ABB Solar inverters

Quick installation guide
PVI-GSM/GPRS

EN

PVI-GSM/GPRS

V_{in} DC: 18-48 V $=$
V_{in} AC: 15-30 V $\sim$
Ta(°C): -20 to +55

TX/RX
Power ON
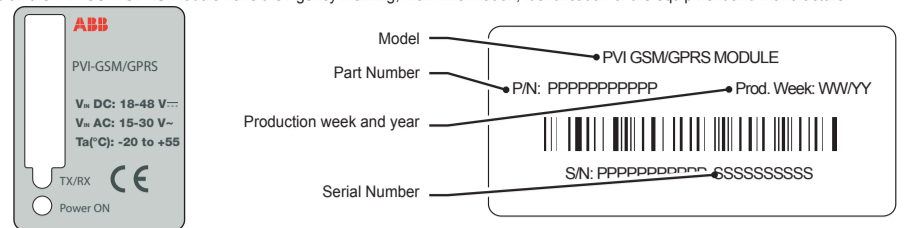
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1.

The labels on the PVI-GSM/GPRS module have the Agency marking, main information, identification of the equipment and manufacturer

PVI-GSM/GPRS

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V_{in} AC: 15-30 V $\sim$
Ta(°C): -20 to +55

TX/RX
Power ON

Model — PVI GSM/GPRS MODULE
Part Number — P/N: PPPPPPPPPPP — Prod. Week: WW/YY
Production week and year
Serial Number — S/N: PPPPPPPPPPP-SSSSSSSSSS

⚠ The labels attached to the equipment must NOT be removed, damaged, dirtied, hidden,etc...

Main symbols used in the guide and on the products

📖	Always refer to instruction manual	⚠	General warning – Important safety information	⚡	Hazardous voltage
IP20	Protection rating of equipment	🌡	Temperature range	🚫	Segnale di divieto

Hot surfaces

Direct and alternating currents, respectively

2.

The PVI-GSM/GPRS expansion module is a GSM/GPRS modem specifically developed for the PVI-AEC-EVO monitoring system. Equipped with a suitable SIM Card, this accessory enables the PVI-AEC-EVO system to connect to the portal management server over a GPRS wireless connection. Connection to the PVI-AEC-EVO system portal is necessary to allow the system to send email alerts and to publish the data gathered by the monitoring system on an internet webpage. The PVI-GSM/GPRS module also allows for interaction with the system through SMS, such as the sending of SMS alerts and the opportunity to use an ordinary mobile phone to request information from the system via SMS. These modem operating features are implemented in the FW of the PVI-AEC-EVO system, starting from version FW AVR v.0.0.124. Earlier versions of FW do not have this function, so you may need to update your FW as described in the PVI-AEC-EVO system Quick Installation Guide.

The PVI-GSM/GPRS module should be used as an accessory for the PVI-AEC-EVO system only: other applications are not envisaged and are therefore not covered under guarantee in case of damage to the unit.

