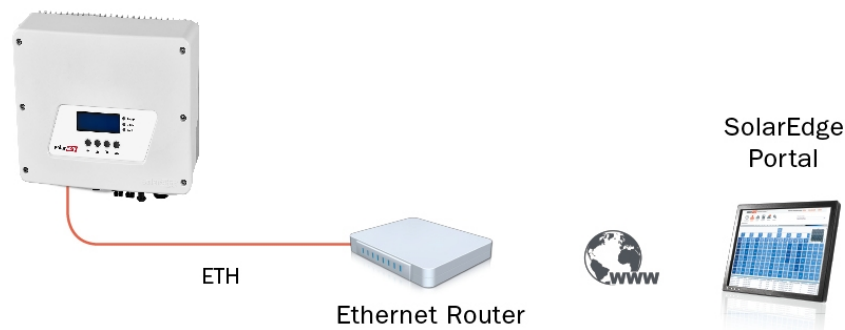


Figure 6: Single device Ethernet connection

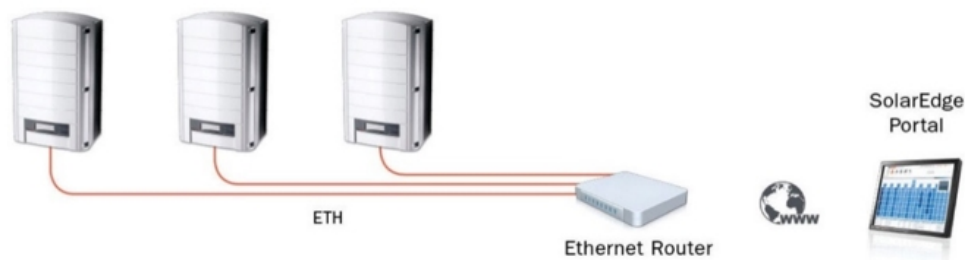


Figure 7: Multiple devices Ethernet connection

Single Device, Wired Ethernet (LAN) Connection

Description

In this configuration, Ethernet cables are used to connect devices to the SolarEdge monitoring server through an Ethernet router.

Required Equipment

- CAT5 or CAT6 Ethernet cable with RJ45 connectors. Max distance: 100 meters / 300 ft. (per device connection)
- Ethernet router

SolarEdge Device LAN Configuration

The SolarEdge devices are preconfigured to use the LAN port by default, thus obtaining the IP settings automatically from a DHCP server. If a static IP is required, select the following in the LCD menu:

- Communication → Server → LAN
- Communication → LAN Conf → Set DHCP → [Select Disable]
- Communication → LAN Conf → Set IP → [Set device IP]
- Communication → LAN Conf → Set Mask → [Set device subnet mask]
- Communication → LAN Conf → Set Gateway → [Set device gateway]
- Communication → LAN Conf → Set DNS → [Set device DNS]
- Verify that the LCD panel displays <S_OK>

Multiple Devices, RS485 Bus, Wired Ethernet (LAN) Connection

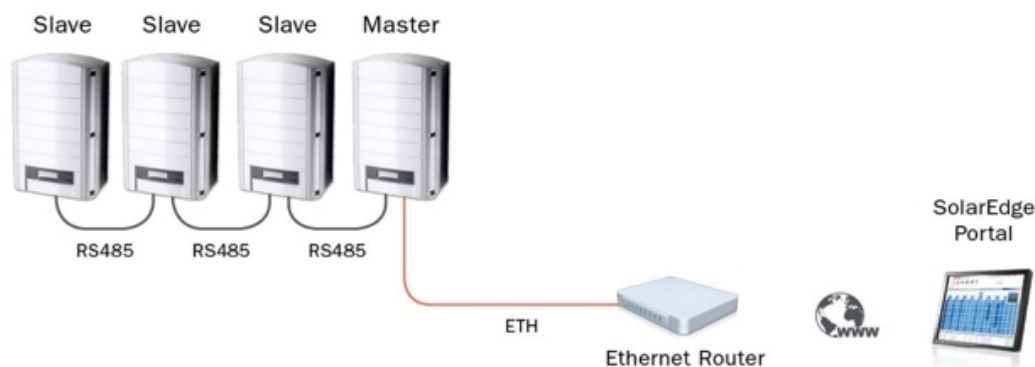


Figure 8: Multiple devices, RS485 bus, wired Ethernet connection

Description

In this configuration multiple devices connect through the same RS485 bus in a master/slave configuration. Only the master is physically connected to the internet through the Ethernet port.

Required Equipment

- CAT5 or CAT6 Ethernet cable with RJ45 connectors. Max distance: 100 meters / 300 ft. (from master device to router)
- Ethernet router
- RS485: 4-conductor cable. Max Distance: 1000 m / 3000 ft. (from the first to last device. The master does not have to be the first or the last one)

SolarEdge Device RS485 and LAN Configuration

In the LCD menu, select the following:

1. For the *slave* devices: The SolarEdge devices are preconfigured to use the RS485-1 port by default. If using RS485-2 (in devices where supported), select the following in the LCD menu:
 - Communication → RS485-2 Conf → Device Type → SolarEdge
 - Communication → RS485-2 Conf → Protocol → Slave
 - Communication → Server → RS485
2. For the *master* device:
 - **LAN** - The SolarEdge devices are preconfigured to use the LAN port by default, thus obtaining the IP settings automatically from a DHCP server. If a static IP is required, select the following in the LCD menu:
 - Communication → Server → LAN
 - Communication → LAN Conf → Set DHCP → [Select Disable]
 - Communication → LAN Conf → Set IP → [Set device IP]
 - Communication → LAN Conf → Set Mask → [Set device subnet mask]
 - Communication → LAN Conf → Set Gateway → [Set device gateway]
 - Communication → LAN Conf → Set DNS → [Set device DNS]
 - **RS485** – select the following in the LCD menu:
 - Communication → RS485-X Conf → Device Type → SolarEdge
 - Communication → RS485-X Conf → Protocol → Master
 - Communication → RS485-X Conf → Slave Detect
3. The master should report the correct number of slaves. If it does not, verify the connections and terminations.
4. Verify that the LCD panel displays <S_OK>.

Chapter 3: RS485 Plug-in Kit

Multiple devices with a second RS485 port connection interface with Modbus devices

Description

The RS485 Plug-in kit provides an additional RS485 port (called RS485-E) for the inverter and/or the Commercial Gateway.

The kit contains a module which is installed on the inverter or the Commercial Gateway board and has a 3-pin RS485 terminal block.

