

Product Manual

UNO-DM-1.2/2.0/3.0/3.3/4.0/4.6/5.0-TL-PLUS
(from 1.2 to 5.0 kW)



General conditions

Before checking the operation of the equipment, it is necessary to have a thorough knowledge of the Instruments chapter 6 and the functions that have been enabled in the installation process.

The equipment operates automatically without the aid of an operator; the operating state should be controlled through the equipment's instrumentation.

The interpretation or variation of some data is reserved exclusively for specialized and qualified staff.



The input voltage must not exceed the maximum values shown in the technical data, section 2 in order to avoid damaging the equipment.

Consult the technical data for further details.

During operation, check that the environmental and storage conditions are correct (see installation chapter 5).

Make sure that environmental and storage conditions have not changed over time and that the equipment is not exposed to adverse weather conditions.

Commissioning (Via web user interface)



Do not place objects of any kind on the inverter during operation! Do not touch the heat sink while the inverter is operating! Some parts may be very hot and could cause burns.



Before proceeding with commissioning, make sure you have carried out all the checks and verifications indicated in the section on preliminary checks.

Commissioning is carried out via wireless connection to the inverter's internal web user interface. Initial setup of the system must therefore be carried out via a tablet, notebook or smartphone with a wireless connection.

- Close the DC disconnect switch to supply the inverter with input voltage from the photovoltaic generator.



Make sure irradiation is stable and adequate for the inverter commissioning procedure to be completed.

Pre-commissioning phase 1 - Connection to the local Wi-Fi network

DEVICE USED TABLET/SMARTPHONE:

- Once the inverter is powered, launch a QR reader for mobile and SCAN the QR code  marked with  symbol content on the "Wireless Identification Label" (placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page)
- Connect to inverter network (tap connect).
The name of the wireless network created by the system that the connection should be established with, will be: **ABB-XX-XX-XX-XX-XX** where "X" is a hex digit of the wireless MAC address  (MAC address can be found on the "Wireless Identification Label" placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page).
- After this step wait 10 seconds to allow the WLAN connection

DEVICE USED LAPTOP:

- Enable the wireless connection on the laptop which is being used for the board setup and connect it to the Access Point created by the inverter system: the name of the wireless network created by the system that the connection should be established with, will be: **ABB-XX-XX-XX-XX-XX** where "X" is a hex digit of the wireless MAC address  (MAC address can be found on the "Wireless Identification Label" placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page).
- When prompted, type the "product key"  (including the dashes. Example: 1234-1234-1234-1234) as the network password to access the inverter's access point. The product key is printed on the "Wireless Identification Label" placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page.

SN WLAN: SSSSSSSSSS
 PN WLAN: PPP.PPPPP.PP
 MAC: XX:XX:XX:XX:XX:XX 

Remove and apply on the Quick installation guide

1. 

SN Inverter: SSSSSSSSSS
 MAC: XX:XX:XX:XX:XX:XX 
 PK: KKKK-KKKK 





Pre-commissioning phase 2 - Internal web UI access

DEVICE USED TABLET/SMARTPHONE:

- SCAN this QR code (it is also reported in the Quick installation guide and in the pre-commissioning flyer inside the box of the inverter).

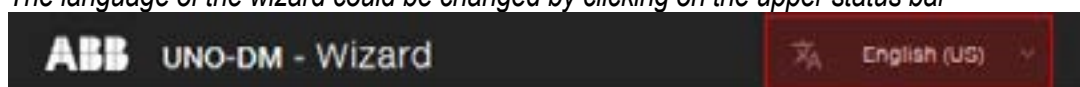
DEVICE USED LAPTOP:

- Open an internet browser (recommended browser: Chrome versions from v.55, Firefox versions from v.50) and enter the pre-set IP address **192.168.117.1** to access the setup pages (web user interface).

STEP BY STEP COMMISSIONING WIZARD:



The language of the wizard could be changed by clicking on the upper status bar



STEP 1 - Administrator/User login credentials

Administrator account

Admin

Username

Required

Password

Required

Confirm Password

Re-enter Password

Required

User account

User

Username

Required

☒ No user password

NEXT

- Set the **Administrator** account user and password (minimum 8 character for password):
Administrator account can open and view the contents of photovoltaic site. Additionally, they can make changes to inverter settings. User and password are CASE SENSITIVE.

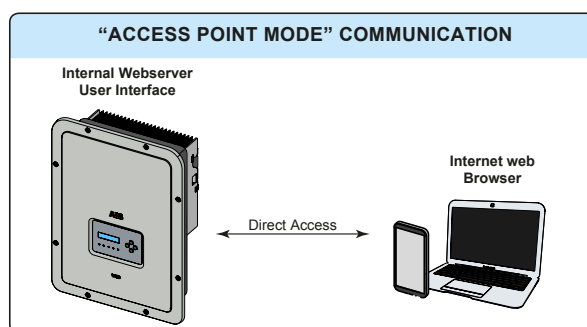


- Set the **User** account user and (optional) password (minimum 8 character for password):
User account can only read data. It cannot make any changes. User and password are CASE SENSITIVE.

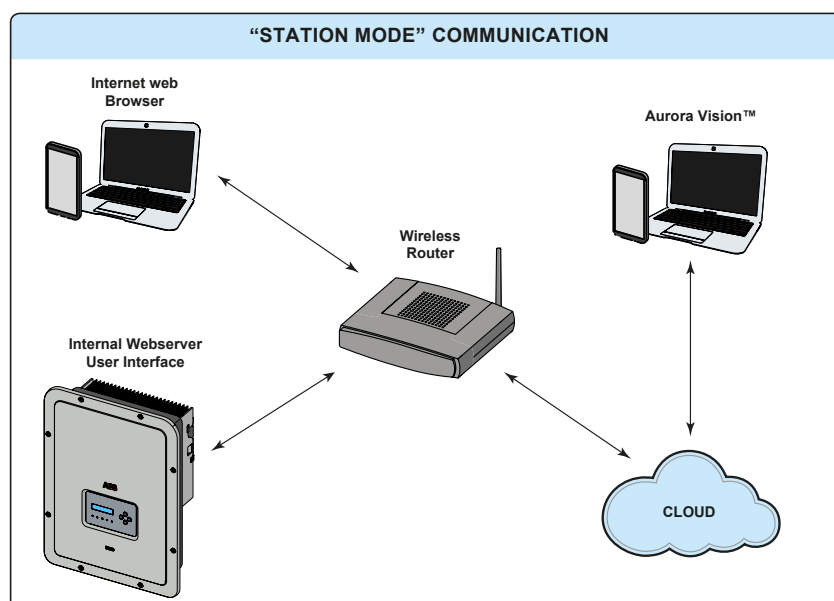
STEP 2 (Optional) - Residential wireless network connection.

The inverter WLAN board can operate in two different operating modes: “Station Mode” or “Access Point Mode” (also known as “AP Mode”)

- “AP mode”: Only local communication is enabled in this mode; In particular, the WLAN board acts like an «access point» generating a wireless network to which the user can connect locally, to monitor or configure the inverter / photovoltaic system, using the direct access to the Internal Web user interface integrated in the WLAN board



- “Station Mode”: In this operating mode, not only local but also remote monitoring is enabled through access to the LAN connection or through the Aurora Vision® CLOUD platform.



Where possible, connecting the inverter in “Station Mode” is always preferable. Thanks to the internet connection, this mode ensures better operation.

This setup stage relates to connecting the inverter to the own residential wireless network.

If it is not possible to connect the inverter to the wireless network, or you do not want to do so, select the “Skip this step” button. In this situation, communication between the inverter and the tablet/smartphone/PC can be only performed with a point to point (“AP Mode”) connection.

The parameters relating to the home wireless network (set on the router) that must be known and set during this step are:

- IP Settings: DHCP or Static.

If you select the DHCP function (default setup) the router will automatically assign a dynamic IP address to the inverter whenever it tries to connect to the user network.

With Static, the user can assign a fixed IP address to the system. The data which has to be entered in order for IP static address assigning to take place will appear. Complete the additional fields at the bottom of the screen (all the fields are mandatory with the exception of the secondary DNS server).

- Available networks (SSID):

Identify and select your own (home) wireless network from all those shown in the SSID field (you can carry out a new search of the networks that can be detected with the Update button ). Once the network has been selected, confirm.

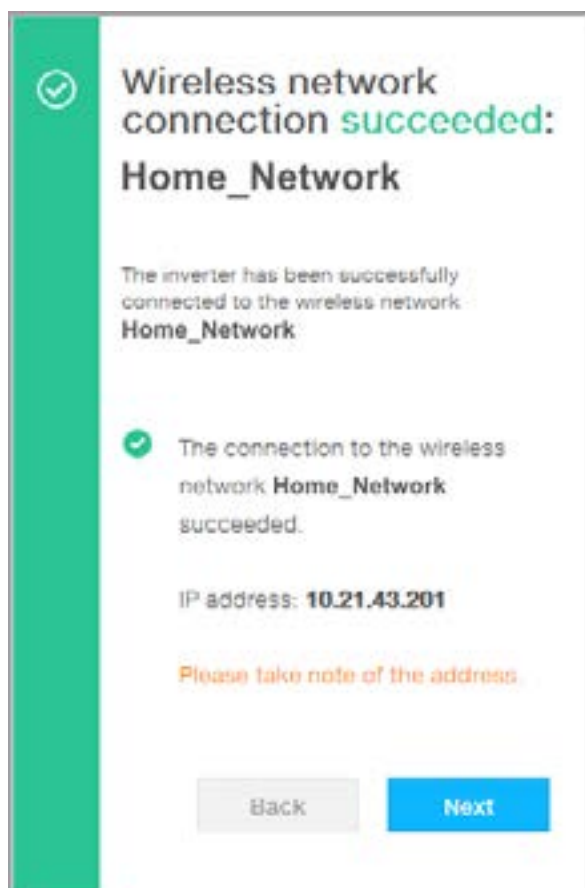
- Password: Wireless network password.

Enter the password for the destination network (if necessary) and start the connection attempt (it will take a few seconds).

Click on “Connect” button to connect the inverter to the home wireless network.



A message will ask for confirmation. Click “Next” to connect the inverter to the home wireless network.



Once the inverter is connected to the domestic wireless network, a new message will confirm that the connection is acquired.

The message provides the IP Address assigned by the home wireless network router to the inverter that can be used each time you want to access the internal web user interface with the inverter connected to the home wireless network. **Take note of it.**

Click on “Next” button to proceed to the next stage of the configuration wizard.



The IP address assigned may vary for reasons connected to the wireless home router setup (for example, a very brief DHCP lease time). If verification of the address is required, it is usually possible to obtain the client list (and the corresponding IP addresses) from the wireless router administration panel.

If the inverter loses the connection with the home wireless network (and therefore, loses the internet connection), it will once again enable its own access point.



The most common causes of losing connectivity might be: different wireless network password, faulty or unreachable router, replacement of router (different SSID) without the necessary setting updates.

STEP 3 - Date, Time and Time zone

Date and Time

✓ network Time Protocol server has been detected and it will be used to keep the system clock synchronized.

Date ●

Feb 22, 2017

SET by the NTP server

Time ●

3:28 PM

SET by the NTP server

Time Zone

Europe/Berlin GMT+01:00

BACK NEXT

Set the Date, Time and Time zone (The inverter will propose these fields when available).

Date and Time

⚠ network Time Protocol server has not been detected. Clock isn't synchronized. The displayed date and time come from the inverter or have been manually set up.

Please set the correct system date and time if needed.

Date and time will be automatically updated as soon an NTP server is available.

Date

2/8/17

Time

11:50 AM

Time Zone

Europe/Berlin GMT+01:00

BACK NEXT

When it's not possible for the inverter to detect the time protocol, these fields have to be manually entered.

Click on "Next" button to proceed to the next stage of the configuration wizard.

STEP 4 - Inverter country standard, Input configuration and Meter configuration (Dynamic Feed-in Control)

- Country standard: selection of grid standard:

Set the grid standard of the country in which the inverter is installed.



From the moment that the grid standard is set, you have 24 hours to make any changes to the value, after which the “Country Select > Set Std.” functionality is blocked, and the remaining time will have to be reset in order to have the 24 hours of operation available again in which to select a new grid standard (follow the procedure “Resetting the remaining time for grid standard variation” described in the relevant section).

The screenshot shows a configuration interface with three main sections:

- Country standard:** A dropdown menu labeled "Grid Standard" with the text "... Please select ..." and a red border. Below it, the word "Required" is written in orange.
- Input mode:** A dropdown menu labeled "PV Input Channels Configuration" with the text "Independent".
- Meter:** A dropdown menu labeled "Meter Model" with the text "none".

At the bottom of the screen, there are two buttons: "BACK" (blue) and "END" (light blue).

- Input mode:

(See the relevant section of this manual to know how set the input mode)

1. **Independent**
2. **Parallel**

- Meter:

When a meter device is connected to the inverter, it's requested to select the meter model:

1. **None** (where system is installed without meter)
2. **REACT-MTR-1PH** (single-phase)
3. **ABB 1PH** (single-phase)
4. **ABB 3PH** (three-phase)



*If a 3PH energy meter (ABB B23, B24) is used in the system as single-phase inverter, it will be necessary to select **ABB 3PH** and the phase to which the inverter is connected.*

Meter

Meter Model

ABB B23 3PH

Meter Phase

Phase L1

Energy Policy

Energy Policy

self consumption

PV Generator Power (kWp)

0

Feed-in Power (% Of PV Generator Power)

100

 after country standard is changed the inverter will be rebooted. The procedure may take up to 5 minutes.

BACK

END

Once the meter model is selected, additional requested fields will appear:

- **METER PHASE:** If the METER is three-phase, the phase to which the inverter is connected must be selected. (This field will appear only if you select the ABB B23 3PH meter model)
- **ENERGY POLICY:** set the way in which you want to manage the energy produced by the PV plant, choosing from the following:

Management mode	Description
Self consumption	The system automatically manages power flows in order to maximise self-consumption. All unused power from domestic loads will feed into the grid. Using the Load Manager Relay, with the optional COM KIT, to program a power-on/power-off of a specific Load is it possible to increase the Self-consumption ratio
Zero injection	The system automatically manages power flows in order to avoid the injection of energy to the grid. If the meter is disconnected or not working the inverter's output power is restricted to zero in order to avoid accidental power feeding to the grid.
Custom	The system automatically manages power flows in order to avoid feeding the grid with power greater than: $P_{DC} \times P_{lim}$ where P_{DC} is the power of the photovoltaic generator ("PV GENERATOR POWER" parameter) and P_{lim} is the output power limit with respect to P_{DC} (%) ("FEED-IN POWER" parameter).



