

solaredge

GSM Plug-In Installation Guide

for Inverters with SetApp

Version 1.0

Version History

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Contents

Contents	2
Disclaimers	3
Important Notice	3
Emission Compliance	3
Support and Contact Information	5
About This Guide	7
Chapter 1: Installation Guidelines	8
Guidelines for installing a SIM Card	9
If Using a Non-SolarEdge SIM Card	9
Chapter 2: System Compatibility Check and Upgrade	12
Software Requirements	12
Chapter 3: GSM Plug-in and Antenna Installation	13
Package Contents	13
Clipping the Antenna to the inverter	13
Connecting the Antenna to a Vertical Surface using a Bracket	16
Installing the Plug-In in the Inverter	16
Chapter 4: Configuring GSM Communication	19
Configuring the Inverter	19
Verifying the Connection and Viewing Communication Status	23
Viewing Error Messages and Troubleshooting	25
The Inverter is not Starting Up	25
Plug-in LED Indications	28
Technical Specifications	29

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

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

Emission Compliance

This equipment has been tested and found to comply with the limits applied by the local regulations. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this

equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

Support and Contact Information

If you have technical problems concerning SolarEdge products, please contact us:

Country	Phone	E-Mail
Australia (+61)	1800 465 567	support@solaredge.net.au
APAC (Asia Pacific) (+972)	073 240 3118	support-asia@solaredge.com
Belgium (+32)	0800-76633	support@solaredge.be
Netherlands (+31)	0800-7105	support@solaredge.nl
China (+86)	21 6212 5536	support_china@solaredge.com
DACH & Rest of Europe (+49)	089 454 59730	support@solaredge.de
France (+33)	0800 917410	support@solaredge.fr
Italy (+39)	0422 053700	support@solaredge.it
Japan (+81)	03 6262 1223	support@solaredge.jp
New Zealand (+64)	0800 144 875	support@solaredge.net.au
US & Canada (+1)	510 498 3200	ussupport@solaredge.com
United Kingdom (+44)	0800 028 1183	support-uk@solaredge.com
Republic of Ireland	1-800-901-575	
Greece (+49)	89 454 59730	support@solaredge.com
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	

Before contact, make sure to have the following information at hand:

- Model and serial number of the product in question.
- The error indicated on the Inverter SetApp mobile applications screen or on the monitoring platform or by the LED, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge server, if the site is connected.
- The software version as appears in the ID status screen.

About This Guide

SolarEdge offers the GSM communication option for connection of the SolarEdge inverter to the SolarEdge monitoring server.

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.

This guide includes the following chapters:

- Chapter 1: *Installation Guidelines* on page 8, provides guidelines for installing the GSM Plug-in with or without data plan according to your system configuration.
- Chapter 2: *Software Compatibility Check and Upgrade* on page 1, describes the hardware and firmware requirements for using the GSM Plug-in.
- Chapter 3: *Cellular GSM Plug-in and Antenna Installation* on page 1, describes how to mount and verify the connection of the GSM Plug-in and antenna.
- Chapter 4: *Configuring Cellular GSM Communication* on page 1, describes how to set up the GSM communication option in the inverter, and check the communication.
- Appendix A: *Technical Specifications* on page 1, provides the electrical and mechanical specifications of the SolarEdge GSM Plug-in.

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.

Chapter 1: Installation Guidelines

Inverters may be supplied with or without a GSM Plug-in, and with or without a SIM card. To use the GSM Plug-in, the inverter communication board firmware (CPU) version must be 4.2.xxx or later. Check your inverter configuration and follow the guidelines in the following table:

