

**solar**edge

**SolarEdge**

**RS485**

**Expansion Kit**

**Installation Guide**

Version 1.0

# Disclaimers

## Important Notice

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# Contents

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<b>Disclaimers</b> .....	<b>1</b>
Important Notice .....	1
<b>Chapter 1: Overview</b> .....	<b>3</b>
<b>Chapter 2: Installation</b> .....	<b>4</b>
Kit Contents .....	4
Software Compatibility and Check .....	4
Installing the RS485 Expansion Module .....	6
Installing the Module in the Inverter .....	6
Installing the Module in the CCG .....	10
RS485-E Configuration to Master .....	11
Troubleshooting .....	13
<b>Appendix A: RS485 Expansion Specifications</b> .....	<b>15</b>

# Chapter 1: Overview

The RS485 Expansion Kit provides an additional RS485 port (called RS485-E) for the inverter and the Control and Communication Gateway (CCG). The kit contains a module which is installed on the inverter or CCG communication board and has a 3-pin RS485 terminal block.

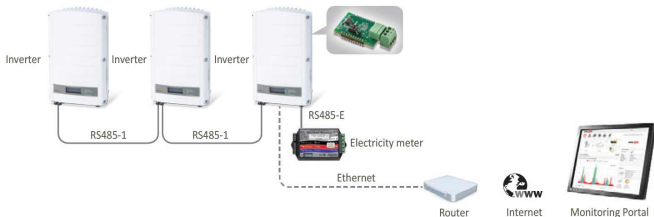
The RS485 module allows connecting the inverter directly to 3rd party monitoring systems (Modbus master) or various Modbus slave devices such as batteries and meters, in addition to other inverters. This second RS485 port also enables nested RS485 networks, valuable when setting up a communication network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

## NOTE



When using the RS485 Expansion module, the ZigBee and Wi-Fi wireless communication options cannot be used.

A multiple inverter system can be connected to meters, 3rd party gateways and other devices with the additional RS485 port.



**Figure 1: A second RS485 port for multiple inverter systems to interface with Modbus devices**

# Chapter 2: Installation

## Kit Contents

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- RS485 Expansion module
- Upgrade card
- Cable tie

## Software Compatibility and Check

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To use the RS485 module, the communication board firmware (CPU) version must be 3.1600 or higher.

► **To check the inverter CPU version:**

1. Verify that the inverter has been activated using the activation card supplied with the inverter.
2. Press the LCD light button short presses until the screen below is reached.

```
ID : ##### ##  
DSP1 / 2 : x.xxxx / x.xxxx  
CPU : 0003.1600  
Country : XXXXX
```


3. Check the CPU version number. If lower than 3.1600, upgrade the inverter software as described below.



### NOTE

Only inverters with version 3.xxxx can be upgraded.

**▶ To upgrade the inverter software:**

1. Disconnect the AC power to the inverter and wait 5 minutes.
2. Open the inverter cover as described in its manual.
3. Insert the firmware upgrade card supplied with the kit into the card slot labeled  on the communication board.
4. Turn the AC ON.

**WARNING!**

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

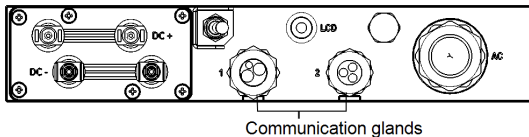
5. If upgrade is required, it starts automatically. Wait for the message "Done" to be displayed on the LCD.
6. Verify the correct version as described above.
7. Remove the card from the inverter.

## Installing the RS485 Expansion Module

The RS485 module can be installed in the inverter and in the CCG.

### Installing the Module in the Inverter

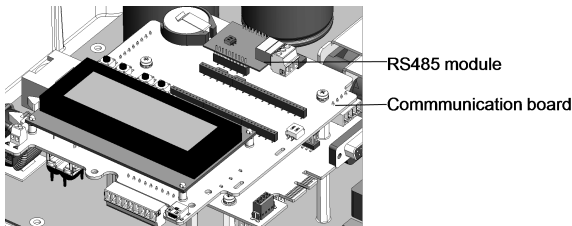
1. Disconnect the AC power to the inverter and wait 5 minutes.
2. Remove the inverter cover as described in its manual.
3. Open the gland numbered 1 at the bottom of the inverter.