- **PV GENERATOR POWER:** Insert the power value of the photovoltaic system (kWp) installed.
- **FEED-IN POWER:** Set the percentage AC power restriction (with reference to the value of the photovoltaic system (kWp) installed) to be feed into the grid. This field can be edited only if the Energy Policy selected is "Configurable".

Confirm the settings by clicking "END" and the inverter will test the meter working (if selected a meter device) and it will reboot at the finish of test phase.

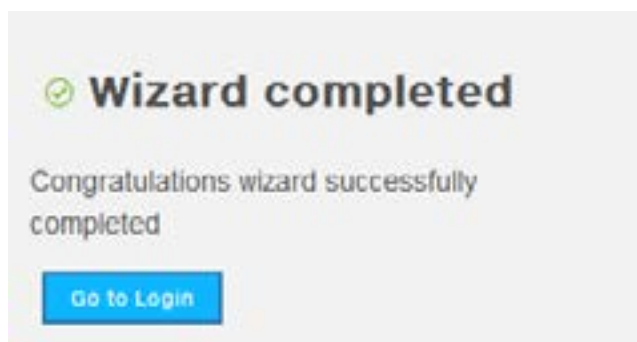
 Saving parameters

 After country standard is changed the inverter will be rebooted. The procedure may take several minutes. Please wait.

BACK

END

A notification will confirm that the wizard is completed.



- After the wizard is completed, the message “Initializing...Please Wait” is displayed on the inverter display. Regardless of the input voltage value, the inverter displays various messages and changes the behaviour of the “Power” and “Alarm” LEDs ⑥:

Input voltage	Message on display	LED Status	Description
$V_{in} < V_{start}$	Waiting Sun	Power = Flashing Alarm = OFF	The input voltage is not sufficient to enable connection to the grid.
$V_{in} > V_{start}$	Missing Grid	Power = Flashing Alarm = ON	The input voltage is sufficient to enable connection to the grid: the inverter waits for the grid voltage to be present to make the parallel connection.



The inverter is powered SOLELY by the voltage generated by the photovoltaic generator: the presence of grid voltage alone is NOT SUFFICIENT for the inverter to switch on.



To address any problems that may occur during the initial stages of operation of the system and to ensure the inverter remains fully functional, you are advised to check for any firmware updates in the download area of the website www.abb.com/solarinverters or at <https://registration.abbsolarinverters.com> (instructions for registering on the website and updating the firmware are given in this manual).

- With the inverter in the “Missing Grid” status, close the AC switch downstream of the inverter thus applying the grid voltage to the inverter: the inverter checks the grid voltage, measures the insulation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the “Power” LED keeps flashing, the “Alarm” and “GFI” LEDs are off.

- During the check on the grid voltage and the measurement of the insulation resistance, the voltage, grid frequency and insulation resistance values measured by the inverter are displayed. The inverter ONLY creates a parallel connection with the grid if the grid and insulation resistance parameters fall within the ranges foreseen by current regulations.

- If the outcome of the preliminary checks on the grid parallel is positive, the inverter connects to the grid and starts to export power to the grid. The “Power” LED remains fixed on while the “Alarm” and “GFI” LEDs are off.

Commissioning (Using the inverter display)



Do not place objects of any kind on the inverter during operation! Do not touch the heat sink while the inverter is operating! Some parts may be very hot and could cause burns.



Before proceeding with commissioning, make sure you have carried out all the checks and verifications indicated in the section on preliminary checks.

The procedure for commissioning the inverter consists of the following steps:

- Close the DC disconnect switch to supply the inverter with the photovoltaic generator voltage.
If the inverter is equipped with a DC disconnect switch (-S models), set the DC disconnect switch ⑩ to the ON position.

- When the inverter is connected to the power supply, the display will show a guided configuration procedure and the yellow ALARM led is fast blinking. Press ENTER to set the following:

Config. Wizard
ENTER to START

ENTER

Time hh:mm
Date DD MMM YYYY

ENTER

INPUT MODE
Independent

ENTER

GRID=Xxxxxxxxxx

- Inverter date and time

- Selection of the current input mode: Independent or Parallel (See the relevant section of this manual to know how to set the proper input mode)

- Selection of grid standard (and corresponding display language).



For the list of available grid standards and the relative details, contact ABB.



From the moment that the grid standard is set, you have 24 hours to make any changes to the value, after which the “System > Settings > Country Select > Set Std.” functionality is blocked, and the remaining time will have to be reset in order to have the 24 hours of operation available again in which to select a new grid standard (follow the procedure “Resetting the remaining time for grid standard variation” described in the relevant section).

- After having set the Country Standard (grid standard), the message “Initializing...Please Wait” is displayed. Regardless of the input voltage value, the inverter displays various messages and changes the behaviour of the “Power” and “Alarm” LEDs ⑩:

Input voltage	Message on display	LED Status	Description
$V_{in} < V_{start}$	Waiting Sun	Power = Flashing Alarm = OFF	The input voltage is not sufficient to enable connection to the grid.
$V_{in} > V_{start}$	Missing Grid	Power = Flashing Alarm = ON	The input voltage is sufficient to enable connection to the grid: the inverter waits for the grid voltage to be present to make the parallel connection.



The inverter is powered SOLELY by the voltage generated by the photovoltaic generator: the presence of grid voltage alone is NOT SUFFICIENT for the inverter to switch on.

- With the inverter in the "Missing Grid" status, close the AC switch downstream of the inverter thus applying the grid voltage to the inverter: the inverter checks the grid voltage, measures the insulation resistance of the photovoltaic field with respect to ground and performs other auto-diagnostic checks. During the preliminary checks on the parallel connection with the grid, the "Power" LED keeps flashing, the "Alarm" and "GFI" LEDs are off.
- During the check on the grid voltage and the measurement of the insulation resistance, the voltage, grid frequency and insulation resistance values measured by the inverter are displayed. The inverter ONLY creates a parallel connection with the grid if the grid and insulation resistance parameters fall within the ranges foreseen by current regulations.
- If the outcome of the preliminary checks on the grid parallel is positive, the inverter connects to the grid and starts to export power to the grid. The "Power" LED remains fixed on while the "Alarm" and "GFI" LEDs are off.



To address any problems that may occur during the initial stages of operation of the system and to ensure the inverter remains fully functional, you are advised to check for any firmware updates in the download area of the website www.abb.com/solarinverters or at <https://registration.abbsolarinverters.com> (instructions for registering on the website and updating the firmware are given in this manual).



Power, Alarm, GFI LEDs behaviour

The following table shows all the possible activation combinations of “Power” “Alarm” and “GFI” LEDs on the LED panel 06 according to the operating status of the inverter.

● = LED On

⊗ = LED flashing

⊗ = LED Off

⊗ = Anyone of the conditions described above

LED status	Operating state
Power: ● Alarm: ⊗ GFI: ⊗	Firmware programming The inverter firmware is being programmed
Power: ⊗ Alarm: ⊗ GFI: ⊗	Night mode (inverter automatically switches off) The inverter is in night time switch-off mode (input voltage less than 70% of the set start-up voltage).
Power: ● Alarm: ⊗ GFI: ⊗	Inverter initialisation This is a transitional state due to the verification of the operating conditions. During this stage the inverter checks that the conditions for connecting to the grid are met.
Power: ● Alarm: ⊗ GFI: ⊗	The inverter is connected and is feeding power into the grid Normal operation. During this stage, the inverter automatically tracks and analyses the photovoltaic generator's maximum power point (MPP).
Power: ⊗ Alarm: ● GFI: ⊗	Disconnection from the grid Indicates no grid voltage. This condition does not allow the inverter to connect to the grid (the inverter display shows the message "Missing Grid").
Power: ⊗ Alarm: ● GFI: ⊗	Indication of Warning (W message codes) or Error (E message codes) Indicates that the inverter control system has detected a warning (W) or error (E). The display shows a message indicating the type of problem found (see Alarm messages).
Power: ⊗ Alarm: ⊗ GFI: ⊗	• Ventilation anomaly Indicates an anomaly in the operation of the internal ventilation system that could limit output power at high ambient temperatures.
	• Failed association of internal inverter components (after replacement) Indicates that the installed wiring box (only in the event of a replacement) was already associated with another inverter and cannot be associated with the new inverter
	• Overvoltage surge arresters triggered (where fitted) Indicates that any class II overvoltage surge arresters installed on the AC or DC side have been triggered
	• String protection fuses triggered (where fitted) Indicates that one or more input string protection fuses that may be installed have been triggered
	• Autotest (for Italian grid standards only) The inverter is performing an Autotest
Power: ⊗ Alarm: ⊗ GFI: ●	Anomaly in the insulation system of the photovoltaic generator Indicates that a leakage to ground from the PV generator has been detected, causing the inverter to disconnect from the grid.



Specifications on operation of the LEDs

In correspondence to each status of the inverter indicated by the constant or intermittent lighting of the specific LED, the display ⑦ also shows a message identifying the operation which is being carried out or the defect/anomaly recorded (see specific chapter).



In the case of malfunction it is extremely dangerous to intervene personally to try and eliminate the defect. The instructions below must be followed scrupulously; if you do not have the necessary experience and training to intervene safely, please contact a specialist.

LED insulation fault

Interventions after warning of insulation fault

When the GFI LED comes on, first try to reset the warning by pressing the multi-function ESC button on the keyboard ⑧. Should the inverter reconnect normally to the grid, the fault was due to temporary phenomena.



You are advised to have the plant inspected by the installer or a specialist should this malfunction occur repeatedly.

Should the inverter not reconnect to the grid, isolate it on both the AC and DC sides (by using the disconnect switches), then contact the installer or authorised centre to repair the fault in the photovoltaic generator.



COMM, WLAN LEDs behaviour

The following table shows all the possible status of “COMM” and “WLAN” LEDs on the LED panel ⑥ according to the operating status of the wireless board.

LED	Description
COMM (MULTICOLOR)	Operation status of wireless communication line: Blink Red: Communication error (no communication available) Green: Communication OK
WLAN (MULTICOLOR)	Communication type and quality of the wireless communication signal (for “Station Mode”): Blink Blue: Wireless board is working in Access Point mode (AP Mode) OFF: No signal Blink Red: Low signal strenght Blink Yellow: Medium signal strenght Blink Green: High signal strenght

Description of the Web user interface

The UNO-DM-TL-PLUS inverters are equipped with an advanced integrated web user interface and user interface that allow a full access to all configuration and commissioning parameters from any electronic device (laptop, tablet and smartphone).



The screenshots shown in this chapter are indicatives and it could be changed without any notification.

Access to the Web user interface

To access to the web user interface is required to connect a device equipped with wireless connection (such as tablet, laptop or smartphone).

Depending on completion of STEP #2 of the wizard commissioning phase (the inverter was connected to the domestic wireless network ("Station Mode"), or this step was skipped) it's required to follow one of the two procedures described below:

Connection to the inverter in "Station Mode"

If the inverter was connected to the domestic wireless network, follow this procedures:

- Enable the wireless connection on the device (tablet, smartphone or laptop) and connect it to the same wireless network to which the inverter is connected.
- Open an internet browser (recommened browser: Chrome versions from v.55, Firefox versions from v.50) and enter the IP Address assigned by the router to the inverter, or the "Host Name" (that could be obtained writing this url: **http://ABB-XX-XX-XX-XX-XX-XX.local** replacing the "X" with the hex digits of the wireless MAC address of the inverter (it can be found on the "Wireless Identification Label" placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page)), to access the login page.



*In order to use the "Host Name" as an alternative to the dynamic IP address, the Wi-Fi router to which the board is connected (when operating in "Station Mode") must provide the Domain Name System (DNS) service (contact the network administrator for further information regarding the presence or absence of the DNS service in the Wi-Fi router or how to enable it). In this way, even if the IP address assigned to the inverter should change over time, (dynamic IP), it will always be possible to use the same "Host Name" which will remain unchanged over time. **Android devices doesn't allow the use of "Host Name" to access to the web user interface!***



The IP address assigned may vary for reasons connected to the wireless home router setup (for example, a very brief DHCP lease time). If verification of the address is required, it is usually possible to obtain the client list (and the corresponding IP addresses) from the wireless router administration panel.

Connection to the inverter in “AP Mode”

If the inverter wasn't connected to the domestic wireless network, follow this procedures:

- Enable the wireless connection on the device which is being used for the board setup (tablet, smartphone or PC) and connect it to the Access Point created by the inverter system: the name of the wireless network created by the system that the connection should be established with, will be:

ABB-XX-XX-XX-XX-XX

where “X” is a hex digit of the wireless MAC address (MAC address can be found on the “Wireless Identification Label” placed on the side of the inverter or applied during the commissioning phase to the quick installation guide on cover page).

- When prompted, type the “product key” (including the dashes. Example: 1234-1234-1234-1234) as the network password to access the inverter's access point. The product key is printed on the “wireless identification label” on the side of the inverter.
- Open an internet browser (recommended browser: Chrome versions from v.55, Firefox versions from v.50) and enter the pre-set IP address **192.168.117.1** to access the login page.



Login page

After you have connected the device to the inverter and you access to the login page, login with the username and password created during the commissioning phase.



User and password are CASE SENSITIVE.



If the Password is lost click on “Forgot your password?” to obtain the access to the web user interface (and it will be possible to change the password) by entering the PRODUCT KEY (printed on the “Wireless identification label” and applied during the commissioning phase to the quick installation guide on cover page).



The language of the web user interface could be changed in any moment by clicking on the right status bar:

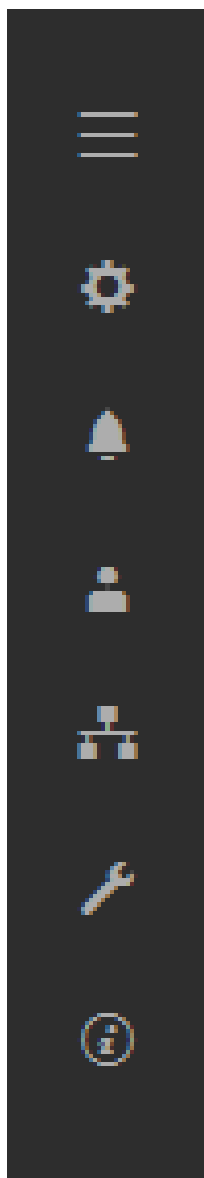


Web user interface menu structure



The following screenshots are related from a laptop visualization, may differ from smartphone or tablet visualization.