If your inverter includes:	Do this:
No GSM Plug-in	One of the following: <ul style="list-style-type: none"> ○ If you purchased a GSM Plug-in <i>including a SolarEdge data plan</i> - Mount the antenna, install the GSM Plug-in and SIM card and configure GSM, as described herein. ○ If you purchased a GSM Plug-in without a data plan. - A data plan with SIM card is available from SolarEdge, or you may use your own card (refer to the requirements in "Guidelines for installing a non-SolarEdge SIM Card" on the next page) .Mount the antenna, install the GSM modem and SIM card and configure GSM, as described herein.
A built-in GSM Plug-in <i>without</i> a SIM card	Mount the supplied antenna as described herein. Insert a SIM card and configure the data plan as described herein. A data plan with SIM card is available from SolarEdge, or you may use your own plan (refer to the requirements in "If Using a Non-SolarEdge SIM Card" on the facing page).
A built-in GSM <i>Plug-in</i> with a SIM card (data plan)	Mount the supplied antenna as described herein. No configuration is required. Data plan is pre-configured.

Guidelines for installing a SIM Card

Activating and using the GSM connection requires a SIM card, which is inserted into a designated slot on the GSM Plug-in. A SIM card is required in each GSM Plug-in.

1. If there is no SIM card installed in the Plug-in, insert one into the slot on the GSM Plug-in.

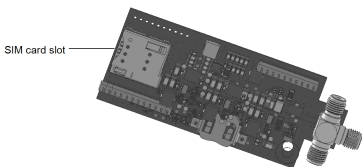


Figure 1: SIM card slot on GSM Plug-in

2. Remove the inverter cover as described in its manual.

If Using a Non-SolarEdge SIM Card

If using a non- SolarEdge SIM card:

- Calculate the data required (refer to *Technical Specifications* on page 1). For example, if the installation comprises one inverter, 16 power optimizers, and one production meter - the data plan required for Low bandwidth configuration is: $2.6 \text{ MB} + 16 * 0.05 \text{ MB} + 0.1 \text{ MB} = 3.5 \text{ MB}$ per month
- Select a SIM card with the following specifications:
 - μ SIM
 - Supports SMS
 - Works with the 3G GSM network

- Obtain the following details from your operator:
 - SIM phone number
 - PIN (Personal Identification Number)
 - MNO (Mobile Network Operator)
 - APN (Access Point Name)
 - User name

When using multiple SolarEdge inverters in the same site, depending on the system operation mode (high or low bandwidth), a GSM Plug-in must be installed as follows:

- Low bandwidth - in each inverter
- High bandwidth - in one device (master inverter for up to 31 slave inverters)

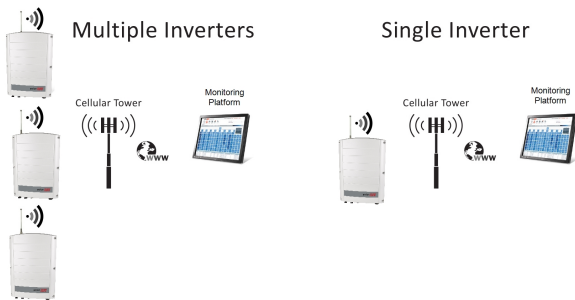


Figure 2: GSM Plug-in low bandwidth mode connection diagram

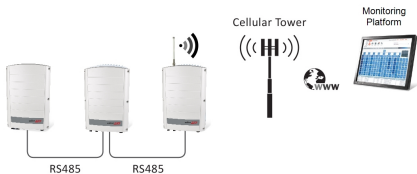


Figure 3: GSM Plug-in high bandwidth mode connection diagram

Chapter 2: System Compatibility Check and Upgrade

Software Requirements

To use the GSM communication option, the communication board firmware (CPU) version must be 4.2.XX or higher ((three phase inverters) or 4.4.xx or higher (single phase inverters)).

▶ **To check the inverter CPU version and upgrade firmware using SetApp:**

1. Access SetApp and select **Commissioning** → **Information**
2. If required, upgrade to the latest available firmware :select **Maintenance** → **Firmware Upgrade**, and follow the instructions on the screen.

Chapter 3: GSM Plug-in and Antenna Installation

This chapter describes how to install a GSM Plug-in and antenna in a SolarEdge inverter.

