TURBO ENERGY
SOLAR INNOVATION

SUNBOX ®

Instruction
manual

Three Phase SunBox Series 10.0

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Editor: **Turbo Energy S.L.**

Important note: The satisfaction of the end user will depend heavily on having made an adequate estimate of the demand, power, and energy, present and future, to which the equipment will be subjected. Improper calculation may not provide adequate and sufficient service.

Safety recommendations:

Please read the following information carefully before installing and implementing the product. The installation and commissioning of the system must comply with the Electrotechnical Low Voltage Regulation (REBT), and its complementary technical instructions, specifically, the ITC_BT 03, 04, 05 and 40, and the rest of the current regulations, either locally or regionally. Non-compliant use, use of the product in applications and/or configurations not in accordance with this manual, and/or modifications during assembly will result in warranty cancellation and all liability will be disclaimed.

Solar energy systems must be grounded (lightning protection).

Electrical connections must be made exclusively by a specialist technician.

This manual is intended to be a document that facilitates the correct installation of the SunBox equipment. However, once installed it is important to pay attention to the monitoring of maintenance instructions in order to maintain over time the functional and aesthetic characteristics inherent in the installation.

The correct use and the compliance with the maintenance requirements to be performed will depend heavily on the inevitable rate of aging of the installation. Similarly, the manufacturer will only assume responsibility if the equipment has defects of origin and will recline it if equipment contained in this manual is not maintained, or does not use manufacturer-approved spare parts.

Please read this manual carefully before starting the installation.

Content

SUNBOX ®

1. Scope

This manual refers to the installation, operation, and maintenance of hybrid photovoltaic solar equipment SunBox.

Proper installation, as well as proper maintenance, are essential to ensure optimal performance and make the most of system capabilities.

This manual is complementary and is presented indivisibly with the following additional documents:

- o Instruction Manual and Datasheet for Hybrid Inverter (Three Phase Hybrid Series 48V 10.0)
- o Instruction Manual and Datasheet for Batteries (Lithium Series 48V 5.1kWh)

For any other questions about the inverter or the battery, consult the corresponding manuals that can be found on the Turbo Energy website.

2. Safety instructions

To ensure correct installation it is recommended:

i.   Use safe mounting tools and install safety devices. Use ladders in good condition and check that they are securely fixed (~ 70 °) on firm support points.

ii.   Use the appropriate PPE for assembly: approved protective glasses, safety shoes, gloves and helmet.

SUNBOX

3. Description and operation

Description:

The SunBox consists of a mounted and wired cabinet prepared to include up to 2 Turbo Energy Lithium Batteries (Lithium Series 48V 5.1kWh) and a Turbo Energy Three Phase Hybrid Series 48V 10.0.

The system includes several protections for both DC and AC:

Continuous current (DC)

- Six 15A fuses

AC (Protections)

- A magnetothermal switch

The machine has fast MC4 links that facilitate the connection of each string.

In terms of support and handling, the system includes four wheels that can support a load of 280 Kg.

Operation mode:

This SunBox is designed to work in self-consumption mode. Depending on the energy coming from the photovoltaic panels, there are two different situations:

a)   When the demand for electricity consumption is lower than the energy produced by photovoltaic panels, the Inverter transforms the DC into AC to meet the demand for electricity, while charging the batteries with excess power. In this way energy is accumulated for later use at times when energy production is not sufficient.

b)   When the demand for electricity consumption exceeds the energy produced by photovoltaic panels, the Inverter transforms the DC into AC

and takes the missing power from the batteries or the grid, depending on whether the batteries are charged or not, to meet the demand for electricity.

i.   When the batteries are sufficiently charged, the inverter transforms the energy stored in DC to AC to 220V to supply the load. When the batteries are left with the minimum charge level that allows them to ensure a proper operation, they are automatically disconnected to protect the system.
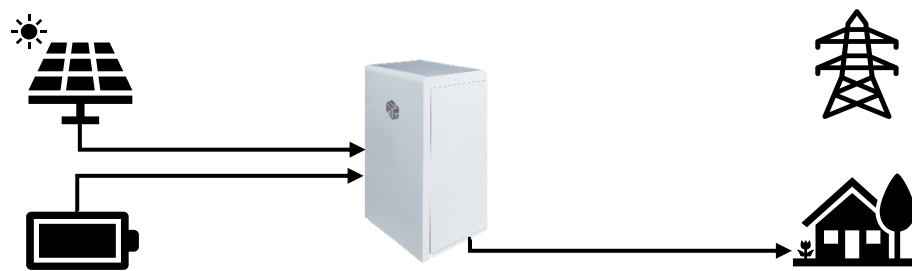
ii.   When the batteries do not have enough charge level to ensure proper operation, the inverter takes the missing power to meet the demand from the grid. In this way the system works in parallel with the grid and with photovoltaic panels.
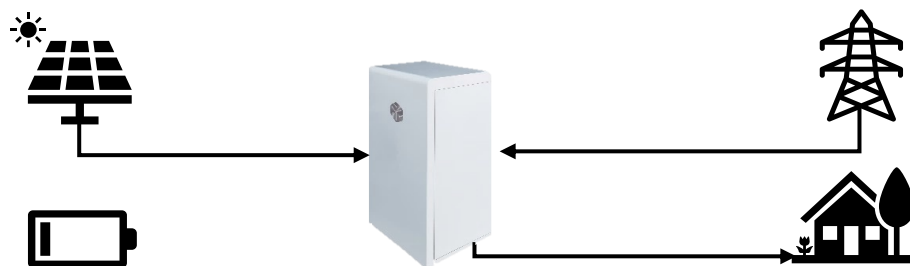
Furthermore, in this mode, in the event of a network failure, the switch automatically switches to off-grid mode to continue its correct operation and comply with anti-island regulations.

In short, the Inverter performs the functions of energy balancing and ensures the operation of the system.

4. Specifications

Batteries

- Manufacturer: Turbo Energy SL
- Model: Lithium Series 48V 5.1kWh
- Attached data sheet and instruction manual.

Inverter/Charger

- Manufacturer: Turbo Energy SL
- Model: Three Phase Hybrid Series 48V 10.0
- Attached data sheet and instruction manual.

Model	Three Phase SunBox Series 10.0
Photovoltaic panels data	
Max. photovoltaic field power	13000 Wp
PV voltage range	160-800 V
MPPT working range	200-650V
Starting voltage	160V
Independent MPPT	2
Maximum current per MPPT	26A + 13A
Category DC surges	II
AC Output (Self-consumption with grid)	
Maximum current	32A
Rated output voltage	230V / 400V (three phase)
Rated output frequency	50/60Hz
AC Output (Self-consumption with grid / Off-grid)	
Nominal power	10000W
Maximum power	11000W (21.7A per phase)
Rated output voltage	230V / 400V (three phase)
Rated output frequency	50/60Hz
Batteries data	
Capacity	5,1kWh / 10,2kWh
Usable capacity	4,60kWh / 9,20kWh
DoD	90%
Cycles at 90% DoD	>6000
Cells	Metal Can
Type of technology	LiFePO4
Nominal battery voltage	51,2V
Max. Charge/discharge current	50A
BMS communication	CAN