The RS485 module allows to connect the inverter directly to 3rd party monitoring systems (Modbus master) or various Modbus slave devices such as batteries and meters, in addition to other inverters. This additional RS485 port also enables multiple parallel (i.e nested) RS485 buses, valuable when setting up a communication network for large sites.

To use the RS485 Plug-in kit, the SolarEdge device CPU version must be 3.1600 or higher.

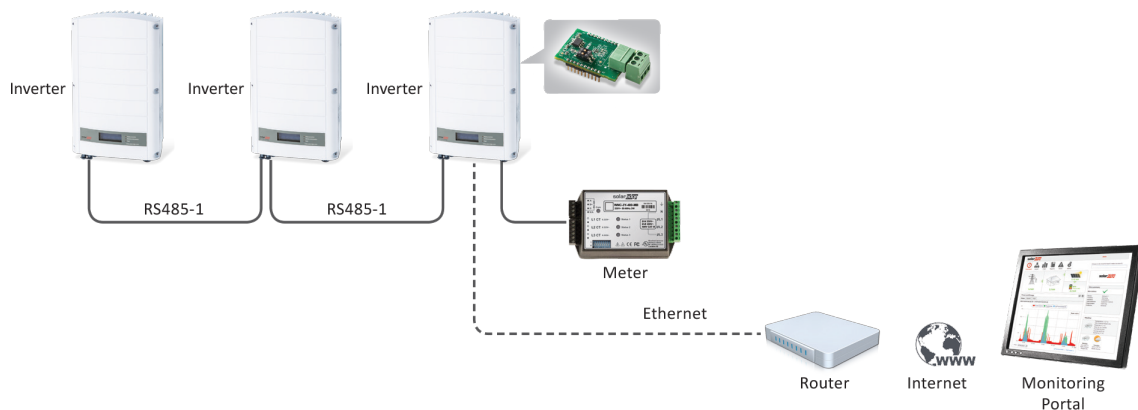


Figure 9: Multiple devices with a second RS485 port connection to interface with Modbus devices

Required Equipment

- RS485 Plug-in kit

For detailed installation instructions, refer to [RS485 Expansion Kit Installation Guide](#).

SolarEdge Device RS485 Configuration

- For the *slave* devices: The SolarEdge devices are preconfigured to use the RS485-1 port by default. If using RS485-2 (in devices where supported) or using RS485 Plug-in (in devices that do not support RS485-2) select the following in the LCD menu:
 - Communication → RS485-2 (or RS485-E) Conf → Device Type → SolarEdge
 - Communication → RS485-2 (or RS485-E) Conf → Protocol → Slave
 - Communication → Server → RS485
- For the RS485 *master* device, select the following:
 - Communication → RS485-X Conf → Device Type → SolarEdge
 - Communication → RS485-X Conf → Protocol → Master
 - Communication → RS485-X Conf → Slave Detect

The master should report the correct number of slaves. If it does not, verify the connections and terminations.
- For the meter, select the following:
 - Communication → RS485 Conf → Device Type → Multi devices → Meter1
 - Meter1 → Device Type → Revenue meter
 - Protocol → <Device Protocol>
 - Device ID → 1
 - CT Rating → <xxx A>
 - Meter Func. → Export + Import or Consumption
- Verify that the LCD panel displays <S_OK>.

Multiple Inverters with RS485-Plug-in connections

Description

SolarEdge protocol configuration is supported on all RS485 buses simultaneously. The inverter can be:

- Master on one bus and slave on the other
- Master on both buses (dual master)
- Slave on both buses

With the RS485 Plug-in you can connect up to 16 RS485 buses with up to 32 devices each in a daisy chain configuration for communications in commercial installations. Using this option allows you to connect only the master inverter to the monitoring platform.

To use the RS485 Plug-in kit, the SolarEdge device CPU version must be 3.1600 or higher.

See additional scenarios with the RS485-E are in [Non SolarEdge Monitoring Connection Options](#) on page 21

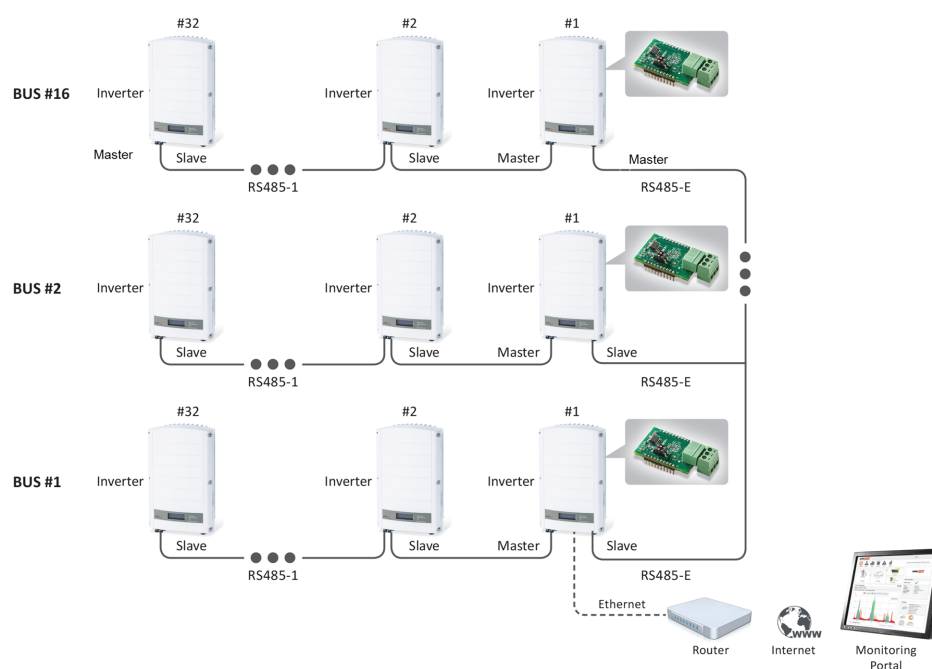


Figure 10: Multiple Inverters with RS485 Plug-in connections

Required Equipment

- RS485 Plug-in kits

For detailed installation instructions, refer to [RS485 Expansion Kit Installation Guide](#).

SolarEdge Inverters Configuration

1. For each master in each of the three segments, use RS485-1 (in devices that do not support RS485-2) select the following in the LCD menu:
 - Communication → RS485-1 Conf → Device Type → Solar Edge
 - Communication → RS485-1 Conf → Protocol → Master
 - Communication → RS485-1 Conf → Slave Detect

The master should report the correct number of slaves. If it does not, verify the connections and terminations.

