SolarEdge Home Gateway Installation Guide

Version 1.5

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

- 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.

SIMPLIFIED EU DECLARATION OF CONFORMITY

Hereby, SolarEdge Technologies Ltd., declares that the radio equipment type Wireless Communication ZigBee Kit is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:
https://www.solaredge.com/sites/default/files/se_wireless_communication_zigbee_kit_certificate_ce_conformity.pdf

Table of Contents

About This Guide

This user guide is intended for Photovoltaic (PV) system owners, installers, technicians, maintainers, and integrators who use the SolarEdge power harvesting system.

This manual describes how to install and set up ZigBee™ communication between a SolarEdge device (inverters or Safety and Monitoring Interface) and the SolarEdge home gateway (also referred to as SolarEdge gateway). The manual instructions and graphics refer to the inverter; however apply to SMI as well.

This guide assumes that the SolarEdge power harvesting system is already installed and commissioned. For additional information about how to install and commission the SolarEdge power harvesting system, refer to the relevant installation guide.

The guide includes the following chapters:

- **Chapter 1: Introducing the Home Gateway**, page 7, describes the SolarEdge home gateway functionality and connection.
- **Chapter 2: Home Gateway User Interfaces**, page 10, describes the home gateway connectors, configuration button, and LEDs.
- **Chapter 3: Installing the SolarEdge Home Gateway**, page 14, describes how to mount, connect and verify the connection of the SolarEdge home gateway.
- **Appendix A: Troubleshooting**, page 18, describes connection and communication problems, and how to troubleshoot them
- **Appendix B: Technical Specifications**, page 22, provides the electrical and mechanical specifications of the SolarEdge home gateway device.

For further information, datasheets and the most up-to-date certifications for various products in different countries, please visit the SolarEdge website: *www.solaredge.com*

Support and Contact Information

If you have technical queries concerning our products, please contact us:

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Before contacting SolarEdge, ensure you have the product serial number as appears on its label.

Chapter 1: Introducing the Home Gateway

Overview

The SolarEdge home gateway is used for wireless connectivity between one or more inverters at a site and a remote internet gateway point. Wireless connectivity allows simplifying the installations as no outdoor cabling is required. The SolarEdge home gateway communicates using ZigBee, a standard for low-rate, high-reliability, and multi device wireless protocol for telemetry communications.

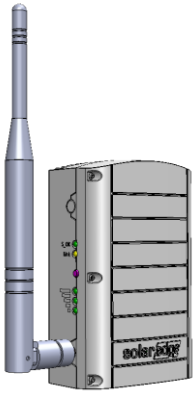


Figure 1: The SolarEdge Home Gateway

Figure 2 shows an inverter as an example; however, this illustration is applicable to other SolarEdge devices, such as Safety and Monitoring Interface (SMI).

Figure 2: Connection to the SolarEdge Inverter

The home gateway is provided with one slave unit that is installed inside the inverter. Up to 15 SolarEdge inverters can be supported per one ZigBee wireless link. In order to enable more than one inverter, additional slave kits are required (sold separately).

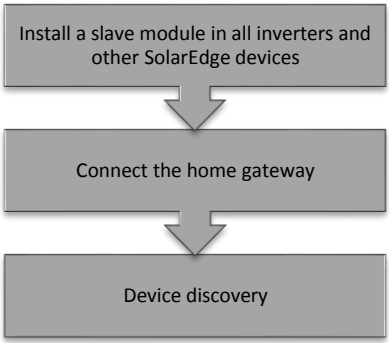
Figure 3: Connection to a Multiple Inverter Wireless Bus

Package Contents

- Home gateway with antenna
- Power supply
- CAT 5E Ethernet cable
- ZigBee slave kit, including:
  - ZigBee slave module
  - Antenna with RF cable
  - Mounting bracket clip for installing the antenna on the inverter
  - Installation guide
- This installation guide

Installation Procedure

The following illustrates the steps required for the home gateway installation:



Safety

WARNING!

