Document version: ***V3***

USER MANUAL

TURBO ENERGY
SOLAR INNOVATION

SUNBOX

Split Phase Series 10.0

ALL-IN-ONE
Compact home solar power battery

MODULAR DESIGN
Flexible and scalable from 5.1 to 20.48 kWh

PLUG & PLAY
Easy installation and quick commissioning

24/7 BACKUP protection and **PEAK SHAVING**

EASE-TO-USE AI-DRIVEN SOFTWARE
Optimized stored energy

10 YEARS
TURBO ENERGY WARRANTY

Table of Contents

1. DOCUMENT INFORMATION

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

A correct installation, as well as proper maintenance, are essential to ensure optimum performance and make the most of the system's capabilities.

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

- Manual and Data Sheet Inverter (Split Phase Hybrid Series 10.0)
- Manual and Data Sheet Batteries (Lithium Series Pro 5.1kWh)

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

1.1 Symbols used

WARNING: indicates a hazardous situation which, if not avoided, could result in minor injury or death.

CAUTION: indicates a hazardous situation which, if not avoided, could result in minor injury or damage to the equipment.

NOTE: Indicates an important step or tip that leads to best results but is not safety or damage related.

REFER TO OPERATING INSTRUCTIONS: indicates that user should refer to operating or installation instructions before proceeding.

RISK OF ELECTRIC SHOCK: indicates components that present risk of electrical shock.

PROTECTIVE CONDUCTOR TERMINAL: indicates location of grounding connection on the equipment.

2. SECURITY MEASURES

To ensure a correct installation it is recommended:

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

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

2.1 General information


WARNING: Read this entire document before installing or using Sunbox Split Phase Series 10.0. Failure to do so or to follow any of the instructions or warnings. in this document can result in electrical shock, serious injury, or death.


WARNING: A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.


WARNING: Sunbox installation must be carried out only by a competent electrician who has been trained in dealing with low voltage electricity.


WARNING: Sunbox is heavy. Use of lift equipment is recommended.


WARNING: Use Sunbox only as directed.


WARNING: Do not use Sunbox if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.


WARNING: Before beginning the wiring portion of the installation, ensure that Sunbox is switched off, and lock out any associated circuit breakers and disconnect switches.


WARNING: To protect Sunbox and its components from damage when transporting, handle with care. Do not impact, pull, drag, or step on Sunbox. Do not subject Sunbox to any strong force. To help prevent damage, leave Sunbox in its shipping packaging until it is ready to be installed.


WARNING: Do not insert foreign objects into any part of Sunbox.


WARNING: Do not expose Sunbox or its components to direct flame.


WARNING: Do not install Sunbox near heating equipment.


WARNING: Do not immerse Sunbox or its components in water or other fluids.


WARNING: Operating or storing Sunbox in temperatures outside its specified range might cause damage to Sunbox.


WARNING: Do not expose Sunbox to ambient temperatures above 50°C (122°F) or below -20°C (-4°F).


CAUTION: Do not use solvents to clean Sunbox or expose Sunbox to flammable or harsh chemicals or vapors.


CAUTION: Do not use fluids, parts, or accessories other than those specified in this manual.


CAUTION: Do not paint any part of Sunbox, including any internal or external components such as the exterior shell or casing.


CAUTION: When installing Sunbox in a garage or near vehicles, keep it out of the driving path.

CAUTION: Avoid installing Sunbox in direct sunlight.

CAUTION: Ensure that no water sources are above or near Sunbox, including downspouts, sprinklers, or faucets.

3. EQUIPMENT DESCRIPTION

3.1 Description

The Sunbox consists of an assembled and wired cabinet prepared to include:

- 1 Turbo Energy Inverter (Split Phase Hybrid Series 48V 10.0)

And up to:

- 4 Turbo Energy Lithium Batteries (Lithium Series Pro 48V 5.1kWh)

The system includes a series of protections for both DC and AC:

Direct Current (DC) Protections:

- Four 1500V surge protectors.
- Eight 20A fuses/fuse holders.
- One RJ45 jack module.

Alternating current (AC) Protections:

- Four 50A Circuit Breaker 3P.
- Manual Changeover 63A, 4P.