Main components	
01	PVI-GSM/GPRS
02	SIM card slot
03	Expansion bus connector
04	"TX/RX" LED
05	"Power ON" LED
06	Coaxial connector
07	Fixing system
08	Adhesive antenna
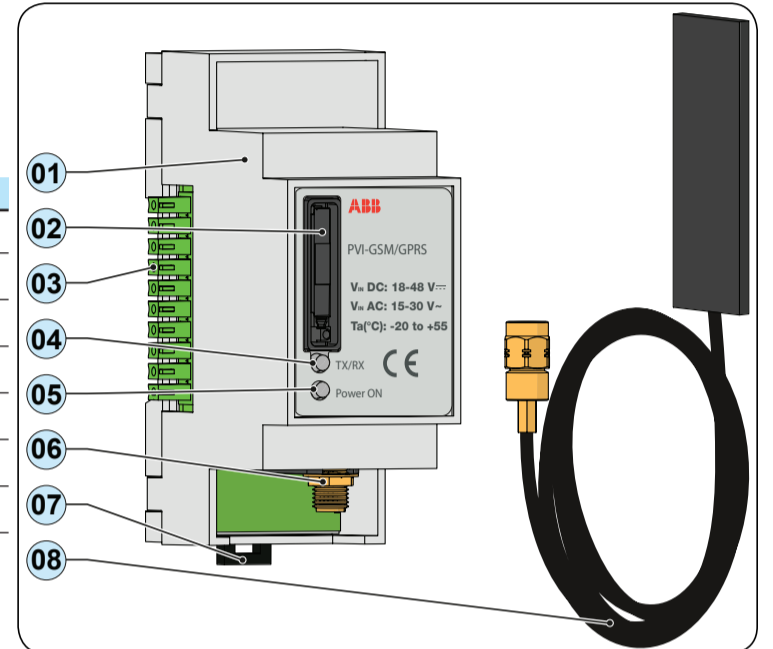
The front panel of the PVI-GSM/GPRS comprises a slot for inserting the SIM Card (not included) and two LEDs which indicate the power supply status and the status of data transmission.
- LED POWER ON (GREEN): Indicates the electricity supply status of the module.
- LED TX/RX (GREEN): Indicates the sending/receiving activity of modem data.

The 10-way connector for connection to the PVI-AEC-EVO is found on the left side panel. The connector for the antenna is located on the underside panel (the antenna is included in the package).

3.

The packaging contains all the components required to correctly install and connect the PVI-GSM/GPRS:

| Components	Quantity
PVI-GSM/GPRS module	1
Adhesive antenna with connection cable (3 mt)	1
Thecnical documentation	

4.

1. SIM card: features and installations

In order to enable the PVI-GSM/GPRS modem to send data collected by the PVI-AEC-EVO, it is necessary to insert into the specific slot a SIM Card with the following features:
- A contract deal SIM Card

⚠ The use of a Pay As You Go SIM Card is strongly discouraged as it may not allow the required services to function with the system. ABB declines all responsibility in the event of operational problems resulting from the use of SIM Cards failing to meet the criteria listed above and/or relating to inefficiency of the mobile phone service provider.

- SIM Card enabled for GPRS service

- Machine-to-Machine SIM Card (M2M)

⚠ The use of the SIM Card Machine-to-Machine is optional
The PIN Code must be disabled before inserting the SIM Card into the system: this can be done by inserting the SIM Card into any ordinary mobile telephone.

- Enabled for fax/data traffic and SMS, both incoming and outgoing.

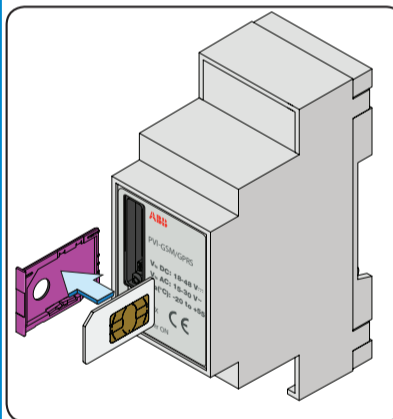⚠ 3G SIM Cards are not supported by the PVI-GSM/GPRS expansion module

To insert the SIM Card into the module:

a. Remove the SIM Card holder from its slot by pressing down on the holder release button with a pointed object (screwdriver, pen).
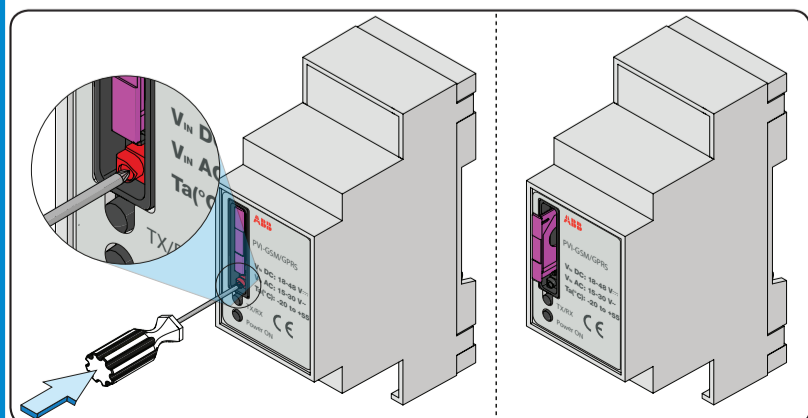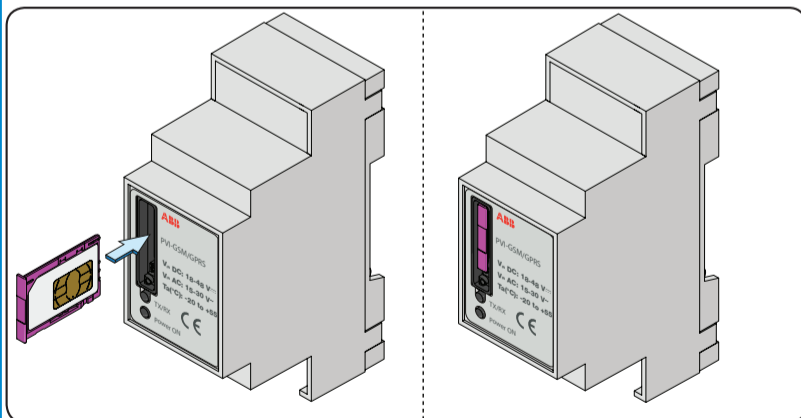

b. Insert the SIM card into the holder.

c. Reinsert the holder into the SIM card slot.

2. Connecting to the PVI-AEC-EVO

The PVI-GSM/GPRS module is connected to the PVI-AEC-EVO system and supplied by the expansion bus connector. Please refer to the following image.

⚠ The connection and the disconnection of the PVI-GSM/GPRS module to the PVI-AEC-EVO must be done ONLY AFTER having disconnected the PVI-AEC-EVO from the electricity supply.
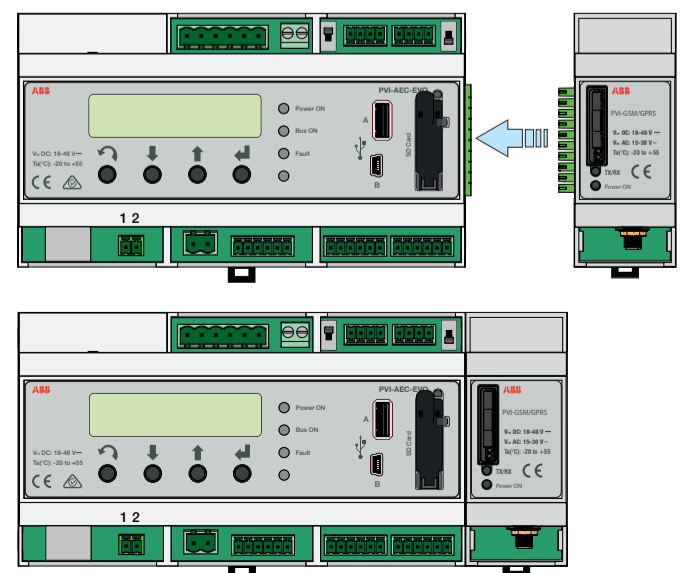
3. Connecting the antenna