**Figure 2: Inverter communication glands**

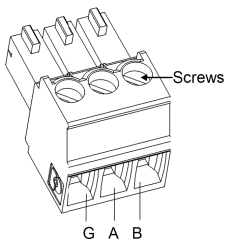
4. Remove the rubber seal from the gland and insert the cable through the gland cover, the seal, and the opened connection of the inverter.
5. Insert the rubber seal with the cable into to the gland body and reconnect the gland to the inverter. Tighten the sealing gland.

6. Connect the RS485 module in its place on the communication board, as shown below. Follow these guidelines:
  - Use the marking on the communication board to plug in the module with the correct orientation.
  - Insert the module such that all pins are correctly positioned in the communication board socket, and no pins are left out of their socket.
  - Make sure that the module is firmly in place.



**Figure 3: RS485 module installed on the communication board**

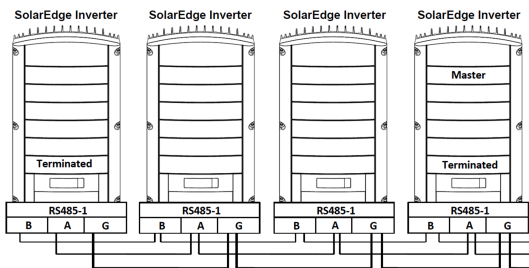
7. Route the cable towards the module along the communication board side.
8. Loosen the screws of pins A(+), B(-), and G on the 3-pin terminal block.



**Figure 4: RS485 3-pin terminal block**



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



**Figure 5: Connecting the inverters in a bus**

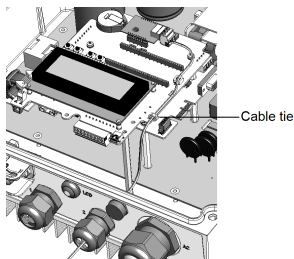


#### NOTE

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

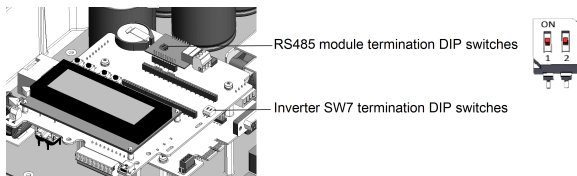
- Tighten the terminal block screws.

12. Tighten the cable to the communication board using the cable tie.



**Figure 6: RS485 cable connected**

13. Check that the wires are fully inserted and cannot be pulled out easily.
14. Terminate the first and last devices in the chain by switching a termination DIP-switch to ON:
  - The inverter that contains the expansion module should be terminated by switching ON the DIP switch on the module.
  - For other devices, the switch located on the communication board and marked SW7 should be terminated.



**Figure 7: RS485 termination DIP switches**

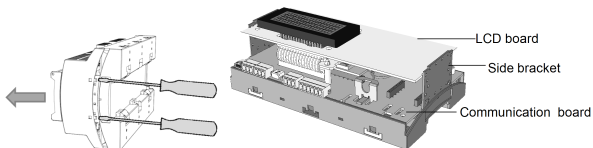


#### **NOTE**

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

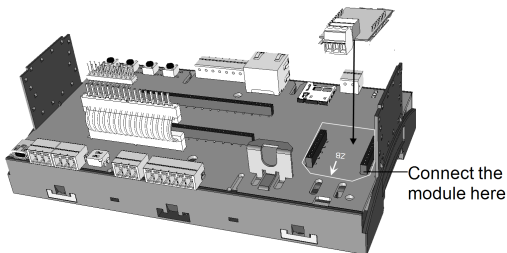
## Installing the Module in the CCG

1. Remove the CCG cover: Insert a flat screwdriver into the grooves on the side of the CCG to release the clasps and carefully remove the cover.