2. For the master of masters , using RS485 Plug-in, select the following in the LCD menu:
 - Communication → RS485-E Conf → EnableCommunication → RS485-E Conf → Device Type → SE
 - Communication → RS485-E Conf → Protocol → Master
 - Communication → Slave Detect → RS485-E
3. Verify for each that the LCD panel displays <S_OK>.

Chapter 4: ZigBee Wireless Connection Options

ZigBee is a protocol for data transfer in wireless networks. Wireless connectivity simplifies the installation, as no cabling is required.

ZigBee cards connected inside the SolarEdge devices communicate wirelessly with a SolarEdge ZigBee Gateway for wireless connectivity between one or more devices and an internet router.

Single Device, ZigBee Connection

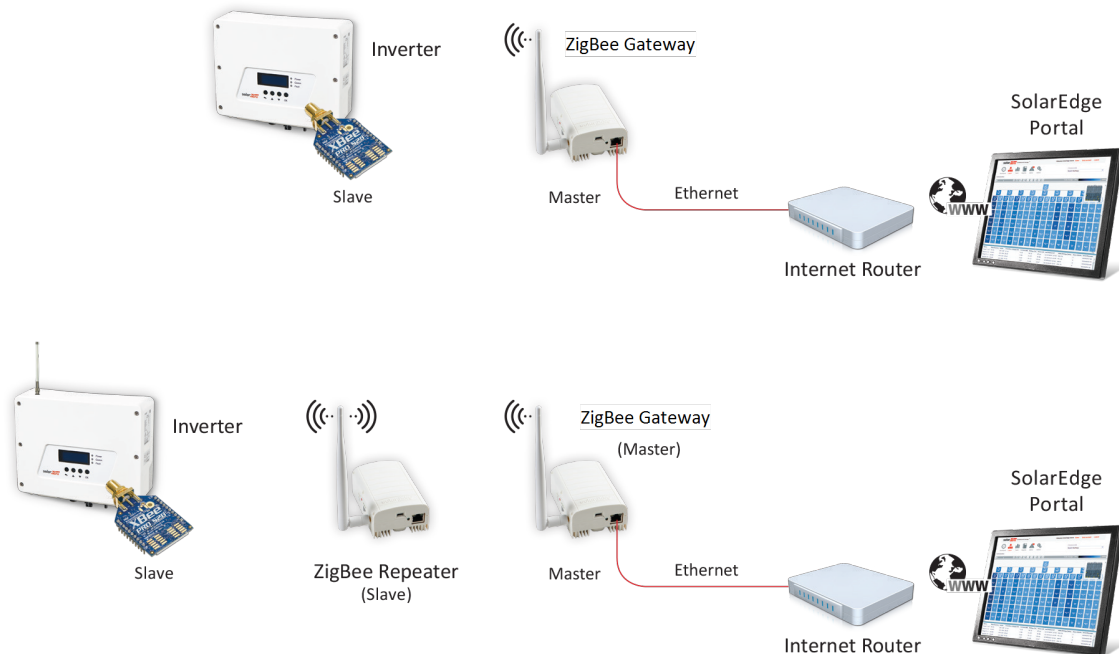


Figure 11: Single device, ZigBee server connection (and extending the ZigBee range using a repeater)

Description

You can connect a single device in a master/slave configuration. In this configuration, the SolarEdge ZigBee Gateway is the master device. The Zigbee Gateway is provided with one slave module that is installed inside the SolarEdge device.

Required Equipment

- SolarEdge Zigbee Gateway Kit including:
 - One Zigbee Gateway
 - One ZigBee Plug-in
 - Power supply for the gateway
 - Ethernet cable for connection of the gateway to the internet router

ZigBee max distance:

- Outdoors (line-of-sight): 400 m / 1300 ft
- Indoors: 50 m / 160 ft
- Ethernet router
- Optional: SolarEdge ZigBee Repeater for extending the ZigBee range

SolarEdge ZigBee Plug-in Device Configuration

The SolarEdge device is preconfigured as a slave by default.

In the ZigBee status screen, check that the message **ZigBee Ready** is displayed.

If not, select the following in the LCD menu:

- Communication → Server → ZigBee
- Communication → ZigBee Conf → Protocol → Multi-Point Slave

ZigBee Gateway Configuration

1. Press the configuration button on the ZigBee Gateway for 5-10 seconds and release after all LEDs have turned on. The gateway starts discovering the slave device(s). The device discovery may take 2-3 minutes, during which all the LEDs blink. The signal strength LEDs also light up.
2. Verify that the S_OK LED is ON, which indicates the communication with the SolarEdge server is established. This may take up to five minutes.
3. Verify that the yellow (Link) LED blinks and indicates that the slave was detected, (if a repeater is used, verify that the correct number of slaves was detected).
4. Verify signal strength: Check that at least two RSSI LEDs are ON, which indicates medium signal strength.

Multiple Devices, ZigBee Connection

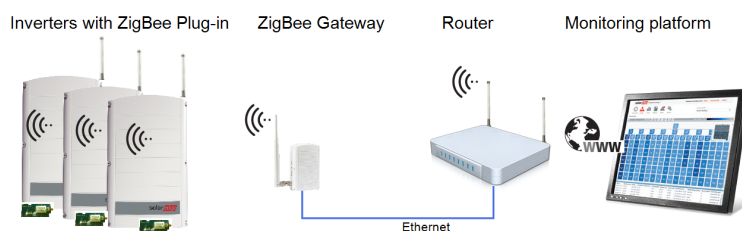


Figure 12: Multiple devices, ZigBee bus, Ethernet server connection

Description

You can connect multiple devices in a master/slave configuration. In this configuration, the SolarEdge Zigbee Gateway is the master device. To enable more than one device, additional slave kits are required. ZigBee operates as a mesh network so that each ZigBee Plug-in operates as a repeater for its neighboring ZigBee Plug-in. Therefore, the position of each ZigBee Plug-in does not have to be within range of the Zigbee Gateway (master), but must be within range of its neighboring ZigBee Plug-in. Up to 15 devices (including repeaters) can be connected to a single Zigbee Gateway.

NOTE



When using Export Limitation in a multiple inverter system it is recommended to use RS485 between the inverters instead of ZigBee, for better response time.

Required Equipment

- SolarEdge Zigbee Gateway Kit including:
 - One ZigBee gateway
 - One Zigbee Plug-in
 - Power supply for the gateway
 - Ethernet cable to connect the gateway to the internet router

ZigBee max distance:

- Outdoors (line-of-sight): 400 m / 1300 ft
- Indoors: 50 m / 160 ft
- SolarEdge ZigBee Plug-in Kit for connecting an additional device to the same Zigbee Gateway; one kit per additional slave after the first one
- Ethernet router
- Optional: SolarEdge ZigBee repeater for extending the ZigBee range

SolarEdge ZigBee Plug-in Device Configuration

The SolarEdge device is preconfigured as a slave by default.