DC protections (by MPPT)	
6 x Fuse holder and fuse 1000Vdc/15A	Integrated
AC protections	
Magnetothermic Grid	Integrated
Magnetothermic Load	Integrated
Magnetothermic Gen Port	Integrated
General data	
Communication with the Portal	Wi-Fi
IP rating	IP20
User interface	APP
Weight (Kg)	110Kg
Switch Self-consumption to Grid	Automatic
Dimensions (width*height*depth)	600*1400*600mm
Certificates and Regulations	
Network connection regulations	RD1699
Safety regulations	IEC/EN62109-1 & -2
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29

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5. Installation and assembly

Recommendations for setting up strings

Voc ≈ 42V

Panel 1660x1004mm

MPPT1 (with 2 identical strings)	MPPT2
Minimum 7 panels	Minimum 7 panels
Maximum 15 panels	Maximum 15 panels

Voc ≈ 51V

Panel 2024x1004mm

MPPT1 (with 2 identical strings)	MPPT2
Minimum 6 panels	Minimum 6 panels
Maximum 12 panels	Maximum 12 panels

These values are approximate, check for each type of panel.
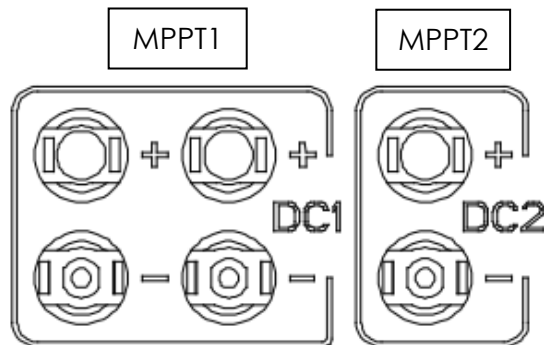
Preliminary recommendations for installation

The installation of the SunBox should be carried out in a place protected from inclement weather, and it is especially relevant that its location is kept dry and avoid potentially flooded areas. The operating temperature range should be considered, which must not exceed 50ºC or be less than 0ºC. Take appropriate measures to ensure the operating temperature range.

Recommendations for system connection:

Below is a simplified scheme of the interior of the Three Phase SunBox Series 10.0:
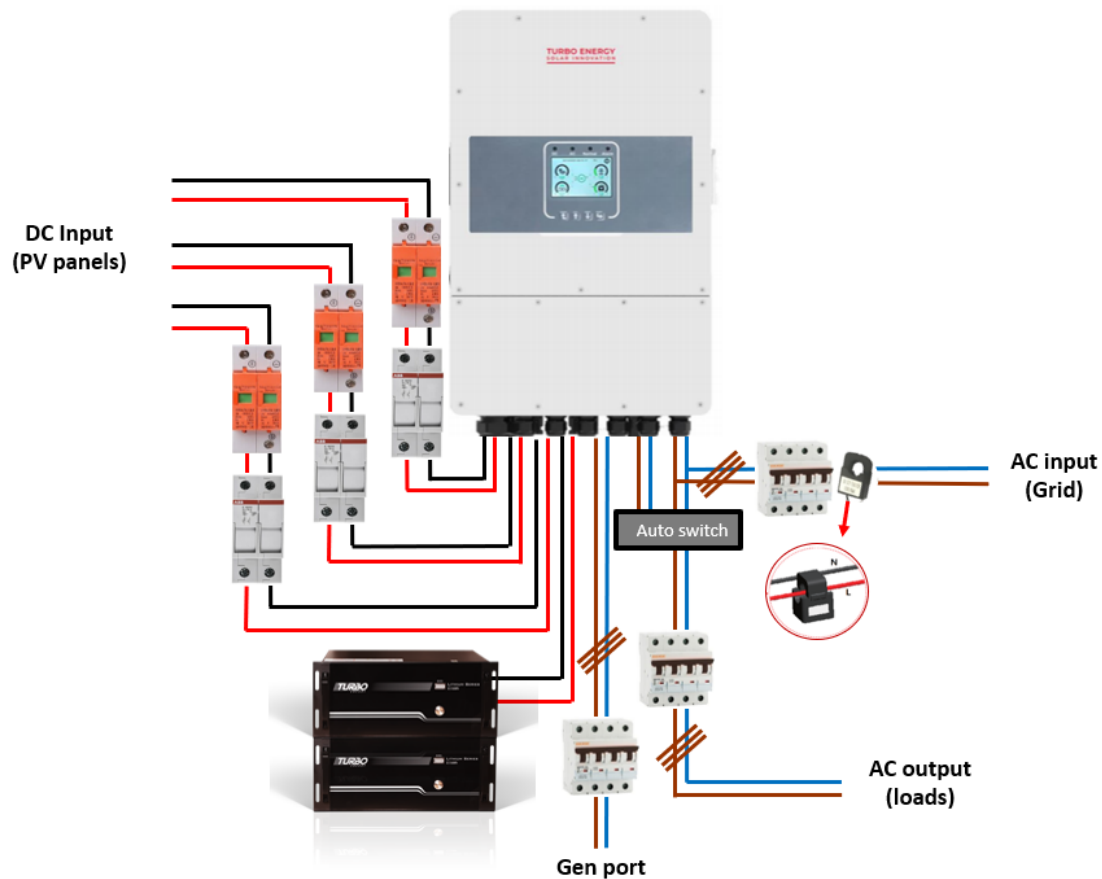
The equipment is prepared so that the installer simply has to connect the input of panels, grid, loads and batteries, if applicable, to the place indicated below. All protections specified in the schematic are included and pre-assembled, thus facilitating the function of the installer.

- Photovoltaic panels must be connected in series to the input specified below. Internally connects to its corresponding fuses.
- The inverter's grid output is protected with its differential and automatic switches. It must be connected after the magnetothermal of the general housing frame and to the specified internal terminals of the SunBox by a 6 mm^2 hose.
- The CT-meter comes pre-assembled and connected inside the SunBox.
- In case batteries need to be installed, the Three Phase SunBox Series 10.0 comes ready to store up to 2 Turbo Energy Lithium Series 48V 5.1kWh batteries. Its installation is explained below.

*The Grid and Load outputs in normal grid operation will be the same as they are internally connected, however, in case of grid failure, if the system stays running in off-grid, the inverter opens the contact that joins the grid and load and leaves the load output running in off-grid. This is because the inverter cannot operate in island mode, therefore the automatic must be separated from the frame so that it can operate in off-grid. The operation in off-grid will depend on whether the corresponding batteries have been installed and will operate by solar energy and batteries only for the duration of renewable energy. It should be noted that the power will be limited to 10 kW (and 32A per phase), therefore it is not possible to include loads that require a lot of power.