The Web user interface is divided in six main sections, available on the left sidebar:



MAIN: Main section of web user interface dedicated to viewing the summary informations related the status and the production informations of the inverter and photovoltaic plant.

SETUP: Section dedicated to AC and DC line parameters configurations.

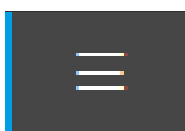
EVENTS: Section dedicated to viewing Alarms and Warnings event log.

USER: Section dedicated to User management.

NETWORK: Section dedicated to inverter communication settings and configurations.

TOOLS: Section dedicated to main service tools configurations.

INFORMATION: Section dedicated for general informations about the embedded web user interface.



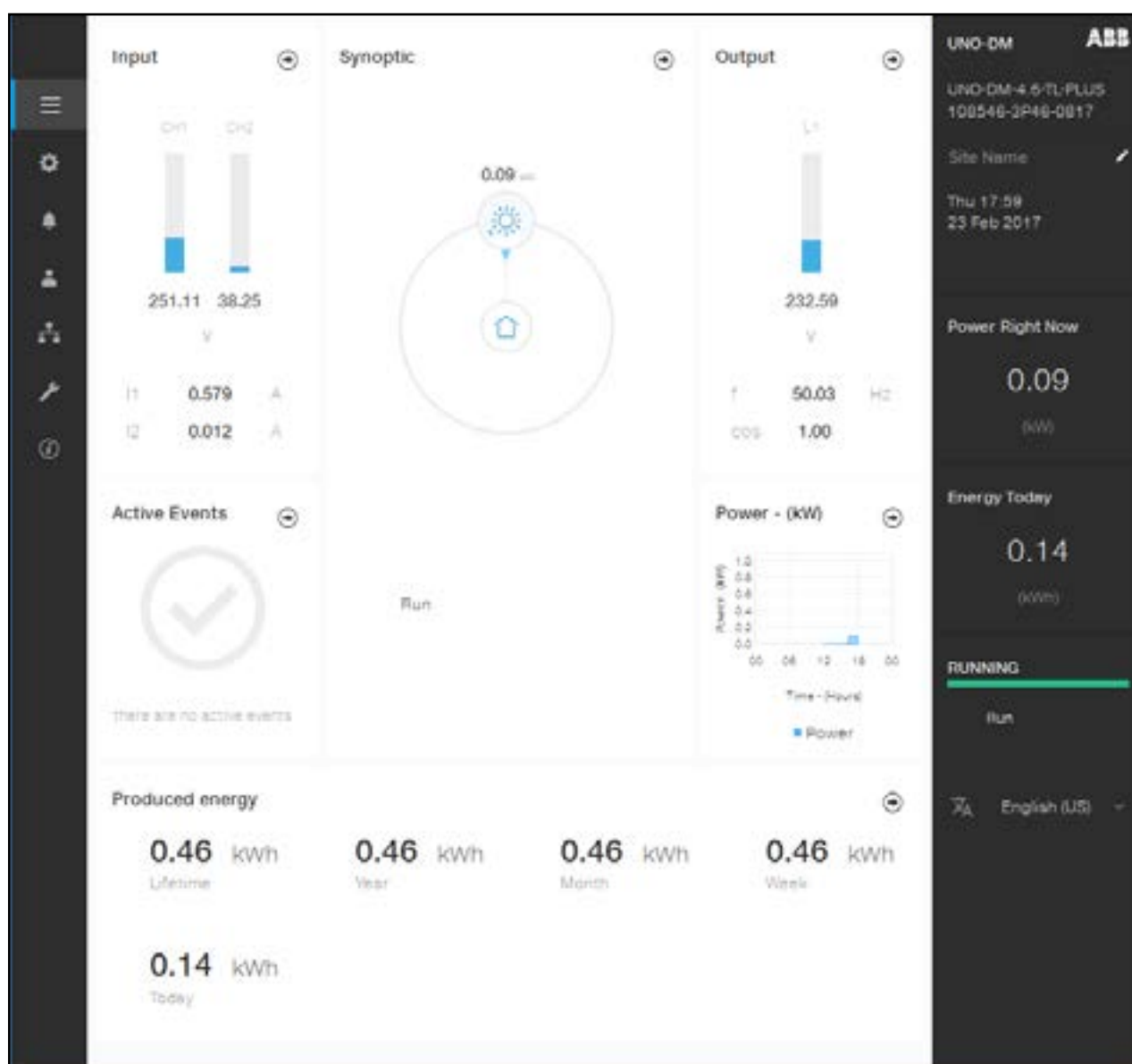
MAIN section

In the **MAIN** section it's possible to access the following sub-menus:

- **Dashboard**
- **Status Summary**

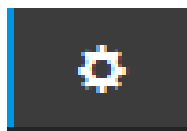
Dashboard

In the **Dashboard** sub-menu you can view the main informations related the status and the production informations of the inverter and photovoltaic plant and alarm/warning active events.



Status Summary

In the **Status Summary** sub-menu you can view the detailed informations related the status and the production informations of the system.



SETUP section

In the **SETUP** section it's possible to access the following sub-menus:

- **Setup DC Side**
- **Setup AC Side (Only visible and editable with Admin Plus privileges)**
- **Ground Fault Interface**

Setup DC Side

In the **Setup DC Side** sub-menu you can setup the parameter related to the Input DC side:

1. VStart1

This parameter is used to set the Vstart activation voltage for the input channel 1 if they are configured independently (If parallel you will see only a single "Vstart" parameter for both channels). This voltage imposes a minimum input voltage on the inverter above which connection to the grid will be attempted.

2. VStart2

This parameter is used to set the Vstart activation voltage for the input channel 2 if they are configured independently (If parallel you will see only a single "Vstart" parameter for both channels). This voltage imposes a minimum input voltage on the inverter above which connection to the grid will be attempted.



We advise changing the activation voltage only if really necessary and to set it to the correct value: the photovoltaic generator sizing tool available on the ABB website will indicate whether Vstart needs changing and what value to set it to.

3. Input Mode

This settings allows you to set the input configuration mode.

In particular:

- **Independent:** Independent configuration of the two input channels. This configuration is set by default.
- **Parallel:** Parallel configuration of the input channels (single input channel). Other hardware settings must be set on the inverter to set this mode. Refer to the paragraph "Parallel channel configuration".

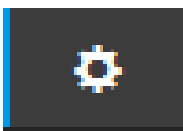
4. UV Protection Time

This section of the menu allows you to set the time for which the inverter stays connected to the grid after the input voltage has dropped below the Under Voltage limit (set at 70% of Vstart).

This value can be set from 1 to 3600 seconds (60 seconds is the default setting).

5. Multiple Max Scan Enable

This settings allows you to Enables/disables the scan for identifying the maximum power point of the system.



6. Multiple Max Scan Period

This settings allows you to set the time between scans. Remember that the shorter the scan interval the greater the loss of production, due to the fact that energy is transferred to the grid during the scan but not at the maximum power point. Each scan takes roughly 2 seconds..

7. MPPT Noise amplitude (Only visible and editable with Admin Plus privileges)

By changing this settings you can choose the amplitude of the DC perturbation introduced to establish the optimal operating point.

Setup AC Side (Only visible and editable with Admin Plus privileges)

In the **Setup AC Side** sub-menu you can setup the parameter related to the Output AC side:



Changing the above-mentioned parameters may prevent disconnection from the grid if the new values exceed those given in the standards of the country of installation. If these parameters are changed to values outside the standard range, an interface protection must be installed external to the inverter in accordance with the requirements of the country of installation.

1. Grid Protection

By editing these settings it's possible to enable/disable and change the grid protection intervention thresholds parameters.

2. Grid Connection

By editing these settings it's possible to change the grid connection thresholds parameters to which the inverter have to connect to the grid.

3. High Frequency Derating

By setting these parameters it's possible to change the output derating behavior of the inverter related to the grid frequency parameters.

4. Setup Average Vgrid Derating

By setting these parameters it's possible to change the output derating behavior of the inverter related to the average voltage parameters of the grid.



Ground Fault Interface

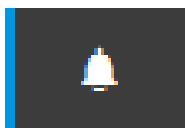
In the **Ground Fault Interface** sub-menu you can setup the parameter related to the Ground Fault Interface:

1. Minimum Riso (read only)

These read only field shown the measure of the insulation resistance of the PV generator compared to ground.

2. Minimum time for Riso check

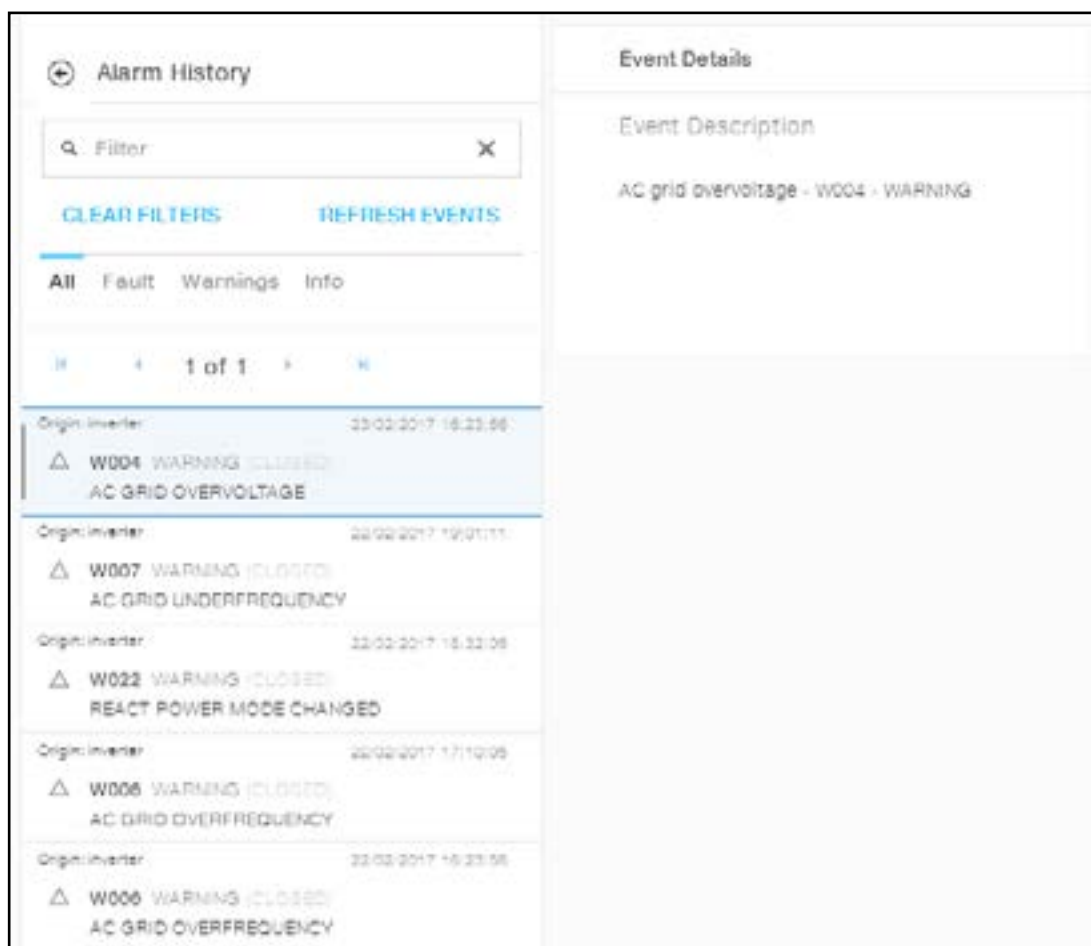
By editing this settings it's possible to change the necessary time for checking the Riso value.

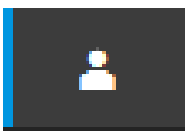


EVENTS Section

In the **EVENTS** Section it's possible to view the Alarm and Warning events list that it can be custom filtered by type or by entering a matching word.

Clicking on any event to view his details.





USER section

In the **USER** section it's possible to logout from web user interface and return to the login page, or to access the following sub-menus:

- **Edit Email and Password**
- **Admin Plus**
- **User Management**

Edit Email and Password

In the **Edit Email and Password** sub-menu you can change the e-mail and password related to the user which is used to login to the web user interface:

Admin Plus

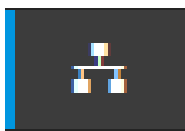
By accessing to the **Admin Plus** sub-menu you can obtain the “Admin Plus” user privileges which allow you to:

- Change the grid standard of the inverter, after 24 hours while the inverter is operating (so the **Country Standard** sub-menu on **TOOLS** section is locked).
- View and edit the **Setup AC** sub-menu on **SETUP** section.
- View and edit the “**MPPT Noise amplitude**” field in **Setup DC** on **SETUP** section.

To access on the web user interface with the “Admin Plus” user privileges it's required to enter a security token that it can be obtained by registering on the website <https://registration.abbsolarinverters.com>. Refer to the dedicated section on this topic in the manual.

User Management

By accessing to the **User Management** sub-menu it's possible to edit all the users already created and create new users (both with admin or User privileges).



NETWORK section

In the **NETWORK** section it's possible to access the following sub-menus:

- **RS485**
- **WLAN Status**
- **Modbus TCP**
- **Debug Settings**

RS485

In the **RS485** sub-menu it's possible to adjust the settings relating to the RS485 communication serial line:

- RS485 Node Address: It allows you to set the address for serial communication of the individual inverters connected to the RS485 line. The UP and DOWN buttons scroll through the numerical scale. (The addresses that can be assigned are 2 to 63).
- RS485 Baud Rate: It allows you to set the Baud Rate (2400/4800/9600/19200/34800/57600/115200).
- RS485 Protocol Type: It allows you to set the type of protocol to be used for the RS485 line.
  - "Modbus Sunspec Server": General purpose communication protocol to be selected to enable monitoring and control.
  - "Modbus Meter Interface": communication protocol to be selected for enable communication with the supported external meter.
  - RS485 Parity Mode: It allows you to set the Parity bit (No Parity, Even Parity, Odd Parity).





WLAN Status

In the **WLAN Status** sub-menu it's possible to view operation status and the information about the WLAN board for both of wireless channel and to switch between the two operation mode ("Station Mode" or "AP Mode").

