

Monitoring Box

IMA-BOX

EN



Version externe / External version

Indice des modifications / Modification Index				
Indice / Index	Date	Pages modifiées / Modified pages	Description de la modification / Modification description	Auteur / Author
A.1	08/12/16	X	Rédaction initiale / Initial Drafting	XML
A.2	12/12/16	All	Navigation -> firmware 1.5	XML
A.3	24/02/17	All	Installation, Configuration, Navigation	XML
A.4	20/04/17	All	Modification nom et ajout Smart Meter / Name modification and add smart Meter	FLT
A.5	18/07/2017	8/31	Spécification port USB / USB port specification	FLT
A.6	03/01/2018	All		FLT

Référence / Reference	IMA-BOX	Indice / Index	A.6
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■ **Monitoring Box / Installation** ■

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Before installing this material, read carefully this document. A bad usage of this equipment can lead to non reversible body damage and/or equipment failures.

1. Running mode

Behaving as a true embedded computer, the Monitoring Box runs an electrical installations management feature. The integrated services library is updated on a regular basis. It's important to keep the Monitoring Box connected to the Internet : Regular update cycles of this box guarantee your system to improve its own capabilities. The featured connectors of this box provides a scalability insurance for the future.

This documentation describes the Monitoring Box installed as an external module.



CAUTION : Un-plugging the Battery to Monitoring Box communication cable (so interrupting the communication of The IMEON inverter with the battery) will turn the Battery into a safety mode, and will inhibit all running services.

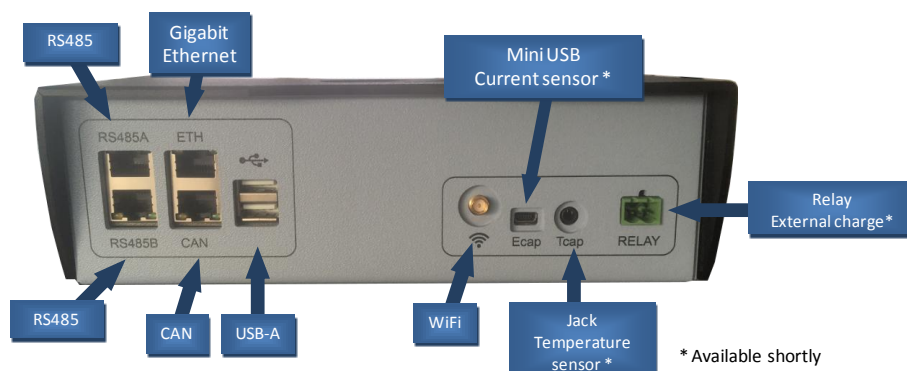
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2. Connectors



The Monitoring Box is equipped with several communication ports: RS485, Ethernet, CAN, USB, Wifi, RELAY and sensor ports (Ecap, Tcap).

- RS485: to communicate with specific devices
- Ethernet: to connect with a local area network
- WiFi: to connect with a wireless network (router, PC, mobile...)
- CAN: to communicate with lithium batteries (only batteries compatible with IMEON)
- USB: to communicate with an USB device
- RELAY: to control a diesel generator
- Tcap: temperature sensor
- Ecap: current sensor



3. Accessories

The Monitoring Box is provided with the following accessories:


Accessories	
Name	Photo
Power supply 12V	
Communication cable USB-RS232	 <p>Communication cable: Monitoring Box (USB) to inverter (RS232)</p>
WiFi antenna	
Relay Connector	