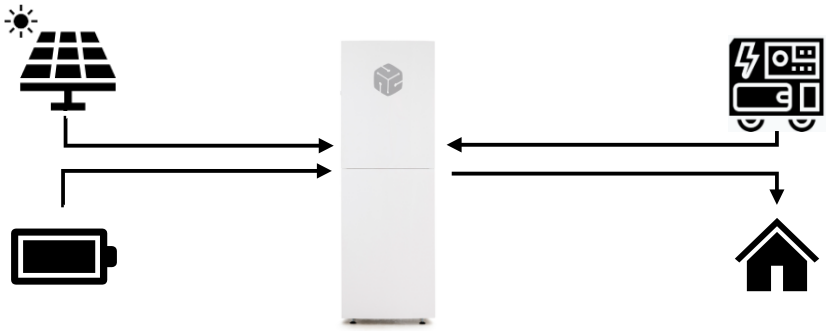
Regarding its support, the system includes four adjustable legs that can collectively support a maximum load of 400 kg. Additionally, two anchors are included in case it is wanted to anchor the Sunbox to a nearby wall (in addition to the four adjustable legs).

3.2 Functioning

The Sunbox can work both connected to the grid in self-consumption mode and in off-grid.

1. Off-grid mode

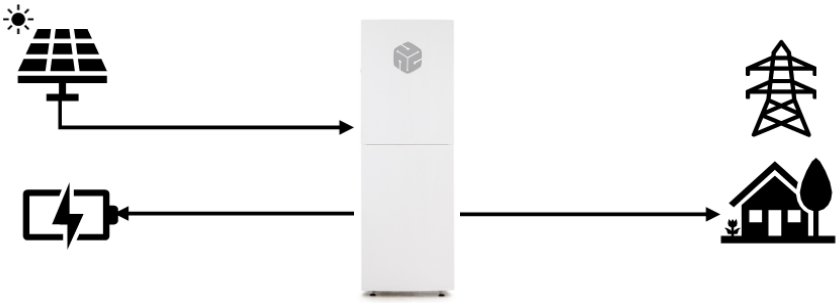
It is a way for the system to be completely independent from the grid, operating solely with photovoltaic generation and batteries, as well as being supported by a generator set.



2. Self-consumption mode

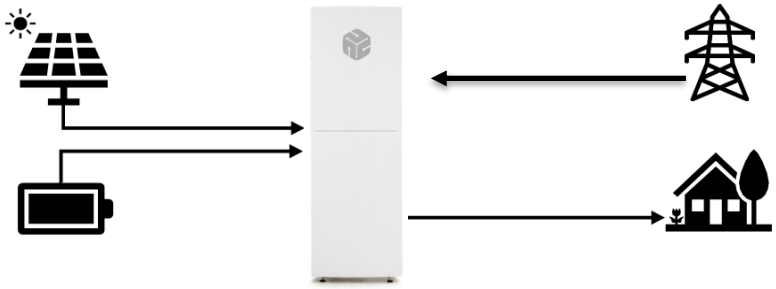
For the general mode of operation and depending on the energy coming from the photovoltaic panels, there are two different situations:

a) When the demand for electricity consumption is less than the energy produced by the photovoltaic panels, the Inverter transforms DC into AC to meet the electricity demand, and at the same time charges the batteries with the excess energy. In this way, energy is stored for later use at times when energy production is not sufficient.

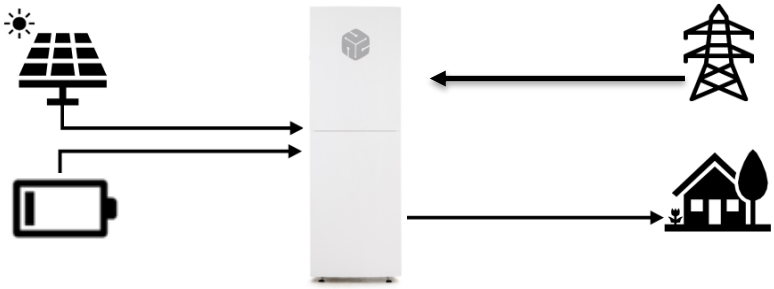


b) When the demand for electricity consumption is higher than the energy produced by the photovoltaic panels, the Inverter transforms the DC into AC and takes the missing energy from the batteries or from the grid, depending on whether the batteries are charged or not, to meet the demand for electricity.

