

ABB solar inverter

Addendum

DCWB-TRIO-TM;DISPLAY

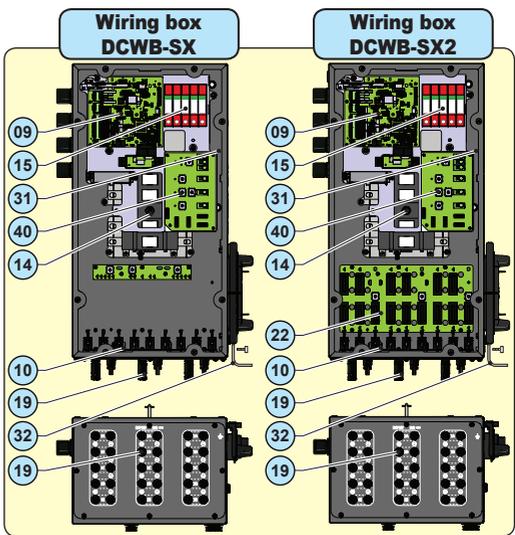
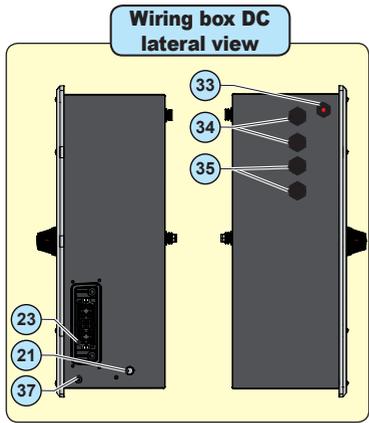
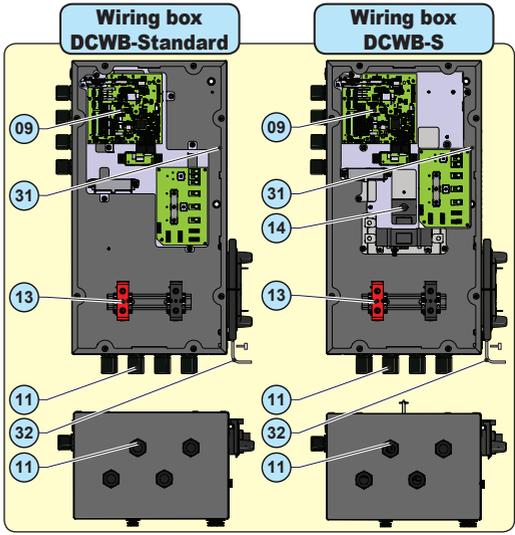
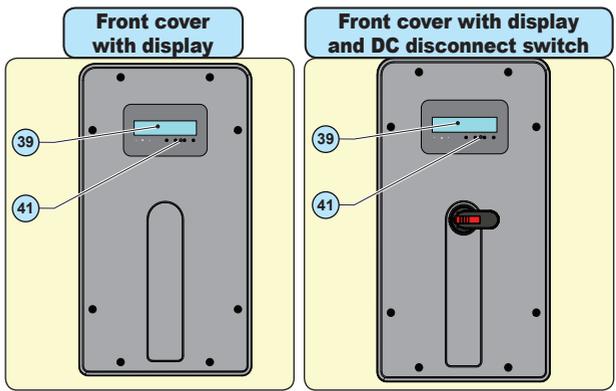