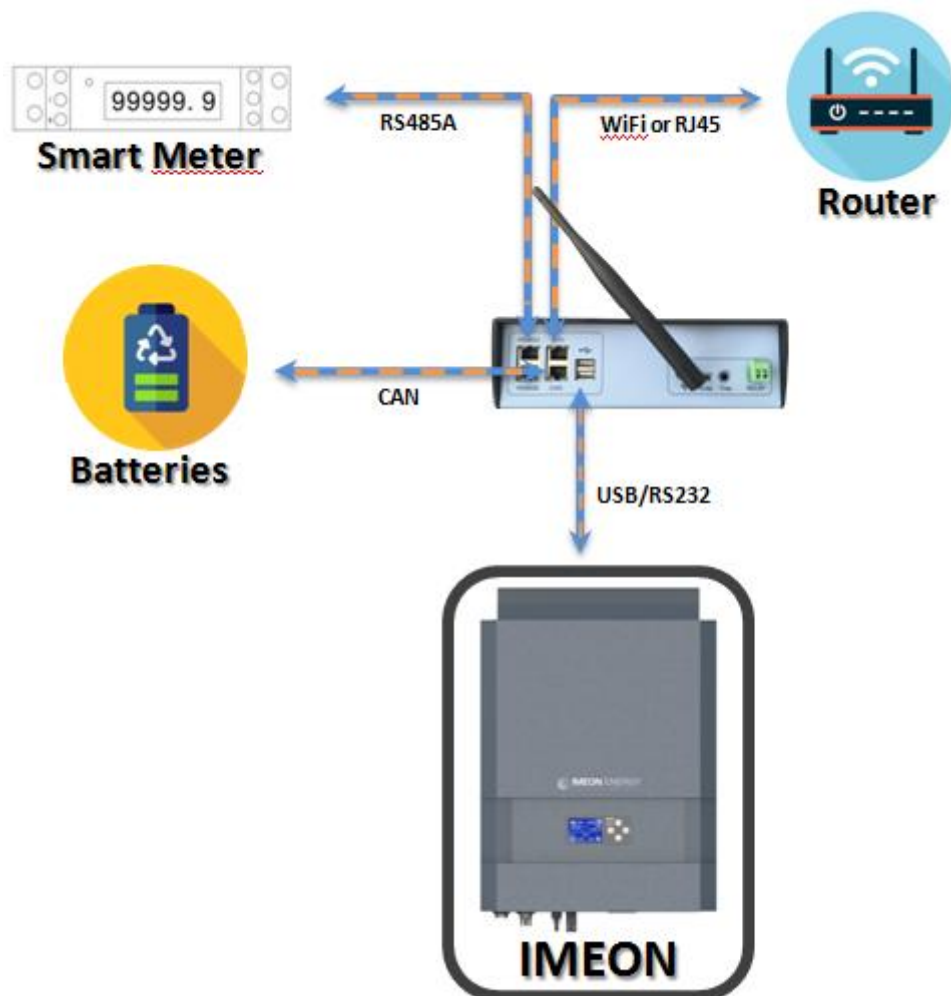
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4. Installation overview

This scheme describes a standard installation with an external Monitoring Box.

 Warning : The USB/RS232 cable between IMA-BOX and inverter must be plugged into the **bottom USB** port of the IMA-BOX.

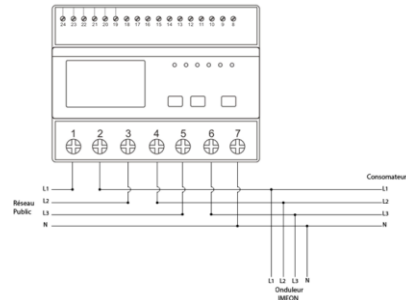
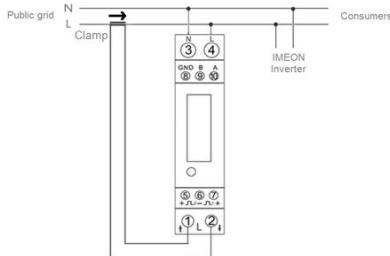


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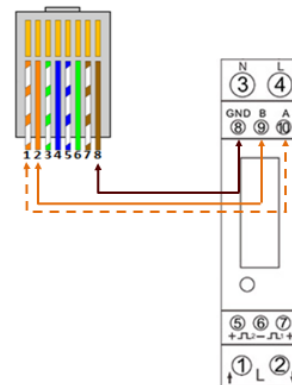
5. Smart Meter

1. The energy meter must be installed between the IMEON inverter and the Public Grid. The monophase Smart meter model is equipped with a clamp. See the diagram below:

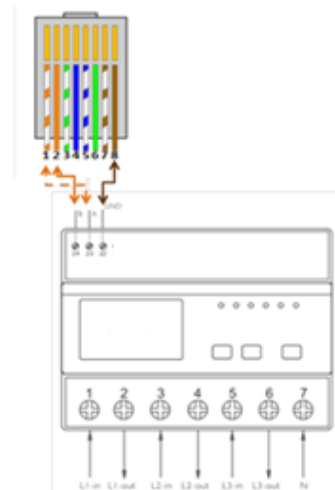



2. The communication cable has to be plugged on the RS485A inverter port.
Follow the pin map below to establish the communication between the energy meter and the inverter.
The length of the cable between the inverter and the meter must be a maximum of 10 to 20m depending on the cable category used. In case a longer cable used, please refer to the standard IEA-485 and the guideline TSB-89.

Inverter connection	Smart Meter connection
2	9
1	10
8	8




Inverter connection	Smart Meter connection
2	24
1	23
8	22



3. To confirm the good communication between the inverter and the Smart Meter, please connect to MANAGER WEB and check if the following symbol  is displayed on the top left of the interface.