I. When the batteries are sufficiently charged, the inverter transforms the stored energy from DC to AC at 230V to provide power. When the batteries are left with the minimum charge that allows them to ensure 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 energy that is missing to cover the demand from the electrical grid. In this way, the system works in parallel with the grid and with the photovoltaic panels.



In addition, if a grid failure occurs, the switch automatically transitions to isolated mode to maintain proper operation and comply with anti-islanding regulations. Furthermore, in the event of an inverter failure, the user can manually operate the changeover switch to connect to the grid, ensuring that the loads remain powered.

3.3 Manual changeover positions

One of the protection devices, is a manual changeover. For better understanding the following operation modes, these images show the different positions this device can have:

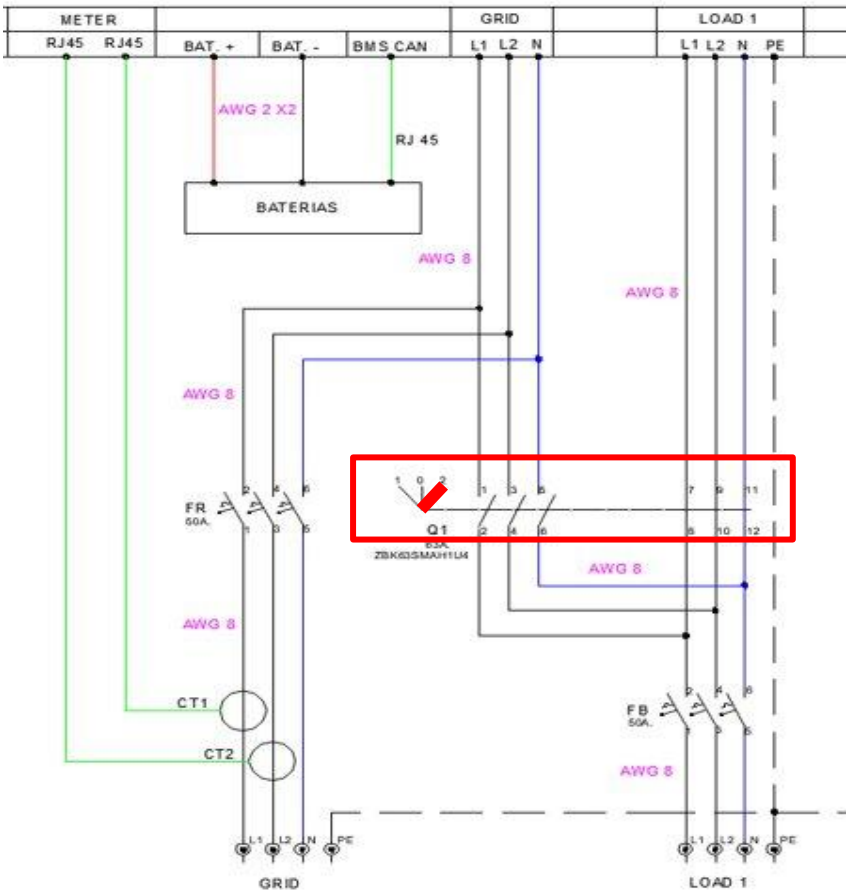
Position 0

Position 1: inverter failure

Position 2: Normal

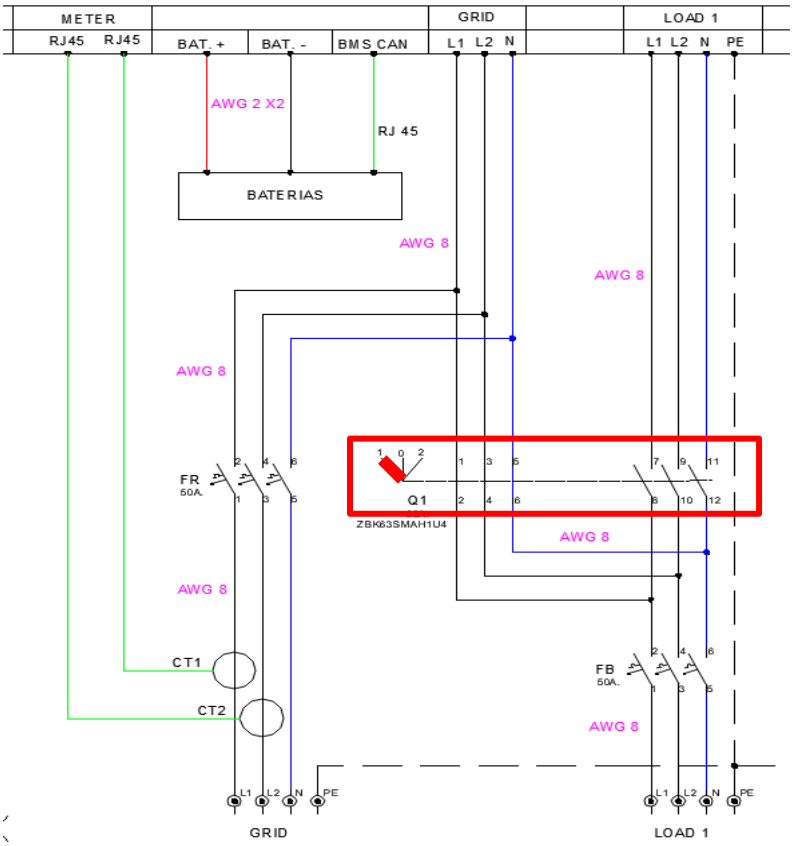
Case 1: Normal operation

In normal operation, the changeover is in position 2. Everything goes through the inverter, and in case there is a failure in the grid, loads can still be supplied, thanks to the internal relay of the inverter that allows for automatic backup.



Case 2: Inverter failure

In the event of an inverter failure, the customer can use the manual changeover to position 1, and then, all loads will be fed by the grid instead of the inverter.