To enable the PVI-GSM/GPRS modem to send out the data collected from the PVI-AEC-EVO, it is necessary to connect the supplied antenna to the PVI-GSM/GPRS connector. When choosing where to position the antenna, take the following points into consideration:
- Install the antenna in a sheltered place, protecting it from weather.
- Install the antenna within range of the GSM/GPRS signal
- Do not install the antenna in metal casing or close to other antennas/transmitters.
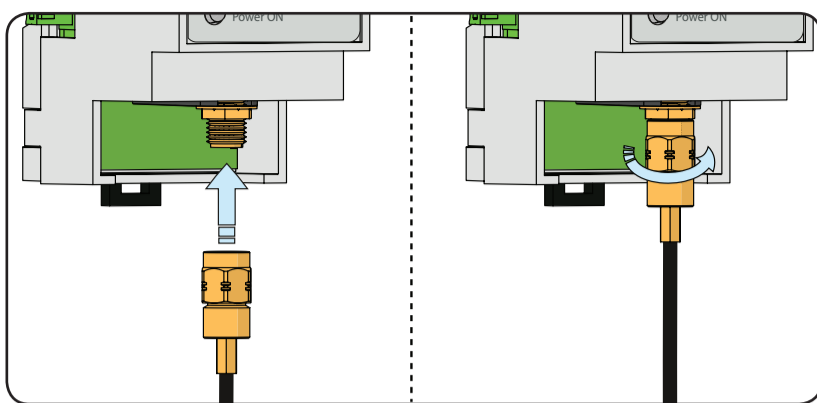

- It's recommended to carefully clean the surface where the antenna will be positioned and held in place by its adhesive strip (on reverse side).

4. Mounting on din rail

The unit, comprising the now connected PVI-AEC-EVO and PVI-GSM/GPRS modem, must be mounted on the DIN rail (UNI EN 50022) using the special catch on the back of each of the two devices.

To correctly mount the unit on the DIN rail, follow the procedure below:
- Using a flat head screwdriver, pull out the tabs in order to release the catch.
- Place the combined PVI-AEC-EVO and PVI-GSM/GPRS modem unit on the DIN rail.
- Push the tab in order to lock the catches.
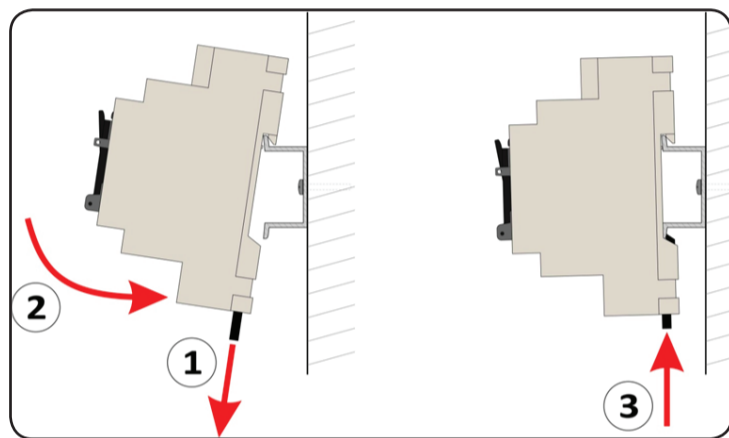
- Checking Modem Status And Activity

Using the PVI-AEC-EVO display and buttons (see PVI-AEC-EVO Quick Installation Guide), access the "INFORMATION" → "GSM / GPRS" menu. This menu contains three sub-menus which can be navigated using the arrow keys. The three sub-menus are: MODEM STATUS, MODEM SIGNAL and MODEM ACTIVITY.

Modem Status
The sub-menu "Modem Status" indicates whether the modem is ready to transmit data using the GPRS service.

Status	Description
READY GPRS-En	The modem is ready to transmit data (The prompt GPRS-En appears when, in the internal connection configuration web page, the "Gprs" connection type is selected for data transfer to the portal)
NOT READY GPRS-En	The modem is not ready to transmit data (Verify the configuration of the APN field in the menu Config→Network)

Modem Signal
The sub-menu "Modem Signal" provides an indication of the GSM/GPRS signal strength. The signal strength is represented on a numerical scale from 0 to 31. Please refer to the following table:

Value	Meaning
0 – 12	Weak signal: possible lack of connection
13 – 19	Unstable connection: possible temporary loss of connection
20 – 31	Stable connection

The value of the Modem Quality represents the quality of the signal of data communication, sent directly by the provider of the phone service. Whereas GPRS management system of the provider does not implement this function the expansion module will report a signal quality factor equal to 99.