**Figure 8: Removing the CCG cover**

2. Pull the two CCG side brackets to release the LCD board and access the communication board.
3. Connect the RS485 module to the socket marked "ZB" on the communication board. Make sure all the pins are located correctly in the socket.



**Figure 9: Connecting the module to the CCG communication board**

4. Loosen the screws of pins A(+), B(-), and G on the RS485 3-pin terminal block.

6. 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.
6. For creating an RS485 bus - connect all B, A and G pins in all devices.

**NOTE**

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

7. Terminate the first and last device in the chain by switching a termination DIP switch to ON:
  - The CCG that contains the expansion module should be terminated by switching ON the DIP switch on the module.
  - For other devices, the switch located on the communication board and marked SW7 should be terminated.

**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).

8. Carefully return the CCG LCD board to its location.
9. Carefully re-install the CCG cover.

## RS485-E Configuration to Master

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

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

The RS485 Expansion Kit enables the connection of up to 16 RS485 buses with up to 32 devices each in a daisy chain configuration for communications in commercial installations.

▶ **To configure RS485 communications of the additional bus:**

1. If the master device is an inverter - verify that the inverter ON/OFF switch is OFF.
2. Turn ON the AC to the inverter/CCG.

**WARNING!**

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

3. Press the Enter button for at least 5 seconds, and enter the password (12312312).
4. Select **Communication** → **Server** → **RS485**.
5. Select **Communication** → **RS485-E Conf.** → **Enable**. The following is displayed:

```
Enabling RS485 - E
Interface. Verify
module is inserted.
Continue?
```

6. Press Enter to continue. The following is displayed:

```
Device Type <SE>
Protocol <S>
Device ID <1>
Disable
```

- The default protocol is slave. To configure as master select **Protocol** → **Master**.

The Slave Detect and Slave List menus are added to the screen.

```
Device Type <SE>
Protocol <S>
Device ID <1>
Slave Detect
Slave List
Disable
```

- Select **Slave Detect**.

The system starts automatic detection of the SolarEdge slave devices connected to the master device. The master device should report the correct number of slaves. If it does not, refer to the RS485 troubleshooting section below.

## Troubleshooting

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- If the message **Master Not Found** appears, the master device is not responsive or the RS485 cable is not connected. Check the connections to the master device and fix if required.
- If after slave detection the number of slaves reported in the master is smaller than the actual number of slaves, you can use the slave list<sup>1</sup> to identify missing slaves and troubleshoot connectivity problems, as described below.

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<sup>1</sup>Available from CPU version 3.14xx and later.

**▶ To show the slave list on the master device:**

1. After slave detection, if slaves were detected, an additional menu is displayed in the RS485-X Conf. menu: **Slave List**.

If the number of detected slaves does not match the number of slaves connected to the master, use the slave list to check for missing slaves, and check their connection.

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

2. Select **Slave List**. A list showing serial numbers of the detected slaves is displayed. For example:

```
5 0 0 0 F E 0 1 - 4 F
5 0 0 0 F E 0 2 - 5 0
.
.
```

3. To view the details of a detected slave device, select its serial number entry. The following information is displayed:

```
ID: 5 0 0 0 F E 0 1 - 4 F
Last Communication
17 / 02 / 2015
14 : 24 : 01
```

- **ID:** the device serial number
- **Last Communication:** the date and time (dd:mm:yy 24h) the device last communicated with the master device. If this device is detected for the first time after the master wakeup, **N/A** appears for this information.

# Appendix A: RS485 Expansion Specifications

FUNCTIONAL		Unit
Maximum number of slave inverters connected on the RS485 bus	31	
Maximum number of interconnected RS485 buses	16	
Maximum number of Smart Energy Management devices on the RS485 bus	Up to 1 battery; Up to 2 meters	
Maximum RS485 cable length	1000/ 3300	m/ ft
INSTALLATION SPECIFICATIONS		
Dimensions (L x W)	33 x 25/ 1.3 x 1	mm/ in
Operating Temperature	-40 to 85/ -40 to 185	°C/°F



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