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

4. SPECIFICATIONS

Batteries

- Manufacturer: Turbo Energy SA
- Model: Lithium Series Pro 5.1kWh
- Data sheet and instruction manual attached.

Inverter

- Manufacturer: Turbo Energy SA
- Model: Split Phase Hybrid Series 48V 10.0
- Data sheet and instruction manual attached.

PV Input Data	
Max. DC power	15,000W
PV voltage range	120-500V
MPPT working range	120-500V
Startup voltage	120V
N° MPPTs	4
Maximum input current	14A*4
Maximum Short-Circuit current	22A
Strings per MPPT	1 / 1
AC Output (ON-Grid/OFF-Grid)	
Rated power	10,000W
Maximum power	11,000W
Peak Power (Off-grid)	15,000W
Maximum Backup power	10,000W
Output Voltage	120/240V
Grid voltage	Split phase
Rated output current	41.7A
Grid Frequency	50/60Hz
Harmonic distortion	T HD<3% AC Output ;<2% EPS
Battery Specifications	
Capacity	5.1kWh / 20.48 kWh
Usable capacity	4.60kWh / 18.6 kWh
DoD	90%
Cycles at 90% DoD	>6,000
Cells	Metal Can
Type of technology	LiFePO4
Battery voltage range	40-60V
Max. Charge/discharge current	190A/210A
DC Protections	
8x Fuse holder and fuse 1000V/20A	Integrated
4x Surge protection 1500V	Integrated
AC Protections	
4x Circuit Breaker 3P, 50A	Integrated
Manual Changeover 4P, 63A	Integrated
General Specifications	
Communication with the portal	Wi-Fi
User interface	APP
Weight	≈352,74 lbs. (without batteries)
Dimensions (width*height*depth)	≈26,00 x 76,38 x 16,93 inches
Certifications	
Inverter	UL 1741, UL 1699, UL 1998
Battery	UL 9540A, UL1973
SunBox	UL 9540, UL 9540A, UL 5500