Package Contents

- GSM Plug-in (optionally including a SolarEdge SIM card)
- Antenna and mounting clip with antenna cable



Clipping the Antenna to the inverter

1. Power off the inverter:
 - a. Turn the inverter ON/OFF/P switch to OFF. Wait 5 minutes for the capacitors to discharge.
 - b. Turn the Safety Switch (if applicable) to OFF.
 - c. Disconnect the AC to the inverter by turning OFF the circuit breakers on the distribution panel.

- Clip the antenna vertically to the heatsink fins or the inverter side.

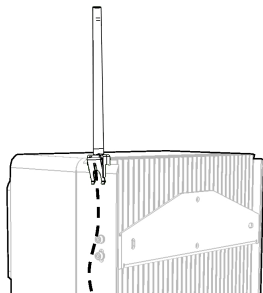


Figure 4: Antenna mounted on the inverter

- Pass the antenna cable between the mounting bracket and the rear side of the inverter or along the heatsink fins.
- Open the gland numbered 1 at the bottom of the inverter.

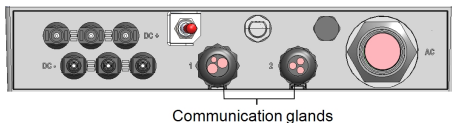


Figure 5: Inverter communication glands

- Remove the rubber seal from the gland and insert the cable through the gland body and the opened connection of the inverter.
- Push the cable into the cut opening of the rubber seal.
- Insert the rubber seal with the cable into the gland body and reconnect the gland to the inverter. Tighten the sealing gland.

8. Pull the excess cable into the inverter so that the cable can be attached to the inverter communication board (see *Figure 7*). The cable connects to the GSM Plug-in Wi-FiZigBeeZigBee Plug-in as described in the next section.

Connecting the Antenna to a Vertical Surface using a Bracket

For connecting the antenna to a vertical surface (i.e. a wall), use a bracket with the following recommended dimensions (not supplied by SolarEdge):

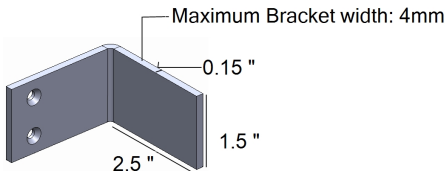


Figure 6: Example of antenna bracket

1. Drill two holes in the surface and attach the bracket to it with two screws.
2. Clip the antenna onto the bracket. Make sure the antenna is vertical.

Installing the Plug-In in the Inverter

NOTE



If the GSM Plug-in is pre-installed in the inverter (with a SIM card), this step is not required.

1. Remove the inverter cover as described in its manual.

▶ To Install the Plug-in in the inverter:

1. Locate the Plug-in in its place on the communication board, as shown in *Figure 7*.

follow these guidelines:

- Plug in the Plug-in making sure that all pins are correctly positioned in the Plug-in connector, and no pins are left out of the connector.
 - Make sure that the Plug-in is firmly in place.
2. Connect the antenna cable to the cellular Plug-in and tighten manually (as shown in *Figure 7*).

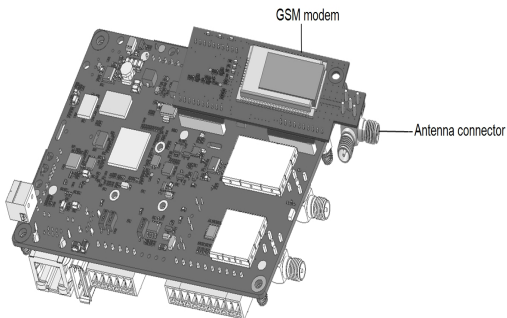


Figure 7: Installed Plug-in and antenna connector

- Turn the AC ON.