5.1 Installation options

Option 1

For load currents lower than 32A per phase (around 7.2kW), the general connection of the SunBox will be as shown in the following diagram:
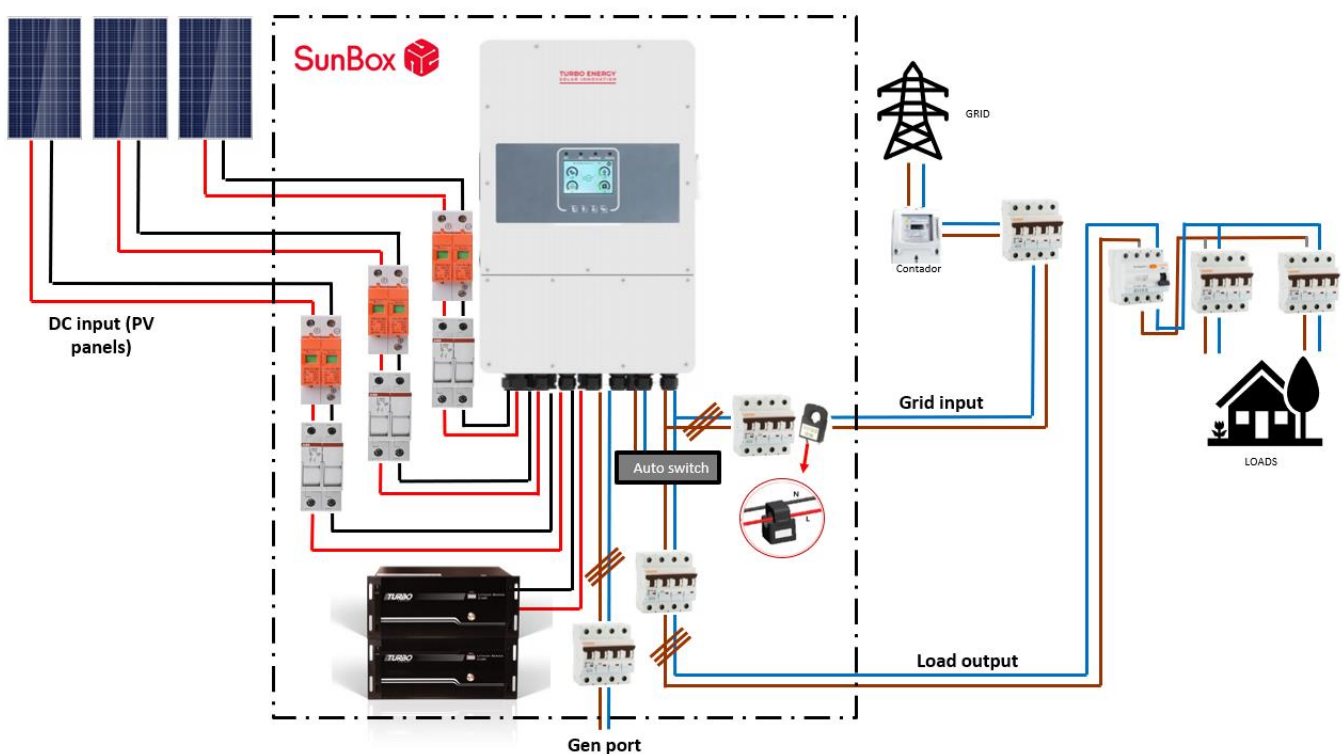
It is the simplest configuration and avoids manipulation of the load connections. As all the power from the network passes through the equipment (Load output) and it distributes the energy, it implies that the maximum current of the loads is 32A per phase in self-consumption mode (around 7.2kW), and 32A per phase and 10kW in total when there is no grid.

Option 2

In the case of connecting load currents greater than 32A per phase (around 7.2kW) in self-consumption mode, the configuration to be carried out is as follows:
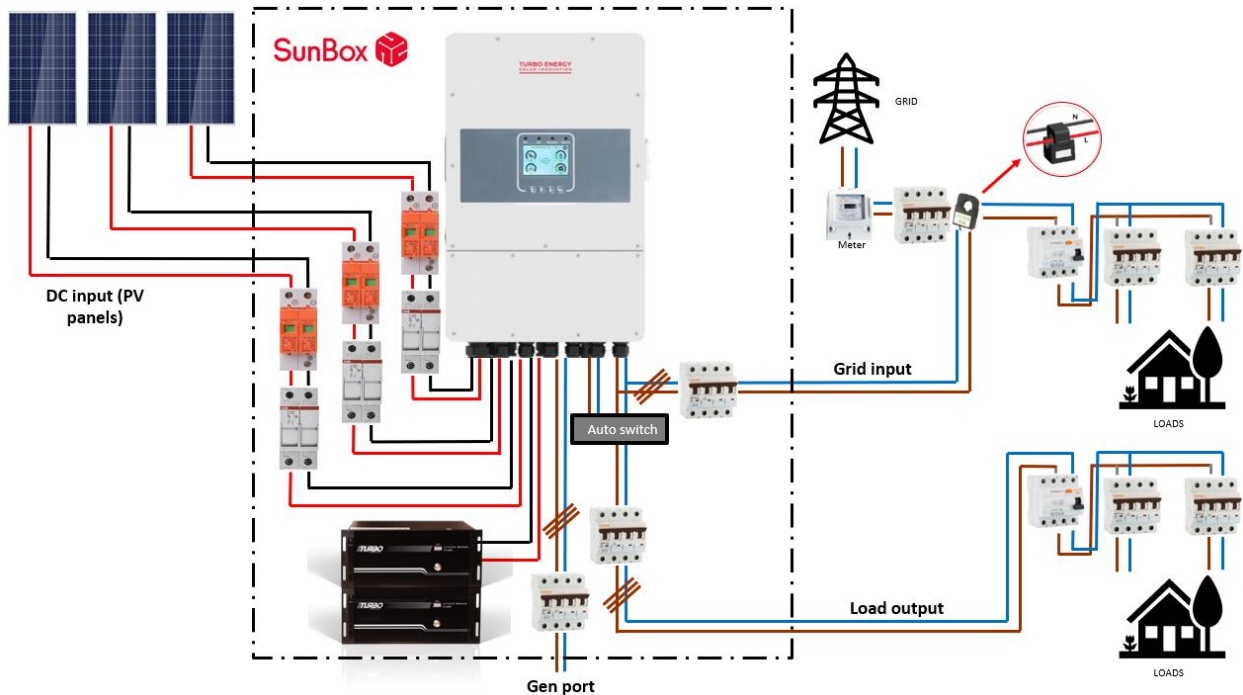
In this way, we have a series of critical loads connected to the Load output (up to a maximum of 32A per phase) that will allow the panels and / or batteries to supply them with energy despite a grid failure. The rest of the loads above 32A per phase must be connected on the grid side.