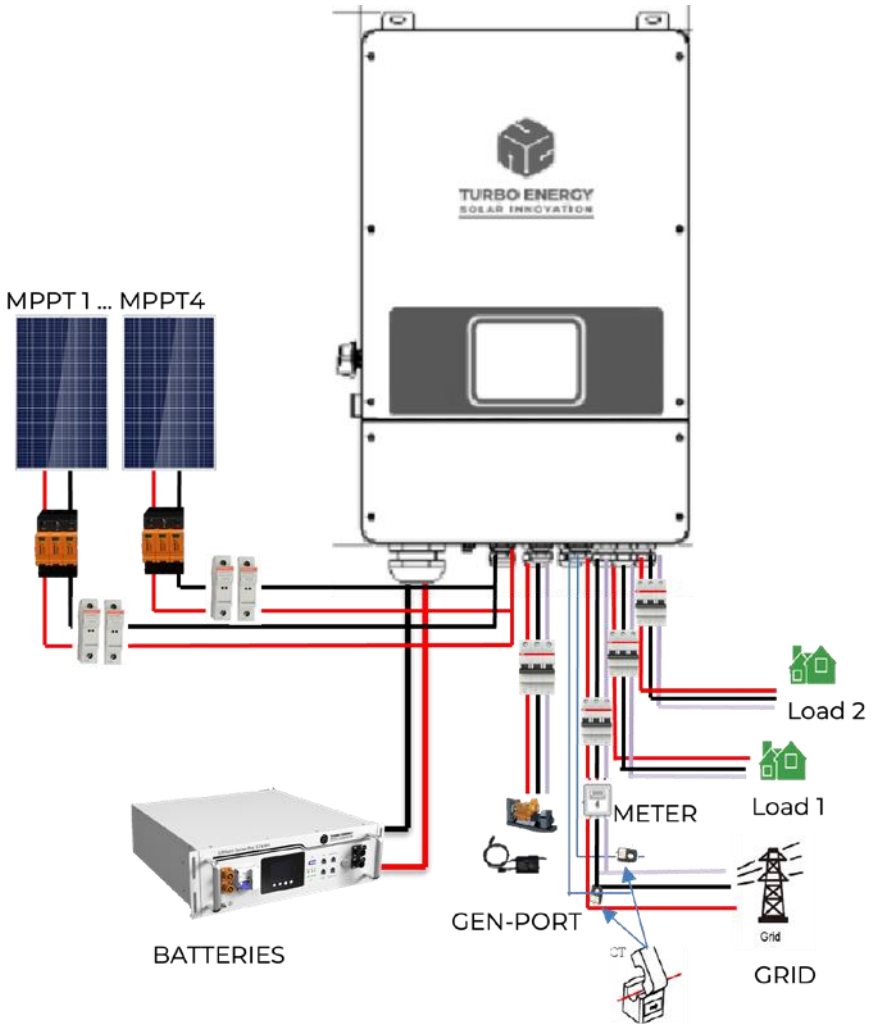
5. INSTALLATION AND ASSEMBLY

Preliminary recommendations for installation

The SunBox is rated for indoor use only. The installation of the Sunbox must be carried out in a place protected from the weather, and it is especially important that its location is kept dry, avoiding potentially floodable areas. The operating temperature range must be considered, which must not exceed 122°F nor be less than 32°F. Take appropriate measures to ensure the operating temperature range.

Recommendations for connecting the equipment:

Next, we show a simplified diagram of the interior of the Sunbox Split Phase Series 10.0



The equipment comes prepared so that the installer just needs to connect the grid, loads and gen (if needed) input together with the battery's connection. All the protections specified in the diagram are included and pre-assembled, thus facilitating the installer's job.

- The photovoltaic panels must be connected in series to the input specified below. Internally it is connected to its corresponding fuses and surge protections.
- The grid output of the inverter is protected by circuit breakers. It must be connected behind the circuit breaker of the home's general panel and to the specified internal terminals blocks of the Sunbox with AWG 8 wires.
- The double CT meter is pre-assembled and connected inside the Sunbox.
- If it is necessary to install batteries, the Sunbox comes prepared to store up to 4 Turbo

Energy Lithium Series Pro 5.1kWh batteries. Its installation is explained below.

*The Grid and Load 1 in normal operation with the grid will be the same since they are internally connected. In the event of a grid failure, the inverter will switch off the grid input/output while Load 1 output is still fed and will never supply energy through the Grid input/output. Stand-alone operation will depend on whether the corresponding batteries have been installed and will work using solar energy and batteries only for the duration of the renewable energy. It must be considered that the power will be limited to 10 kW, therefore, it is not possible to include loads that require a lot of power.

