# Setting Up ZigBee Communication between SolarEdge Devices

This document describes how to install and set up ZigBee communication between several SolarEdge devices (inverters and Safety and Monitoring Interfaces (SMI)).

## What's in the Box

Make sure all of the items listed below are included in your box:

- 1 x ZigBee coordinator (master) module **OR** 1 x ZigBee router (slave) module
- 8.5" RG-174 RF cable, RP-SMA connectors
- 2.11" Helical whip 2.4GHz omni-directional antenna

## Creating a ZigBee Connection

ZigBee is a technology that enables you to wirelessly connect several SolarEdge devices. Up to 32 devices may be inter-connected. One of the ZigBee modules must be ordered as a ZigBee coordinator module (master). All the other modules act as routers (slaves).

ZigBee operates as a mesh network so that each ZigBee module operates as a repeater for its neighboring ZigBee module. Therefore, the location of each ZigBee router module (slave) need not be within range of the ZigBee coordinator module (master). It must be within range of its neighboring ZigBee module, which acts as a repeater.

## Physically Connecting the ZigBee Modules Inside the Inverter or SMI

**1** Make sure to turn the devices' AC power off and wait for five minutes.

**2** Open each device cover and insert the appropriate ZigBee module in its place on the communication board, as shown in Figure 1.



**Figure 1: ZigBee Module Location**

> **NOTE:**
> Make sure to plug in the ZigBee module in the correct orientation as illustrated in Figure 1. There is also a marking on the communication board that shows the correct orientation.
> Make sure that all the ZigBee module pins are inserted into the communication board socket.

**3** Make sure to install ZigBee router (slave) modules (SE1000-ZB02-SLV or SE1000-ZB02-SLV-NA) in all SolarEdge devices, except the main device.

**4** Install a ZigBee coordinator (master) module (SE1000-ZB02-MST or SE1000-ZB-MST-NA) in the main SolarEdge device, which is to be connected to the SolarEdge Monitoring Portal.

**5** Connect the RF cable (see Figure 2) to the ZigBee module. Tighten the cable connector using a 5/16" torque wrench set to 3-5 in·lbf (0.3-0.6 Nm). If you do not have a torque wrench, tighten firmly with your hand.
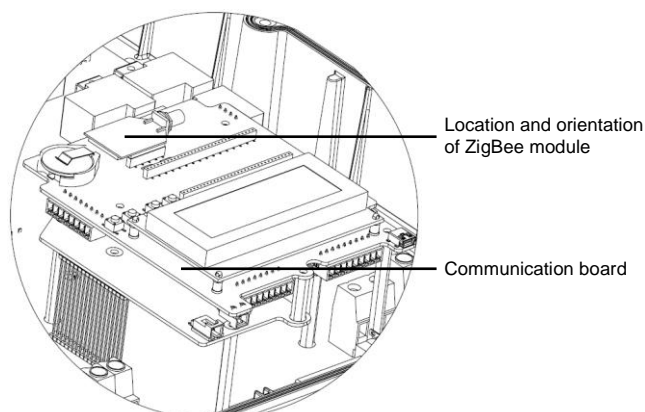Make sure that after tightening the cable, the ZigBee module is still firmly in place.



**Figure 2: ZigBee Module and RF Cable**

**6** Connect the antenna to the cable. Tighten as instructed in the previous step.

**7** Open the gland at the bottom of the inverter, as shown in Figure 2, and slide the antenna from the inside through the opened gland.
Figure 2 shows the inverter, for example. The procedure for the Safety and Monitoring Interface (SMI) is similar.