In the case of not needing to connect critical loads and wanting to simplify the installation, all the loads can be put on the grid side as follows (but in the event of a grid failure, the loads are left without supply even though there is generation photovoltaic and / or battery):
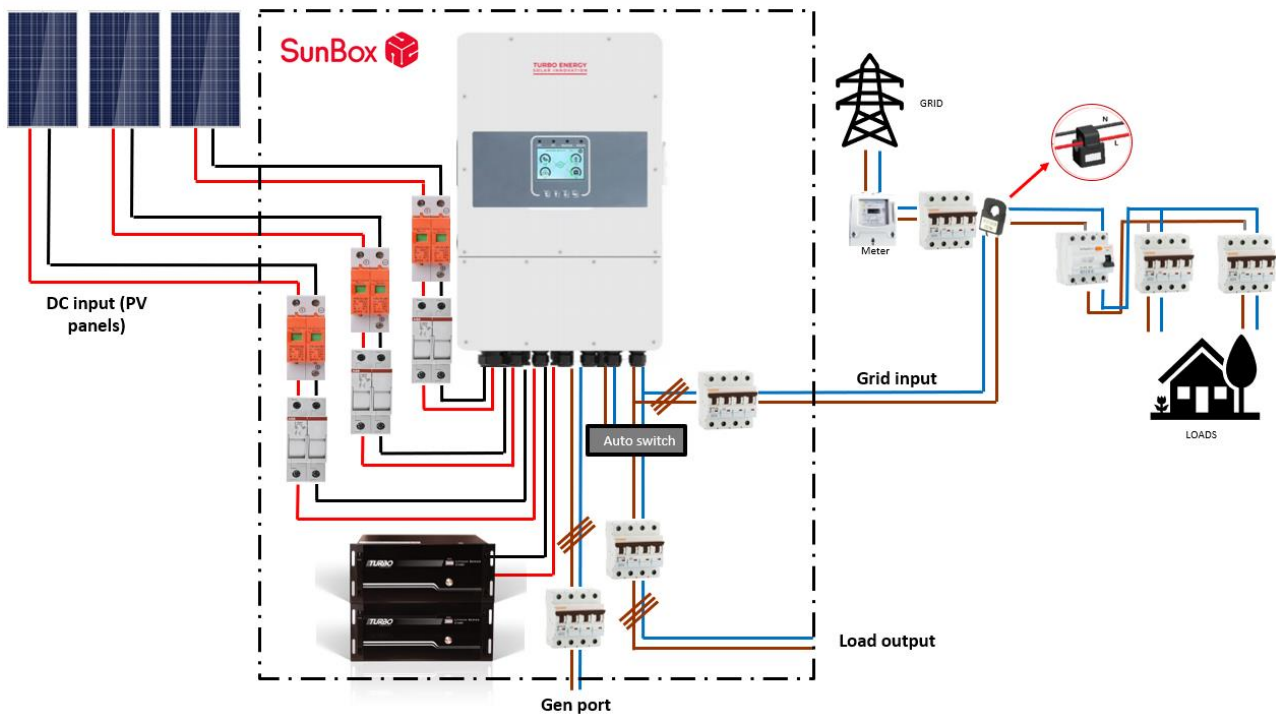
5.2 Gen-Port

The SunBox has an intelligent input / output that can provide the equipment with different functionalities.

Generator input

The output of a generator can be connected to this input, so that the off-grid installation can rely on this source for power supply. The maximum power value is 10000 W.

Microinverter or inverter input

The output of microinverters or inverters can be connected to this input, with a total power of up to 10000W. This is a great advantage, since the number of photovoltaic panels in the installation can be increased.

Smart Load

This mode uses this input as an output and receives power only when the battery SOC and PV power are above a user-programmable threshold.

For example, if you have an auxiliary electric water heater connected to this output, with this functionality you can program that, if the SOC of the battery is above 95% and the solar production is more than 500W, the water heater will heat up with that surplus energy.

5.3 DC wiring

The series of photovoltaic panels shall be carried out as indicated in section 4.1.

The cabinet already has the right protections installed for continuous sockets.

To access the connections, open the back door of the SunBox cabinet. It is very important to note that each positive must be connected to its negative in the cabinet, for this it is recommended to mark the cables or make connections one at a time until the installation is complete.
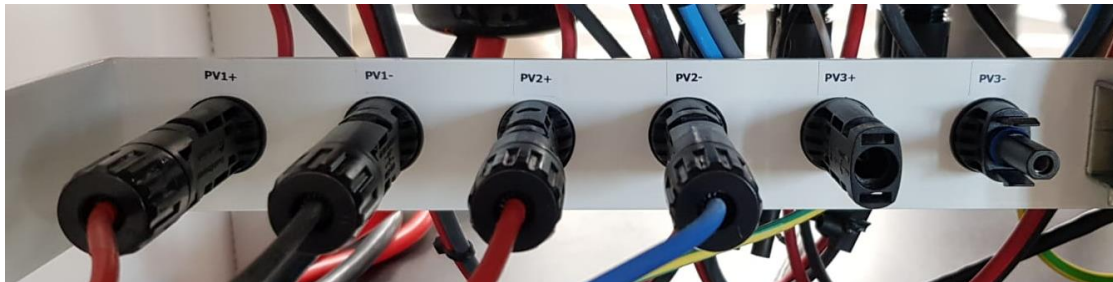
5.4 AC wiring

To connect Grid and Load open the back door of the SunBox cabinet and connect to the pointed and identified terminals with colors, phase gray, neutral blue, yellow and earth green. The cables must be 6 mm2.
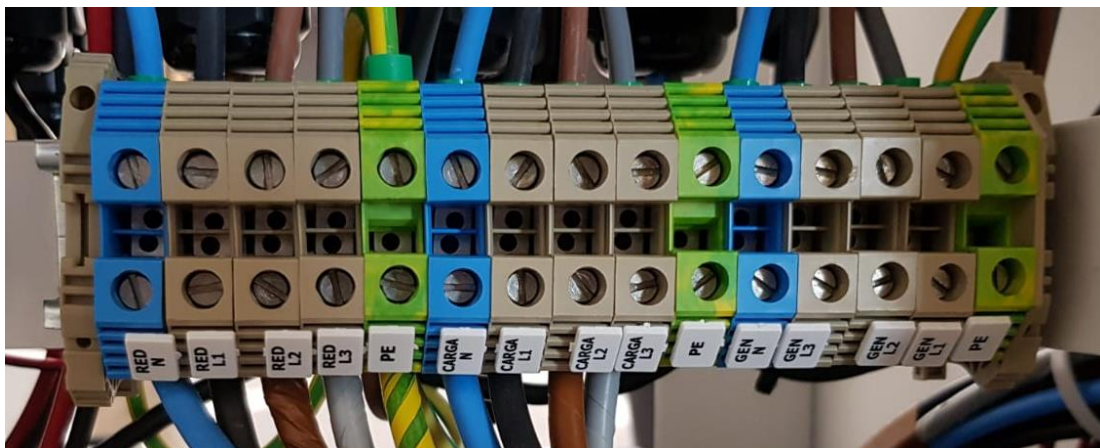
5.5 Grounding

Connect ground wire to the ground plate on the grid side, preventing electric shock if the original protective conductor fails. Using the auxiliary connecting elements we must connect the grounding, both to the rack and to the structure of photovoltaic modules.

Make sure that the grounding of all elements are connected to each other via the ground wire.

5.6 Recommendations for the installation of 48V 5.1kWh Lithium Series batteries

To install 48V 5.1kWh Lithium Series batteries, follow these steps:

1. Make sure the inverter is turned off and has no grid connection.

2. Make sure the battery is also turned off.

3. Set up battery switches as follows:

- One battery:
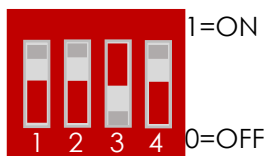
- Two batteries:
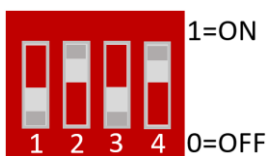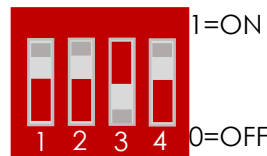
   (Master battery)   (Bottom battery)

- Three or more batteries:
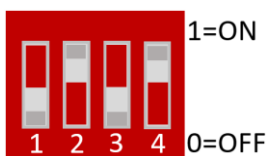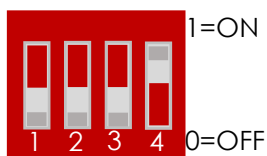
   (Master battery)   (Middle batteries)   (Bottom battery)
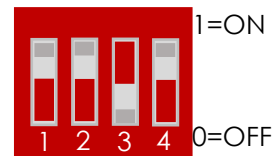
4. Place the battery in the capsule structure with the corresponding screws.