- Do not use the AC power supply if it is broken.
- Do not use the AC power supply if the cable is damaged.
- The home gateway/ repeater kit and the AC power supply are for indoor use only and cannot be used in wet locations.

Chapter 2: Home Gateway User Interfaces

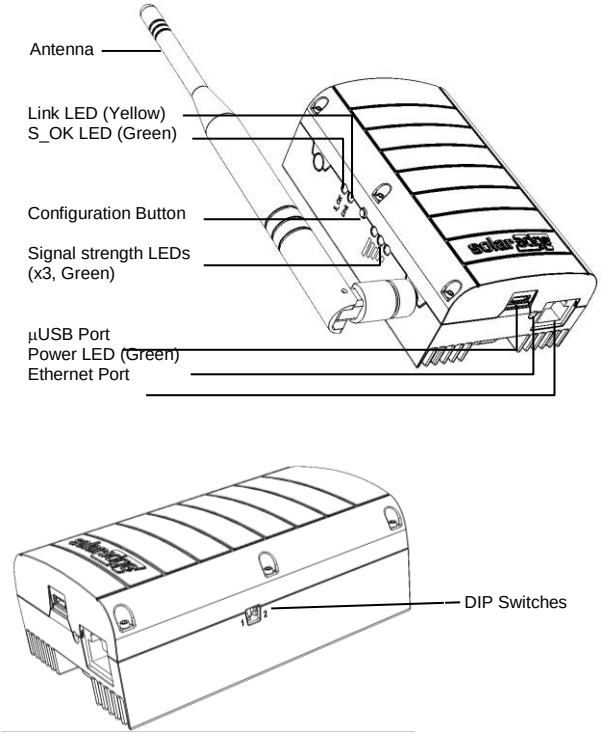


Figure 4: SolarEdge Home Gateway Interfaces

Connectors

- μ**USB**: Connection to the power supply. This port can also be used for connecting to a computer for advanced configuration or SW upgrade.
- **Ethernet**: Connecting the SolarEdge gateway to the SolarEdge monitoring portal through an Ethernet switch/router. The Ethernet switch/router should be connected to the Internet.

DIP Switches

Two DIP switches are located at the side of the gateway. They are used for internal configuration; therefore, their position should not be changed.

Configuration Button

The configuration button is used for the following:

- Discovery of slave devices and associating them to the home gateway
- Diagnosis of communication problems

To use the configuration button:

- Short press: Pressing the configuration button for 5-10 seconds and releasing it - discover slaves (device discovery)
- Long press: Pressing the configuration button for more than 10 seconds and releasing it - start diagnostics mode (refer to *Appendix A: Troubleshooting* on page 18.

LEDs

The gateway has four LED indicators, as follows:

Label and Color	Indication	Functionality[1]
S_OK (green)	Connection with the SolarEdge monitoring portal	**ON** - Connection with SolarEdge monitoring portal is OK **OFF** - Communication with the SolarEdge monitoring portal failed
Link (yellow)	Communication with associated slave(s)	**Blinking** - There has been ZigBee communication in the last 15 minutes. The LED blinks according to the number of slaves as follows: for each slave 0.5 sec. ON and 0.5 sec. OFF. This is repeated following a 5 sec. pause. **OFF** - No communication with any slave in the last 15min
3x Signal strength (RSSI) (green)	Received Signal Strength Indication - Low/Medium/High	**All 3 LEDs ON** - High **Two LEDs ON** - Medium **One LED ON** - Low
Power (green)	Power	Power supply connected to the home gateway

[1] Functionality during normal operation. during device discovery and diagnostic mode, the LEDs indicate different functionality (see *Appendix A: Troubleshooting)*

Chapter 3: Installing the SolarEdge Home Gateway

Installation Guidelines

The following requirements apply when locating and mounting the SolarEdge gateway:

- The SolarEdge home gateway is suitable for mounting indoors only. For outdoor installation, use an external plastic outdoor enclosure (not provided by SolarEdge)
- The SolarEdge home gateway must always remain in an ambient temperature of -20°C (-4°F) to +60°C (140°F).
- Protect the SolarEdge home gateway from dust, wet conditions, corrosive substances, and vapors.
- Install the SolarEdge home gateway on a wall or place it on the desk.