Navigation for single phase Smart Meter:

Each successive pressing of the  button selects a new range:

- | | |
|----------------------------------|--------------------|
| 1. Total active energy in kWh | 7. Frequency in Hz |
| 2. Consumed active energy in kWh | 8. Power factor |
| 3. Injected active energy in kWh | 9. Modbus address |
| 4. Voltage in V | 10. Baud Rate |
| 5. Current in A | 11. Parity |
| 6. Power in W | 12. ratio |




WARNING: It is necessary to check that the Smart Meter is configured for a 100A current sensing clamp. To do this, verify that the value of the input current (see navigation in the table above) is set to "CT0100".


If this is not the case, restart the inverter (after taking the precautions related to disconnection) and press the button until the Smart Meter display shows "-SET-". The inverter will automatically configure the Smart Meter input current to "CT0100". This automatic configuration is only done during the first 5 minutes following startup of the inverter.

When the text "-SET-" disappears, verify again that the Smart meter is set to "CT0100".


Navigation for three phases Smart Meter:

Each successive pressing of the  button selects a new value:

1. Instantaneous Active Power in kW
2. Instantaneous Reactive Power in kVAR
3. Instantaneous Volt-amps in KVA
4. Total kW, kVARh, kVA
5. Frequency and Power Factor (total)
6. Power Factor of each phase
7. Maximum Power Demand

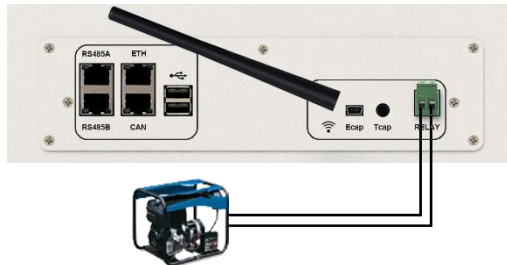
Each successive pressing of the  button selects a new value:

1. Phase to neutral voltages (V)
2. Phase to phase voltages (V)
3. Current on each phase (A)
4. Neutral current (A)
5. Maximum Current Demand (A)

Each successive short pressing (lasting less than 3s) of the  button selects a new value:

1. Total active energy in kWh. Total kWh=imported +exported (kWh)
2. Total Imported active energy in kWh
3. Total Exported active energy in kWh
4. Total reactive energy in kVARh. Total kVARh=imported +exported (kVARh)
5. Imported reactive energy in kVARh
6. Exported reactive energy in kVARh

6. Generator relay



The integrated relay allows automatically starting and stopping the diesel generator via a dry contact depending on the battery state of charge.



WARNING: The generator must be equipped with a voltage regulator and a frequency regulator. The output of the generator must comply with the AC input voltage specifications of the IMEON (N/PE = 0 Vac) to be checked prior to connection to IMEON.

The generator will charge the batteries connected to the IMEON through the “GRID CONNECTION” terminal as soon as the voltage of battery bank is below the “battery cut-off voltage when grid is available” threshold. The generator will stop automatically. The generator will stop charging the batteries when the battery pack is recharged.

In order to use this function, you need to go to MANAGER WEB, page “Module”, then enable the “Genstart” module and configure the module. It will auto-configure certain settings of the inverter. To learn more about auto-configuration, refer to the module description.

7. Inverter configuration : MANAGER WEB

MANAGER WEB is web-based software included with IMEON inverters, which allows using local Wi-Fi network for easy and intuitive configuration of the system and real-time monitoring. It also allows setting up the Internet access for the inverter.

Note : An Ethernet connexion to MANAGER WEB is available. Please refer to the section « Inverter Internet access : Monitoring ».

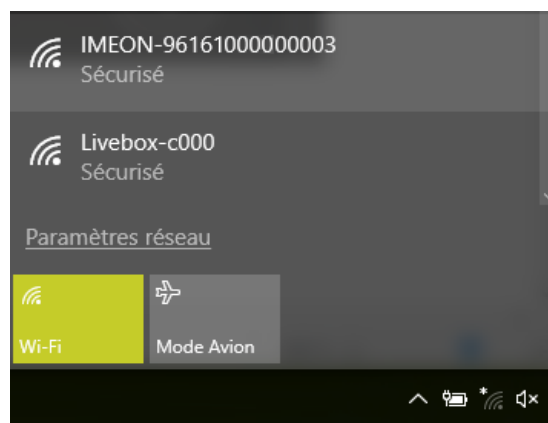


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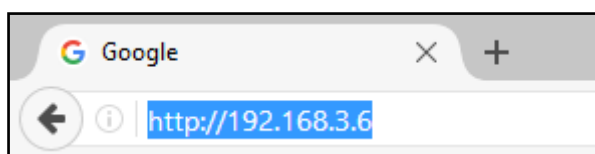
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7.1 Network Connection