**WARNING!**

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

- Check that all the GSM Plug-in LEDs are lit. If not, refer to "Viewing Error Messages and Troubleshooting" on page 25

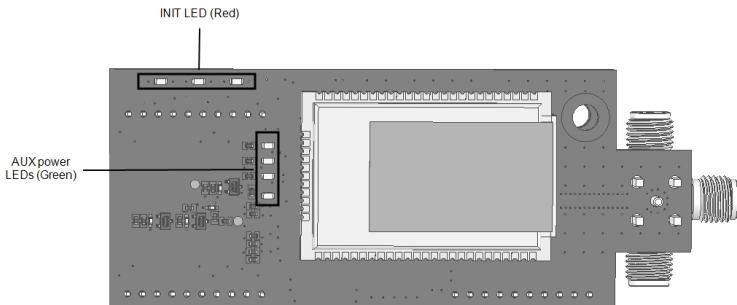


Figure 8: GSM Plug-in LEDs


Chapter 4: Configuring GSM Communication

This chapter describes how to activate the GSM Plug-in if using a *non-solarEdge SIM card*, configure the inverter to use GSM communication, verify the connection and troubleshoot problems.

Configuring the Inverter

1. Ensure you have installed the Plug-in and antenna. For instructions see "GSM Plug-in and Antenna Installation" on page 13.
2. Activate, commission and configure the installation (except for communication) according to the Inverter Installation Guide.
3. Access SetApp and select **Communication** → **Cellular**
4. In the **Cellular** screen select **Configurations**

5. In the **Cellular Configurations** screen click **Edit** then enter required information.
- Access Point Name - the mobile network operator (MNO)name
 - User Name -the mobile network operator name
 - Password - the mobile network operator user password
 - PIN - Personal Identification Name (PIN) code .
 - Phone Number - the mobile phone number. Enter "+", the country code, and the mobile number. For example, If your number is 732403100 and the country code is 972 - enter: +972732403100

After entering information click **Done** or **Cancel**, then tap  at the top of the screen to access the Cellular screen.

Cellular Configurations

Access Point Name (APN)	MNO APN
User Name	MNO User Name
Password	Password
PIN	1234
Phone Number	+972732403100

Done

6. In the **Cellular** screen select **Data Plan**. Low bandwidth is automatically selected as it is the default.
- **Low Bandwidth** - This is the default mode that uses 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 GSM Plug-in and a SIM card are required in every inverter. Configuring to Low BW is required in every inverter.
 - **High Bandwidth** - This mode uses a data plan for high resolution monitoring. In this mode the Plug-in 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), a GSM Plug-in and a SIM card are required in only one device. Configuring to High BW is required only in that device.
 - To change to **High Bandwidth** contact SolarEdge Support. support@solaredge.com

**NOTE**

If you want to change back to Low Bandwidth, from the Data Plan options select Low Bandwidth.

7. Do one of the following :

- If you leave Low Bandwith selected the following is displayed and occurs:

Auto Activation, the Plug-in connects to the server.

If auto activation fails (the Unidentified # error message appears on the status screen. For information see "Viewing Error Messages and Troubleshooting" on page 25), select **Manual Activation** and in the screen that appears .Enter "+", the country code, and the mobile number. For example, If your number is 732403100 and the country code is 972 - enter: +972732403100

- If you select High BW, a message is displayed: Significant cost may be incurred. Proceed?.

If you select Yes , the Plug-in attempts to establish communication with the monitoring server.

If **Unidentified #** error appears on the status screen (see instructions for accessing the Status screen in the next section) , refer to *Viewing Error Messages and Troubleshooting* on page 25

Verifying the Connection and Viewing Communication Status

You view error messages on the Status screen.

▶ To access the SetApp Status screen:

1. Do one of the following:
 - During first time Commissioning and configuration: From the **Commissioning** menu select **Status**. The main inverter Status screen is displayed (see on the following page)
 - If the inverter has already been activated and commissioned - open SetApp and follow the instructions on the screen (scan the inverter bar-code; move the ON/OFF/P switch to P position (for less than 5 sec) and release).