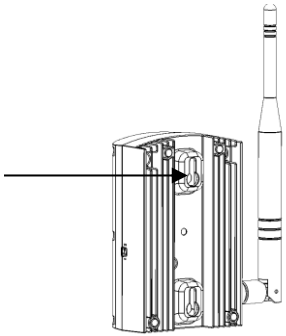


Figure 5: Wall Mount Option

- Ensure that the antenna is always vertically oriented.

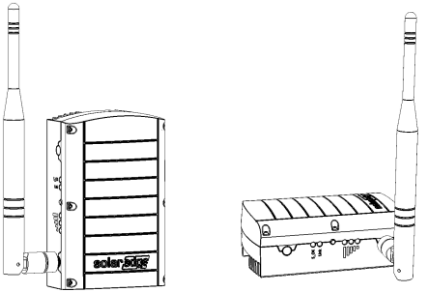


Figure 6: Antenna Orientation

Connecting the SolarEdge Gateway

1. Install the supplied ZigBee slave module in the slave device (inverters or SMI) as described in the *ZigBee Slave Kit Installation Guide*. To connect more slaves, purchase an additional ZigBee slave kit for each slave device (sold separately).
2. Connect the power supply to the μUSB connector and connect to an AC source. The power LED is lit to indicate power connection.
3. Connect the Ethernet cable between the gateway connector and the router or switch used to connect to the Internet.

Device Discovery

Press the configuration button on the home gateway for 5-10 seconds and release. Release the button 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 (refer to *LEDs* on page 13).

Verifying the Connection

1. Verify that the S_OK LED is ON, which indicates the communication with the SolarEdge portal is established. This may take up to five minutes. If the LED does not light up, refer to *Appendix A: Troubleshooting* on page 18.
2. After device discovery, verify that the yellow (Link) LED blinks and indicates the correct amount of slaves, as described in the following illustration.

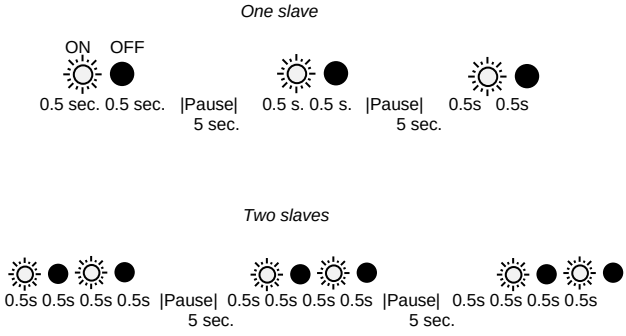


Figure 7: Example of LED Blinks for One or Two Slaves

3. Verify signal strength: Check that at least two RSSI LEDs are ON, which indicates medium signal strength. If only one LED is ON, the signal strength is Low. Consider relocating the home gateway closer to the inverter to improve reception. If all RSSI LEDs are OFF, place a SolarEdge ZigBee repeater (sold separately) between the home gateway and the inverter. Refer also to *Troubleshooting Ethernet Connection*, below.

Appendix A: Troubleshooting

Troubleshooting Ethernet Connection

If the **S_OK** LED on the gateway is not ON, use the diagnostics mode to identify the error:

Press the gateway configuration button for more than 10 seconds and release it (after all LED turn on and then off while pressing). The home gateway is now in diagnostics mode.

- If all LEDs light up – no error has occurred.
- If one of the LEDs is OFF, refer to the following table to diagnose the problem. If more than one problem is identified, diagnose the top one first

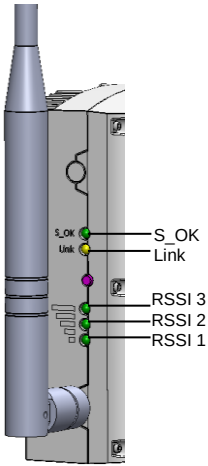
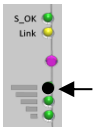
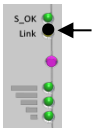