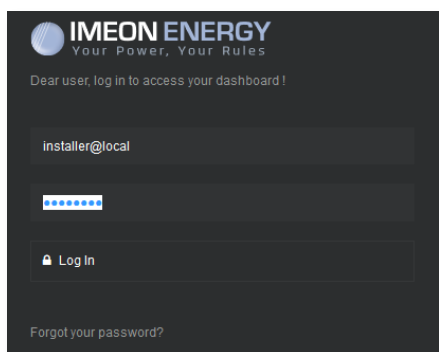
1. On a PC / Tablet / Smartphone, go to Wi-Fi network manager, then scan the Wi-Fi network
2. Select IMEON SSID (for example Imeon-96161000000003) and connect using the « BonjourImeon » password.



3. When connected to IMEON Wi-Fi, in a Web browser, go to the URL address:
For IMEON 3.6: <http://192.168.3.6>
For IMEON 9.12: <http://192.168.9.12>



7.2 Identification



Login using the below information depending on the profile:

User profile :

Usage: Allows access to a simplified interface

Email: user@local

Password: password

Installer profile:

Usage: Allows access to an interface with some additional parameters

Email: installer@local

Password: Installer_P4SS



Warning: If the connection is established but the access to the identification page is unavailable, please refer to the annex « IP address modification » in order to set an automatic IP (DHCP).

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7.3 Description of MANAGER WEB

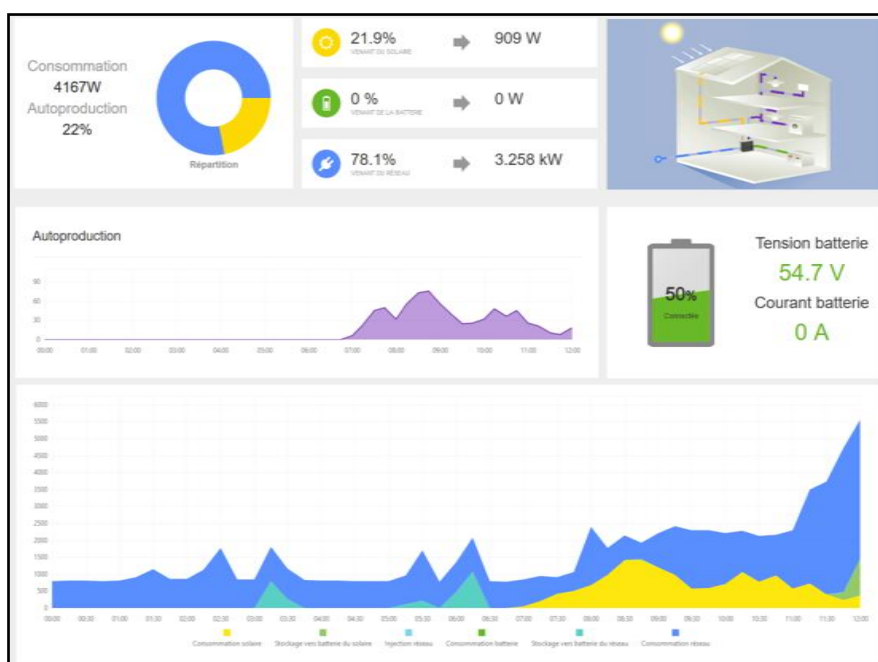


WARNING: Before performing any modifications, make sure that you follow the applicable standards in your country. Only the IMEON MANAGER WEB software can be used for configuration of IMEON inverters. The use of any software other than IMEON MANAGER WEB is not authorized by IMEON ENERGY and may cause irreversible damage affecting the operation of IMEON inverter.

Each parameter has its explanation. Click  icon for more information.

7.3.1 “Home” page

The homepage allows viewing the real time distribution of the energy sources feeding the load, as well as the evolution of the self-production rate, the status of the battery and the overview of the energy flow.



7.3.2 « Manager » page : FLOW

The "Flow Management" tab allows you to change the mode of operation of the inverter. Refer to the annex "Mode of operation" for more information on different modes of operation.

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7.3.3 « Manager » page: Battery

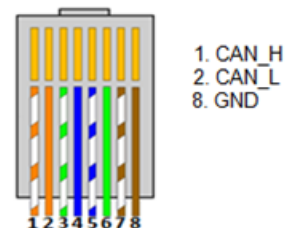
The "Battery Management" tab allows you to set up the battery bank. The setting varies depending on the battery technology in use (Lead-Acid or Lithium).