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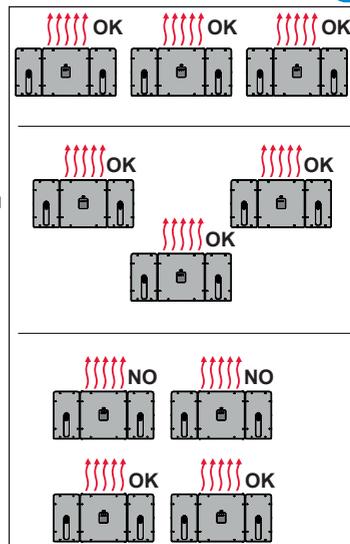
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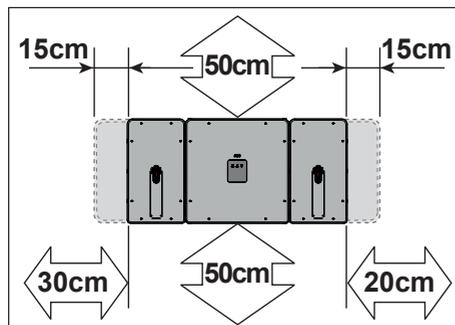
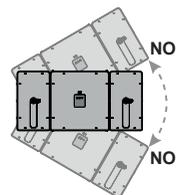
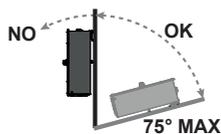


**Installation site and position**

- Consult technical data to confirm the environmental specifications will be met.
- **Installation of the unit equipped with the display (DCWB-TRIO-TM;DISPLAY) in a location exposed to direct sunlight should preferably be avoided. Direct exposure to sunlight could cause a premature wear of the user interface (display)**
- Do not install in closed spaces where air does not freely circulate.
- Always ensure that the flow of air around the inverter is not blocked, so as to prevent overheating.
- Do not install the equipment near flammable substances (minimum distance: 3m).
- Do not install the equipment on wooden walls or other flammable surfaces.
- Do not install in inhabited rooms or where the prolonged presence of people or animals is expected due to inverter's noise level during operation. The sounds level is heavily influenced by its location (for example, the surface around the inverter, the environment, etc.) and grid quality.
- Install on a wall or structure capable of bearing the weight of the inverter.
- Install vertically or horizontally (i.e. with the inverter on its back), with a maximum inclination as indicated in the adjacent figures.
- Maintain minimum clearance and spacing between inverters as indicated in the adjacent figures to prevent limitations on air circulation.
- Ensure sufficient working area in front of the inverter for wiring box access.
- If possible, install at eye-level so that the LEDs can be easily seen.
- Install at a height that allows the equipment to be serviced considering its size and weight.
- Position multiple inverters side-by-side, maintaining minimum clearances (measured from the outermost edge of the inverter).
- Multiple inverters can also be placed in a staggered arrangement. Minimum clearances for staggered arrangements include the width of the inverter plus additional allowances for inverters arranged above or below.
- All installations over 6500' (2,000 meters) must be assessed by ABB Technical Sales to determine the proper output derating.

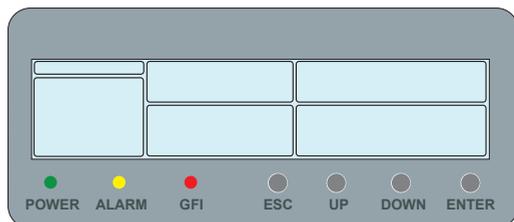
**Do not block access to the external AC and DC disconnects.**

Please refer to the warranty terms and conditions and avoid voiding the warranty with improper installation.

**Vertical installation bracket****Horizontal installation bracket**

LEDs and BUTTONS, in various combinations, can be used to view the status or carry out actions.