WLAN Status

Wireless channel 1
You are connected through the channel 1 (Access Point)

Mode:	Access Point
Status:	on
SSID:	ABB-b0-72-bf-9f-e4-8a
IP:	192.168.117.1

Wireless channel 2

Mode:	Station
Status:	connected
Connected to:	Home_Network
Signal level:	Strong
IP:	10.21.43.201
Netmask:	255.255.252.0
DNS:	
Gateway:	10.21.43.1

DISCONNECT

Edit channel 2 configuration

IP Settings

DHCP

Available Network (SSID)

Home_Network

Password

.....

☐ Show password

Back **Apply changes**

Wireless channel 1 is always active and it's dedicated to operate in Access Point mode only.

Wireless channel 2 is dedicated to operate in "Station" mode. If the inverter is connected to channel 2 it will be shown all information regarding the wireless parameters.

You will be able to edit the configuration of wireless channel 2 only connecting to the channel 1.

If you are connected via channel 2, you can switch to Access Point mode and disconnect the inverter from the domestic wireless network by clicking "Switch to AP mode" button.

If the inverter wasn't previously connected to the router, it will now be possible to connect it by entering the following wireless network parameters (set on the router):

- IP Selection Mode: DHCP or Static:

If you select the DHCP function (default setup) the router will automatically assign a dynamic IP address to the inverter whenever it tries to connect to the user network.

With Static, the user can assign a fixed IP address to the system. The data which has to be entered in order for IP static address assigning to take place will appear. Complete the additional fields at the bottom of the screen (all the fields are mandatory with the exception of the secondary DNS server).

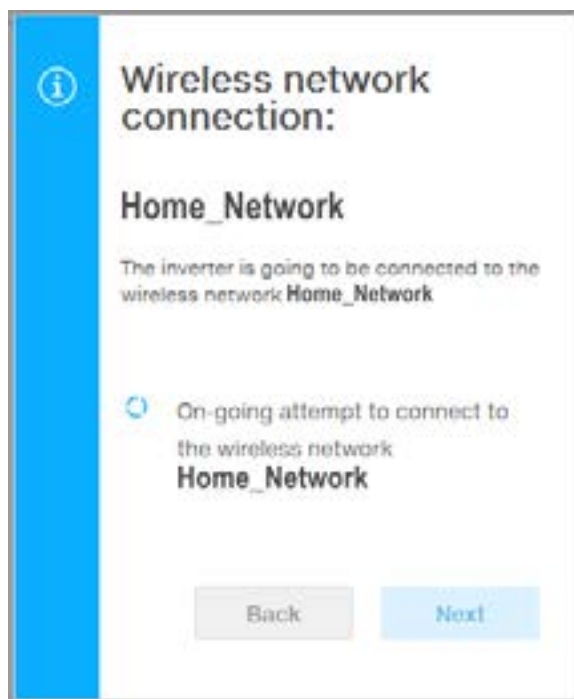
- Available Network (SSID):

Identify and select your own (home) wireless network from all those shown in the SSID field (you can carry out a new search of the networks that can be detected with the Update button ). Once the network has been selected, confirm.

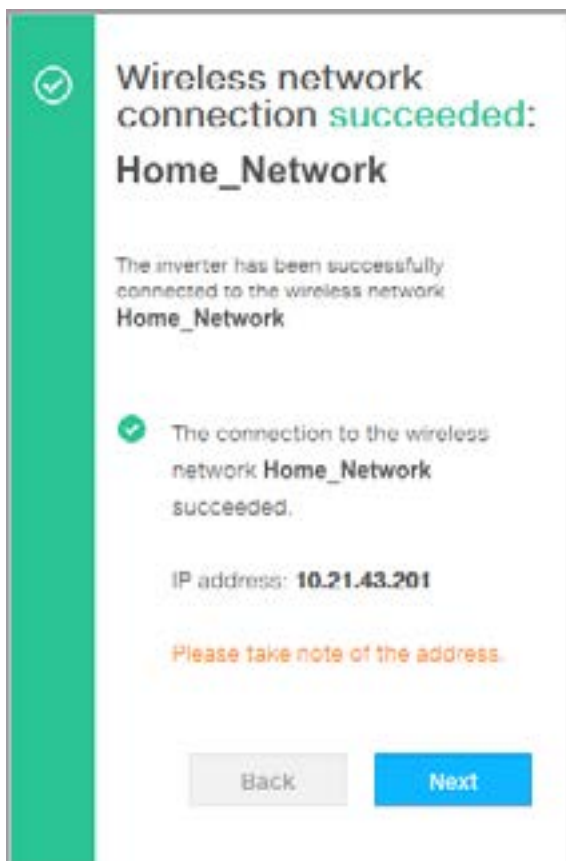
- Password (wireless network password):

Enter the password for the destination network (if necessary) and start the connection attempt (it will take a few seconds).

Click on "Connect" button to switch the inverter wireless connection from point to point to the home wireless network.



Once the inverter is connected to the domestic wireless network, a new message will confirm that the connection is acquired.



The message provides the IP Address assigned by the home wireless network router to the inverter that can be used each time you want to access the web user interface, with the inverter connected to the home wireless network. **Take note of it.**

Click the “Next” button” to complete the setup of “Station Mode” connection.



The IP address assigned may vary for reasons connected to the wireless home router setup (for example, a very brief DHCP lease time). If verification of the address is required, it is usually possible to obtain the client list (and the corresponding IP addresses) from the wireless router administration panel.



The most common causes of losing connectivity might be: different wireless network password, faulty or unreachable router, replacement of router (different SSID) without the necessary setting updates.



Where possible, “Station Mode” is always preferable. Thanks to the internet connection, this mode ensures better operation.

Modbus TCP

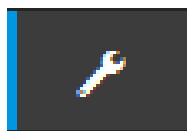
In the **Modbus TCP** sub-menu it's possible to enable exchanging of data with third party monitoring and control systems over wireless channel in compliance with Sunspec register map, by setting “ON” the “Modbus TCP Server” parameter.



By changing “Modbus Power Control” parameter settings to “OFF” only reading register is enabled.

Debug Settings

In the **Debug Settings** sub-menu it's possible to enable or disable the Debugging access for ABB Service purposes.



TOOLS section

In the **TOOLS** section it's possible to access the following sub-menus:

- **Dynamic Feed-in Control**
- **Local I/O Manager**
- **Country Standard**
- **Autotest CEI 0-21**
- **Firmware Update**
- **Date/Time**

Dynamic Feed-in Control

In the **Dynamic Feed-in Control** sub-menu it's possible to enable the management of power flows in order to optimize self-consumption or avoid feeding power to the grid (except during transitory), basing on the reading of the energy meter:



Installation of energy meter is required. Refer to the section "Connection of the energy meter" in the manual for the meter connection.

Dynamic Feed-In Control

Meter

Meter Model
ABB B23 3PH

Meter Phase
Phase L1

Energy Policy

Energy Policy
Self consumption

PV Generator Power (Wp)
4650

Feed-In Power (% PV Generator Power)
100

SAVE

- **Meter:**

When a meter device is connected to the inverter, it's requested to select the meter model:

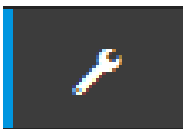
1. **None** (where system is installed without meter)
2. **REACT-MTR-1PH** (single-phase)
3. **ABB 1PH** (single-phase)
4. **ABB 3PH** (three-phase)



*If a 3PH energy meter (ABB B23, B24) is used in the system as single-phase inverter, it will be necessary to select **ABB 3PH** and the phase to which the inverter is connected.*

Once the meter model is selected, additional requested fields will appear:

- **METER PHASE:** If the METER is three-phase, the phase to which the inverter is connected must be selected. (This field will appear only if you select the ABB B23 3PH meter model)



- **ENERGY POLICY:** set the way in which you want to manage the energy produced by the PV plant, choosing from the following:

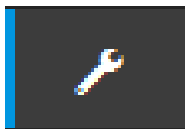
Management mode	Description
Self consumption	The system automatically manages power flows in order to maximise self-consumption. All unused power from domestic loads will feed into the grid. Using the Load Manager Relay, with the optional COM KIT, to program a power-on/power-off of a specific Load is it possible to increase the Self-consumption ratio
Zero injection	The system automatically manages power flows in order to avoid the injection of energy to the grid. If the meter is disconnected or not working the inverter's output power is restricted to zero in order to avoid accidental power feeding to the grid.
Configurable	The system automatically manages power flows in order to avoid feeding the grid with power greater than: $P_{DC} \times P_{lim}$ where P_{DC} is the power of the photovoltaic generator ("PV GENERATOR POWER" parameter) and P_{lim} is the output power limit with respect to $P_{DC}(\%)$ ("FEED-IN POWER" parameter).



- **PV GENERATOR POWER:** Insert the power value of the photovoltaic system (kWp) installed.
- **FEED-IN POWER:** Set the percentage AC power restriction (with reference to the value of the photovoltaic system (kWp) installed) to be feed into the grid. This field can be edited only if the Energy Policy selected is "Configurable".

Confirm the settings by clicking "END" and the inverter will test the meter working.





Local I/O Manager

In the **Local I/O Manager** sub-menu it's possible to enable the management of power flows in order to optimize self-consumption or avoid feeding power to the grid (this features will work only on inverter equipped with UNO-DM-COM KIT (-X models) or UNO-DM-PLUS-COM ETHERNET KIT (-E models)).

This section of the menu allows you to set the activation status of a relay (available either as contact normally open – N.O. - and as a normally closed contact -N.C.) and to configure customised alarm conditions.

This contact can be used, for example, to: activate a siren or a visual alarm, control the disconnect device of an external transformer, or control an external device. A little description of the alarm type (e.g. “alarm lamp”) is required.

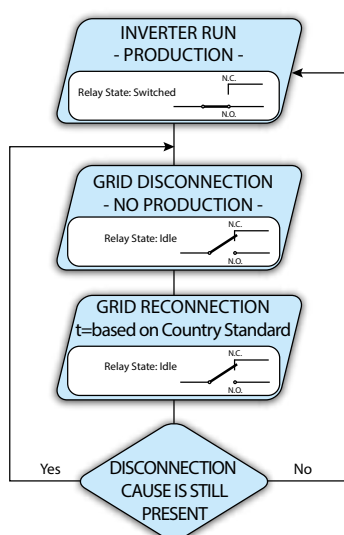
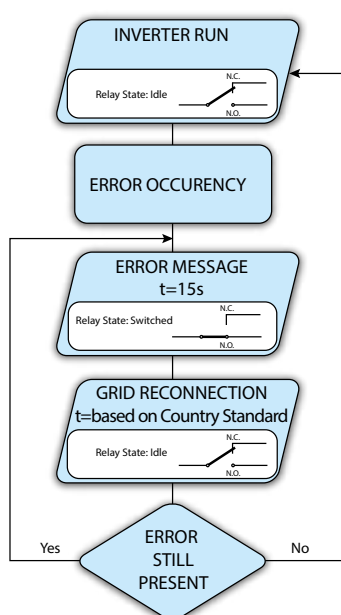
Relay switching can be set in 9 different modes using the submenu **Set Alarm Type** (For the “Alarm Conf.”, “Al. Conf. Latch”, “Al. Conf. Ext.”, “GoGo Rel(Auto)” and “GoGo Rel(Slave)” it is possible to configure customised alarm conditions through the submenu **Alarm Config**:

• Alarm Production - display text “Alarm-Contact (Production)”

The relay is activated (status: switched) whenever the inverter connects to the grid; as soon as the inverter is disconnected from the grid (for whatever reason that caused disconnection), the relay is in its resting position.

• Alarm with reset at the end of the alarm signalling process - display text “Alarm-Contact (alarm ALL - no-latch)”

The relay is activated (status: switched) whenever an error (code Exxx) or warnings related to grid parameters out of range (Warning – codes W003, W004, W005, W006, W007) are present on the inverter. The alarm returns to its resting position when the alarm signal ends, i.e. before the inverter checks the grid parameters after the alarm state. This is because grid control state is not an alarm state but a state of normal operation.

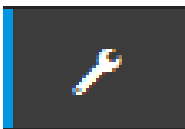
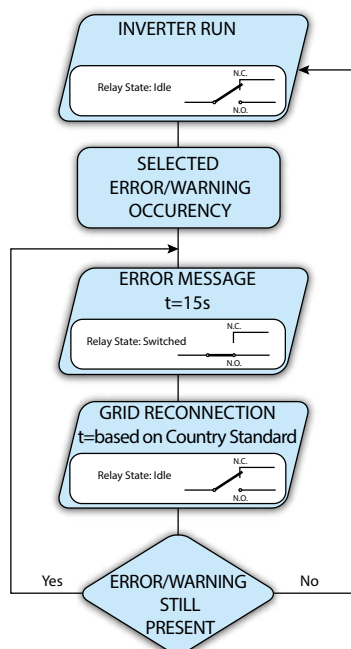


Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E017	E018	E019	E020
E021	E022	E023	E025	E026	E027
E028	E029	E030	E031	E032	E033
E034	E035	E036	E037	E046	E050
E051	E053	E054	E055	E056	E057
E058	E065	E066	E067	E068	E069
E070	E074	E077	E078	E080	E084
E086	E087	E088	E089		
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W027	W029
W030	W036	W037	W039	W040	W042
W043	W046	W047	W048	W051	W058
W059					



In the presence of W003, W004, W005, W006, W007 signalling, the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the absence of grid voltage (display message “Missing Grid”) the alarm contact remains in its resting position.



• **Configurable alarm with reset at the end of the alarm signalling process - display text “Alarm-Contact (alarm configurable - no-latch)”**

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present from those selected from the list in the dedicated submenu **Alarm Config** of the inverter display. The contact returns to its resting position when the alarm signal ends, i.e. before the inverter checks the grid after the alarm state. This is because grid control state is not an alarm state but a state of normal operation.

Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E018	E019	E020	E021
E022	E023	E025	E026	E027	E028
E029	E030	E031	E032	E033	E034
E036	E037	E046	E050	E051	E053
E054	E055	E056	E057	E058	E065
E066	E067	E068	E069	E070	E074
E077	E078	E080	E084	E086	E087
E088	E089				
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W025	W027
W029	W030	W031	W037	W039	W040
W042	W043	W046	W047	W048	W051
W058	W059				

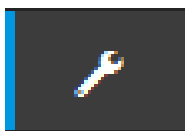
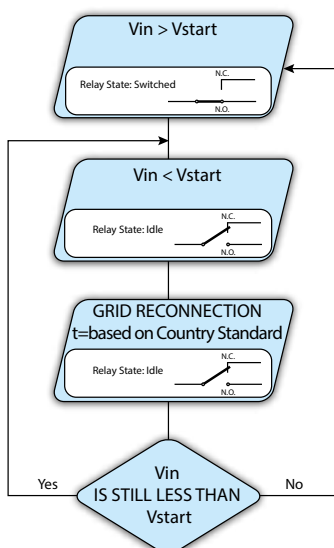
For the configurable relay operating mode “Alarm Conf.”, the following considerations are valid:

If the alarm condition is persistent, the alarm contact cyclically switches from its resting state to its activated state.



In the presence of W002 signalling (Input UV – input voltage below the limit of operation), the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the reduced input voltage (display message “Waiting Sun”) the alarm contact remains in its resting position.

In the presence of W003, W004, W005, W006, W007 signalling, the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the absence of grid voltage (display message “Missing Grid”) the alarm contact remains in its resting position.

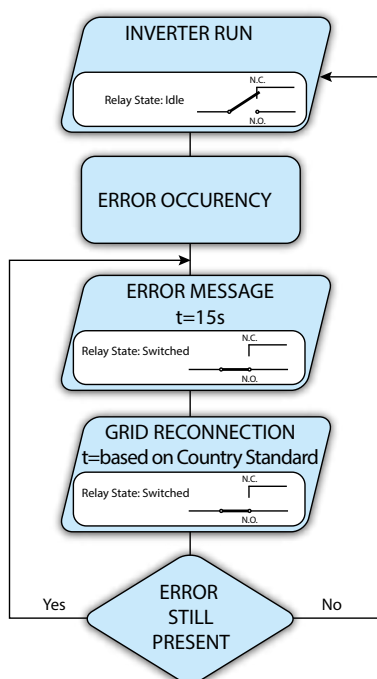


• **Crepuscular - display text “Alarm-Contact (crepuscular)”:**

The relay is activated (status: switched) as soon as the inverter input voltage exceeds the activation voltage set.

The relay switch to rest position when the input voltage drops below 70% of the activation voltage set.

This mode is useful for disconnecting any output transformers that could have unnecessary consumption during the night.



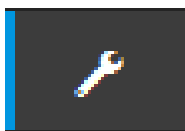
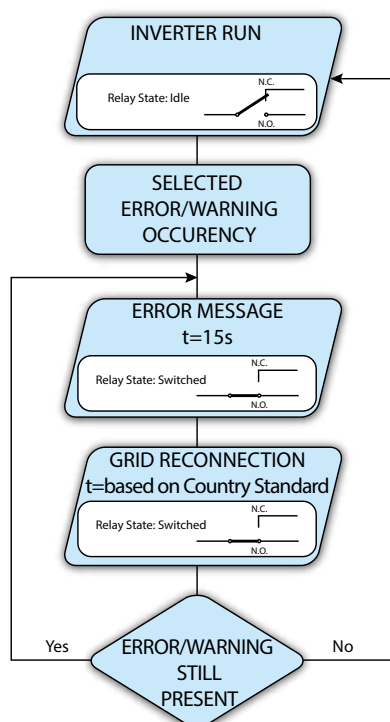
• **Alarm Latch - display text “Alarm-Contact (alarm ALL - latch)”:**

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present (see the table below). When the inverter returns to the normal operating state and reconnects with the grid, the contact returns to its position of rest.

Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E017	E018	E019	E020
E021	E022	E023	E025	E026	E027
E028	E029	E030	E031	E032	E033
E034	E035	E036	E037	E046	E050
E051	E053	E054	E055	E056	E057
E058	E065	E066	E067	E068	E069
E070	E074	E077	E078	E080	E084
E086	E087	E088	E089		
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W027	W029
W030	W036	W037	W039	W040	W042
W043	W046	W047	W048	W051	W058
W059					

If the alarm condition is persistent, the relay will remain activated (status:switched)



• **Latch configurable alarm - display text “Alarm-Contact (alarm configurable - latch)”:**

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present from those selected from the list in the dedicated submenu **Alarm Config** of the inverter display (see the table below). When the inverter returns to the normal operating state and reconnects with the grid.

Alarms for which the relay is activated

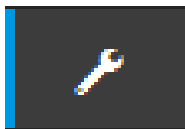
E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E018	E019	E020	E021
E022	E023	E025	E026	E027	E028
E029	E030	E031	E032	E033	E034
E036	E037	E046	E050	E051	E053
E054	E055	E056	E057	E058	E065
E066	E067	E068	E069	E070	E074
E077	E078	E080	E084	E086	E087
E088	E089				
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W025	W027
W029	W030	W031	W037	W039	W040
W042	W043	W046	W047	W048	W051
W058	W059				

If the alarm condition is persistent, the relay will remain activated (status:switched)



• **Ext configurable alarm - display text “Alarm-Contact (alarm configurable - matrix)”:**

In this mode, it is possible to configure the behaviour of the alarm relay according to an external error table which can be setup with the Aurora Manager LITE software. In the table it is possible to select the alarms or warnings for which the alarm relay is activated (status: switched); for each individual alarm it is also possible to select the “Latch” or “No Latch” mode.

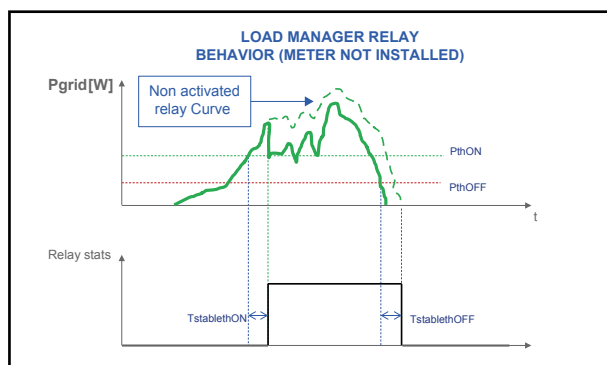
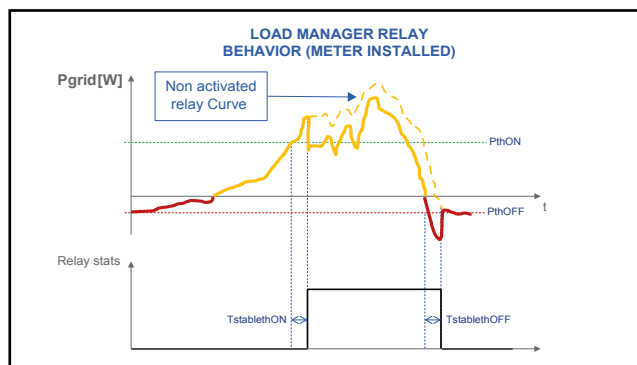


• Load Manager - “Load Management”:

Load Manager functionality allows you to define configurable power thresholds for which the relay is activated (status: switched) to a specific configurable power thresholds.

Once this mode has been selected, the parameters for which the relay is activated and deactivated have to be set.

If the energy meter is installed in the plant the power thresholds “Power Threshold On” and “Power Threshold Off” refers to the Power injected into the Grid (Pgrid); if the energy meter is not installed refers to Inverter output Power (Pout).



Local I/O Manager Settings

Config

Load Management

Description

Please fill the input

Required

Mode

AUTO

Power Threshold On [W]

0

Power Threshold Off [W]

0

TStableThOnM (Minutes)

0

TStableThOffM (Minutes)

0

Back

SAVE

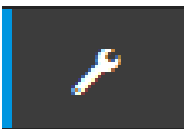
- Mode: It's possible to select AUTO (which allow the automatic switching of the relay based on parameter below), ON (which lock the relay in switched status), OFF (which lock the relay in rest status).

- Power Threshold On [W]: Upper Power threshold (Pgrid/ Pout) for which the relay is activated (status: switched).

- Power Threshold Off [W]: Lower Power threshold (Pgrid/ Pout) for which the relay is deactivated (status: rest position).

- TStableThOnM (Minutes): Minimum time for which the Pgrid/Pout shall remain above the “Power Threshold On” relay activation (status: switched).

- TStableThOffM (Minutes): Minimum time for which the Pgrid/Pout shall remain under the “Power Threshold Off” before the relay deactivation (status: rest position).



Country Standard

By accessing to the **Country Standard** sub-menu you can modify the grid standard within 24 hours while the inverter is operating.



*After the grid standard was set you have 24 hours to make any changes to the grid standard value; 24 hours later the **Country Standard** sub-menu will be locked, and any subsequent changes can only be made accessing with **Adim Plus** privileges. Refer to the dedicated section on this topic in the manual to know how to unlock the **Country Standard** sub-menu.*

Country standard

ⓘ You can change the parameter in the first 24 hours if you logged in as admin. After this time, you can reset the 24 hours only if you logged in as admin plus.

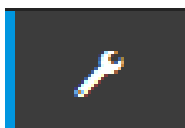
Grid Standard:

CEI 021 - internal protection

RESET

SAVE





Autotest CEI 0-21

By accessing to the **Autotest CEI 0-21** sub-menu you can launch an autest procedures according to the grid standard CEI-021.

AUTOTEST CEI 0-21

① Last execution: ---
Result: ---
[Download the report](#)

☐ Test Selection

☐ U>> Max Tensione	---
☐ U> Max Tensione	---
☐ U> (10 min) Max Tensione media	---
☐ U< Min Tensione	---
☐ U<< Min Tensione	---
☐ F>> Max Frequenza	---
☐ F> Max Frequenza	---
☐ F< Min Frequenza	---
☐ F<< Min Frequenza	---

START

The conditions required to perform an Autotest are:

- The grid standard must be set to CEI-021.
- You must not intervene in any way while the test is underway
- You must check that the equipment has a stable grid connection.

Select the type of test required from the list and click on “START” button. A notification confirm request will appear.

While one of the tests is being performed, the set limits will be gradually increased/reduced (depending on the type of test) until the threshold at which the inverter is disconnected from the grid is reached. The procedures for running the Autotest comply with the legislation in force.

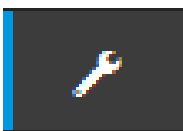
At the end of the tests a message will confirm the results and it will be possible to download a .pdf file report of the test that has been done.

AUTOTEST CEI 0-21

① Last execution: 23/02/2017 at 4:23PM
Result: Success
[Download the report](#)

☒ Test Selection

☒ U>> Max Tensione	---
☐ U> Max Tensione	---
☐ U> (10 min) Max Tensione media	---
☐ U< Min Tensione	---
☐ U<< Min Tensione	---
☐ F>> Max Frequenza	---
☐ F> Max Frequenza	---
☐ F< Min Frequenza	---
☐ F<< Min Frequenza	---



Firmware Update

By accessing to the **Firmware Update** sub-menu you can upgrade the firmware of the inverter and his components selecting a Remote firmware Update or a Local firmware Update.

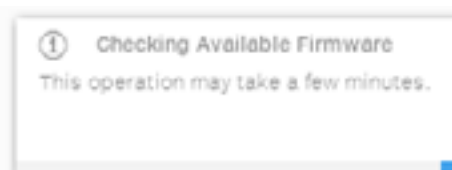


*Perform the update during good irradiation conditions (avoid the dawn and dusk hours).
An interruption of updating process could damage the inverter!*



• **Remote firmware Update:**

- In remote mode, the firmware will update automatically, searching the last available firmware on ABB servers, by clicking the “CHECK” button.



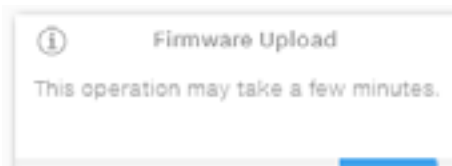
- After the finish of the checking process the available release will be notified on the bottom part of the section
- Click on “UPDATE” button to start with the updating process.



• **Local firmware Update:**

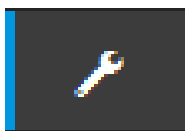
By updating in local mode, the firmware have to be selected and uploaded from local folder of the used devices to access to the web server. The latest firmware version is available from the download area of the website **www.abb.com/solarinverters** or from **<https://registration.abbsolarinverters.com>**

- Click on “FW SELECT” and select the firmware package previously downloaded.



- Click on “UPDATE” button to start with the updating process.





Date and Time

In the **Date and Time** sub-menu it's possible to set the date, time and time zone.

The inverter will propose these fields when the time protocol is available).

When it's not possible for the inverter to detect the time protocol, these fields have to be manually entered.

Date and Time

✓ Network Time Protocol server has been detected and it will be used to keep the system clock synchronized.