7.3.3.1 Using a Lithium battery

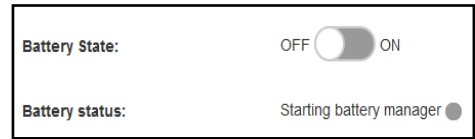


Refer to the battery manufacturer's documentation if necessary.

1. To establish communication between the inverter and the battery, an RJ45 connector wired as presented here should be made for the inverter's end of the cable.
2. Select the battery from the list, then press "OK".



- The message "Starting battery manager" will be displayed



- Start the battery physically. The Battery Status indicates "Detecting battery in progress".

- When the message "Battery ready to start" appears, move the Battery State switch to "ON" position on the WEB interface.



- When the "Battery operating" message is displayed, the battery is operational and communicates with IMEON.



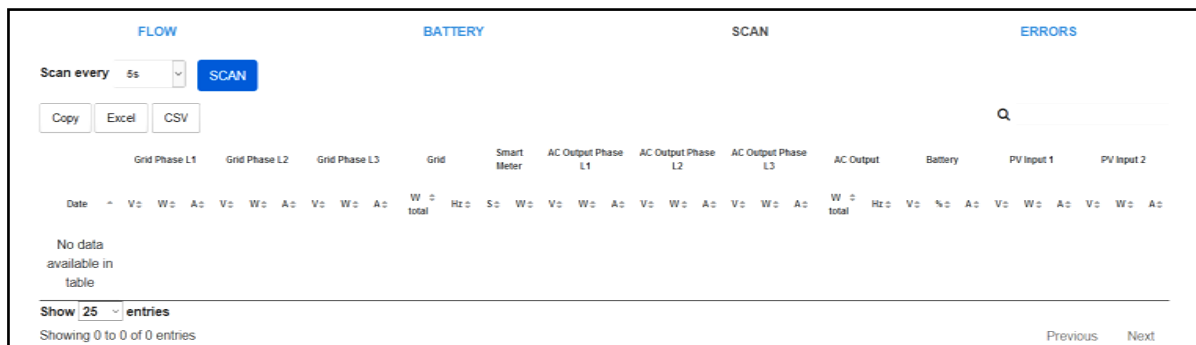
7.3.3.2 Using a Lead-Acid battery

- Select the lead battery technology used (GEL, AGM, OPz) and press "Ok".
- Wait a few seconds for the inverter to be configured.
- Set the capacity of the batteries in Wh

Note: A more advanced setting is possible (voltage, current setting) with a different connection code held by your distributor.

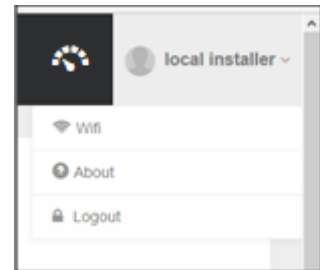
7.3.4 « Manager » page : SCAN

The "Scan" tab is available only in "installer" mode. It allows you to scan, record and export the real time values.



7.3.5 User/Installer drop-down menu

By clicking on the drop-down menu, a submenu is opened including « Wi-Fi », « about » « Log out ».



7.3.5.1 Wi-Fi

Allows connecting the inverter to Internet. Refer to “Inverter Internet access: MONITORING” Section.

Enables or disables security features (encryption) and allows changing the IMEON Wi-Fi password.

7.3.5.2 About

Allows viewing the inverter’s ID information, restarting the inverter’s communication module by pressing «Reboot» and restoring the default settings by pressing "Reset Manager".

7.3.5.3 Log out

Disconnect from MANAGER WEB by pressing "Log out".