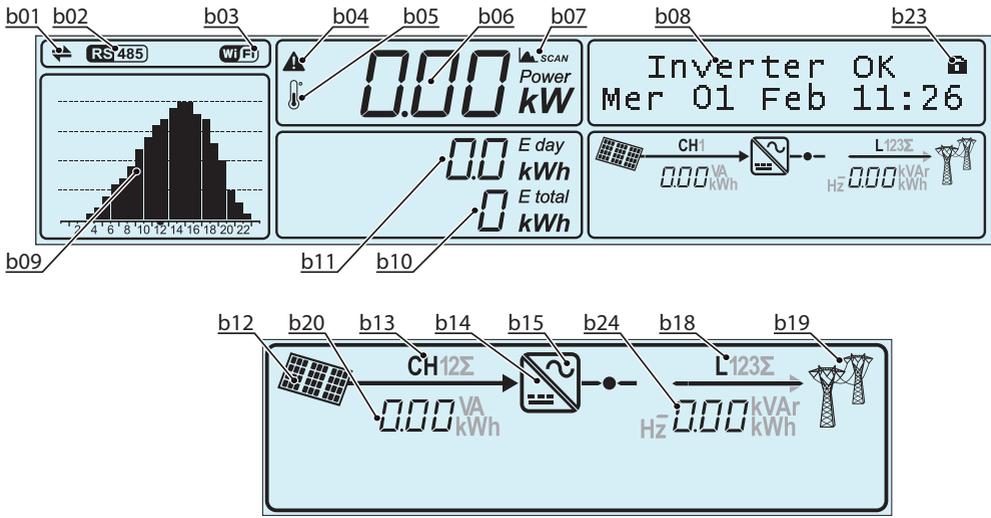
<b>LED POWER</b>	<b>GREEN</b> On if the inverter is working correctly. Flashes when checking the grid or if there is insufficient sunlight.
<b>LED ALARM</b>	<b>YELLOW</b> The inverter has detected an anomaly. The anomaly is shown on the display.
<b>LED GFI</b>	<b>RED</b> Ground fault on the DC side of the PV generator. The error is shown on the display. May indicate also errors relating to the operation of the battery unit.
<b>ESC</b>	It is used to scroll down the menu options or to shift the numerical scale in descending order
<b>UP</b>	It is used to scroll up the menu options or to shift the numerical scale in ascending order
<b>DOWN</b>	It is used to scroll down the menu options or to shift the numerical scale in descending order
<b>ENTER</b>	It can be used to confirm an action, to access the submenu for the selected option (indicated by the > symbol) or to switch to the next digit to be edited



The system is equipped with a graphic display and status LEDs which make it possible to immediately understand the operating status of the system. In addition, on the display it is possible to make configurations, view statistics and information relating to all the components which make up the system itself. Navigation of the display menus is made possible by a keyboard.

Description of symbols and display fields

Using the display, operating parameters for the equipment are shown, warnings, alarms, channels, voltages, etc. During operation, the display behaves dynamically, which allows some information to be displayed cyclically.



Ref.	Description
b01	Indicates the transmission and reception of data through the RS485 line.
b02	Indicates the presence of the RS485 communication line.
b03	Indicates the presence and enablement of the Wi-Fi communication line.
b04	Reports an active power derating for out-of-range input voltage or power restrictions set by the grid manager or by the display
b05	Reports a power derating due to high internal temperature
b06	Instantaneous power fed into the grid
b07	MPPT SCAN function active
b08	Text lines to cyclically display the inverter parameters, error codes, and for menu navigation
b09	Display area where it is possible to graphicate the average value (recorded over a period of 20 minutes) of the power introduced to grid (from 0 to 100%).
b10	Displays the total energy from the inverter installation
b11	Shows the energy produced throughout the day
b12	Indicates that the PV generator voltage is greater than the inverter Vstart
b14	Indicates the DC/DC input circuit part (Booster)
b15	Indicates the DC to AC conversion circuit (inverter)
b18	Indicates the output voltage phase (or the list) for which the data relating to the output parameters are shown in the field <b>b24</b> Indicates the status of the grid voltage: Icon absent: no grid voltage Flashing icon: grid voltage present but outside the parameters set by the grid standard Icon present: Grid voltage present and within parameters set by the standard grid
b20	Cyclic display of the input parameters
b23	When the ENTER key is pressed, cyclic display of the parameters can be: blocked (🔒) or cyclic (🔄)
b24	Cyclic display of the output parameters