**8** Seal the gland and screw the gland nut back on around the antenna.

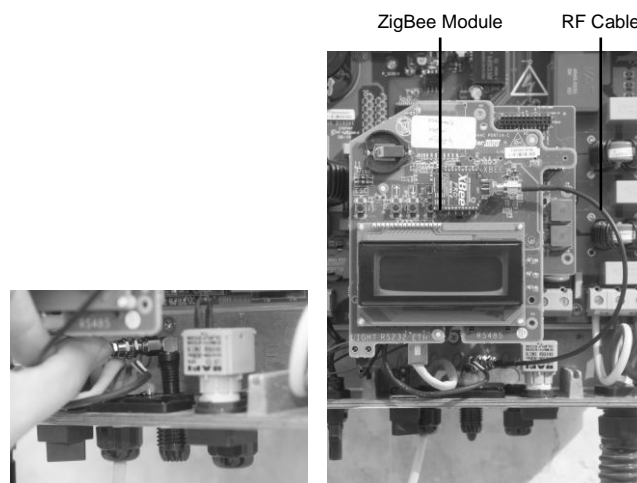**9** Repeat steps **1** through **8** for each SolarEdge device.

solar**edge** architects of energy™

# Configuring ZigBee Communication between the SolarEdge Devices

Figure 3 shows an inverter as an example. This illustration is can be applied to any SolarEdge device connection.

This configuration enables you to wirelessly interconnect several SolarEdge devices in a master/slave configuration (point to multipoint (P2MP) configuration). In this configuration, the master device can optionally be connected to the Internet (WWW) using an Ethernet router/switch.

The SolarEdge devices can be configured in one of two ways:

- **Method A – Configuring the Devices Using the LCD Button:** When using this option, there is no need to open the device's cover in order to set it up.
- **Method B – Configuring the Devices Using the User Buttons:** When using this option, the device's cover is removed and the AC power is turned on in order to set it up.

These configuration options are described in detail below. You can choose either one of them.



Figure 3: Multiple Devices, ZigBee Bus, Ethernet Server Connection

## ► Method A – Configuring SolarEdge Devices Using the LCD Button

The connector panel on the inverter and Safety and Monitoring Interface appears as shown below:
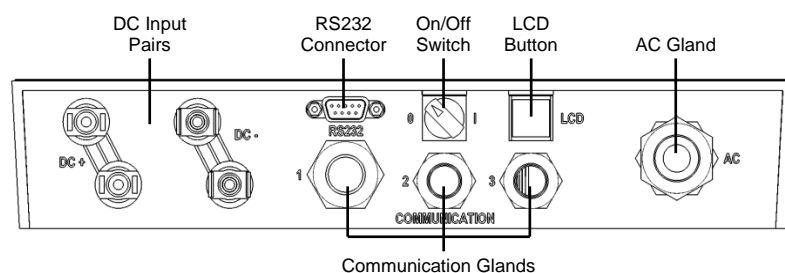
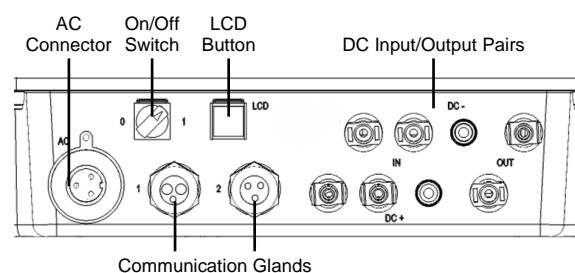

Figure 4: Inverter Connector Panel



Figure 5: Safety and Monitoring Interface Connector panel

Use the LCD button to toggle through the informative status screens. The LCD button can also be used for communication setup.

### For the slave devices, select the following:

**1** Verify that the device's ON/OFF switch is OFF.

**2** Press the LCD Light button once to turn ON the backlight.

⚠ **WARNING!**
If the SolarEdge device worked properly before this action, the following message is displayed:

```
D C   V O L T A G E   N O T   S A F E !
D O   N O T   D I S C O N N E C T !
V D C :       7 2 . 0
```

This message is displayed until the DC is below the safety voltage threshold. The default safety voltage is 50 V.

**3** Short press the LCD button to scroll through the informative screens to show the ID status window and check the CPU firmware version. The correct configuration sequence depends on the CPU version.

```
I D   :   # # # # # # #   # #
D S P 1 / 2 : 1 . 0 2 1 0 / 1 . 0 0 3 4
C P U : 0 0 0 2 . 0 2 5 0
C o u n t r y : U S A
```

**4** Access the LCD button Setup mode. Press and hold down the LCD button until the following message is displayed:

```
K e e p   h o l d i n g   b u t t o n
f o r   p a i r i n g ,   r e l e a s e
t o   e n t e r   m e n u . . .
R e m a i n i n g :       3   s e c
```

**5** Release the button within three seconds.
A short press scrolls down to the next menu option and a long press selects the item. You can use the **Exit** option in these menus to move up one menu level.