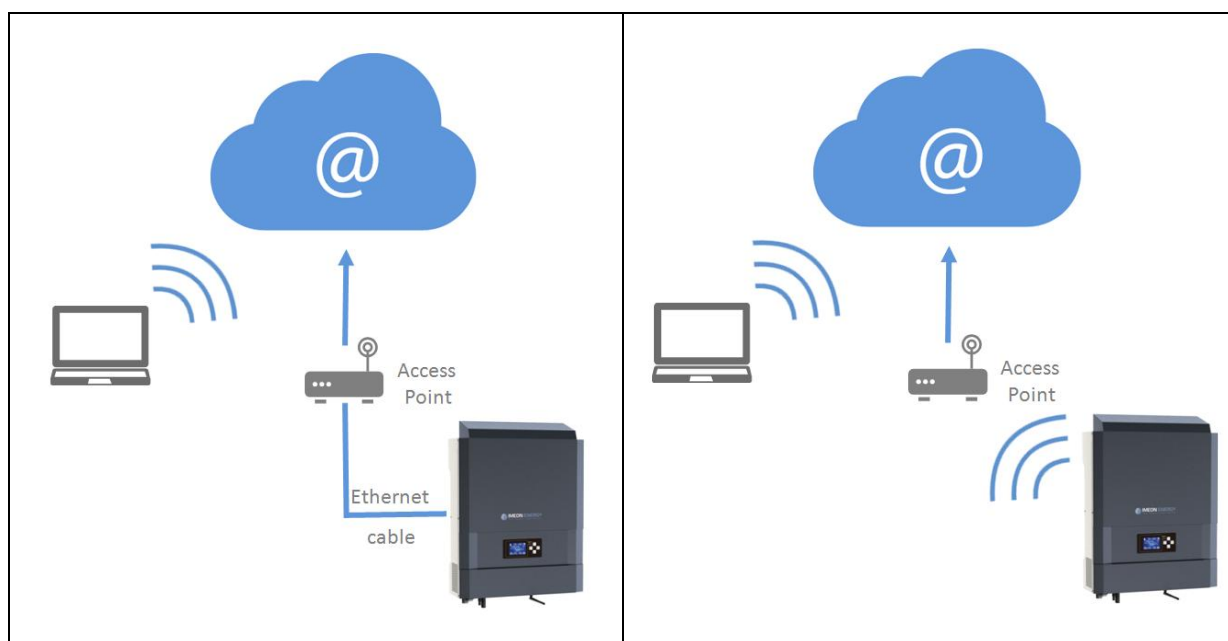
8. Inverter Internet access : MONITORING

The MONITORING is a Web-based application for remotely viewing the real time as well as historical photovoltaic plant performance data.

This application requires an unlimited connection to the Internet, the subscription of which is the responsibility of the user.

There are 2 possibilities to connect the inverter to the Internet:

- With Ethernet cable RJ45
- With Wi-Fi



Choice 1 : Ethernet Cable RJ45

Choice 2 : Wi-Fi

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8.1 Configuration for Ethernet connection

1. Connect the inverter with an Ethernet cable (RJ45) from "ETH" port to an access point.
2. Check if the DEL of « ETH » port are blinking
3. On a PC connected to the same Ethernet network, through the network explorer, check if an IMEON device is displayed.
4. The inverter is connector to the access point. Go to the web portal identification step.

Autres périphériques



IMEON
(192.168.XXX.XXX)/

Imprimantes



Samsung
CLX-3170

Ordinateur



USER-PC



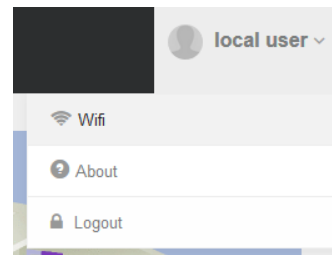
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8.2 Configuration for Wi-Fi connection.

- 1- Connect to MANAGER WEB, then go to Local→Wi-Fi
- 2- Press "List connection" to scan and display the list of Wi-Fi networks available for the inverter.
- 3- In the list of identified networks, press "Select" to establish connection with the chosen network.
- 4- Enter the network key (if required), then click on "Connect".
- 5- The name of the Wi-Fi network selected is displayed on « Wireless station name » and the status is « connected »
- 6- The inverter is connected to the access point. Go to the web portal identification step.



Get list available connection:

List connection

#	SSID	Strength	Select to connect
1	Livebox-xxx	60%	Select
2	Livebox-xxx	50%	Select

Wireless station name (SSID):

Livebox-xxx

Wireless connection status:

connected

8.3 Web portal Identification

The URL to access the MONITORING portal is:

monitoring.imeon-energy.com



The screenshot shows the login interface for the IMEON ENERGY web portal. At the top is the company logo and tagline. Below it, a message in French asks the user to connect to access the web. There are two input fields: 'Adresse email' and 'Mot de passe'. A dark button labeled 'Connexion' is positioned below the password field. At the bottom, there is a link for 'Mot de passe oublié ?'.

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Log in with the information (email address and password) you received by email when the installer created the user account, then press "Login".

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If no account has been created, contact your installer.