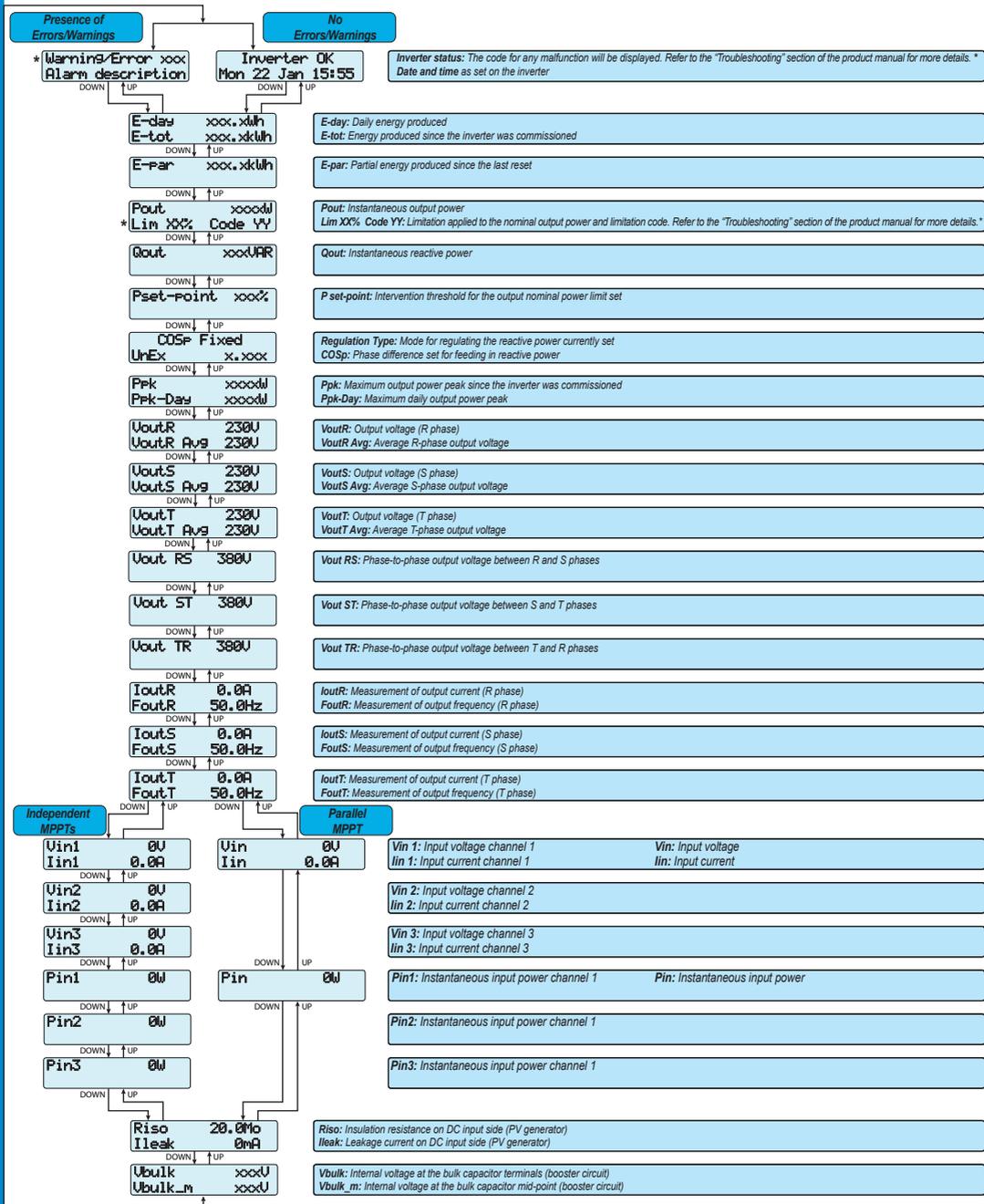
The ABB inverters are equipped with a graphical display (39), consisting of 2 lines of 16 characters each, which can be used to:

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

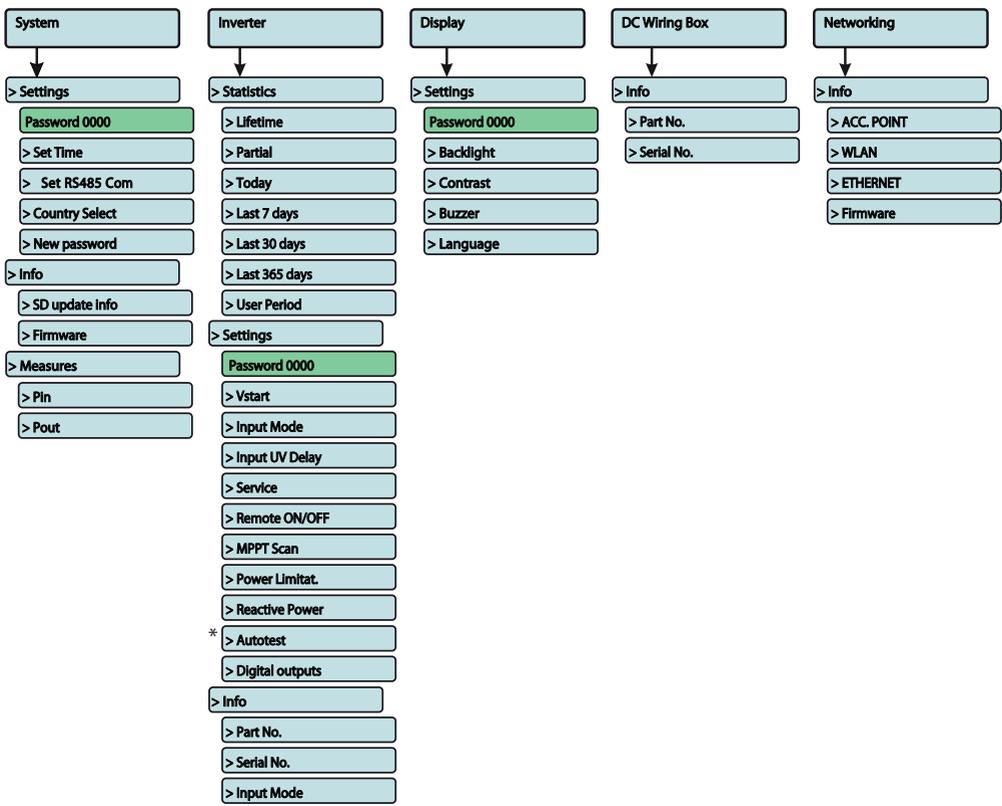
### General information

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.

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



# Menu structure



\* Available only with CEI 016 country standard.

## System Menu

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

### System > Settings

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

Enter the password using the keys on the display:

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

#### 1. Set Time

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

#### 2. Set RS485 Com

This section of the menu allows you to adjust the settings relating to the RS485 communication serial ports ("Set port 1" and "Set port 2").

- Address RS485: Allows you to set the address for serial communication of the individual inverters connected to the RS485 line. Use the UP and DOWN buttons to scroll the numerical scale. (The addresses that can be assigned are 1 to 63).
- Protocol: It allows you to set the type of protocol to be used for the RS485 line. The proprietary "Aurora (slave)" protocol or "ModBus RTU ABB" protocol can be selected.
- Parity: It allows you to set the Parity bit (None, Even, Odd).
- Baud Rate: Allows you to set the Baud Rate (2400/4800/9600/19200/34800/57600/115200).

#### 3. Country Select.

Allows you to modify the grid standard (this option can be selected when the inverter is first 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 and put the inverter in "Wizard" mode, where is possible to perform the commissioning of the inverter and to select the new country standard. To carry out the reset, it is necessary to enter the 2nd level password.

#### 4. New Password

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

We ADVISE you to be very careful in memorizing 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.