The mobile device creates a Wi-Fi connection with the inverter and displays the inverter main Status screen.

solar edge		
Status		
Inverter		
SN 07318000C		
Power	Voltage	Frequency
Optimizers Connected		S_OK Server Connected Cell
Status Production	⚠	Switch OFF
CosPhi 1.00	Limit No Limit	Country Netherlands
Voltage	Temp 20 C	Fan
⚠ Switch Off. Production disabled >		
Commissioning		

Figure 9: SetApp Status screen

- Verify that **S_OK** (inverter established a successful physical connection to the monitoring platform) and **Cell** (the method of communication to the SolarEdge monitoring platform) appear on the Status screen.
- If required you can view the:
 - mobile network operator name (MNO) on the Communication menu ,see Chapter 4

- The Signal strength received from the GSM Plug-in(**Sig**) on the Status screen *Figure 9*.
The strength is displayed as a value between 0-5, (0 = no signal, 5 = excellent signal).

Viewing Error Messages and Troubleshooting

The Inverter is not Starting Up


If the inverter is not starting up, the Plug-in may have been installed in an inverter with an incompatible CPU software version.

Check if the Plug-in is installed, remove it and upgrade the inverter as described in *System Compatibility Check and Upgrade* on page 12 .

You view error messages on the SetApp screen. To access the SetApp Status screen see *Verifying the Connection and Viewing Communication Status* on page 23.

Error message	Description	Troubleshooting
GSM Plug-in detected	The internal Plug-in is not communicating with the communication board.	Check that the GSM Plug- in is installed properly: All the pins are inserted in the correct location and not shifted.
SIM not detected	The SIM card is not inserted or not recognized.	Insert a valid SIM card and check it is inserted correctly.
Enter PIN	Personal Identification Name (PIN) code is pending.	<ul style="list-style-type: none"> Enter Setup mode From Communication select Cellular Conf, and set the PIN code according to the MNO (Mobile Network Operator).
Enter APN	The Access Point	<ul style="list-style-type: none"> Enter Setup mode

Error message	Description	Troubleshooting
	Name (APN) parameter is empty.	<ul style="list-style-type: none"> From Communication select Cellular Conf, and set the APN according to the MNO.
Not registered	The GSM Plug-In is not registered to a network provider.	<ul style="list-style-type: none"> Check antenna connection or change antenna location. Contact SolarEdge support.
APN authentication failed	Invalid APN, username or password.	<ul style="list-style-type: none"> Enter Setup mode From Communication select Cellular Conf.and set the APN/username/password according to the MNO. If setting the APN/username/password according to the MNO generates a "Configuration Error", check with the carrier whether the SIM needs to be activated.
No signal	No GSM signal is received.	<ul style="list-style-type: none"> Check that the cable is connected properly to both Plug-in and antenna. Check for any damage to the cable or connectors. Try relocating the antenna. Check that there is cellular coverage in your area.
Activate Plan	Data plan was not selected.	Select a data plan as described in <i>Configuring the Inverter</i> on page 19.
DNS Failure	The DNS request that was forwarded to the cellular network provider has failed, or	Contact SolarEdge support.

Error message	Description	Troubleshooting
	there is a problem in the DNS registration on the SolarEdge server.	
TCP Failure	Connection to the SolarEdge server has failed.	Contact SolarEdge support.
SMS blocked	The SIM card does not support SMS capability	<p>Replace the SIM card.</p> <div style="background-color: #333; color: white; padding: 5px;">NOTE</div> <p> Replacing a SIM card requires system reconfiguration and activation.</p> <p>If the replaced SIM card was configured to Low BW, the new SIM can only be set to Low BW.</p>
Unidentified #	The mobile number is blocked or incorrectly decoded.	<p>Activate the Plug-in <i>manually</i>:</p> <p>Select Manual Activation. Enter "+", the country code, and the mobile number. For example, If your number is 732403100 and the country code is 972 - enter: +972732403100</p>
S_OK is not displayed on the SetApp status screen .	Communication with the SolarEdge monitoring server is not established.	Verify that none of the above errors appear.