**6** Scroll down to the **Communication** submenu and select it. **For FW versions above 2.250, continue to step 13. For earlier versions complete steps 6 through 12 below.**

**7** Select the **Server** submenu, scroll down to the **Zigbee** option and select it. The device performs a reset immediately after the selection is made.
**Server Submenu:**

```
  L A N
  R S 2 3 2
  R S 4 8 5
> Z i g b e e
  N o n e
```

**8** Repeat steps **4** through **6** above to access the Setup mode.

**9** Scroll down to the **Bus** submenu and select it.
**Communication Submenu:**

```
  S e r v e r   < Z i g b e e >
> B u s   < Z i g b e e >
  L o a d   Z B   D e f a u l t s
  E x i t
```

**10** Select the **Zigbee MP** option in the **Bus** submenu. The device performs a reset immediately after the selection is made.

**Bus Submenu:**

```
  Z i g b e e    P 2 P
> Z i g b e e    M P
  R S 4 8 5    M a s t e r
  R S 4 8 5    S l a v e
  N o n e
```

**11** Short press the LCD button to scroll through the informative screens to show the ZigBee status window and verify that you see the message **ready for pairing**.

**12** Repeat steps **1** through **11** for all slave devices.
This concludes the slave SolarEdge devices installation and setup using the LCD button for FW version earlier than 2.250.

**Follow steps 13 through 18 for FW versions above 2.250.**

**13** Select the **Server** submenu, scroll down to the **Zigbee** option and select it.

**Server Submenu:**

```
  L A N
  R S 2 3 2
  R S 4 8 5
> Z i g b e e
  N o n e
```

## For the master (main) device, select the following:

**1** Enter Setup mode. Repeat steps **1** through **6**, as described above.

**For FW versions above 2.250, continue to step 5. For earlier versions, complete steps 2 through 5 below.**

**2** Select the **Bus** submenu. Scroll down and select **Zigbee MP**. The device performs a reset immediately after the selection is made.

**Bus Submenu:**

```
  Z i g b e e    P 2 P
  Z i g b e e    M P
> R S 4 8 5    M a s t e r
  R S 4 8 5    S l a v e
  N o n e
```

**3** Repeat steps **4** through **5** as described above in the Slave Configuration section, to show the **Main** menu. Scroll down to the **Bus Slave Detect** submenu and select it.

**Main Menu:**

```
  O p t i m i z e r    P a i r i n g
> B u s    S l a v e    D e t e c t
  C o m m u n i c a t i o n
  E r r o r    L o g
  W a r n i n g    L o g
  E x i t
```

**4** Scroll down to the **Zigbee Conf** submenu and select it.

**Communication Submenu:**

```
  S e r v e r < L A N >
  R S 4 8 5 - 1    C o n f < S >
  R S 4 8 5 - 2    C o n f < S >
> Z i g b e e    C o n f < M >
  S l a v e    D e t e c t
```

**14** Scroll down to the **Zigbee Conf** submenu and select it.
**Communication Submenu:**

```
  S e r v e r < L A N >
  R S 4 8 5 - 1    C o n f < S >
  R S 4 8 5 - 2    C o n f
> Z i g b e e    C o n f < S >
```

**15** Select the **Multi-Point Slave** option under the **Protocol** submenu.

**Zigbee Conf Submenu:**

```
  D e v i c e    T y p e < S E    >
> P r o t o c o l    < M P S >
  L o a d    Z B    D e f a u l t s
  E x i t
```

**16** Exit the Setup mode by selecting the **Exit** option in each submenu screen or wait for the device to automatically exit Setup mode, if no buttons are pressed for more than two minutes.

**17** Short press the LCD button to scroll through the informative screens to show the ZigBee status window and verify that you see the **ZigBee Ready** message.