### System > Info

The Info menu is only available if previous firmware updates have been carried out via SD Card. Select Info to access the following sub-menus:

#### 1. SD Update Info

This section of the menu (visible only when SD card is inserted) is used to display the outcome of the firmware update of the various devices in the inverter carried out using the SD Card. The word "OK" signals programming was successful (if the opposite is true, it shows "FAIL").

#### 2. Firmware

Lets you see the revision of the firmware and the Update version (if the inverter has been updated with a .tib type firmware package) installed on the equipment.

### System > Measure

Select Measures to see the instantaneous value of the following parameters:

- Pin: instantaneous power of the photovoltaic generator
- Pout: instantaneous output power

## Inverter Menu

Select the Inverter menu to access the following sub-menus:

### Inverter > Statistics

Select Statistics to access the following sub-menus:

#### 1. Lifetime

This section of the menu displays the Total statistics:

- Time: Total operating time
- E-tot: Total energy produced
- P-Peak: peak power value
- CO<sub>2</sub>: Amount of CO<sub>2</sub> 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
- CO<sub>2</sub>: Partial amount of CO<sub>2</sub> saved

#### 3. Today

This section of the menu displays today's statistics:

- E-day: Energy produced today
- P-Peak: daily peak power value
- CO<sub>2</sub>: Amount of CO<sub>2</sub> saved daily

#### 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
- CO<sub>2</sub>: Amount of CO<sub>2</sub> 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
- CO<sub>2</sub>: Amount of CO<sub>2</sub> 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
- CO<sub>2</sub>: Amount of CO<sub>2</sub> 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 during the selected period
- CO<sub>2</sub>: Amount of CO<sub>2</sub> saved during the selected period

### Inverter > Settings

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

The default password is "0000".

Enter the password using the keys on the display:

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

#### 1. Vstart

This section of the menu is used to set the Vstart activation voltage ( for each input channel ) 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 settings allows you to set the input configuration mode. In particular:

- Independent: allows to set the the input channels in independent configuration.
- Parallel: allows to set the the input channels in parallel configuration (single input channel). Other hardware settings must be set on the inverter to set this mode (refer to the product manual).