Date ✓

Feb 22, 2017

SET by the NTP server

Time ✓

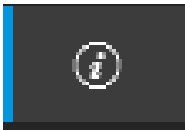
4:52 PM

SET by the NTP server

Time Zone

Europe/Berlin GMT+01:00

SAVE



INFORMATION Section

In the **INFORMATION** Section it's possible to view the general informations about the embedded web user interface.

it's possible to access the following sub-menus:

- **Privacy Policy**
- **Provider Information/Impressum**
- **Acknowledgments**
- **Release Notes**



Description of the Display menus

The ABB inverters are equipped with a graphic display ⑦, consisting of 2 lines of 16 characters each, which can be used to:

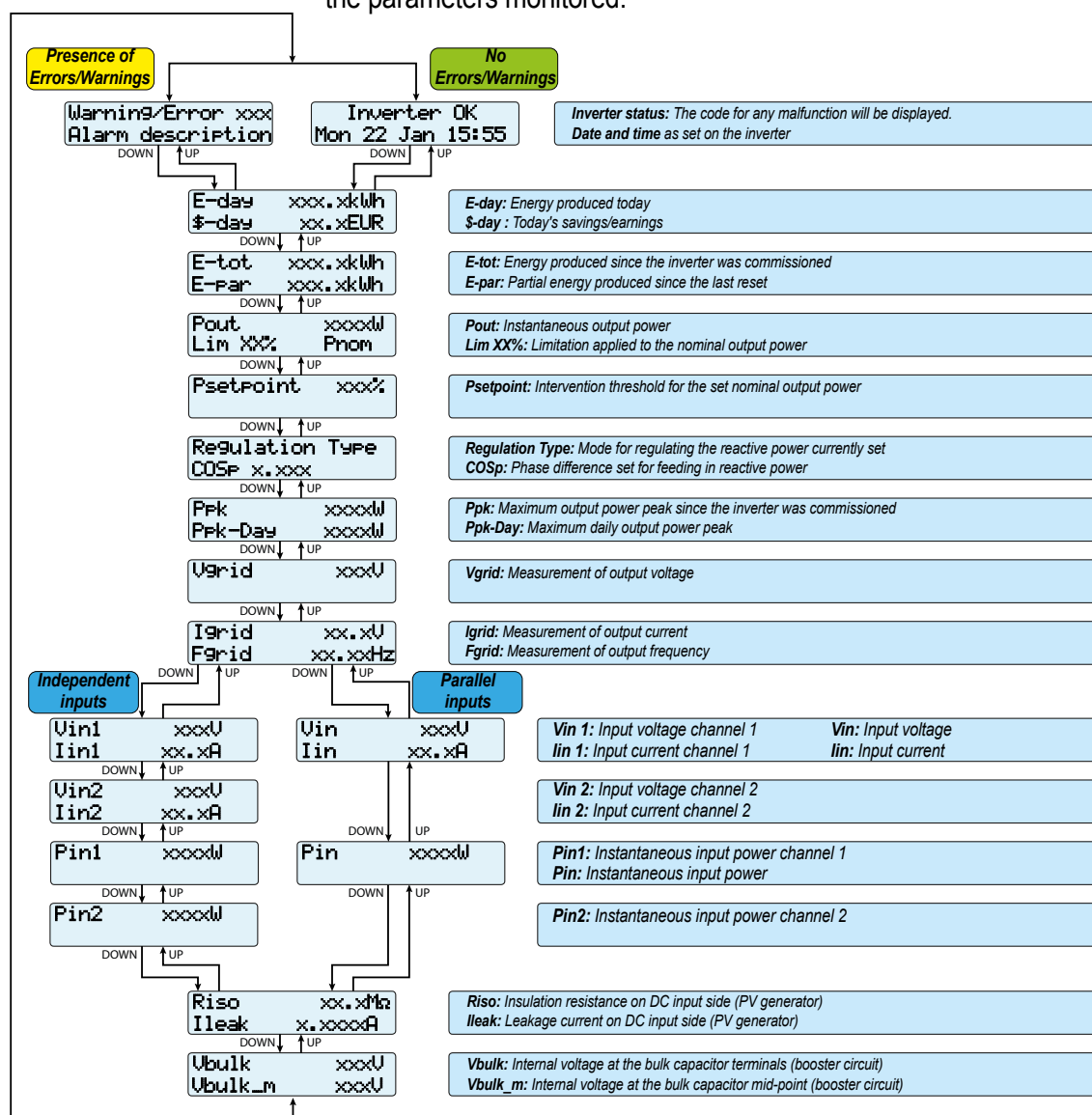
- Display the operating status of the inverter and the statistical data
- Display service messages for the operator
- Display the alarm and fault messages
- Change the inverter settings.

General information

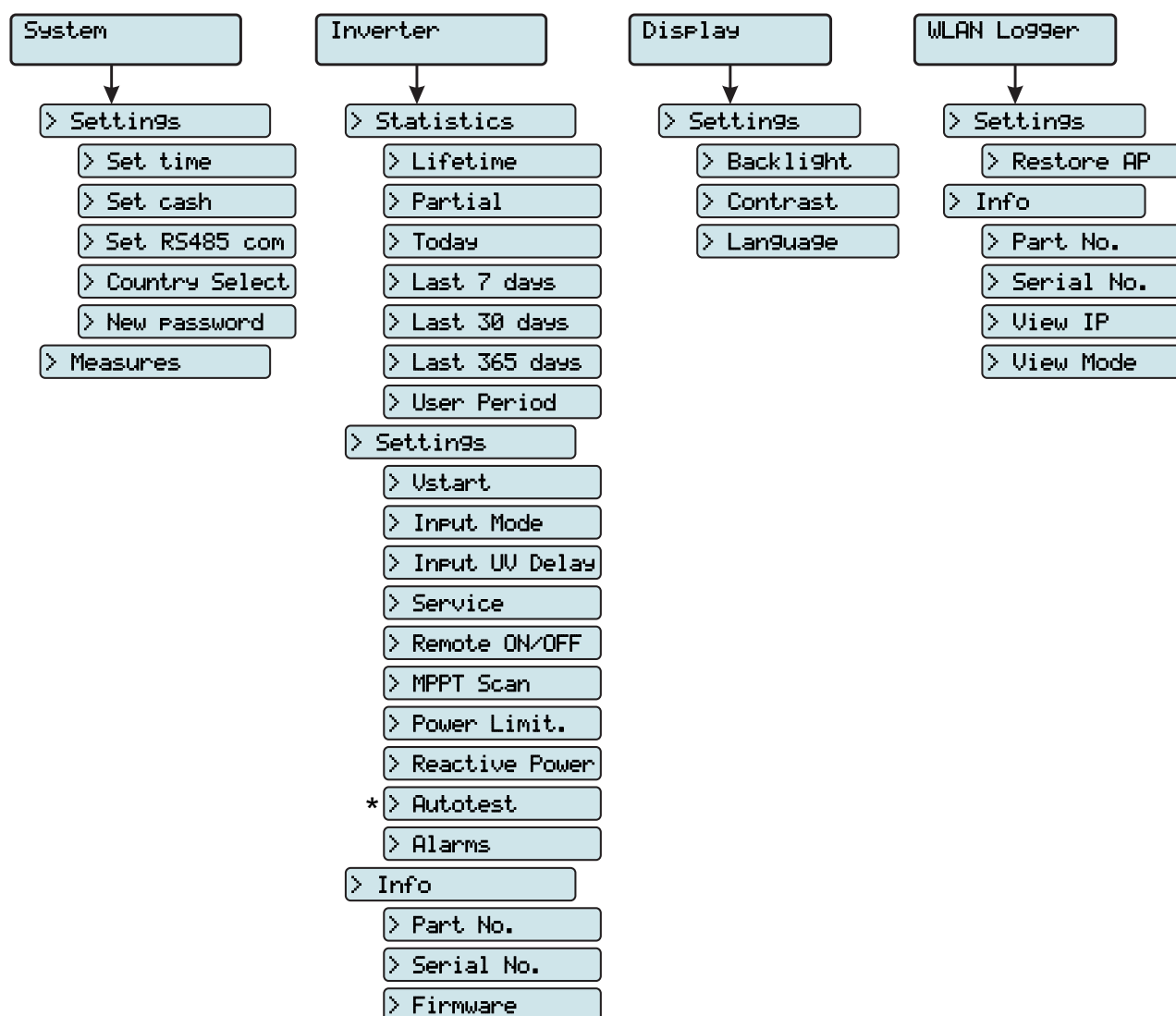
While the inverter is operating, the display shows various items of information on the main parameters measured, the operating conditions and the inverter's operating status.

When the icon  appears on the display, information is shown cyclically; if the padlock icon  is displayed it means that the display of information is locked and the UP and DOWN buttons can be used to scroll through the screens of information instead.

The sequence of screens displayed is shown below, with a description of the parameters monitored.



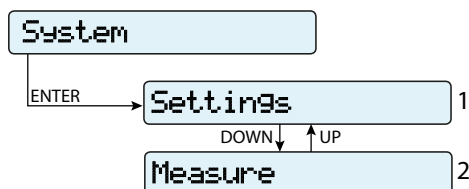
Menu structure



(*): Available for the Italian country standard only.

System Menu

By selecting the **System** menu, the following menus can be accessed:



Settings

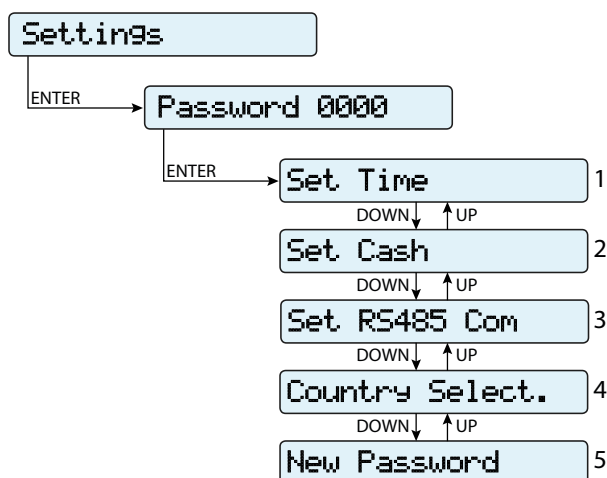
Selecting **Settings** brings up the first screen relating to the password.

The default password is "0000".

This can be modified by using the display buttons, always following the same procedure:

- ENTER scrolls through the digits (from left to right)
- ESC returns to the previous digit (from right to left)
- Press ESC several times to return to the previous menus
- DOWN scrolls down the numerical scale (from 9 to 0)
- UP scrolls up the numerical scale (from 0 to 9)

After entering the password, press ENTER to access the information in this section:



1. Set Time

Allows you to set the current date and time (not counting summer time)

2. Set Cash

This section of the menu allows you to set the name of the currency and the value of 1 kWh of energy produced. Setting these parameters correctly allows the actual earnings/savings achieved by the system to be displayed.

- **Currency:** sets the desired currency (default is Euro)
- **Val/KWh:** indicates the cost/incentive for 1 kWh in the chosen currency (default is 0.50).

3. Set RS485 Com

This section of the menu allows you to adjust the settings relating to the RS485 communication serial line:

Set Port 1:

- **Address RS485:** It allows you to set the address for serial communication of the individual inverters connected to the RS485 line. The UP and DOWN buttons scroll through the numerical scale. (The addresses that can be assigned are 2 to 63).
- **Protocol:** It allows you to set the type of protocol to be used for the RS485 line. The proprietary "Aurora-(Slave)", "ModBusRTU-ABB", "ModBusRTU-Sunsp" or "ModBusRTU-Meter" protocol can be selected depending on the device to which the inverter communicates.
- **Parity:** It allows you to set the Parity bit (None, Even, Odd).
- **Baud Rate:** It allows you to set the Baud Rate (2400/4800/9600/19200/34800/57600/115200).

4. Country Select.

It allows you to modify the grid standard (this option can be selected before the inverter is switched on) within 24 hours while the inverter is operating.

- **Set Std:** allows you to set the required grid standard.
- **Residual Time:** indicates the time remaining until the "Country Select" feature is blocked.
- **Reset Country:** Unlocks the grid standard selection (resets the 24 hours available for changing the grid standard).



After the grid standard was set you have 24 hours to make any changes to the grid standard value; 24 hours later the "Country Select." functionality will be blocked, and any subsequent changes can only be made using a password provided on request by ABB (refer to dedicated chapter in this manual).

5. New Password

This section of the menu allows you to change the settings menu password (default 0000).



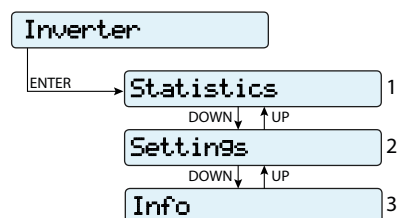
*We advise you to memorise the new password.
If the Password is lost you will not have access to the inverter, since there is no Reset function for security reasons.*

Measures

By selecting **Measures** it is possible to display the instantaneous value of the input power (PV Pw) and the instantaneous value of the output power (Pinv).

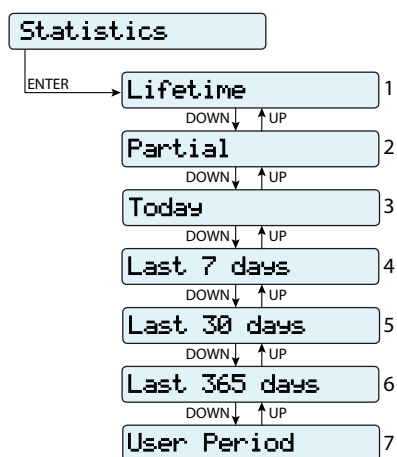
Inverter Menu

By selecting the **Inverter** menu, the following submenus can be accessed:



Statistics

By selecting **Statistics**, the following menus can be accessed:



1. Total

This section of the menu displays the Total statistics:

- **Time:** Total operating time
- **E-tot:** Total energy produced
- **P-Peak:** Peak power value
- **Val. :** Total production value, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved compared to fossil fuels

2. Partial

This section of the menu displays the Partial statistics:

- **Time:** Partial operating time
- **E-par:** Partial energy produced
- **Val. :** Partial production value, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Partial amount of CO₂ saved



To reset all the counters of this sub-menu, press the ENTER button for more than 3 seconds. At the end of this time, you will hear a sound repeated 3 times.

3. Today

This section of the menu displays today's statistics:

- **E-day:** Energy produced today
- **P-Peak:** Today's peak power value
- **Val. :** Value of today's production, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved today

4. Last 7 days

This section of the menu displays the statistics for the last 7 days:

- **E-7d:** Energy produced over the last 7 days
- **Val. :** Value of production over the last 7 days, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved over the last 7 days

5. Last 30 days

This section of the menu displays the statistics for the last 30 days:

- **E-30d:** Energy produced over the last 30 days
- **Val. :** Value of production over the last 30 days, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved over the last 30 days

6. Last 365 days

This section of the menu displays the statistics for the last 365 days:

- **E-365d:** Energy produced over the last 365 days
- **Val. :** Value of production over the last 365 days, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved over the last 365 days



7. User period

This section of the menu displays the statistics for a period chosen by the user.

Once the start and end dates for the period have been set, the following data are available:

- **E-user:** Energy produced over the selected period
- **Val. :** Value of production over the selected period, calculated using the currency and conversion coefficient set in the relevant section of the SETTINGS menu
- **CO₂:** Amount of CO₂ saved over the selected period

Settings

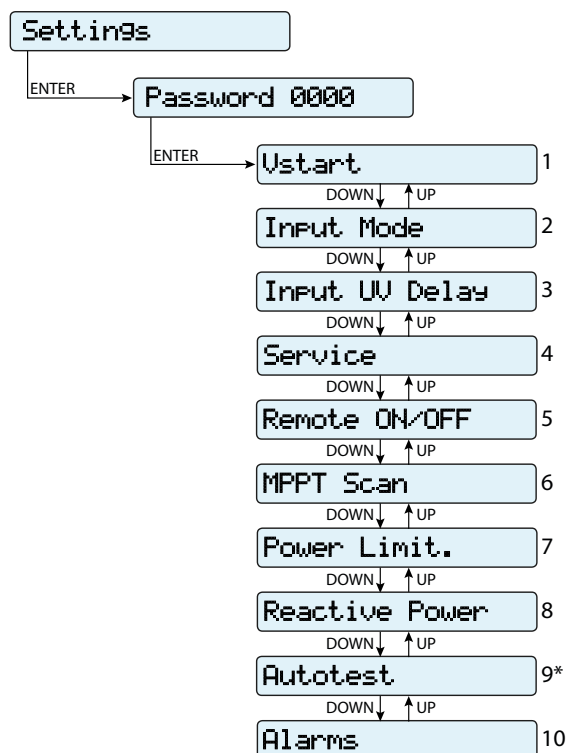
Selecting **Settings** brings up the first screen relating to the password.