**18** Repeat steps **1** through **5** and **13** through **17** for all slave devices.

This concludes the slave SolarEdge devices configuration using the LCD button for FW version 2.250 and above.

**For FW versions earlier than 2.250, complete steps 6 through 7 below.**

**5** Select the **Multi-Point Master** option in the **Protocol** submenu.

**Zigbee Conf Submenu:**

```
  D e v i c e    T y p e < S E    >
> P r o t o c o l    < M P M >
  L o a d    Z B    D e f a u l t s
  S l a v e    D e t e c t < 0 >
  E x i t
```

**6** Select the **Slave Detect** option and select **Yes**. The message **Detecting Slaves** is displayed during the detection process, as well as the number of detected slaves.
This procedure may take a few minutes. The master should report the correct number of slaves on the LCD screen.

**7** Exit the Setup mode by selecting the **Exit** option in each submenu screen or wait for the inverter to automatically exit Setup mode, if no buttons are pressed for more than two minutes.

**NOTE FOR FW VERSIONS EARLIER THAN 2.250:**
The master device sets the PAN ID for the detected slaves.Thus,on FW versions earlier than 2.250, if you try to detect a new slave after a successful pairing, you must reset the initial PAN ID for all slave inverters by reconfiguring the slave inverters, as described in steps **1** through **12** in the slave inverter configuration section.

This concludes the multi-devices setup using the LCD button.

The following steps are required if a connection to the SolarEdge Monitoring Server is necessary (optional and already preconfigured by default).

**8** Enter Setup mode by repeating steps **4** through **6**, as described in the Slave Configuration section.

**9** Select the **Server** submenu, scroll down to the **LAN** option and select it. The device performs a reset immediately after the selection is made.

**Server Submenu:**

```
> L A N
  R S 2 3 2
  R S 4 8 5
  Z i g b e e
  N o n e
```

**10** Exit the Setup mode by selecting the **Exit** option in each submenu screen or wait for the device to automatically exit Setup mode, if no buttons are pressed for more than two minutes.

## ► Method B – Configuring SolarEdge Devices Using the User Buttons

### For the slave devices, select the following:

**1** Verify that the device's ON/OFF switch is OFF.

**2** Press the LCD Light button once to turn ON the backlight.

⚠ **WARNING!**
If the SolarEdge device worked properly before this action, the following message is displayed:

```
D C    V O L T A G E    N O T    S A F E !
  D O    N O T    D I S C O N N E C T !
       V D C :         7 2 . 0
```

This message is displayed until the DC is below the safety voltage threshold. The default safety voltage is 50 V.

**3** Short press the LCD button to scroll through the informative screens to show the ID status window and check the CPU firmware version. The correct configuration sequence depends on the CPU version.

```
I D   :     # # # # # # #   # #
D S P 1 / 2 : 1 . 0 2 1 0 / 1 . 0 0 3 4
C P U : 0 0 0 2 . 0 2 5 0
C o u n t r y : U S A
```

**4** The following configuration procedures must be performed with the device cover open. Four buttons for controlling the LCD panel menus are then accessible, as shown below:
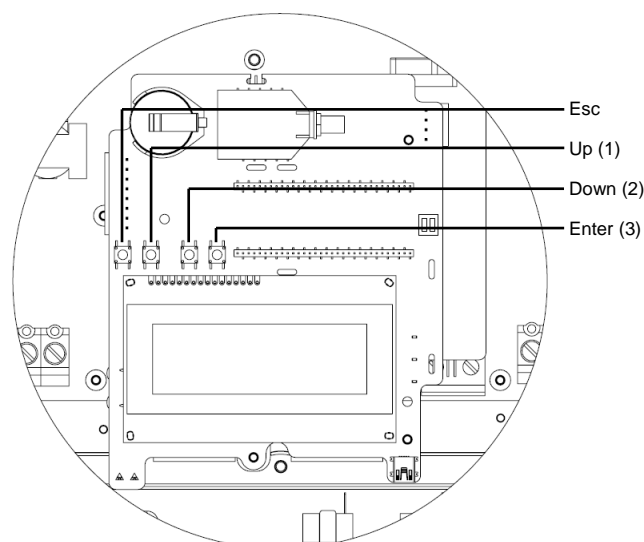


— Esc
— Up (1)
— Down (2)
— Enter (3)

**Figure 6: LCD Panel Menu Buttons**

- **Esc:** Goes to the beginning of the currently entered parameter or to the previous menu.
- **Up (1):** Goes up one option in a menu.
- **Down (2):** Goes down one option in a menu.
- **Enter (3):** Confirms the entry or selection of a parameter.