#### 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 Vin 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): <b>En/Dis U&gt;&gt;</b> . Enable/Disable the parameter <b>Value U&gt;&gt;</b> . Set tripping value <b>Time U&gt;&gt;</b> . Set tripping time
Set U>	Grid over-voltage (OV) threshold (restricted range): <b>En/Dis U&gt;</b> . Enable/Disable the parameter <b>Value U&gt;</b> . Set tripping value <b>Time U&gt;</b> . Set tripping time
Set U> (10Min)	Grid over-voltage (OV) threshold (average grid voltage value): <b>En/Dis U&gt; (10min)</b> . Enable/Disable the parameter <b>En/Dis U&gt; (10min)d</b> . Enable/Disable the derating on this parameter <b>Value U&gt; (10min)</b> . Set tripping value
Set U<	Grid under-voltage (UV) threshold (restricted range): <b>En/Dis U&lt;</b> . Enable/Disable the parameter <b>Value U&lt;</b> . Set tripping value <b>Time U&lt;</b> . Set tripping time
Set U<<	Grid under-voltage (UV) threshold (extended range): <b>En/Dis U&lt;&lt;</b> . Enable/Disable the parameter <b>Value U&lt;&lt;</b> . Set tripping value <b>Time U&lt;&lt;</b> . Set tripping time
Set F>>	Grid over-frequency (OF) threshold (extended range): <b>En/Dis F&gt;&gt;</b> . Enable/Disable the parameter <b>Value F&gt;&gt;</b> . Set tripping value <b>Time F&gt;&gt;</b> . Set tripping time
Set F>	Grid over-frequency (OF) threshold (restricted range): <b>En/Dis F&gt;</b> . Enable/Disable the parameter <b>Value F&gt;</b> . Set tripping value <b>Time F&gt;</b> . Set tripping time
Set F<	Grid under-frequency (UF) threshold (restricted range): <b>En/Dis F&lt;</b> . Enable/Disable the parameter <b>Value F&lt;</b> . Set tripping value <b>Time F&lt;</b> . Set tripping time
Set F<<	Grid under-frequency (UF) threshold (extended range): <b>En/Dis F&lt;&lt;</b> . Enable/Disable the parameter <b>Value F&lt;&lt;</b> . Set tripping value <b>Time F&lt;&lt;</b> . Set tripping time
Set Connect	<b>Set U&gt;Connect</b> . Max. permissible voltage during checks prior to grid connection <b>Set U&lt;Connect</b> . Min. permissible voltage during checks prior to grid connection <b>Set F&gt;Connect</b> . Max. permissible frequency during checks prior to grid connection <b>Set F&lt;Connect</b> . Min. permissible frequency during checks prior to grid connection <b>Set Time con</b> . Grid control interval before connection <b>Set T GridFault</b> . Grid control interval before connection following a grid fault
Set Slow Ramp	Enables gradual ramping up of power after the grid connection.
Set GND KIT	This functionality should be enabled if the grounding kit is installed on the inverter
Set VRT	<b>En/Dis VRT</b> . Enable/Disable the VRT function. <b>Set LVRT Zero P</b> . Sets the minimum voltage threshold at which the inverter interrupts the export of energy to the grid. <b>Set HVRT Zero P</b> . Sets the maximum voltage threshold at which the inverter interrupts the export of energy to the grid.
Set FRT	<b>En/Dis FRT</b> . Enable/Disable the FRT function. <b>Set LFRT Zero P</b> . Sets the minimum frequency threshold at which the inverter interrupts the export of energy to the grid. <b>Set HFRT Zero P</b> . Sets the maximum frequency threshold at which the inverter interrupts the export of energy to the grid.

### 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 (REM).

- 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 to/from the grid is dictated (as well as by the inverter input - voltage from photovoltaic generator - and output parameters - grid voltage) by the state of the remote On/Off signal.

### 6. MPPT Scan

This section of the menu allows you to set the parameters of the maximum power point search (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 2 seconds.

### 7. Power Limitat.

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

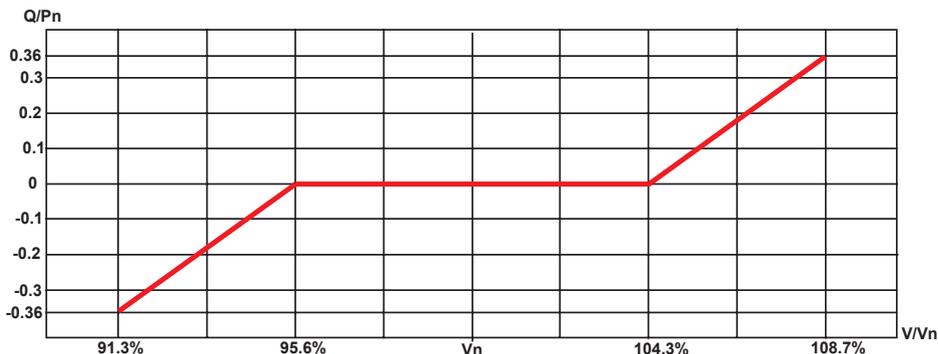
This section of the menu may be used to manage the supply of reactive power into the grid. There are 5 possible types of management:

- 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 factor 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; 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 factor 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 regulation curve:



The curve can be modified using the Aurora Manager Lite setup 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 regulation curve:



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

## 9. Autotest

This section of the menu is available only for the CEI-016 Italian country standard.

The conditions required to perform an Autotest are:

- The grid standard must be set to CEI-016.
- 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"

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.

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.