5. If you incorporate a pair of batteries, connect them in parallel and to the inverter. If you only have one battery, connect it directly to the inverter (picture detail).

6. Connect the RJ cable to the CAN port of the master battery. Also connect the Master Battery to the slaves with the corresponding RJ connector (picture detail).
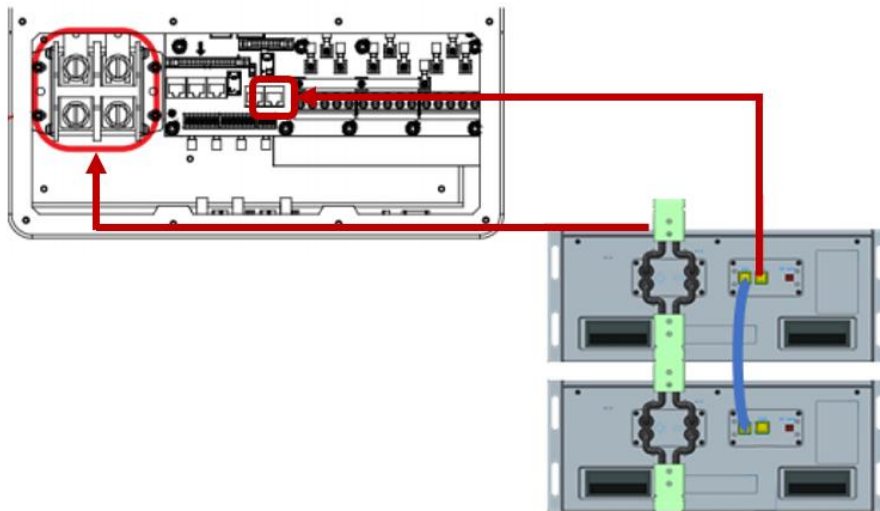
⚠	Do not pull or force the communication cables in a way that can bend or damage the connection ports. These ports can be easily broken if not handled properly.

Power cables must have a section of 25mm².

For more information read the attached Lithium Series 48V 5.1kWh battery manual.

5.7 Wheels mounting

The SunBox has 4 wheels that must be mounted using the included screws and washers.
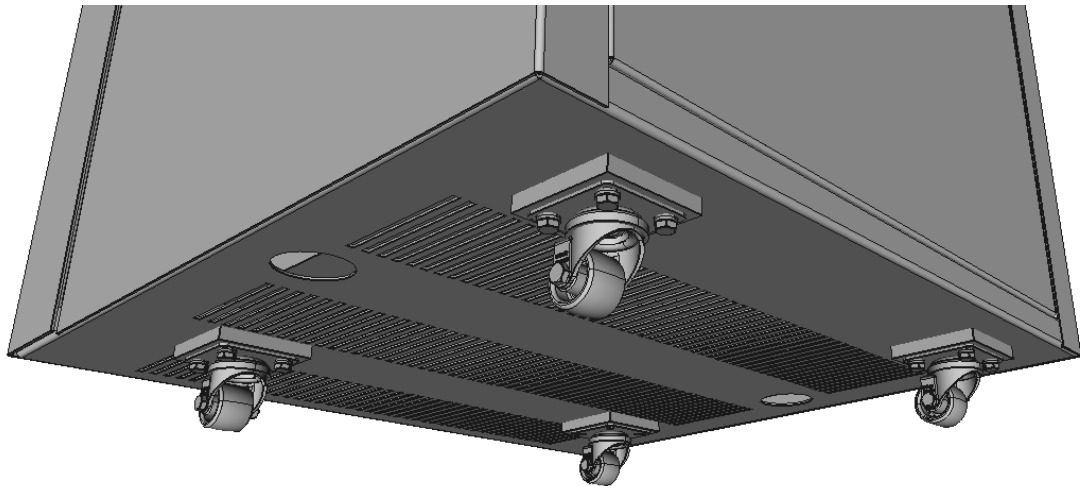
The order of placement of the elements is Grower washer, DIN 125 washer and screw.
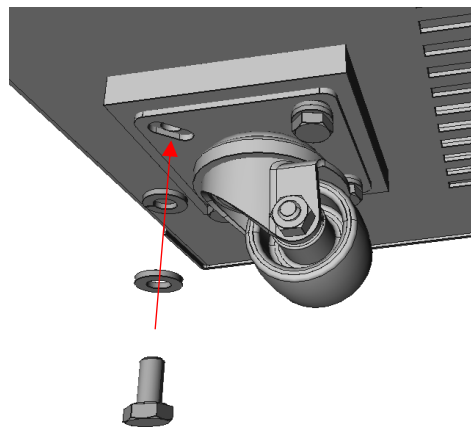
5.8 Start-up

Once you are finished with all connections, the machine is ready to start working. It will proceed as follows:

1. Reset the DC and AC protections at the back of the cabinet.
2. Start the Batteries. To do this, press the Power button (On/Off) for 2-4 seconds. The BMS will start, and both the LCD screen and the power button will light up.
3. Press the ON / OFF button on the side of the inverter and turn the DC switch to the ON position.

6. Inverter/Charger Configuration

To configure the inverter, it is necessary to modify parameters on its screen to adjust them to the characteristics of our installation.

To do this, it is necessary to access the system configuration menu through the main screen, by clicking on the icon in the upper right.
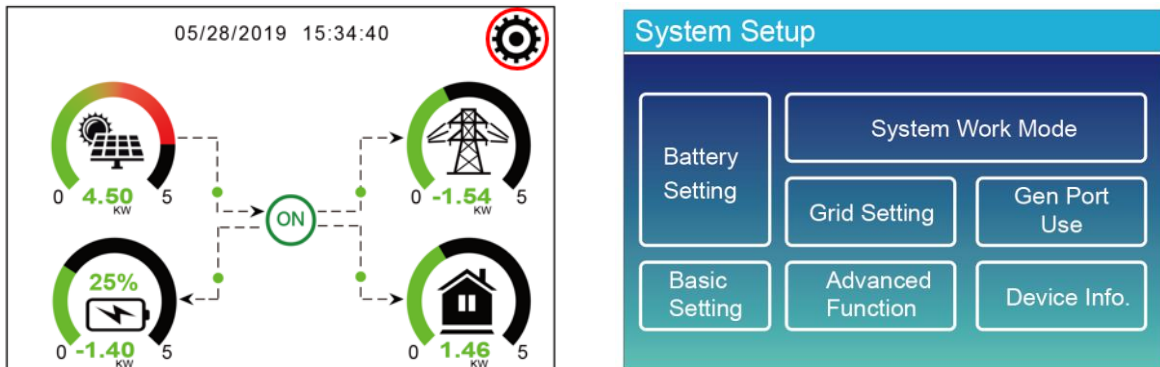
6.1 Basic setup menu

The first thing will be to set the date and time at the time of installation.
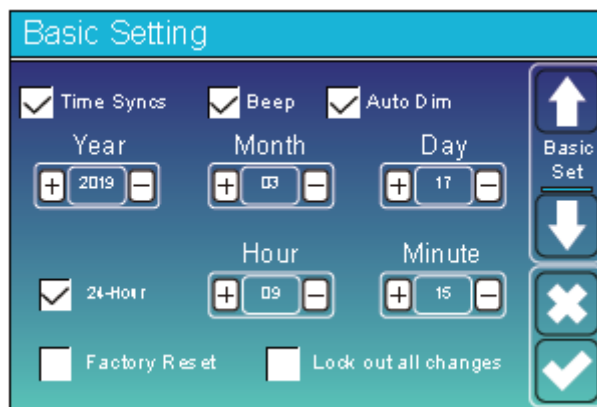
6.2 Battery setup menu

If you have a battery, it is necessary to specify that it is a lithium battery. In case of not having a battery, No Batt will be selected.