Modem Activity
The sub-menu "Modem Activity" shows the current activity of the PVI-GSM/GPRS modem.

Status	Description
MODEM_CHECK_REG	Verifying registration status of the SIM Card with the mobile phone network provider
MODEM_PRESENCE	Verifying whether the modem is present
MODEM_INIT_GSM	Registering with the mobile phone operator's network
MODEM_INIT_GPRS	Initialising GPRS service
MODEM_GPRS_ON	Activating GPRS service
MODEM_GPRS_OFF	Suspending GPRS service
MODEM_GPRS_CONNECTION	Active GPRS connection
MODEM_WAIT_CALL	Checking for GSM incoming data call
MODEM_ANSWER_CALL	Responding to GSM incoming data call
MODEM_ANSWER_MSG	Connection to remote modem is active
MODEM_CHECK_SMS	Checking for incoming SMS
MODEM_SENT_SMS	The modem is sending an SMS
MODEM_READ_SMS	Reading incoming SMS
MODEM_DELETE_SMS	Deleting an SMS received
MODEM_SOCKET_WRITE	Sending data to portal

- Checking The GPRS Modem Operation

Once connected to the PVI-GSM/GPRS module, the PVI-AEC-EVO unit can interact with the user via SMS. In particular, the system is capable of receiving SMS and, on the basis of the text contained in the message, sends information via SMS or initiates data transmission to the portal. These features can be used to test the correct functioning of the unit.
As the system cyclically turns among the states of GPRS connection for the sending of data to the portal and the reporting of SMS, during the sending of data to the portal will not be possible to manage the SMS messages.

Sending SMS Messages
The system is capable of responding to SMS messages sent from an ordinary mobile phone. The messages that the system recognises, and which it is therefore able to respond to, are the following:

Function	Sms Text	Description/Response
System structure request	000000#system test#	The system responds by the indication of the total number of inverters present in the system and the number of centralised inverters and string inverters. Example of response SMS: Datalogger S/N: 000202# Command:SYSTEM TEST# Total Modules:2# Central Modules:0# Grid Modules:2# 11/6/23,10:31:22
Power and energy level request	000000#read energy#	The system responds by the indication of the instantaneous power produced by the system, and the energy produced daily and weekly by the whole plant. Example of response SMS: Datalogger S/N: 000202#Command:READ ENERGY#Ouput Power:0.2 KW#Daily Energy:4.9 KWh#Weekly Energy:47.6 KWh#11/6/21,18:33:13

The SMS messages above can be used to verify that the system has sent the SMS. It is recommended to send a test SMS message in order to ensure that SMS messages can actually be sent.

Sending data to the portal
Once the system has been commissioned and correctly configured, it will send data to the portal management server according to the configuration settings entered on "Config" → "Network" page of the integrated web server. It is also possible to initiate a data transmission to the portal or checking the data connectivity to the portal via the SMS messages described in the following table:

Function	Sms Text	Description/Response
Send data to portal management server	000000#upgrading data#	The system sends instantaneous data to the portal management server. One received the request the datalogger will send an SMS to notify a TEST IN PROGRESS.
Connecti test to the portal	000000#test ip portal#	The system check the correct connectivity between the portal and the datalogger. One received the request the datalogger will send an SMS to notify a TEST IN PROGRESS. Example of response: Datalogger S/N: 000202#Command:TEST IP PORTAL#SUCCESS# 11/6/21,18:38:16

5.