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

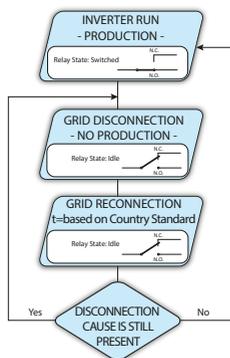
Press ESC to go back to the Autotest menu, from where you may select the next test to be performed

## 10. Digital outputs

This section of the menu allows you to set the activation status of 2 relays (Digital out 1 and Digital out 2) and to configure customised alarm conditions. The relays are available either as a normally open contact (N.O.) and as a normally closed contact (N.C.)

These contacts can be used, for example, to: activate a siren or a visual alarm, control an external device, etc.

The switching of each relay can be set in different modes using the submenu Set Output Type.



- 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"):

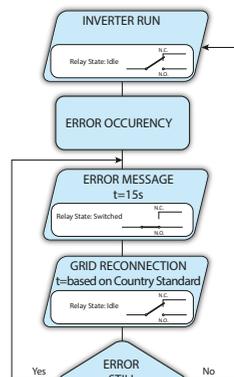
Available only for Digital out 1

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 contact 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	E013	E014	E015
E017	E018	E019	E020	E021	E022
E023	E025	E026	E027	E028	E029
E030	E031	E032	E033	E034	E036
E037	E046	E050	E053	E054	E055
E056	E057	E058	E077	E078	E081
E084	E089	W003	W004	W005	W006
W007					

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.



### Inverter > Info

Select Info to access the following sub-menus:

- 1. Part No.**  
Displays the model code
- 2. Serial No.**  
Displays the serial number and week and year of manufacture of the equipment
- 3. Input mode**  
Displays the settings of the input channel (independent or parallel).

## Display Menu

Select the Display menu to access the following sub-menus:

### Display > Settings

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

Enter the password using the keys on the display:

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

#### 1. Backlight

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

- Mode. Allows you to set from:
  - ON: Light always on
  - OFF: Light always off
  - AUTO: Automatic light control. The backlighting comes on whenever a button is pressed and stays on for 30 sec, after which it gradually dims out.
- Intensity: adjustment of display brightness (scale from 0 to 9)

#### 2. Contrast

This section of the menu allows you to set the contrast of the display (on a scale of 0 to 9).

#### 3. Buzzer

Enabling/Disabling key sounds

#### 4. Language

Allows you to set the required menu language

## DC Wiring Box Menu

Select the DC Wiring Box menu to access the following sub-menus:

### DC Wiring Box > Info

Select Info to access the following sub-menus:

- 1. Part No.**  
Displays the model code of DC Wiring Box
- 2. Serial No.**  
Displays the serial number of the DC Wiring Box

## Networking Menu

Select the Networking menu to access the following sub-menus:

### Networking > Info

Select Info to access the following sub-menus:

#### 1. ACC. POINT

Displays the access point (wireless network generated from the inverter) information:

- Local SSID: Allows to view the identification name of the wireless network generated from the inverter
- Local IP ADD: Access point IP address used to reach to the inverter internal webserver

#### 2. WLAN.

Displays the status and the information about the second wireless communication channel:

- Status Connected/Disconnected: Indicates if the inverter is connected to a wireless network for monitoring purpose
- SSID: Allows to view the identification name of the wireless network where the inverter is connected to
- Signal Level: Shows the signal level (from a minimum of 1 to maximum 30) of the wireless network
- IP Address: Wireless IP address used to send the information the the Aurora Vision web portal.

#### 3. ETHERNET

Displays the status and the information about the ethernet communication line:

- Status Connected/Disconnected: Indicates if the inverter is connected to a ethernet network for monitoring purpose
- IP Address: Ethernet IP address used to send the information the the Aurora Vision web portal.

#### 4. Firmware

- Build: Shows the firmware release of the Wi-Fi / Ethernet board.

## Further information

For more information on ABB solar products and services,  
visit [www.abb.com/solarinverters](http://www.abb.com/solarinverters)

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