Depending on the number of batteries, the specifications for battery capacity and charge / discharge current need to be changed as follows.
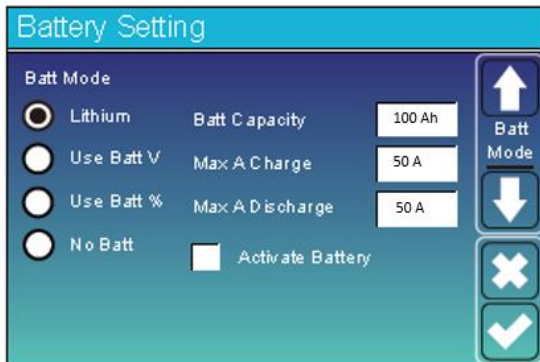
Setup 1 battery   Setup for 2 batteries
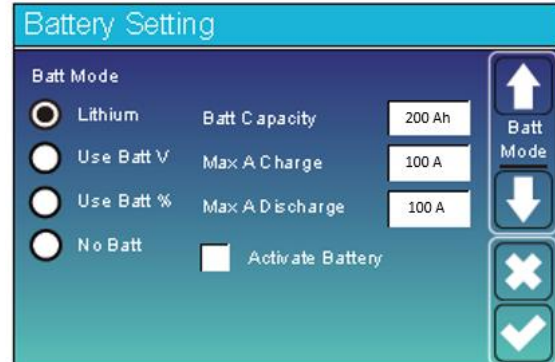
The battery charge is configured with grid or generator. In the case of grid, a 10% is indicated for the start of the charge, 50 A of battery charge in case of having one and 100 A in case of having two batteries. The maximum current that the inverter can supply is 120 A.

Settings:

- **1 Generator**

- **2 Grid**

- **3 Time**

- **Start: 15%-10%** Indicates the battery level for the start of charging

- **A:** Charging current. **40 A** Gen/ **50 A** Grid

- **Gen Max Run Time:** maximum daily generator charge time. **24 h**

- **Gen Down Time:** Delay time the generator uses to shut down. **0 h**

The type of BMS for communication with batteries with Lithium Mode 00 is also indicated.
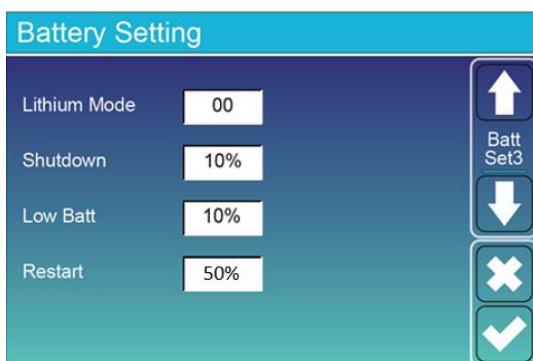
- **Lithium Mode: 00** BMS Protocol

- **Shutdown: 10%** The inverter shuts down when the battery reaches the indicated charge

- **Low batt**: **10%** The inverter will alarm when the battery has lower SOC than indicated

- **Restart: 50%** Battery percentage to restart the inverter

6.3 System work mode

When programming the inverter, you can choose between various configuration options:

1. Selling first: the priority for excess energy is to deliver it to the grid.
2. Zero Export To Load: The output power feeds the Load
3. Zero export To CT: Production feeds the sum of loads (Network and Load).

You have to select one of these three modes and activate or deactivate the option of supplying power to the grid.

Additionally, power can be prioritized over load or battery.

The recommended working mode is: Zero Export to CT / Sollar Sell activated / Load First. In this way, the energy generated will feed the load, the excess amount will go to the battery and finally, the excess energy will be discharged to the grid.
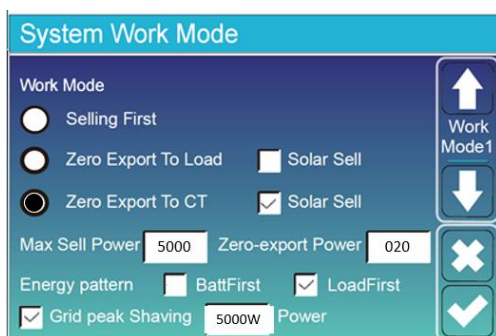
- **Selling first:** Deliver to grid first
- **Zero Export to Load:** Output power adjusts to BackUp load
- **Zero Export to CT**: The system adjusts the production to the sum of the loads (Network and BackUp)
- **Solar Sell:** Sell surplus energy
- **Max Sell Power:** maximum power output
- **Zero-export Power:** Network output power
- **Batt First:** The energy from the PV is used to charge the batteries first.
- **Load First:** The energy from the PV is used for loads and then for the batteries.
- **Grid Peak Shaving:** Power limit to be taken from the grid

The Three Phase SunBox Series 10.0 inverter also incorporates the possibility of using the Grid Peak Shaving function, which allows reducing the maximum power consumed from the grid. With this function the user can have less power contracted in the hours of the day that are more expensive and the excess power that is consumed will be supplied by the battery.

There are three different modes:

- GM (General Mode): Mode to supply the energy consumed with Battery and PV

- BU (BackUP): No battery discharge mode

- CH (Charge): Battery charging mode

System Work Mode

	GM	BU	CH	SOC1	GPS	START	END
			✓	10%	5000	00:00	08:00
		✓		10%	5000	08:00	10:00
	✓			30%	2500	10:00	14:00
		✓		10%	5000	14:00	18:00
	✓			45%	2000	18:00	22:00
	✓			10%	5000	22:00	00:00

SOC2 [10%] Enable ✓

Work Mode3

As an example, following the table above, different schedules can be established in different time periods:

- 00:00 - 08:00: Charge mode activated. Since the energy is cheaper at night it compensates to charge the battery with the grid and store it for use in more expensive periods.

- 08:00 - 10:00: BackUP mode activated. Battery does not discharge.

- 10:00 - 14:00: GM mode activated. The user has a lower contracted power (2500 W) for this period since it is more expensive. A 30% battery is reserved to supply power peaks that exceed 2500 W.

- 14:00 - 18:00: BackUP mode activated. The battery is not discharged since these are the hours of greatest sun production.

- 18:00 - 22:00: GM mode activated. The user has a lower contracted power (2500 W) for this period since it is more expensive. 45% battery is reserved to supply power peaks that exceed 2500 W.

- 22:00 - 00:00: GM mode activated. No reserve to supply the peaks.