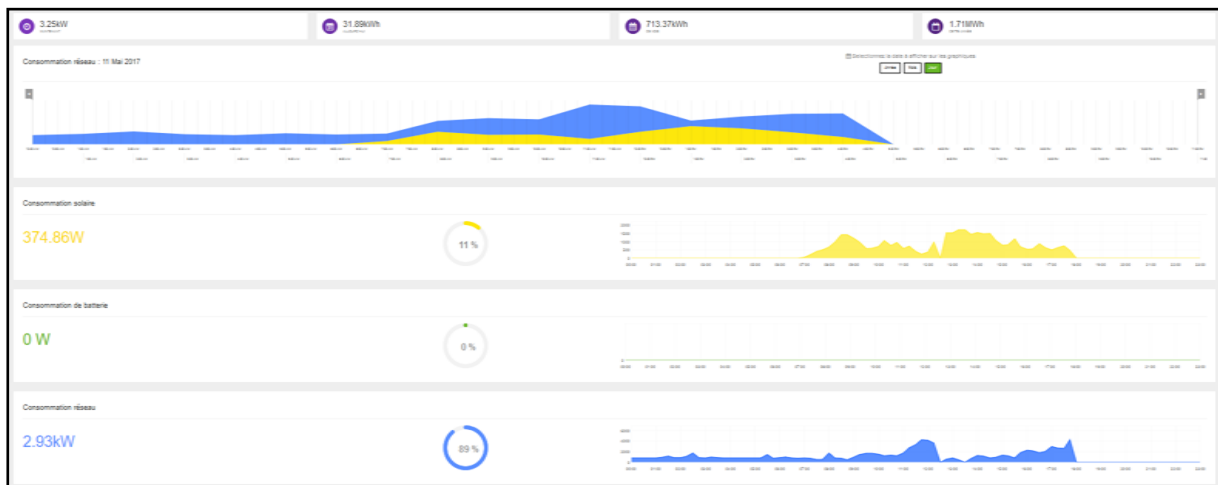
8.4 Description of the MONITORING

8.4.1 Home page

The homepage is the same as one of MANAGER WEB. It allows to view the real time distribution of the energy sources feeding the load, as well as the evolution of the self-production rate, the status of the battery and the overview of the energy flow.

8.4.2 Consumption page

Allows viewing the real time and historical data concerning energy distribution of the energy sources feeding the consumption, as well as the daily, monthly and annual consumption.



8.4.3 Solar page

Allows viewing the real time and historical data concerning energy distribution and the use of the solar production as well as the daily, monthly and annual production.



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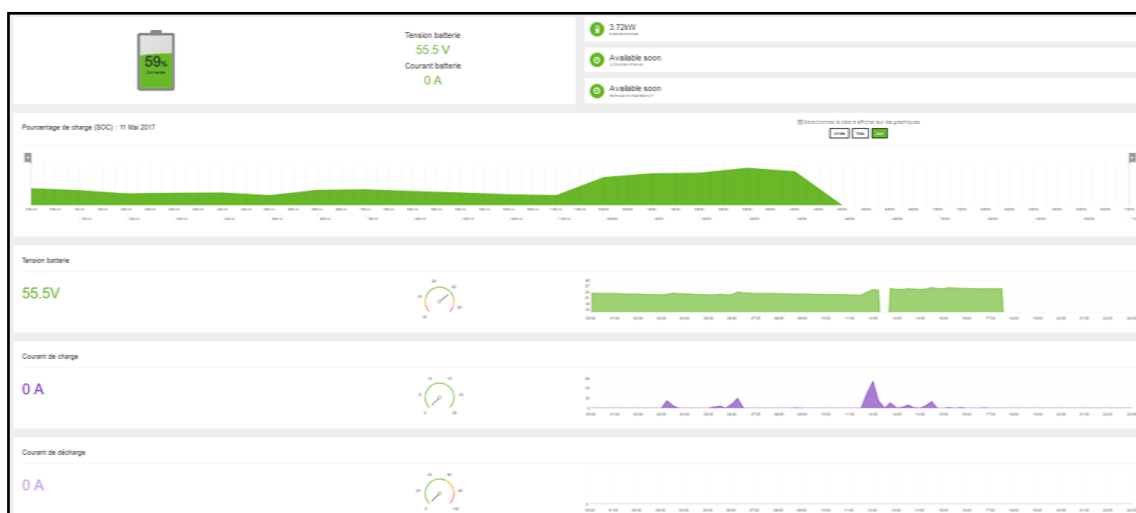
8.4.4 Grid page

Allows viewing the real time, daily, monthly, annual and historical data concerning power consumed from and injected to the public electrical grid as well as grid voltage and frequency.



8.4.5 Storage page

Allows viewing the real time, evolution and historical data concerning the state of charge, battery voltage, charging current and discharging current.



8.4.6 My installation

Allows viewing the GPS coordinates of the installation, model and serial number of the inverter as well as contacting information of the installer company.

8.4.7 My account

Allows viewing and modifying the user information and information related to the system.

8.4.8 Logout

Allows disconnecting from MONITORING.

9. Warning and error codes

Warning and error codes In case of a warning or error displayed by the inverter, refer to the table below before contacting technical support if needed.