In the ZigBee status screen, check that the message **ZigBee Ready** is displayed.

If not, select the following in the LCD menu:

- Communication → Server → ZigBee
- Communication → ZigBee Conf → Protocol → Multi-Point Slave

ZigBee Gateway Configuration

1. Press the configuration button on the ZigBee Gateway for 5-10 seconds and release after all LEDs have turned on. The gateway starts discovering the slave device(s). The device discovery may take 2-3 minutes, during which all the LEDs blink. The signal strength LEDs also light up.
2. Verify that the S_OK LED is ON, which indicates the communication with the SolarEdge server is established. This may take up to five minutes.
3. Verify that the yellow (Link) LED blinks and indicates that the slave was detected, (if a repeater is used, verify that the correct number of slaves was detected).
4. Verify signal strength: Check that at least two RSSI LEDs are ON, which indicates medium signal strength.

Multiple Devices, RS485 Bus, ZigBee Connection



Figure 13: Multiple devices, RS485 bus , ZigBee server connection

Description

With this configuration you can connect multiple devices through an RS485 bus in a master/slave configuration. In this configuration, only the RS485 master device is connected wirelessly to a SolarEdge ZigBee Gateway, which is the ZigBee master device. Up to 15 devices (including repeaters) can be connected as slaves to the Zigbee Gateway.

Required Equipment

- SolarEdge Zigbee Gateway Kit including:
 - One ZigBee gateway
 - One Zigbee Plug-in
 - Power supply for the gateway
 - Ethernet cable to connect the gateway to the internet router

ZigBee max distance:

- Outdoors (line-of-sight): 400 m / 1300 ft
- Indoors: 50 m / 160 ft
- Optional: SolarEdge ZigBee repeater for extending the ZigBee range
- RS485: 4 conductor cable. Max Distance: 1000 m / 3000 ft. (from the master device)
- Ethernet router

SolarEdge Device RS485 Configuration:

1. For the *slave* devices: The SolarEdge devices are preconfigured to use the RS485-1 port by default. If using RS485-2 (in devices where supported), select the following in the LCD menu:
 - Communication → RS485-2 Conf → Device Type → SolarEdge
 - Communication → RS485-2 Conf → Protocol → Slave
 - Communication → Server → RS485
2. For the RS485 *master* device, select the following:

- Communication → RS485-X Conf → Device Type → SolarEdge
- Communication → RS485-X Conf → Protocol → Master
- Communication → RS485-X Conf → Slave Detect

The master should report the correct number of slaves. If it does not, verify the connections and terminations.

3. Verify that the LCD panel displays <S_OK>.

SolarEdge ZigBee Plug-in Device Configuration

The SolarEdge device is preconfigured as a slave by default.

In the ZigBee status screen, check that the message **ZigBee Ready** is displayed.

If not, select the following in the LCD menu:

- Communication → Server → ZigBee
- Communication → ZigBee Conf → Protocol → Multi-Point Slave

Chapter 5: Wi-Fi Connection (EU & APAC)

The Wi-Fi communication option enables to wirelessly connect a SolarEdge device to the SolarEdge monitoring server. You can wirelessly connect multiple devices with Wi-Fi, or connect an RS485 bus of devices and connect only the master with Wi-Fi to the server.

Single or Multiple Devices, Wi-Fi Connection

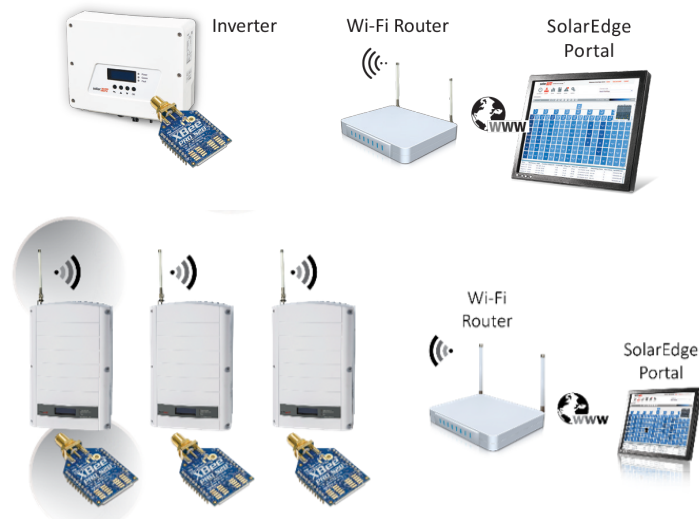


Figure 14: Single and multiple devices, Wi-Fi server connection

Description

With this configuration you can wirelessly connect one or several devices. A Wi-Fi kit is required for each of the devices to be connected wirelessly. The position of each Wi-Fi device must be within range of the Wi-Fi router.

Required Equipment

- SolarEdge– Wi-Fi Kit (one kit per device) including:

- Wi-Fi Plug-in
- Antenna with a mounting clip
- RF cable

Wi-Fi max distance:

- Indoors (line-of-sight): 400 m / 1300 ft
- Outdoors: 50 m / 160 ft

- Wi-Fi router

SolarEdge Device Wi-Fi Configuration

In each of the devices perform the following:

1. In the LCD menu, select the following:
 - Communication → Server → Wi-Fi
 - Communication → Wi-Fi Conf
2. Select one of the following:
 - If your router supports WPS mode, you can automatically connect without entering a password (use either the LCD light button or the internal user buttons):
 - Select Wi-Fi Conf → WPS mode
 - Push the WPS button on your router and hold until a LED lights up (refer to your router manual).
 - Check that the message **Connected** is displayed on the inverter LCD screen.

- Otherwise, to connect to a specific network from a list:
 - Select Wi-Fi Conf → Scan Networks
 - Select the required network from the list of networks.
 - If required, enter the security key (up to 20 characters) and long-press the Enter button. The system starts the connection process. Connection time may take up to 30 seconds, after which the message Connected is displayed on the LCD for 5 seconds.
- 3. Verify that the LCD panel displays <S_OK>.