**5** Press the **Enter** button until the following message is displayed (approximately five seconds):

```
    P l e a s e    e n t e r
    P a s s w o r d
       * * * * * * * *
```

The device is now in Setup mode and all its LEDs are lit. The device automatically exits Setup mode if no buttons are pressed for more than two minutes.

**6** Use the three right-most buttons inside the device (the **UP-1**, **Down-2** and **Enter-3** buttons), shown above, to type in the following default password: **12312312**.

**7** Scroll down to the **Communication** submenu and select it.
**For FW versions above 2.250, continue to step 13. For earlier versions, complete steps 8 through 12 below.**

**8** Select the **Server** submenu, scroll down to the **Zigbee** option and select it. The device performs a reset immediately after the selection is made.

**9** Repeat steps **5** through **7** above to enter Setup mode.

**10** Select the **Bus** submenu. Scroll down and select **Zigbee MP**. The device performs a reset immediately after the selection is made.

**Bus Submenu:**

```
  Z i g b e e    P 2 P
  Z i g b e e    M P
  R S 4 8 5    M a s t e r
> R S 4 8 5    S l a v e
  N o n e
```

**11** Short press the LCD button to scroll through the informative screens to show the ZigBee status window and verify that you see the message **ready for pairing**.

**12** Repeat steps **1** through **11** for all slave devices.
This concludes the setting of the slave devices for FW versions earlier than 2.250.
**Follow steps 13 through 18 for FW versions above 2.250.**

**13** Select the **Server** submenu, scroll down to the **Zigbee** option and select it.

**14** Scroll down to the **Zigbee Conf** submenu and select it.

**Zigbee Conf Submenu:**

```
  D e V i c e    T y p e < S E    >
> P r o t o c o l    < M P S >
  D e V i c e    I D < 1 >
  P A N    I D
  S c A n    C h a n n e l
  L o a d    Z B    D e f a u l t s
```

**15** Select the **Multi-Point Slave** option from the **Protocol** submenu.

**16** Exit setup mode by pressing the ESC button few times.

**17** Short press the LCD button to scroll through the informative screens to show the ZigBee status window and verify that you see the message **ZigBee Ready**.

## For the master (main) device, select the following:

**1** Repeat steps **1** through **7,** as described above in the Slave Configuration section.

**For FW versions above 2.250, continue to step 5. For earlier versions, complete steps 2 through 4 below.**

**2** Select the **Bus** submenu. Scroll down and select **Zigbee MP**. The device performs a reset immediately after the selection is made.

**Bus Submenu:**

```
  Z i g b e e    P 2 P
> Z i g b e e    M P
  R S 4 8 5   M a s t e r
  R S 4 8 5   S l a v e
  N o n e
```

**3** Repeat steps **5** through **7** as described above in the Slave Configuration section to enter Setup mode.

**4** Scroll down to the **ZigBee Conf** submenu and select it.

**Communication Submenu:**

```
  S e r v e r < L A N >
  B u s < Z i g B e e >
  L A N    C o n f
  R S 4 8 5   C o n f < S >
> Z i g b e e   C o n f < S >
  R S 2 3 2   C o n f
  M o d b u s   C o n f
```

**For FW versions earlier than 2.250, complete steps 7 through 8 below.**

**5** Scroll down to the **Zigbee Conf** submenu and select it.

**Zigbee Conf Submenu:**

```
  D e v i c e  T y p e < S E   >
> P r o t o c o l   < M P - M >
  P A N   I D
  S c a n   C h a n n e l
  L o a d   Z B   D e f a u l t s
```

**6** Select the **MP Master** option from the **Protocol** submenu.

**18** Repeat steps **1** through **7** and **13** through **17** for all slave devices.

This concludes the setting of the slave devices for FW version 2.250 and above.