Plug-in LED Indications

Function	LED functionality	Description	Troubleshooting
AUX Power LEDs	All LEDs are OFF	The Plug-in is not connected properly	Check that the Plug-in is installed properly: All the pins are inserted in the correct location and not shifted.
		The Plug-in is damaged	Contact SolarEdge support
	The green Plug-in power LED is ON, but one or more of the other LEDs is OFF	The Plug-in is damaged	Contact SolarEdge support
Init LEDs	Red LED is blinking slowly	Communication between Plug-in and main board is established	Indication only
	Orange ON	The Plug is registered to a cellular network	Indication only
	Green ON	The Plug-in is connected to the Internet	Indication only

Technical Specifications

GSM Plug-in for US systems:

DATA PLAN (for Non-SolarEdge SIM cards)	High Bandwidth	Low Bandwidth	
Number of Inverters Monitored With a Single GSM Kit	Up to 32	1	
Monitoring	Data sampled every 5 minutes and sent to SolarEdge server continuously	Data sampled every 15 minutes and sent to SolarEdge server every 4 hours	
Monthly Data - per Inverter	7.8	2.6	MB
Monthly Data - per Optimizer	0.15	0.05	MB
Monthly Data - per Revenue Grade Meter	0.3	0.1	MB
Data per Export or Consumption Meter	3	0.55	MB
Monthly Data - per Battery	3	0.7	MB
RF Performance			
Operating Frequency Min.-Max. 850	Plug-in transmit: 824-849		MHz
	Plug-in receive: 869-894		
Operating Frequency Min.-Max. 1900	Plug-in transmit: 1850 -1910		MH
	Plug-inreceive: 1930 -1990		
Antenna	Included, 2dBi outdoor; Dual band antenna: 824-960 MHz / 1710-2170 MHz		
Maximum output power 850 MHz band	33		dBm

Maximum output power 1900 MHz band	30	dBm
Receiver Input Sensitivity	Typical -109	dBm
(Downlink RF level @ BER Class II < 2.4 %)		
Standard Compliance		
Emissions and Radio	FCC CFR Title 47 Part 15 Class B, Part 15.247	
Installation Specifications		
Dimensions (L x W)	3.55 x 1.35 / 90.5 x 34.5	in/mm
Operating Temperature	-40 to +185 / -40 to +85	°F/°C
Sim Card Holder		
Type	MicroSim	

GSM Plug-in for worldwide systems:

DATA PLAN (for Non-SolarEdge SIM cards)	High Bandwidth	Low Bandwidth	Unit
Number of Inverters Monitored With a Single GSM Kit	Up to 32	1	
Monitoring	Data sampled every 5 minutes and sent to SolarEdge server continuously	Data sampled every 15 minutes and sent to SolarEdge server every 4 hour	
Monthly Data - per Inverter	7.8	2.6	MB
Monthly Data - per Optimizer	0.15	0.05	MB
Monthly Data - per Production Meter	0.3	0.1	MB
Monthly Data - per Export or Consumption Meter	3	0.55	MB
Monthly Data - per Battery	3	0.7	MB
RF Performance			
Operating Frequency Min.-Max. 900	Plug-in transmit: 880-915		MHz
	Plug-in receive: 925-960		
Operating Frequency Min.-Max. 1800	Plug-in transmit: 1710-1785		MHz
	Plug-in receive: 1805-1880		
Operating Frequency Min.-Max. 2100	Plug-in transmit: 1920 -1980		MHz
	Plug-in receive: 2110 -2170		

Antenna	Included, 2dBi outdoor; Dual band antenna: 824-960MHz / 1710-2170MHz	
Maximum output power: 900 MHz band	33	dBm
Maximum output power: 1800 MHz band	30	dBm
Maximum output power: 2100 MHz band	24	dBm
Receiver Input Sensitivity (Downlink RF level @BER Class II < 2.4 %)	Typical. -109	dBm
Standard Compliance		
Emissions and Radio	EN 301-489-1, EN 301-489-7, EN 301-511	
Installation Specifications		
Dimensions (L x W)	90.5 x 34.5 / 3.55 x 1.35	mm/in
Operating Temperature	-40 to +85 / -40 to +185 °C/°F	
Sim Card Holder		
Type	MicroSim	

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

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