Multiple Devices, RS485 Bus, Wi-Fi Server Connection

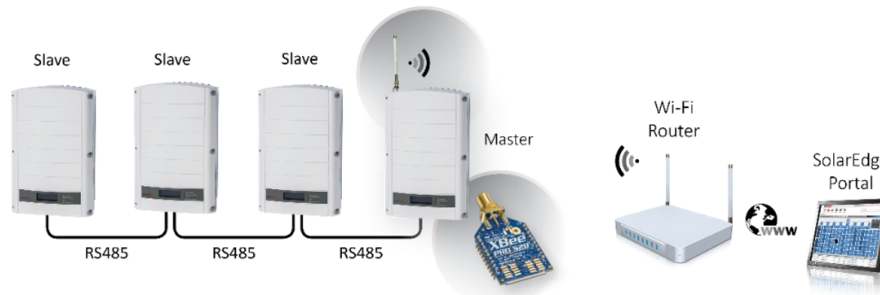


Figure 15: Multiple devices, RS485 bus, Wi-Fi server connection

Description

You can connect multiple devices on the same RS485 bus in a master/slave configuration. In this configuration, only the master device is connected wirelessly to a Wi-Fi router. Up to 31 devices can be connected as RS485 slaves.

Required Equipment

- SolarEdge– Wi-Fi Kit (one kit per device) including:
 - Wi-Fi Plug-in
 - Antenna with a mounting clip
 - RF cable

Wi-Fi max distance:

- Indoors (line-of-sight): 400 m / 1300 ft
 - Outdoors: 50 m / 160 ft
- Wi-Fi router
- RS485: 4 conductor cable. Max Distance: 1000 m / 3000 ft (from the first to last device. The master does not have to be the first or the last one)

SolarEdge Device RS485 Configuration

1. For the *slave* devices: The SolarEdge devices are preconfigured to use the RS485-1 port by default. If using RS485-2 (in devices where supported), select the following in the LCD menu:
 - Communication → RS485-2 Conf → Device Type → SolarEdge
 - Communication → RS485-2 Conf → Protocol → Slave
 - Communication → Server → RS485
2. For the RS485 *master* device, select the following:
 - Communication → RS485-X Conf → Device Type → SolarEdge
 - Communication → RS485-X Conf → Protocol → Master
 - Communication → RS485-X Conf → Slave Detect

The master should report the correct number of slaves. If it does not, verify the connections and terminations.
3. Verify that the LCD panel displays <S_OK>.

Wi-Fi Configuration

1. Configure the master device to communicate via Wi-Fi:
 - Communication → Server → Wi-Fi
 - Communication → Wi-Fi Conf
2. Select one of the following:
 - If your router supports WPS mode, you can automatically connect without entering a password (use either the LCD light button or the internal user buttons):
 - Select Wi-Fi Conf → WPS mode
 - Push the WPS button on your router and hold until a LED lights up (refer to your router manual).
 - Check that the message **Connected** is displayed on the inverter LCD screen.
 - Otherwise, to connect to a specific network from a list:
 - Select Wi-Fi Conf → Scan Networks
 - Select the required network from the list of networks.
 - If required, enter the security key (up to 20 characters) and long-press the Enter button. The system starts the connection process. Connection time may take up to 30 seconds, after which the message Connected is displayed on the LCD for 5 seconds.

Chapter 6: Cellular Connectivity

The cellular communication option enables to wirelessly connect a SolarEdge device to the SolarEdge monitoring server using a cellular network. Depending on your SIM card and data plan provider, you can wirelessly connect multiple devices, each with its own cellular modem, or connect an RS485 bus of devices and connect only the master with a cellular module to the server.

To use the cellular communication option, the communication board must include a designated modem connector and its SolarEdge device CPU version must be 3.1600 or higher. To use a SolarEdge data plan, the SolarEdge device CPU version must be 3.1800 or higher.

Cellular communication offers two modes of operation:

- **Low Bandwidth (BW)**- This mode utilizes a data plan for low-cost monitoring. In this mode, the data is sampled every 15 minutes and the server connection is established every 4 hours. In a multiple inverter system, a cellular modem and a SIM card are required in every inverter. Low BW is the default configuration. This mode is available only when the SIM card and data plan are purchased from SolarEdge.
- **High Bandwidth** - This mode utilizes a data plan for high resolution monitoring. In this mode, the modem maintains a continuous connection with the server, and the data is sampled every 5 minutes. After optimizer pairing there is communication with the server for the first hour to simplify commissioning. In a multiple device system, up to 32 devices can be connected in an RS485 bus and a cellular modem installed only in the master. A cellular modem and a SIM card are required for every 32 devices. This mode is available only when the SIM card and data plan are purchased from a 3rd party carrier.

For more information about data plans and other related information refer to the relevant cellular modem datasheet:

- [SolarEdge Cellular GSM Kit & Data Plan For North America](#)
- [SolarEdge Cellular GSM Kit & Data Plan for Europe](#)
- [SolarEdge Cellular GSM Kit & Data Plan for Australia and New Zealand](#)
- [SolarEdge Cellular CDMA Kit North America](#)
- [SolarEdge Commercial GSM Kit & Data Plans for North America](#)

Low Bandwidth Mode - Single Device

This option is available both with a SolarEdge SIM card and a non SolarEdge SIM card.



Figure 16: Low bandwidth mode, single device, cellular modem connection

Description

With this configuration you can connect one device via a cellular network. A GSM kit is required for the device being connected via the cellular network.

In this mode data is sampled every 15 minutes and sent to SolarEdge server every 4 hours.

Required Equipment

GSM kit

Inverters for APAC and EU (not North America) can be purchased with a built-in modem.

Cellular Communication Configuration

- In the LCD menu, select the following:
 - Server → Cellular
 - Communication → Cellular Conf.
 - Select Data Plan to set the communication mode Low BW.

For detailed communication configuration instructions see, 'GSM Communication Configuration' chapter in the [GSM Installation Guide](#).

Low Bandwidth Mode - Multiple Devices

This option is available both with a SolarEdge SIM card and a non SolarEdge SIM card.

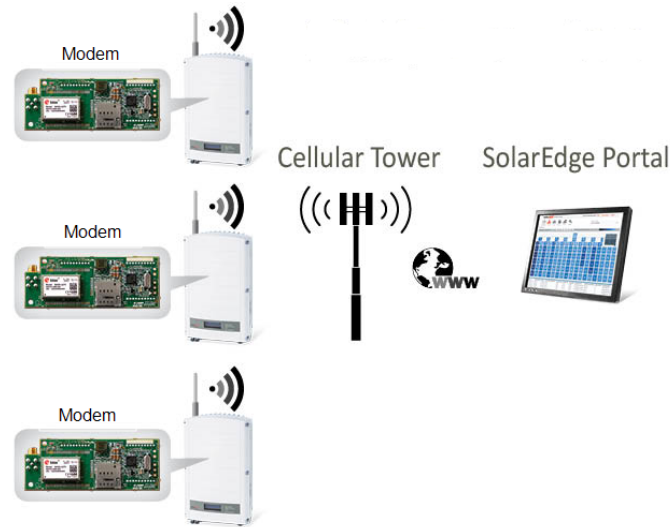


Figure 17: Low bandwidth mode, multiple devices, cellular modem connection

Description

With this configuration you can connect several devices via a cellular network. A GSM kit is required for each device connected via the cellular network.