**7** Select the **Slave Detect** option and select **Yes**. The message **Detecting Slaves** is displayed during the detection process, as well as the number of detected slaves.
This procedure may take a few minutes. The master should report the correct number of slaves on the LCD screen.

**8** Press the **ESC** button repeatedly to exit the Setup menu.
This concludes the multi-device setup using the user buttons.

**NOTE FOR FW VERSIONS EARLIER THAN 2.250:**
The master device sets the PAN ID for the detected slaves.Thus,on FW versions earlier than 2.250, if you try to detect a new slave after a successful pairing, you must reset the initial PAN ID for all slave inverters by reconfiguring the slave inverters, as described in steps **1** through **12** in the slave inverter configuration.

The following steps are required if a connection to the SolarEdge Monitoring Server is necessary (optional).

**9** Enter Setup mode by repeating steps **5** through **7**, as described above in the slave configuration section.

**10** Select the **Server** submenu, scroll down to the **LAN** option and select it.

**Server Submenu:**

```
> L A N
  R S 2 3 2
  R S 4 8 5
  Z i g b e e
  N o n e
```

**11** For FW versions above 2.250, press the **ESC** button repeatedly to exit the Setup menu.

This concludes the server connection configuration using the user buttons.

## Verifying the Connection to SolarEdge Monitoring Server (Optional)

**1** Verify that the inverter's ON/OFF switch is still OFF.

**2** Turn ON the AC to the inverter by using the circuit breakers on the main circuit board.

**3** Wait for the inverter to connect to the SolarEdge Monitoring Server. This may take up to two minutes.

**4** Verify that the LCD panel displays a window similar to the following:

```
V a c [ v ]    V d c [ v ]    P a c [ w ]
2 3 0 . 7       5 . 2 V           0 . 0
                   < S _ O K >
                              O F F
```
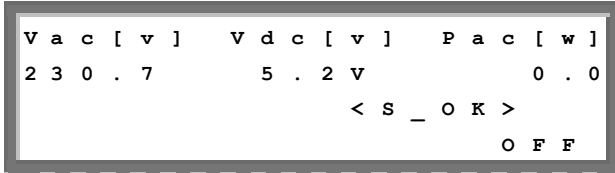
▪ **S_OK:** Verify that **S_OK** appears on the panel to indicate a functioning connection to the SolarEdge Monitoring Server, which was validated during the last two minutes.

**NOTE:**

If the **S_OK** indication is not displayed on the master device, perform the following:

- Check the ZigBee status screen by short pressing the LCD button and if the message **No ZigBee** (appears only in FW ver. 2.250 and above) is displayed, then check that the ZigBee module inside the device is in the correct orientation and that all its pins are connected to the communication board socket without any shift.
- Use another method (unrelated to the SolarEdge Inverter) to check whether the network and modem are operating properly. For example, connect a laptop to the Ethernet modem and connect to the Internet.
- Check the Server Communication status screen by short pressing the LCD button and verify that the **Status** shows **OK**. If not, an error message should appear describing the nature of the problem.
- When using LAN for server connection, check whether a firewall or another device is blocking transmission.
- Check the configuration of the inverter.

If the **S_OK** indication is not displayed on the slave inverters, perform the following:

- Check the ZigBee status screen by short pressing the LCD button and if the message **No ZigBee** (appears only in FW ver. 2.250 and above) is displayed, then check that the ZigBee module inside the device is in the correct orientation and that all its pins are connected to the communication board socket without any shift.
- Check the Server Communication status screen by short pressing the LCD button and if the message **Gateway Not Found** (appears only in FW ver. 2.250 and above) is displayed do the following:
  - Check the RSSI level in the ZigBee status screen – if it reads **L** or **-** then relocate the ZigBee antenna for better signal reception.
  - Check that the master device reports the correct number of slave devices.
- Check the configuration of the inverters.