Figure 8: Home Gateway LEDs

Label and Color		Indication when OFF During diagnostic mode	Troubleshooting
RSSI 1 (Low, green)		An Ethernet physical cable connection fault: The Ethernet link or physical Ethernet cable are not connected properly	Check the cable pin-out assignment and cable connection
RSSI 2 (Medium, green)		The gateway failed to get a valid IP address from the DHCP server, or The DHCP/static IP settings in the gateway are not the same as those of the router.	Refer to ***Error! Reference source not found.*** on page **Error! Bookmark not defined.**
RSSI 3 (High, green)		The connection to the router is not available: Ping to the first local switch/router failed (LAN error)	Check the physical connection to the switch/router. contact your network IT, otherwise replace the cable or change it from cross to straight connection
Link (yellow)		The connection to the Internet is not available: Ping to google.com failed	Connect a laptop and use the configuration tool to check for internet connection. If internet access is unavailable, contact your IT admin or your internet provider.
S_OK (green)		The connection to the SolarEdge portal was not established: Communication with the portal failed	Check the SolarEdge server address

Troubleshooting ZigBee Wireless Connection

Yellow LED (Link) does not blink after device discovery

If the yellow LED (Link) does not blink after device discovery, a connection error may have occurred. Try the following troubleshooting actions:

- Relocate the home gateway closer to the inverter to improve signal strength.
- Disconnect the inverter rom the AC source and check that the ZigBee slave inside the inverter is in the correct orientation and that all its pins are inserted into their correct locations in the communication board, and no pins are left out of their socket.
- Place a SolarEdge repeater (sold separately) between the home gateway and the inverter. Refer to the *SolarEdge Repeater Installation Guide*.

Yellow LED (Link) does not blink according to no. of Slaves

If the yellow LED does blink, however not the correct number of times (according to number of slaves), try the following troubleshooting actions:

1. Check the inverters as follows in order to identify a disconnected inverter:
   a. Short-press the inverter's LCD light button until reaching the *Server* status screen:

b. Check that **S_OK** appears in the Server field to indicate a functioning connection to the SolarEdge monitoring portal, which was validated during the last two minutes. Check that the **<OK>** appears in the Status field.

If **S_OK** is not displayed, or **Gateway Not Found** / **Master Not Found** appear, then this is the slave not detected. Do the following:

- Check that the ZigBee slave inside the inverter is in the correct orientation and that all its pins are inserted into their correct locations in the communication board, and no pins are left out of their socket.
- Reload ZigBee defaults as described in the *ZigBee Slave Kit Installation Guide*.

2 Short-press the inverter's LCD light button until reaching the *ZigBee* status screen:

```
PAN   ID: 0000001AB7
CH:   15/1FFE  RSSI:  <M>
ID:   0013A200404B92
MID   : 0013A200409203 36
```

3 Check the following:

- **MID**: check that an MID (Master ID) value appears, to indicate the identification number of the home gateway. If **ZigBee Ready** appears, the inverter is not associated with the home gateway. Perform device discovery.
- **RSSI**: check that **H** (High) or **M** (Medium) appears which indicates the signal strength. If **L** (Low) or no values appear, relocate the gateway for better signal reception, or use a repeater.

Appendix B: Technical Specifications

	North America	Worldwide	Unit
Functional			
Number of inverters that can be monitored	1-15		
Performance			
Transmit power	22.8	11.8	dBm
Receiver Sensitivity	-102		dBm
EIRP with Antenna	27.8	16.8	dBm
Outdoor (LOS) range	400/1300		m/ft
Indoor range[1]	50/160		m/ft
Frequency Band	2400 - 2483		MHz
Maximum Emitted Power	≤ 30	≤ 20	dBm
Antenna Gain	5		dBi
Environmental			
Operating temperature	-20 ÷ +60		°C
Storage temperature	-20 ÷ +60		°C
Relative humidity (non condensing)	0 ÷ 80		%
Ingress protection	IP20		
Power Supply Requirements			
Voltage	5		V
Current			A

[1] Approximate values, may differ depending on specific installation conditions

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