In this mode data is sampled every 15 minutes and sent to SolarEdge server every 4 hours.

High Bandwidth Mode - Third Party SIM Card

This option is available only with a Third Party SIM card.

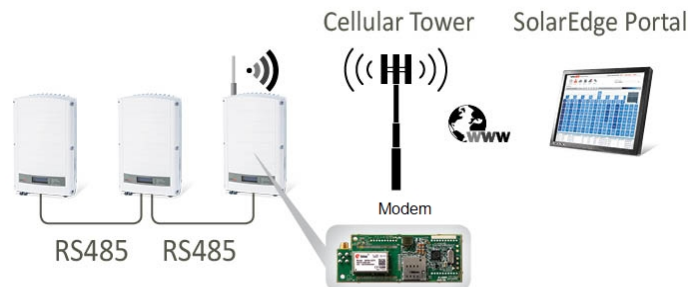


Figure 18: High bandwidth mode, multiple devices, RS485 bus, cellular modem connection

In this mode data is sent to SolarEdge server continuously.

Description

With this configuration you can connect multiple devices on the same RS485 bus in master/slave configuration. In this configuration, only the master device is connected via the cellular network. Up to 32 devices, but only up to 31 slaves can be connected as RS485 slaves. A GSM kit is required only for the master device.

NOTE



For detailed information about, Installation Guidelines, System Compatibility Check and Upgrade, GSM Modem and Antenna Installation, GSM Communication Configuration and Technical Specifications see, [GSM Installation Guide](#).

Cellular Communication Configuration

- In the LCD menu, select the following:
 - Server → Cellular
 - Communication → Cellular Conf.
 - Select Data Plan to set the communication mode High BW.

For detailed communication configuration instructions see the 'GSM Communication Configuration' chapter in the [GSM Installation Guide](#).

Chapter 7: Non SolarEdge Monitoring Connection Options

These communication options are used for monitoring SolarEdge inverters using a non-SolarEdge logger. The configurations enable connecting to a non-SolarEdge logger using the SunSpec protocol.

These scenarios describe multiple inverter configurations, which are common for non-SolarEdge monitoring. However they can be implemented in single inverter systems as well, with only one SolarEdge inverter on the RS485 bus.

Multiple Inverters, RS485 Bus, Wired Ethernet (LAN), Non-SolarEdge Logger

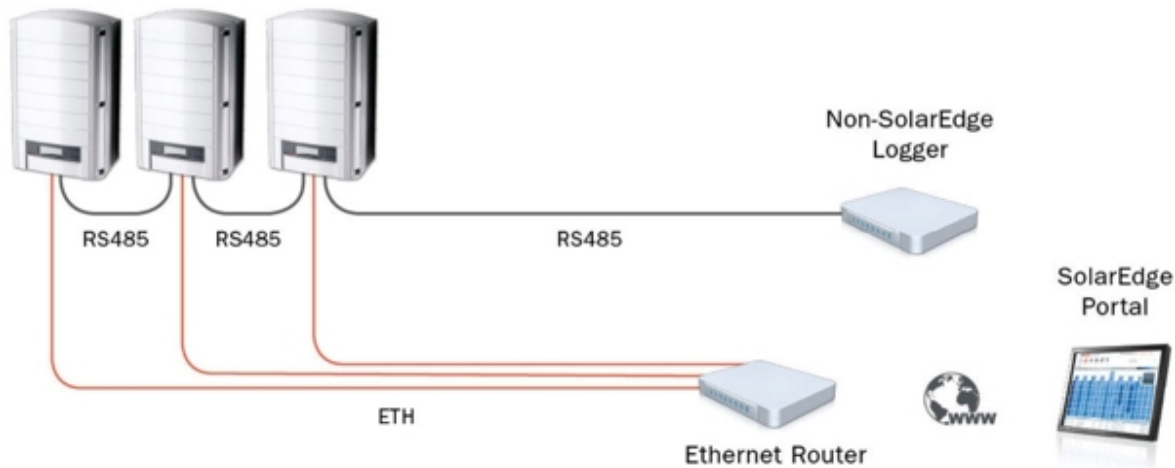


Figure 19: Multiple inverters, RS485 bus, wired Ethernet, non-SolarEdge logger

Description

With this configuration you can connect multiple inverters on the same RS485 bus in a master/slave configuration directly to a Non-SolarEdge logger.

Ethernet cables are used to connect the inverters to the SolarEdge monitoring platform through an Ethernet router.

Inverter and optimizer monitoring data is sent to the SolarEdge monitoring server via the LAN port using the SolarEdge protocol, and inverter monitoring data is sent to the non-SolarEdge logger via the RS485 port using the SunSpec protocol.

Required Equipment

- CAT5 or CAT6 Ethernet cable with RJ45 connectors. Max Distance: 100 meters / 300 ft. (per inverter connection).
- Ethernet router
- Non-SolarEdge SunSpec logger
- 4 conductor cable (logger end of the cable should have a connector to match the logger). Max Distance: 1000 m / 3000 ft.

NOTE

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

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 DC Safety Unit, connect the grounding wire to the grounding bus-bar in the DC Safety Unit.



NOTE

An RS485 surge protection plug-in is integrated into the RS485-1 terminal block.

Inverter RS485 Configuration

For all the inverters, select the following in the LCD menu:

- Communication → Server → None
- Communication → RS485-1 Conf → Device Type → Non-SE Logger
- Communication → RS485-1 Conf → Protocol → SunSpec
- Communication → RS485-1 Conf → Device ID → [unique value 1...247]

Inverter LAN Configuration

The SolarEdge devices are preconfigured to use the LAN port by default, thus obtaining the IP settings automatically from a DHCP server. If a static IP is required, select the following in the LCD menu:

- Communication → Server → LAN
- Communication → LAN Conf → Set DHCP → [Select Disable]
- Communication → LAN Conf → Set IP → [Set device IP]
- Communication → LAN Conf → Set Mask → [Set device subnet mask]
- Communication → LAN Conf → Set Gateway → [Set device gateway]
- Communication → LAN Conf → Set DNS → [Set device DNS]
- Verify that the LCD panel displays <S_OK>