The default password is "0000".

This can be changed by using the display buttons, following the same procedure as always:

- ENTER scrolls through the digits (from left to right)
- ESC returns to the previous digit (from right to left)
- Press ESC several times to return to the previous menus
- DOWN scrolls down the numerical scale (from 9 to 0)
- UP scrolls up the numerical scale (from 0 to 9)

After entering the password, press ENTER to access the information in this section:



(*) Available for the Italian country standard only. Refer to the section on this topic in the manual.

1. Vstart

This section of the menu is used to set the Vstart activation voltage (for the two channels separately if they are configured independently) to adapt it to the needs of the system. This voltage imposes a minimum input voltage on the inverter above which connection to the grid will be attempted.



We advise changing the activation voltage only if really necessary and to set it to the correct value: the photovoltaic generator sizing tool available on the ABB website will indicate whether Vstart needs changing and what value to set it to.

2. Input Mode

This section of the menu allows you to set the input configuration mode. In particular:

- **Independent:** Independent configuration of the two input channels. This configuration is set by default.
- **Parallel:** Parallel configuration of the input channels (single input channel). Other hardware settings must be set on the inverter to set this mode. Refer to the paragraph "Parallel channel configuration".

3. Input UV Delay

This section of the menu allows you to set the time for which the inverter stays connected to the grid after the input voltage has dropped below the Under Voltage limit (set at 70% of Vstart).

This value can be set from 1 to 3600 seconds (60 seconds is the default setting).



Example: With Input UV Delay set at 60 seconds, if voltage V_{in} drops below 70% of Vstart at 9.00, the inverter stays connected to the grid (taking power from it) until 9.01.

4. Service

This section of the menu is reserved for installers.

A special access password is required, which may be obtained from the website <https://registration.ABBsolarinverters.com>.

Before connecting to the site, make sure you have all the information required to calculate your password: Inverter Model, Serial Number and week of manufacture of the Inverter

When you have a password you can set the parameters in the menu.

Changing the above-mentioned parameters may prevent disconnection from the grid if the new values exceed those given in the standards of the country of installation. If these parameters are changed to values outside the standard range, an interface protection must be installed external to the inverter in accordance with the requirements of the country of installation.

The table below shows the parameters which cannot be modified.

Parameter	Description
Set U>>	Grid over-voltage (OV) threshold (extended range)
Set U>	Grid over-voltage (OV) threshold (restricted range)
Set U> (10Min)	Grid over-voltage (OV) threshold (average grid voltage value)
Set U<	Grid under-voltage (UV) threshold (restricted range)
Set U<<	Grid under-voltage (UV) threshold (extended range)
Set F>>	Grid over-frequency (OF) threshold (extended range)
Set F>	Grid over-frequency (OF) threshold (restricted range)
Set F<	Grid under-frequency (UF) threshold (restricted range)
Set F<<	Grid under-frequency (UF) threshold (extended range)
Set Connect	
> Set U>Connect	Max. permissible voltage during checks prior to grid connection
> Set U<Connect	Min. permissible voltage during checks prior to grid connection
> Set F>Connect	Max. permissible frequency during checks prior to grid connection
> Set F<Connect	Min. permissible frequency during checks prior to grid connection
> Set Time con.	Grid check time prior to connection
> Set T GridFault	Grid check time prior to connection after a grid fault
Set Slow Ramp	Enables gradual ramping up of power after the grid connection.
Set OF Derating	
> OF Der. Mode	Selects the power derating mode in the event of grid over-frequency.
> OF Der. Res. T.	Time period after OF derating in which the inverter checks that the frequency is back within the operating ranges (parameters "F<Connect" "F>Connect") required by the grid standard before ramping up the output from the derating condition.
Reset Latch	Allows the Latch alarms present to be reset manually



5. Remote ON/OFF

This section of the menu is used to enable/disable connection/disconnection of the inverter from the grid using the special control signal (**R+**) for inverter equipped with UNO-DM-COM KIT (-X models) or UNO-DM-PLUS-COM ETHERNET KIT (-E models).

- **Disabled:** the connection/disconnection of the inverter to/from the grid is dictated by the input (voltage from the photovoltaic generator) and output (grid voltage) parameters of the inverter.
- **Enable:** connection/disconnection of the inverter from the grid is dictated (as well as by the inverter input - voltage from the photovoltaic generator - and output parameters - grid voltage) by the state of the signal **R+** with respect to the signal **RTN**.

6. MPPT Scan

This section of the menu allows you to set the parameters of the maximum power point tracking (MPPT) function. This function is useful when there are areas of shade on the PV generator, which may create several points of maximum power on the operating curve.

- **E/D MPPT Scan:** Enables/disables the scan for identifying the maximum power point of the system.
- **Scan Interval:** This section allows you to set the time between scans. Remember that the shorter the scan interval the greater the loss of production, due to the fact that energy is transferred to the grid during the scan but not at the maximum power point. Each scan takes roughly 2 seconds.

7. Power Limit.

This section of the menu allows you to adjust the limit to the active power that the inverter can feed into the grid by setting the percentage of nominal power at which the limit should be triggered.

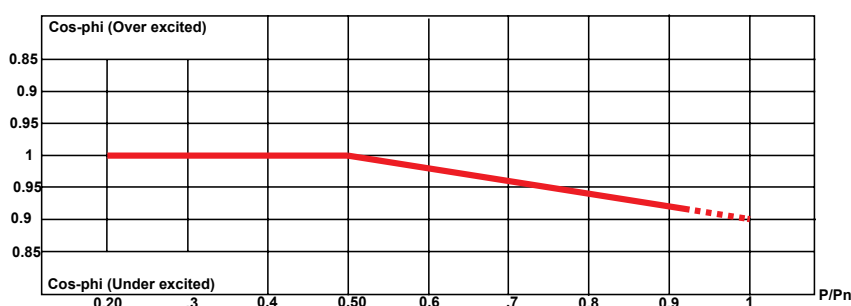
Setting it to 100% resets the default maximum power, which in some installation country standards may be 110% of nominal power



8. Reactive Power

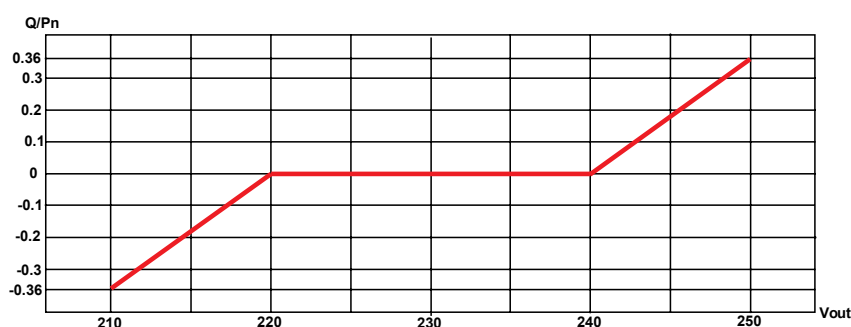
This section of the menu may be used to manage the supply of reactive power into the grid. There are 5 possible types of management:

- **Q: No Regulation:** no regulation of reactive power. To activate this mode, press **ENTER** and then press **ENTER** to confirm.
- **Cos-phi fixed:** Sets the power rating to a fixed value. To activate this mode, press **ENTER** and set the Cos-Phi value to Over excited or Under excited, from 1.000 to 0.8000; press **ENTER** to confirm.
- **Q Fixed:** Sets the reactive power to a fixed value. To enable this mode, select **Enable** and then **OK** (using the UP / DOWN arrows). When enabled, **Set value** will appear on the display, allowing you to set the value of the reactive power (as either Over or Under excited, from 1.000 to 0.001)
- **Cos-phi = f(P):** Power rating as a function of the active power supplied by the inverter. To enable this mode, select **Enable** and then **OK** (using the UP / DOWN arrows). When it has been enabled, **Load std curve** will appear on the display, allowing you to set the following control curve:



The curve can be modified using the Aurora Manager Lite configuration software

- **Q = f(U):** reactive power as a function of the grid voltage measured by the inverter. To enable this mode, select **Enable** and then **OK** (using the UP / DOWN arrows). When it has been enabled, **Load std curve** will appear on the display, allowing you to set the following control curve:



The curve can be modified using the Aurora Manager Lite configuration software

9. Autotest

This section of the menu is available only for the Italian country standard.

The autotest according to the grid standard CEI-021 can be launched via the menu on the display.

The conditions required to perform an Autotest are:

- The grid standard must be set to CEI-021.
- You must not intervene in any way while the test is underway
- You must check that the equipment has a stable grid connection.

In the Autotest section of the SETTINGS menu, select the type of test the equipment is to run from the following:

OV Test – parameters:

U>>; U>; U> (10Min)

Disconnection from the distribution grid due to “Over-voltage”

UV Test – parameters:

U<<; U<

Disconnection from the distribution grid due to “Under-voltage”

OF Test – parameters:

F>> and F>

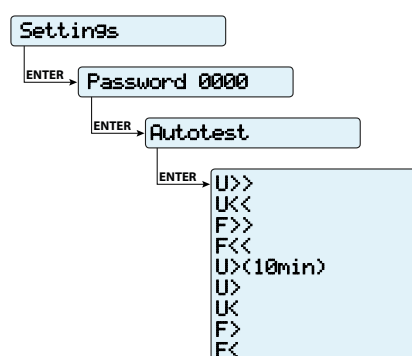
Disconnection from the distribution grid due to “Over-frequency”

UF Test – parameters:

F<< and F<

Disconnection from the distribution grid due to “Under-frequency”

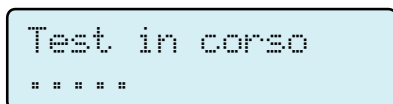
Go to the SETTINGS > Autotest menu



If one of the protections is disabled (from the Service menu), N/A (not applicable) will appear next to the name of the test.

While one of the tests is being performed, the set limits will be gradually increased/reduced (depending on the type of test) until the threshold at which the inverter is disconnected from the grid is reached. The procedures for running the Autotest comply with the legislation in force.

The display shows the message “Performing Test” when the test has started.

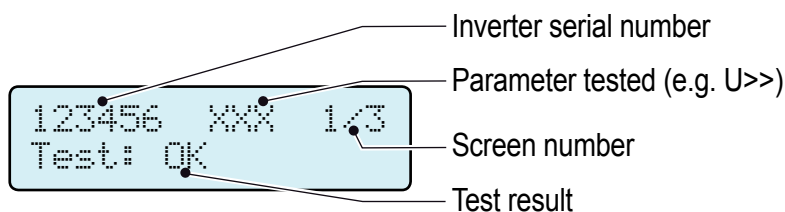


Test in corso
*****

At the end of the test, when the inverter has disconnected from the grid, the results and values of the test performed will appear on the display. You can move from one screen to another using the UP/DOWN arrow keys.

Details of the data available in each screen are provided below:

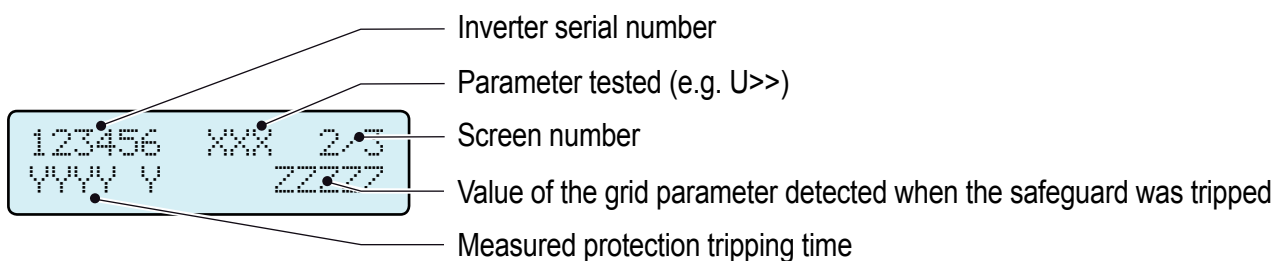
Screen 1 of 3



123456 XXX 1/3
Test: OK

— Inverter serial number
— Parameter tested (e.g. U>>)
— Screen number
— Test result

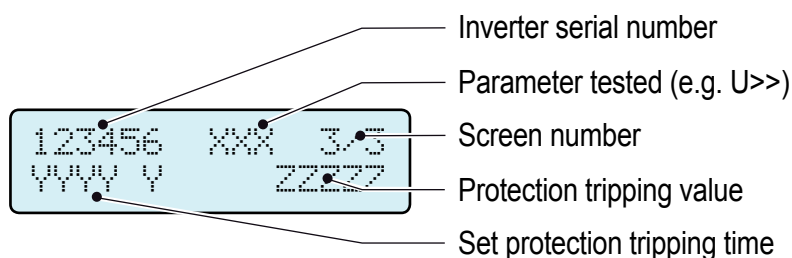
Screen 2 of 3



123456 XXX 2/3
YYYY Y ZZZZ

— Inverter serial number
— Parameter tested (e.g. U>>)
— Screen number
— Value of the grid parameter detected when the safeguard was tripped
— Measured protection tripping time

Screen 3 of 3



123456 XXX 3/3
YYYY Y ZZZZ

— Inverter serial number
— Parameter tested (e.g. U>>)
— Screen number
— Protection tripping value
— Set protection tripping time

The test results should be considered valid on the basis of the following tolerances, as reported in the applicable legislation:

- $\leq 5\%$ for voltage thresholds
- ± 20 mHz for frequency thresholds
- $\leq 3\% \pm 20$ ms for tripping times

Press ESC to go back to the Autotest menu, from where you may select the next test to be performed

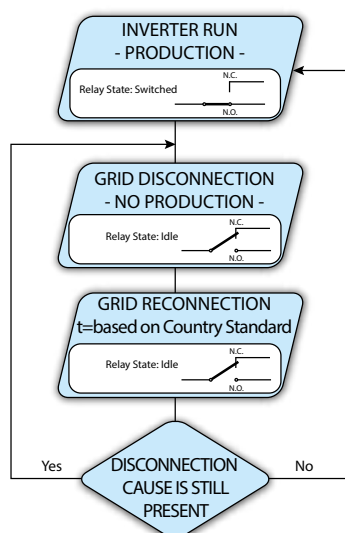
10. Alarm

This features will work only on inverter equipped with UNO-DM-COM KIT (-X models) or UNO-DM-PLUS-COM ETHERNET KIT (-E models).