1	warning_ond	The electrical grid has perturbations.
2	warning_ond	The electrical grid has perturbations.
3	warning_ond	The electrical grid has perturbations.
4	warning_ond	The electrical grid has perturbations.
5	warning_ond	The electrical grid has perturbations.
6	warning_ond	The electrical grid has perturbations.
7	warning_ond	Electrical grid loss.
9	warning_ond	Wrong phase rotation.
10	warning_ond	Electrical grid loss.
11	warning_ond	The electrical grid has perturbations.
12	warning_ond	Overload on AC Output with Grid.
13	warning_ond	Internal temperature nears the inverter temperature limit.
14	warning_ond	Earth fault.
15	warning_ond	Fan fault.
22	warning_pv	Low PV 2 voltage.
23	warning_pv	PV voltage too high.
24	warning_pv	PV2 voltage too high.
25	warning_cpu	Processor1 flash failure.
26	warning_cpu	Processor1 initialization failure.
27	warning_bat	A battery warning has been reported.
30	warning_bat	Battery not connected.
32	warning_bat	Battery voltage too high.
35	error_ond	Communication failure with processor1.
37	error_soft	Internal wiring failure.
38	error_soft	software service failure.
39	error_soft	Software failure on processor2.
40	error_soft	Processor2 operating system failure.
41	error_soft	Failure reading/writing on database.
42	error_pv	Solar input overvoltage.
43	error_pv	Solar input overcurrent.
44	error_pv	Solar isolation resistance too low.
45	error_ond	DC Bus overvoltage.
46	error_ond	DC Bus undervoltage.
47	error_ond	DC Bus circuit start timeout.
48	error_ond	Inverter main circuit start timeout.
49	error_ond	Inverter overcurrent.
50	error_ond	Overheating.

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51	error_ond	Internal relay failure.
52	error_ond	DC current sensor failure.
53	error_ond	PV input overvoltage.
54	error_ond	Over leakage current.
55	error_ond	Inverter DC overcurrent due to grid fluctuations.
56	error_ond	Grid measurement error on processor1.
57	error_ond	GFCI sensor failure.
58	error_ond	AC input ground loss.
59	error_ond	DC Bus discharge failure.
60	error_ond	DC Bus discharge start timeout.
61	error_ond	AC Output overload.
62	error_ond	Long period overcurrent detected on AC Output.
63	error_ond	AC Output short-circuit.
64	error_ond	Fan failure.
65	error_ond	AC Output sensor failure.
66	error_ond	Hardware version error.
67	error_ond	Input / Output reversal.
68	error_ond	AC Output undervoltage.
69	error_ond	AC Output overvoltage.
70	error_bat	Battery overvoltage.
71	error_bat	Battery disconnected.
72	error_bat	Charger current failure.
73	error_bat	Battery voltage differs from communicated value.
74	error_ond	Auxiliary internal supply voltage failure.
75	com_lost	Battery CAN communication lost.
76	error_bat	The battery reported an error
77	com_lost	Communication lost between processors.
78	com_lost	Internet connection is lost.
87	error_bat	Battery current exceeds max battery current limit.
88	error_ond	Power on grid connection overpasses maximum power specification.
89	error_ond	Current on grid connection overpasses maximum current specification.
90	error_ond	Frequency on AC Output exceeds minimum frequency specification.
91	error_ond	Frequency on AC Output overpasses maximum frequency specification.
92	error_ond	Current on AC Output overpasses maximum current specification.
93	error_ond	PV input power overpasses specification.
94	error_ond	PV2 input power overpasses specification.
95	error_ond	Temperature exceeds the specification of the inverter.
96	error_ond	Battery discharging current overpasses specification of the inverter.
97	com_lost	Communication between Inverter and Smartmeter lost.
98	error_spe	Voltage on grid connection exceeds minimum voltage specification.
99	error_spe	Voltage on grid connection overpasses maximum voltage specification.
100	error_spe	Frequency on grid connection exceeds minimum frequency specification.
101	error_spe	Frequency on grid connection overpasses maximum frequency specification.

102	error_spe	Voltage on AC Output exceeds minimum voltage specification.
103	error_spe	Voltage on AC Output overpasses maximum voltage specification.
104	error_spe	Power on AC Output overpasses maximum power specification.
105	error_spe	Voltage on DC bus overpasses maximum voltage specification.
106	error_spe	Voltage on Battery overpasses maximum voltage specification.
107	error_spe	PV input current overpasses specification.
108	error_spe	PV2 input current overpasses specification.
109	error_spe	PV input voltage overpasses specification.
110	error_spe	PV2 input voltage overpasses specification.
111	error_spe	Battery charging current overpasses specification of the inverter.
112	error_ond	Neutral / Ground wires are reversed.

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* Votre énergie, vos règles

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