Multiple Inverters, RS485 Bus, Non-SolarEdge Logger

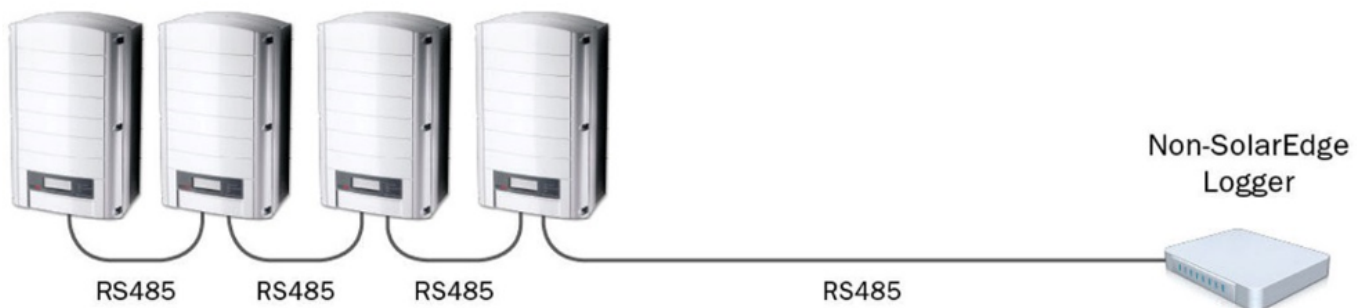


Figure 20: Multiple inverters, RS485 bus, non-SolarEdge logger

Description

This configuration enables to connect multiple inverters on the same RS485 bus in a master/slave configuration directly to a non-SolarEdge logger.

Inverter monitoring data is sent to the non-SolarEdge logger using the SunSpec protocol.

Required Equipment

- Non-SolarEdge SunSpec logger
- 4 conductor cable (logger end of the cable should have a connector to match the logger). Max distance: 1000 m / 3000 ft.

NOTE

If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommended to use external surge protection devices. For details refer to:
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 DC Safety Unit, connect the grounding wire to the grounding bus-bar in the DC Safety Unit.



NOTE

An RS485 surge protection plug-in is integrated into the RS485-1 terminal block.

SolarEdge Device Configuration

For all the inverters, select the following in the LCD menu:

- Communication → Server → None
- Communication → RS485-1 Conf → Device Type → Non-SE Logger
- Communication → RS485-1 Conf → Protocol → SunSpec
- Communication → RS485-1 Conf → Device ID → [unique value 1...247]

Multiple Inverters, RS485 Bus, RS485-E, Wired Ethernet (LAN), Non-SolarEdge Logger

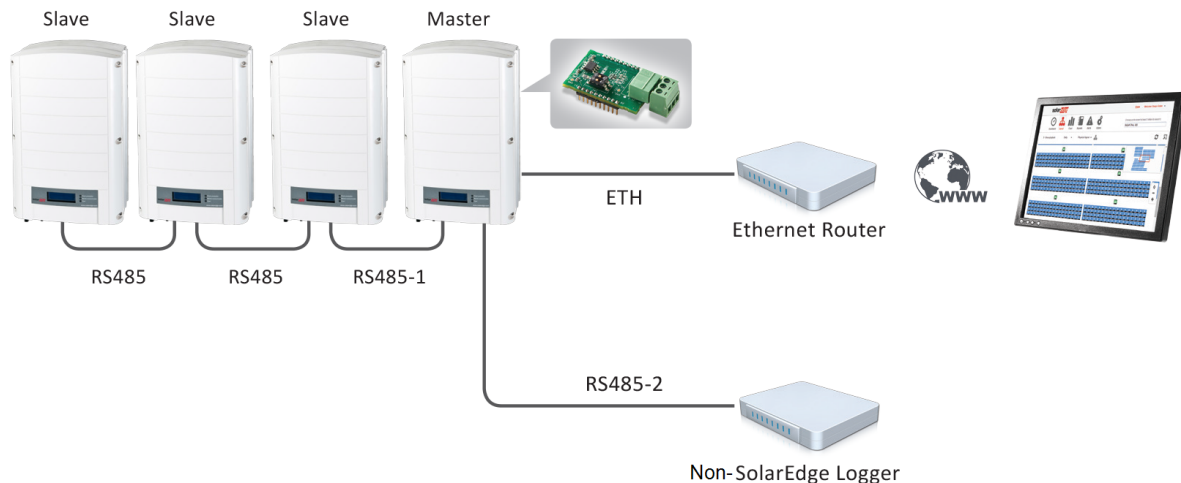


Figure 21: Multiple inverters, RS485 bus, RS485-E, wired Ethernet (LAN), Non-SolarEdge logger

Description

With this configuration you can connect multiple inverters on the same RS485 bus in a master/slave configuration. An Ethernet cable is used to connect the inverters to the SolarEdge monitoring server through an Ethernet router. The non-SolarEdge logger is connected to the second RS485 port of the master inverter. If there is no RS485 port use RS485 -E.

Inverter and optimizer monitoring data is sent to the SolarEdge monitoring server via the LAN port using the SolarEdge protocol, and inverter monitoring data is sent to the non-SolarEdge logger via the second RS485 port using the SunSpec protocol. If a second RS485 port is not available use RS485 -E.

Required Equipment

- CAT5 or CAT6 Ethernet cable with RJ45 connectors. Max distance: 100 meters / 300 ft. (per inverter connection)
- Non-SolarEdge SunSpec logger
- Ethernet router
- 4 conductor cable (logger end of the cable should have a connector to match the logger).
Max distance: 1000 m / 3000 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 DC Safety Unit, connect the grounding wire to the grounding bus-bar in the DC Safety Unit.

**NOTE**

An RS485 surge protection plug-in is integrated into the RS485-1 terminal block.

Inverter RS485 Configuration

For all the inverters, select the following in the LCD menu:

- Communication → Server → None
- Communication → RS485-1 Conf → Device Type → Non-SE Logger
- Communication → RS485-1 Conf → Protocol → SunSpec
- Communication → RS485-1 Conf → Device ID → [unique value 1...247]

SolarEdge Device RS485 Configuration

1. For the *slave* devices: The SolarEdge devices are preconfigured to use the RS485-1 port by default.
If using RS485-2 (in devices where supported), or using RS485-E (in devices that do not support RS485-2) select the following in the LCD menu:
 - Communication → RS485-2 (or RS485-E) Conf → Device Type → SolarEdge
 - Communication → RS485-2 (or RS485-E) Conf → Protocol → Slave
 - Communication → Server → RS485
2. For the RS485 *master* device, select the following:
 - Communication → RS485-X Conf → Device Type → SolarEdge
 - Communication → RS485-X Conf → Protocol → Master
 - Communication → RS485-X Conf → Slave Detect

The master should report the correct number of slaves. If it does not, verify the connections and terminations.
3. Verify that the LCD panel displays <S_OK>.