- Checks prior to commissioning
Before beginning the commissioning procedure, please check the following:
- Check that the SIM card is properly inserted in the specific slot
- Check that the antenna cable is correctly connected to the PVI-GSM/GPRS module
- Check that the PVI-GSM/GPRS modem is correctly connected to the PVI-AEC-EVO

- Commissioning procedure

For details regarding the PVI-AEC-EVO system connection to the power supply, please refer to the PVI-AEC-EVO Quick Installation Guide

- Connect the PVI-AEC-EVO to the mains voltage by the specific protection switch. Verify that the PVI-AEC-EVO has started-up correctly and is properly powered (LEDs should flash during start-up). At the end of the start-up phase, both the "Power ON" LEDs (GREEN) of both the PVI-AEC-EVO and the PVI-GSM/GPRS should remain steadily light up.

⚠ If there is no SIM card or it has not been inserted correctly, the POWER ON LED will flash on and off repeatedly, 15 seconds on / 15 seconds off.

- After a few seconds the "TX/RX" LED will flash; in this phase the system will be registered to the mobile phone service provider's network.

⚠ If the TX/RX LED does not flash, verify that the SIM card has been activated, and that the place where the module is installed is in range of GSM/GPRS services.

- Verify that the PVI-AEC-EVO has the correct version of FW AVR. To carry out this check use the PVI-AEC-EVO buttons, and verify the display messages:
  a. Press the ENTER key
  b. Insert the password "0000" and press ENTER
  c. Select the menu "INFORMATION" and press ENTER
  d. Select the menu "PRODUCT" and press ENTER
  e. Scroll through the menu items until you reach "FIRMWARE AVR". If the FW version is less than 0.0.124, update the FW following the directions contained in the PVI-AEC-EVO Quick Installation Guide.

- Configuration of data transmission
The configuration of the PVI-AEC-EVO system for data transmission through the PVI-GSM/GPRS expansion module must be carried out via the pages of the system's integrated web server. The procedure for accessing the local web pages is described in the PVI-AEC-EVO Quick Installation Guide.
- Access the web server page "Config" → "Network"
- Set up the fields for the GPRS module:

Parameter	Description
APN	Access Point Name: name of the access point for the GPRS network(*)
Username	User name for connection to the APN (*)
Password	Password for connection to the APN (*)
Tel SMS	Mobile phone number to which SMS notifications will be sent (**)

⚠ (*) Obtain the correct APN from your mobile phone network provider; check whether a Username/Password is necessary for connection. If so, get a valid account for connection to the APN.
(**) Please use the international dialling code prefix "00"; and not "+". For example, for Italy: 0039 → OK; +39 → NOT OK.

- Set up the fields for data transmission:

Parameter	Description	Value
IP Address Portal	Portal management server IP address	151.22.100.235
Port	Data transmission port	80
Method	Method of data transmission to the portal	Standard ABB
Type sending	Connection type for data transfer to the portal	GPRS
Eth Sample Data Rate (5 minutes min)	Sampling period if connecting to the portal via Ethernet	N/A
Eth Send Data (10 minutes min)	Time needed for sending data to the portal if connecting via Ethernet	N/A
Gprs Sample Data Rate (5 minutes min)	Sampling time if connecting to the portal via GPRS	Configurable (Default = 5 min)
Gprs Send Data (5 minutes min)	Time needed for sending data to the portal if connecting via GPRS	Configurable (Default = 5 min)
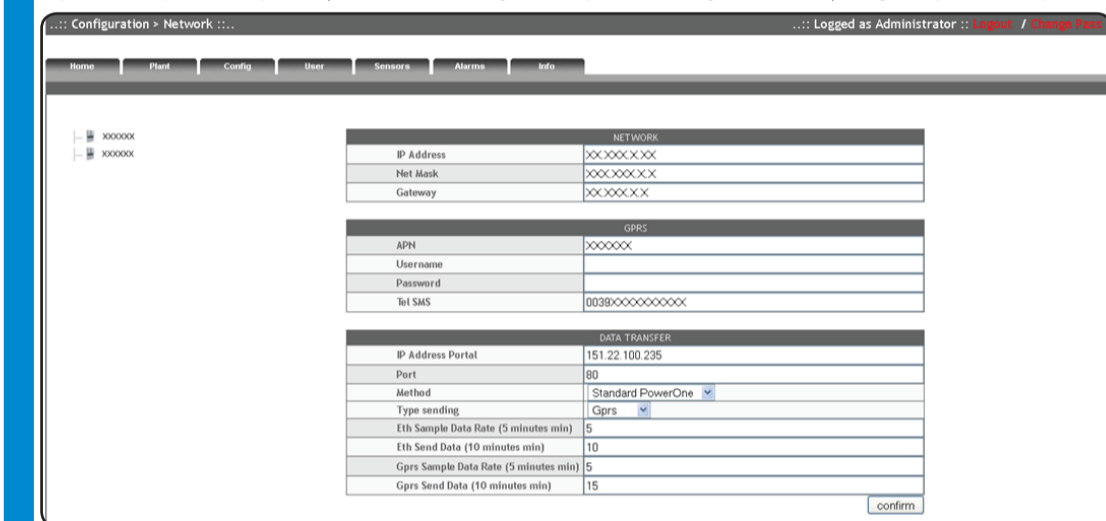
- List of available sms messages
The system sends SMS messages on the basis of client requests, depending on alarm conditions detected in the system.
The SMS messages the system sends upon the client's request are described in the table "Sending SMS Messages" paragraph.
The SMS alerts generated by alarm conditions are listed in the following table.