This section of the menu allows you to set the activation status of a relay (available either as contact normally open – N.O. - and as a normally closed contact -N.C.) and to configure customised alarm conditions.

This contact can be used, for example, to: activate a siren or a visual alarm, control the disconnect device of an external transformer, or control an external device.

Relay switching can be set in 9 different modes using the submenu **Set Alarm Type** (For the "Alarm Conf.", "Al. Conf. Latch", "Al. Conf. Ext.", "GoGo Rel(Auto)" and "GoGo Rel(Remote)" it is possible to configure customised alarm conditions through the submenu **Alarm Config**:

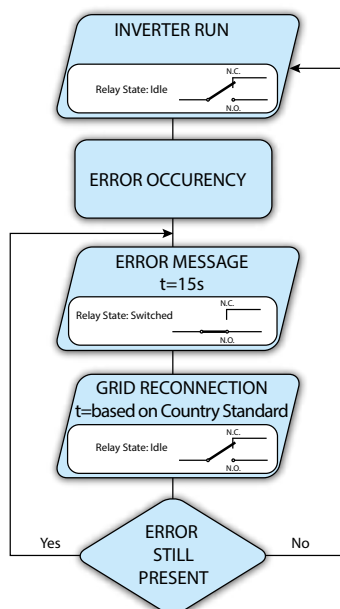


• Production (display text "Production")

The relay is activated (status: switched) whenever the inverter connects to the grid; as soon as the inverter is disconnected from the grid (for whatever reason that caused disconnection), the relay is in its resting position.

• Alarm with reset at the end of the alarm signalling process (display text "Alarm"):

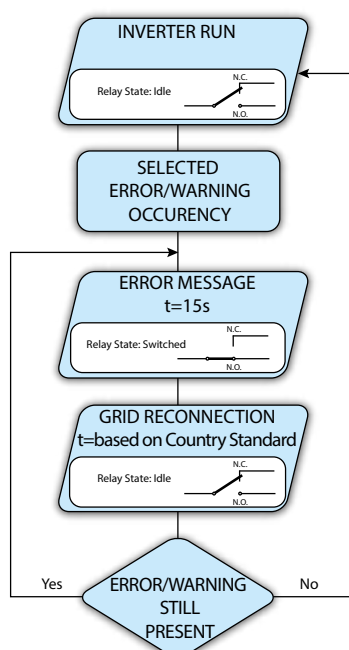
The relay is activated (status: switched) whenever an error (code Exxx) or warnings related to grid parameters out of range (Warning – codes W003, W004, W005, W006, W007) are present on the inverter. The alarm returns to its resting position when the alarm signal ends, i.e. before the inverter checks the grid parameters after the alarm state. This is because grid control state is not an alarm state but a state of normal operation.



Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E017	E018	E019	E020
E021	E022	E023	E025	E026	E027
E028	E029	E030	E031	E032	E033
E034	E035	E036	E037	E046	E050
E051	E053	E054	E055	E056	E057
E058	E065	E066	E067	E068	E069
E070	E074	E077	E078	E080	E084
E086	E087	E088	E089		
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W027	W029
W030	W036	W037	W039	W040	W042
W043	W046	W047	W048	W051	W058
W059					

In the presence of W003, W004, W005, W006, W007 signalling, the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the absence of grid voltage (display message "Missing Grid") the alarm contact remains in its resting position.



• **Configurable alarm with reset at the end of the alarm signalling process (display text “Alarm Conf.”)**

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present from those selected from the list in the dedicated submenu **Alarm Config**. The contact returns to its resting position when the alarm signal ends, i.e. before the inverter checks the grid after the alarm state. This is because grid control state is not an alarm state but a state of normal operation.

Alarms for which the relay is activated

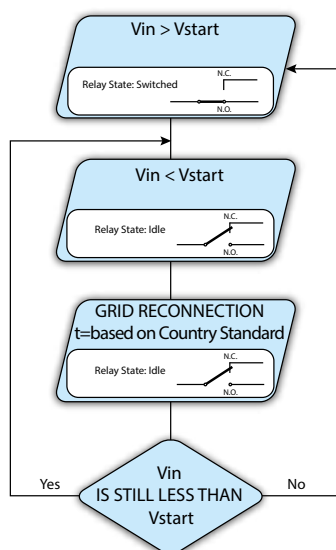
E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E018	E019	E020	E021
E022	E023	E025	E026	E027	E028
E029	E030	E031	E032	E033	E034
E036	E037	E046	E050	E051	E053
E054	E055	E056	E057	E058	E065
E066	E067	E068	E069	E070	E074
E077	E078	E080	E084	E086	E087
E088	E089				
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W025	W027
W029	W030	W031	W037	W039	W040
W042	W043	W046	W047	W048	W051
W058	W059				

For the configurable relay operating mode “Alarm Conf.”, the following considerations are valid:

If the alarm condition is persistent, the alarm contact cyclically switches from its resting state to its activated state.

In the presence of W002 signalling (Input UV – input voltage below the limit of operation), the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the reduced input voltage (display message “Waiting Sun”) the alarm contact remains in its resting position.

In the presence of W003, W004, W005, W006, W007 signalling, the alarm contact switches to then reset itself at the end of the alarm signal. This means that during the absence of grid voltage (display message “Missing Grid”) the alarm contact remains in its resting position.

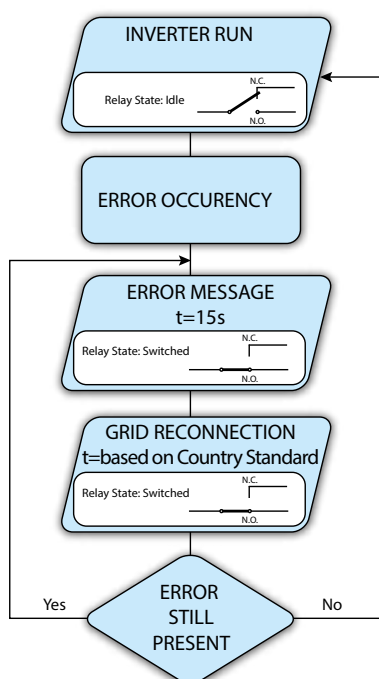


• Crepuscular (display text “Crepuscular”)

The relay is activated (status: switched) as soon as the inverter input voltage exceeds the activation voltage set.

The relay switch to rest position when the input voltage drops below 70% of the activation voltage set.

This mode is useful for disconnecting any output transformers that could have unnecessary consumption during the night.



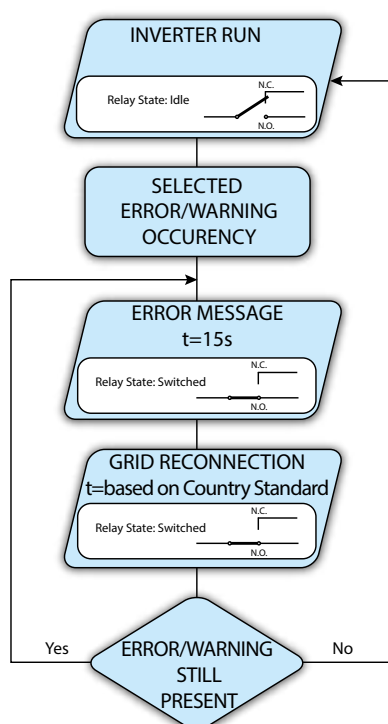
• Alarm Latch (display text “Alarm Latch”)

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present (see the table below). When the inverter returns to the normal operating state and reconnects with the grid, the contact returns to its position of rest.

Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E017	E018	E019	E020
E021	E022	E023	E025	E026	E027
E028	E029	E030	E031	E032	E033
E034	E035	E036	E037	E046	E050
E051	E053	E054	E055	E056	E057
E058	E065	E066	E067	E068	E069
E070	E074	E077	E078	E080	E084
E086	E087	E088	E089		
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W027	W029
W030	W036	W037	W039	W040	W042
W043	W046	W047	W048	W051	W058
W059					

If the alarm condition is persistent, the relay will remain activated (status:switched)



• Latch configurable alarm (display text “Al. Conf. Latch”)

The relay is activated (status: switched) whenever an error (code Exxx) or a warning (code Wxxx) is present from those selected from the list in the dedicated submenu **Alarm Config** (see the table below). When the inverter returns to the normal operating state and reconnects with the grid.

Alarms for which the relay is activated

E001	E002	E003	E004	E005	E006
E007	E010	E011	E012	E013	E014
E015	E016	E018	E019	E020	E021
E022	E023	E025	E026	E027	E028
E029	E030	E031	E032	E033	E034
E036	E037	E046	E050	E051	E053
E054	E055	E056	E057	E058	E065
E066	E067	E068	E069	E070	E074
E077	E078	E080	E084	E086	E087
E088	E089				
W002	W003	W004	W005	W006	W007
W009	W011	W015	W017	W018	W019
W021	W022	W023	W024	W025	W027
W029	W030	W031	W037	W039	W040
W042	W043	W046	W047	W048	W051
W058	W059				

If the alarm condition is persistent, the relay will remain activated (status:switched)

• Ext configurable alarm (display text “Al. Conf. Ext.”)

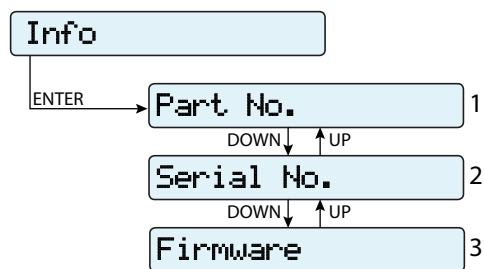
In this mode, it is possible to configure the behaviour of the alarm relay according to an external error table which can be setup with the Aurora Manager LITE software. In the table it is possible to select the alarms or warnings for which the alarm relay is activated (status: switched); for each individual alarm it is also possible to select the "Latch" or "No Latch" mode.

• Load Management (display text “Gogo rel. remote”)

It allows you to enable the Load Management functionality with which the relay is activated (status: switched) to a specific configurable power input threshold. Once this mode has been selected, the parameters for which the relay is activated have to be set (status: switched) on the dedicated section of web user interface (see specific chapter).

Info

By selecting the **Info** menu, the following menus can be accessed:



1. Part No.

Displays the model code

2. Serial number

Displays the serial number and week and year of manufacture of the equipment

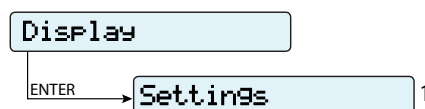
3. Firmware

Lets you view the revision of the firmware installed on the equipment.



Display Menu

By selecting the **Display** menu, the following submenus can be accessed:



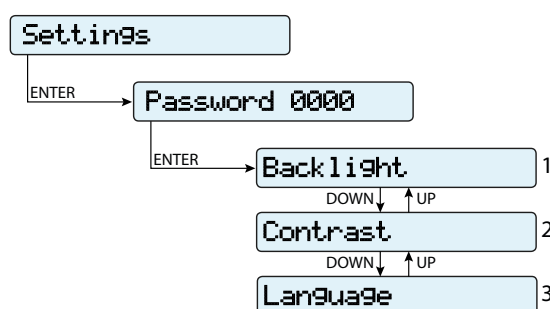
Settings

Selecting **Settings** brings up the first screen relating to the password. **The default password is "0000".**

This can be changed by using the display buttons, following the same procedure as always:

- ENTER scrolls through the digits (from left to right)
- ESC returns to the previous digit (from right to left)
- Press ESC several times to return to the previous menus
- DOWN scrolls down the numerical scale (from 9 to 0)
- UP scrolls up the numerical scale (from 0 to 9)

After entering the password, press ENTER to access the information in this section:



1. Backlight

This section of the menu allows you to set the backlighting display characteristics:

Mode:

ON: Light always on

OFF: Light always off

AUTO: Automatic backlight control. It activates each time a button is pressed and remains active for 30 seconds, after which time it gradually dims and deactivates.

2. Contrast

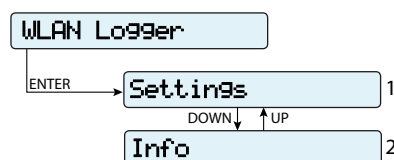
This section of the menu allows you to set the contrast of the display (on a scale of 1 to 9).

3. Language

Allows you to set the language you prefer for the menus

WLAN Logger Menu

By selecting the **WLAN Logger** menu, the following submenus can be accessed:



Settings

Selecting **Settings** brings up the first screen relating to the password.

The default password is "0000".

This can be changed by using the display buttons, following the same procedure as always:

- ENTER scrolls through the digits (from left to right)
- ESC returns to the previous digit (from right to left)
- Press ESC several times to return to the previous menus
- DOWN scrolls down the numerical scale (from 9 to 0)
- UP scrolls up the numerical scale (from 0 to 9)

After entering the password, press ENTER to access the information in this section:

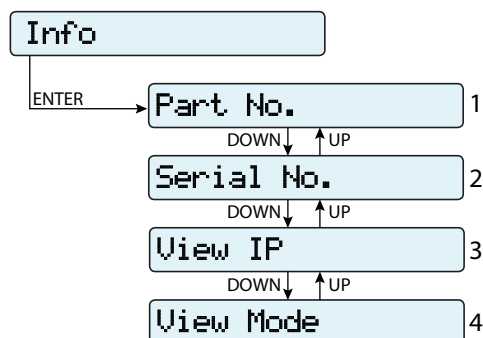
1. Restore AP

This section of the menu allows you to restore the "Access Point" mode of the wireless module of the inverter.



Info

By selecting the **Info** menu, the following menus can be accessed:



1. Part No.

Allows you to view the part number of the wireless board.

2. Serial number

Allows you to view the serial number, the week and year of manufacture of the wireless board.

3. View IP.

Allows you to view the IP address assigned to the wireless board.

4. View Mode

Allows you to view the operating mode of the wireless board ("Access Point" or "Host").