Multiple Inverters, RS485 Bus, RS485-E Bus, CCG, Meter, Non-SolarEdge Logger

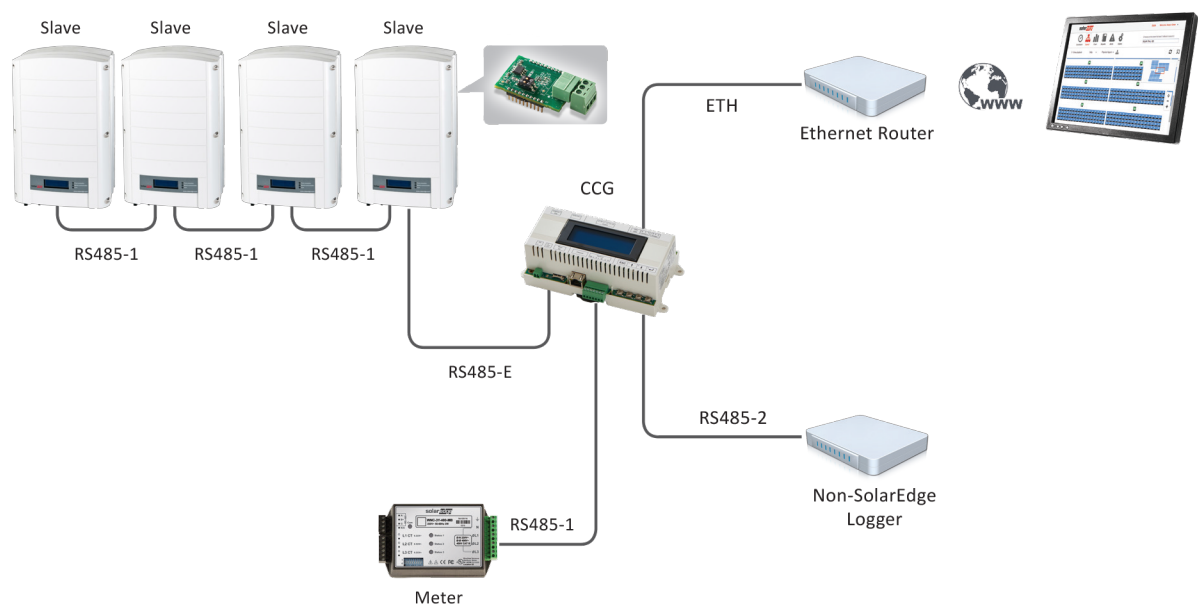


Figure 22: Multiple inverters, RS485 bus, RS485-E bus, CCG, meter, non-SolarEdge logger

Description

With this configuration you can connect multiple inverters on an RS485 bus with a SolarEdge CCG.

The Commercial Gateway which serves as the RS485 master is connected to a meter using its RS485-E port, for reading production, consumption or export measurements (depending on the meter location), and to a non-SolarEdge SunSpec logger using its RS485-2 port. An Ethernet cable is used to connect the CCG to the SolarEdge monitoring server.

Inverter, optimizer and meter monitoring data is sent to the SolarEdge monitoring server via the LAN port using the SolarEdge protocol, and inverter monitoring data is sent to the non-SolarEdge logger via the second RS485 port using the SunSpec protocol.

Required Equipment

- CAT5 or CAT6 Ethernet cable with RJ45 connectors. Max distance: 100 m / 300 ft.
- Ethernet router
- Non-SolarEdge SunSpec logger
- Two 4-conductor cables: The end of one cable should match the meter, the end of the second should match the logger. Max distance: 1000 m / 3000 ft.
- SE1000-CCG-G: SolarEdge Control and Communication Gateway
- SolarEdge approved Modbus electricity meter

NOTE

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

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 DC Safety Unit, connect the



grounding wire to the grounding bus-bar in the DC Safety Unit.

**NOTE**

An RS485 surge protection plug-in is integrated into the RS485-1 terminal block.

Inverter RS485 Configuration

For all inverters, configure the RS485 settings for the logger in the LCD menu:

- Communication → Server → None
- Communication → RS485-1 Conf → Device Type → Non-SE Logger
- Communication → RS485-1 Conf → Protocol → SunSpec
- Communication → RS485-1 Conf → Device ID → [unique value 1...247]

Commercial Gateway Configuration

1. Use RS485-1 to set the Commercial Gateway as the master of the inverter bus:
 - Communication → RS485-1 Conf → Device Type → SolarEdge
 - Communication → RS485-1 Conf → Protocol → Master
 - Communication → RS485-1 Conf → Slave Detect
The CCG should report the correct number of slaves. If it does not, verify the connections and terminations.
2. Use RS485-2 to connect to the logger. Configure the RS485-2 bus as follows:
 - Communication → RS485-2 Conf → Device Type → Non-SE Logger
 - Communication → RS485-2 Conf → Protocol → SunSpec
 - Communication → RS485-2 Conf → Device ID → [unique value 1...247]
Make sure the device ID of the Commercial Gateway is different from all other device IDs configured in the inverters.
3. Use RS485-1 to connect to the meter. Configure the RS485-E as follows:
 - Communication → RS485-1 Conf → Device Type → Meter
 - Communication → RS485-1 Conf → Protocol → [Select the relevant meter protocol]
 - Communication → RS485-1 Conf → Device ID → 1
4. Depending on the meter protocol selection, if the meter is supplied with separate current transformers (CT), set the CT value:
 - Communication → RS485-1 Conf → CT Rating → [insert the CT current rating printed on the CT]
5. Connect the Commercial Gateway to the Ethernet router and configure:
 - Communication → Server → LAN
 - Communication → LAN Conf → Set DHCP → [Select Enable for DHCP or Disable for static IP config.]
 - If DHCP setting Disabled was chosen:
 - Communication → LAN Conf → Set IP → [Set inverters' IP]
 - Communication → LAN Conf → Set Mask → [Set inverters' subnet mask]
 - Communication → LAN Conf → Set Gateway → [Set inverters' gateway]
 - Communication → LAN Conf → Set DNS → [Set inverters' DNS]
 - Verify that the LCD panel of the CCG displays <S_OK>.
6. Verify that the LCD panel of all inverters displays <S_OK>.

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

Australia (+61)	1800 465 567
APAC (Asia Pacific)(+972)	073 240 3118
Belgium (+32)	0800-76633
Netherlands (+31)	0800-7105
China (+86)	21 6212 5536
DACH & Rest of Europe (+49)	089 454 59730
France (+33)	0800 917410
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
Republic of Ireland (+353)	1-800-901-575
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

solaredge