6.4 Grid setup

Grid Setting

Grid Mode	
○	General Standard
○	UL1741 & IEEE1547
○	CPUC RULE21
○	SRD-UL-1741

Grid Type	
○	220V Single Phase
○	120/240V Split Phase
○	120/208V 3 Phase
○	120V Single Phase

Grid Set1

Grid Setting

Grid Frequency	○ 50HZ
	◉ 60HZ

Reconnection Time	60S	PF	1.000

Grid HZ High	60.5Hz	Grid Vol High	265.0V
Grid HZ Low	59.3Hz	Grid Vol Low	185.0V

Grid Set2

Grid Setting

☐ Q(V)	☐ FW	☐ VW
V1:0.0V Q1:0.00	Fstart:0.00Hz	Vstart:0.0V
V2:0.0V Q2:0.00	Fstop:0.00Hz	Vstop:0.0V
V3:0.0V Q3:0.00	Normal Ramp rate 0.0%/s	
V4:0.0V Q4:0.00	Soft Start Ramp rate 0.0%/s	

Grid Set3

Grid Setting

☐ L/HVRT		☐ L/HFRT	
HV2:0.0V	0.16S		
HV1:0.0V	0.16S	HF2:0.00HZ	0.16S
LV1:0.0V	0.16S	HF1:0.00HZ	0.16S
LV2:0.0V	0.16S	LF1:0.00HZ	0.16S
LV3:0.0V	0.16S	LF2:0.00HZ	0.16S

Grid Set4

6.5 Gen Port setup

GEN PORT USE

Mode
- ○ Generator Input   ☐ Gen connect to Grid input
- ◉ SmartLoad Output   ☐ On Grid always on
  - Power: 1000W   Open Delay: 60Min
  - OFF 95%
  - ON 100%
- ○ Micro Inv Input
  - ☐ MI export to Grid cutoff

PORT Set1

Generator Input:use Generator

SmartLoad Output: if the SOC is up than "ON" and solar power is high than 1000W. the inverter will open smartload.

On Grid always on:mean when have Grid,the smartload will always on

Micro Inv Input:Inverter will open Microinverter.if the SOC is below the "ON" and close if the SOC is up than the "OFF"

6.6 Advanced functions
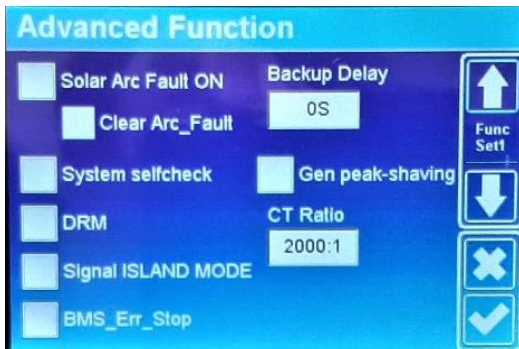
Solar Arc Fault ON---This is only for US.

System selfcheck   ---Disable. this is only for factory.

Gen Peak-shaving---Enable When the power of the generator exceeds the rated value of it, the inverter will provide the redundant part to ensure that the generator will not overload.

Grid Peak-shaving---Enable When the power of the grid exceeds the set value, the inverter will provide the redundant part to ensure that the grid power does not exceed the set value.
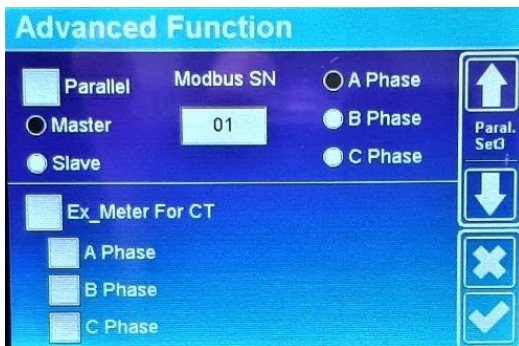
6.7 Device info
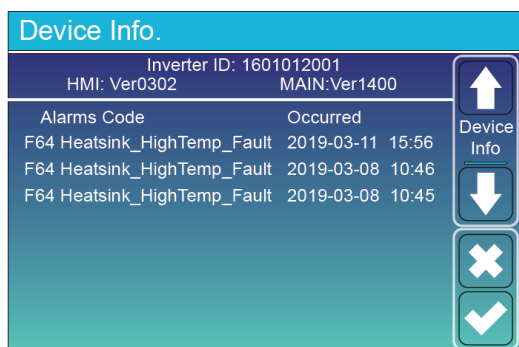
For more detailed information refer to the Three Phase Hybrid Inverter 48V 10.0 Manual.

7. Wi-Fi connection setup

7.1 Setup

In order to upload the SunBox to the cloud and be able to see the monitoring of the system, it is essential to connect the equipment to the internet. To do this, the following steps must be followed:

Step 0: Locate the serial number of the logger

At the bottom of the inverter there is a plate with a QR code, the serial number of your logger and the logger's wifi access password.

The logger creates a Wifi network whose name is "AP_" followed by the serial number of the logger.

Step 1: Connect to the Wifi network

With an electronic device with Wi-Fi (PC, Tablet, Smartphone…) the connection with the logger's Wi-Fi is established:

Open the wireless network connection of PC, Tablet or Smartphone

Click on view available wireless networks

Select the one corresponding to the device with which you want to connect (identified by "AP_" and the serial number of the logger)
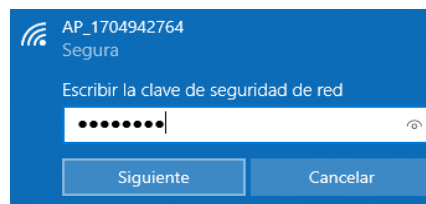
Enter the password that appears on the logger's plate together with the serial number.
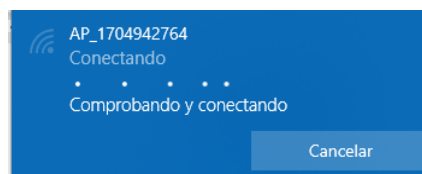
Step 2: Connect to the web portal

Once connected to the Wi-Fi network with your PC, Tablet or smartphone, you must access the logger's web portal.

To do this, open a web browser on the PC, tablet or smartphone that has been connected to the logger's Wi-Fi.

Write the text "10.10.100.254" in the address bar of the web browser.

A pop-up window will appear to login with a username and password. The default user is "admin" and the password is "admin", and then press the "Login" button.

Iniciar sesión

http://10.10.100.254 necesita un nombre de usuario y una contraseña. Tu conexión con este sitio web no es privada
Nombre de usuario

admin

Contraseña

•••••

Cancelar   Iniciar sesión

Once the logger's web portal has been accessed, the "Status" page with general information about the registrar can be seen.

10.10.100.254/index_cn.html   +

← → C   ⚠ No es seguro | 10.10.100.254/index_cn.html

Status	- Inverter information	
Wizard	Inverter serial number	2006284117
Quick Set	Firmware version (main)	---
Advanced	Firmware version (slave)	---
Upgrade	Inverter model	---
Restart	Rated power	--- W
Reset	Current power	--- W
	Yield today	6552.10 kWh
	Total yield	19.7 kWh
	Alerts	---
	Last updated	1

+ Device information
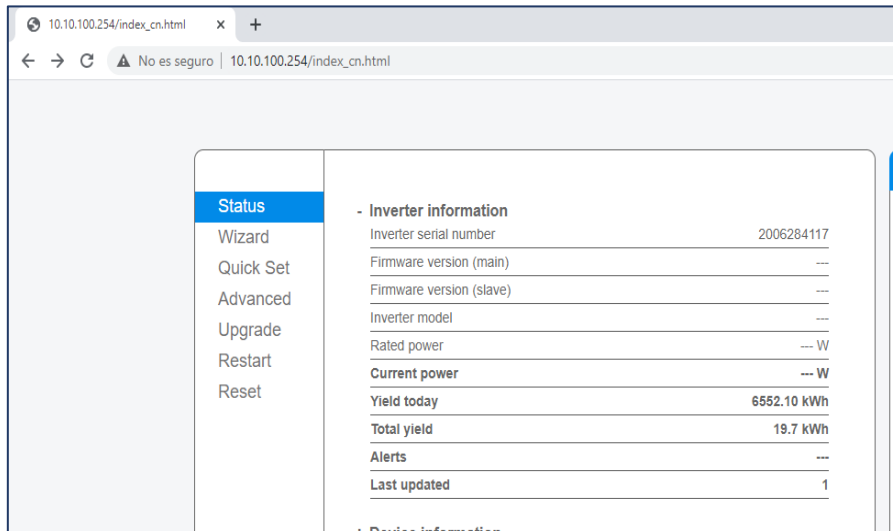
Click on the "Wizard" link under the "Status" link to connect the logger to the Wi-Fi (the Wi-Fi of your house or your plant).