⚠ The system is only capable of sending SMS alerts if a telephone number for an addressee has been set up. Refer to paragraph "Configuration of data transmission" for configuration instructions.

Type of alarm	Code		Description
System alarm	I005	Wake Up	The message is sent when the system starts up.
	W004	AC Failure	The message is sent when the 24Vdc power supply fails (message available only if back-up module PVI-BATTERY-PACK is present which keeps the system active) (*)
	E006	Event on Din1	The message is sent when a change in the status of digital input on Din1 is detected (*)
	E007	Event on Din2	The message is sent when a change in the status of digital input on Din2 is detected (*)
	E008	Event on Din3	The message is sent when a change in the status of digital input on Din3 is detected (*)
	E009	Event on Din4	The message is sent when a change in the status of digital input on Din4 is detected (*)
	E010	Event on Din5	The message is sent when a change in the status of digital input on Din5 is detected (*)
	E011	Event on Din6	The message is sent when a change in the status of digital input on Din6 is detected (*)
Inverter alarm	E501	Comm Fault	The message is sent when the data logger does not receive information from any inverter (*)
	E502	No prod	The message is sent when the system detects that one of the inverters has not increased its energy production for more than one hour (*)
Stringcomb Alarm	E001	Burnt Fuse	The message is sent when it is detected a blown fuse in a Stringcomb (*)

(*) Once normal function has been restored, a second SMS message is sent to report the end of the alarm condition.

6.

PVI-GSM/GPRS	
Wireless Communication	
Method of Data transmission	GSM-GPRS-SMS
Circuit Switch Data (CSD) transceiver bit rate	9600 bps
GPRS Class	10
Frequency Band	EGSM 850/900/1800/1900 MHz
Output power	Class 4 (2W) @850/900 MHz or Class 1 (1W) @1800/1900 MHz
SIM	3V Micro-SIM card
Antenna Parameter	
Frequency range	824-890 MHz / 1850-1990 MHZ
Gain	<3 dBi
Impedance	50 Ohm
Input power	>2W Peak power
VSWR	<= 2:1
Polarization	N/A
Connector	SMA Male
Protection Degree	Indoor use
Environmental parameters	
Ambient Temperature Interval	-20/+ 55°C (-4/131°F)
Degree of Environmental Protection	IP20
Relative Humidity	25…95% @40 °C
Mechanics	
Dimension (H x W x D)	58mm x 90mm x 36mm / 2.3" x 3.5" x 1.4" (2 module DIN 43880)
Weight	0.1 kg / 0.22 lb
Safety	
Certification	CE
Note. Features not specifically mentioned in this data sheet are not included in the product	

Contact us

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