Step 3: Setup logger access to the Wi-Fi

Step 3.1: select the Wi-Fi

When we run the connection wizard, the list of Wi-Fi networks to which the logger has access appears. Among them should appear our Wi-Fi. We must select it and press the "Next" button at the bottom of the screen:

Step 3.2: enter the Wi-Fi password: in the "Password" field, enter your Wi-Fi password and press the "Next" button.

Step 3.3: configure the security of the Wi-Fi connection by selecting the options that appear on the lower screen and press the "Next" button

Step 3.4 If the adjustment has been made correctly, press the "OK" button to restart the connection.

If the restart is successful, a message will appear indicating that it was successful, if it does not appear then refresh the browser page:

Step 4: Verify the logger connection to the Wi-Fi

After restarting the web page, log back in to the "Status" page and check the status of the recorder's network connection:

Once we have verified that the logger is connected to the Wi-Fi, it is possible to add the plant to the cloud platform.

> ⚠️ We recommend not to change the password of the access portal or the password of the inverter's Wi-Fi through the portal 10.10.100.254.
> If you forget the password, you will not be able to access the portal again to configure the WiFi.

8. Maintenance recommendations

To keep the system in good condition, achieve optimal operation and extend its service life, it is recommended to perform the following maintenance tasks:

i. Reviewing connections, and wiring status, replace damaged cables and refix connections if necessary.

ii. Review and check the status of DC fuses. It is suggested, as a simple method of verification, to sequentially disconnect the DC lines one by one to verify the energy input of each panel group. To do this, it is mandatory to disconnect the DC disconnector prior to each disconnection of continuous lines.

iii. **Important:** each continuous line has two fuses, one for the positive and one for the negative. If applicable, replace damaged fuses. If once replaced the line remains current in the presence of solar radiation and verified that the rest of the lines do have, contact technical service.

9. Troubleshooting

9.1 Inverter most common mistakes

The following table recollects most common technical errors from the inverter and how to solve them quickly.

If any of the fault messages listed in Table 7-1 appear on your inverter and the fault has not been removed after restarting, please contact your local dealer or service center. You need to have the following information ready.

1. Inverter serial number;

2. On-grid power generation date;

3. The problem description (including the fault code and indicator status displayed on the LCD) is as detailed as possible.

Error code	Description	Solutions
F07	DC/DC_Softsart_Fault	Check battery fuse. Reset inverter.
F08	GFDI_Relay_Failure	1.When inverter is in Split phase(120/240Vac) or three-phasesystem (120/208Vac) system, the backup load port N line needs to connect ground. 2.If the fault still exists, please contact us for help.
F10	AuxPowerBoard_Failure	Wait a couple minutes. Disconnect Wifi or any other communication type.
F13	Working mode change	1.When the grid type and frequency changed it will report F13. 2.When the battery mode was changed to "No battery" mode,it will report F13. 3.For some old FW version, it will report F13 when the systemwork mode changed. 4. Generally, it will disappear automatically when shows F13. 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch.
F18	AC over current fault of hardware	1.Please check whether the backup load power and commonload power are within the range. 2.Restart and check whether it is in normal.
F20	DC over current fault of the hardware	1.Check PV module connect and battery connect. 2.When in the off-grid mode, the inverter startup with big powerload, it may report F20. Please reduce the load power connected. 3.Turn off the DC switch and AC switch and then wait oneminute,then turn on the DC/AC switch again.
F22	Tz EmergStop Fault	1.indica que el inversor está controlado de forma remota y está apagado. 2.Permanecerá en estado "APAGADO" hasta que llegue el comando de desbloqueo. 3.Cuando el número de inversores en paralelo es inferior a 5 piezas, todos los interruptores DIP del inversor (1 y 2) deben estar en la posición ON. Si el número de inversores en paralelo es mayor que 7, el interruptor DIP del inversor principal (1 y 2) debe estar en la posición ON y el interruptor DIP del resto (1 y 2) debe estar en la posición OFF.
F23	AC leakage current is transient over current	Check PV side cable ground connection. Restart the system 2~3 times.
F24	DC insulation impedance failure	1.Check the connection of PV panels and inverter is firmly andcorrectly. 2.Check whether the PE cable of inverter is connected to ground.

F26	The DC busbar is unbalanced	1.Please wait for a while and check whether it is normal. 2.When the hybrid in split phase mode, and the load of L1 andload of L2 is big different, it will report the F26. 3.Restart the system 2~3 times.
F29	Parallel CAN Bus fault	1.When in parallel mode, check the parallel communication cableconnection and hybrid inverter communication address setting. 2.During the parallel system startup period, inverters will report F29. when all inverters are in ON status, it will disappear automatically.
F34	AC Overcurrent fault	1. Check the backup load connected, make sure it is in allowed power range.
F35	No AC grid	Please confirm grid is lost or not. Check the grid connection is good or not. Check the switch between inverter and grid is on or not.
F41	Parallel system stop	1. Check the hybrid inverter working status. If there's 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system.
F42	AC line low voltage	1.Check the AC voltage is in the range of standard voltage inspecification. 2.Check whether grid AC cables are firmly and correctlyconnected.
F47	AC over frequenc	1. Check the frequency is in the range of specification or not. 2. Check whether AC cables are firmly and correctly connected.
F48	AC lower frequency	1. Check the frequency is in the range of specification or not. 2. Check whether AC cables are firmly and correctly connected.
F56	DC busbar voltage is too low	1.Check whether battery voltage is too low. 2.If the battery voltage is too low, using PV or grid to charge thebattery.
F58	BMS communication fault	1.it tells the communication between hybrid inverter and batteryBMS disconnected when"BMS_Err-Stop" is active. 2.if don't want to see this happen, you can disable"BMS_Err-Stop" item on the LCD.
F59	AC Grid overcurrent	1. Chech AC current. 2. If there is no grid check the discharge battery current.
F63	ARC fault	1. ARC fault detection is only for US market. 2. Check PV module cable connection and clear the fault.
F64	Heat sink high temperatu re failure	1. Check whether the work environment temperature is too high. 2. Turn off the inverter for 10mins and restart.

9.2 Battery errors

If the error appearing is related to batteries, please check the Battery Manual.

INSTRUCTION MANUALS AND DATASHEETS APPENDIX

INVERTER/CHARGER

BATTERIES