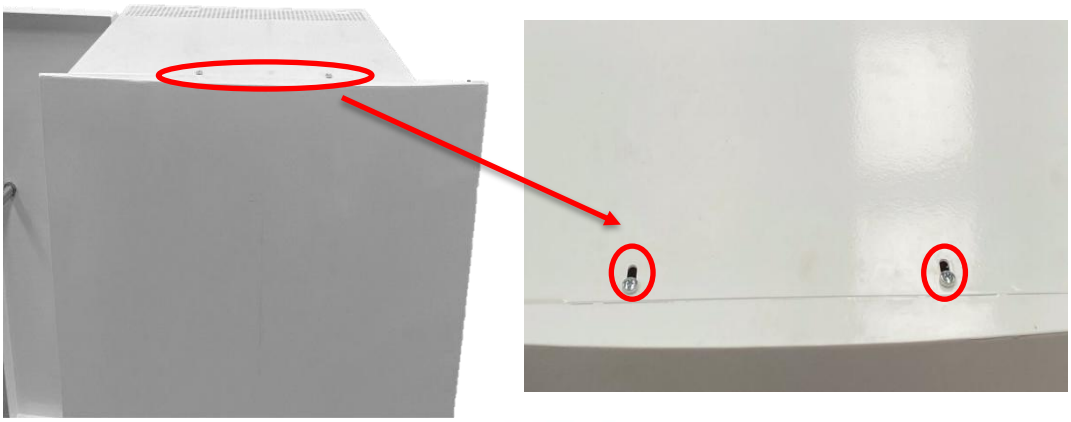
5.1 Access to the Sunbox for installers

The installer has various access points on the Sunbox.

5.1.1 Upper part- Access to the inner part of the Sunbox

To access the inverter and its cables, the installer must remove the upper front door. To open it, a screwdriver must be used to remove the screw located on the right side of the unit as shown in the picture.

Once removed, the central door remains attached to the top of the enclosure with snap-in pieces and two upper screws. To remove it, first remove the screws and after that simply pull gently on the front door until the snap-in piece releases.



5.1.2 Battery access

To access the batteries, the lower-right door must be removed. This door is screwed to the back of the unit. A screwdriver should be used to remove the three screws placed in the rear part.

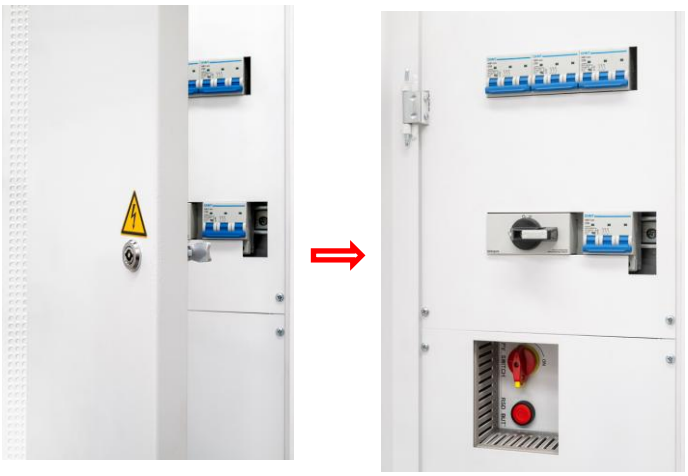
Like the front door, this door has snap-in pieces that secure the door even after removing

the rear screw. Therefore, to remove it, gently pull the door until it is released.

5.1.3 AC protection access

To access the AC protections, the left door has a lock and a key that will be provided.

When the door is opened, it can only be accessed to the circuit breakers, manual changeover, and buttons of the inverter.



To access the connection terminals, a screwdriver must be used to remove the screws that anchor the protection plate shown in the image.

5.1.4 DC Protection access

To access the DC protections, the upper front cover must first be removed.

Once removed, the screw located inside the right side of the enclosure must be loosened. Therefore, to access this screw, the upper centre door of the Sunbox must be removed. After removing this screw, the cover can be taken off to access the protections.

The wires of the photovoltaic panels, as well as the grid wires will be introduced through the lower part of the Sunbox, through plastic protections. These protections prevent the shearing of the wires, as well as the passage of elements larger than the diameter of the cables.

These protections must be pierced to be able to insert these wires.

When removing any of the parts, since they are grounded, take care to disconnect the cable from the bolt to avoid breaking it or damaging the equipment.

5.1.5 AC Installation cables

To access to the plastic protections meant for the AC wires, there are some steps to follow:

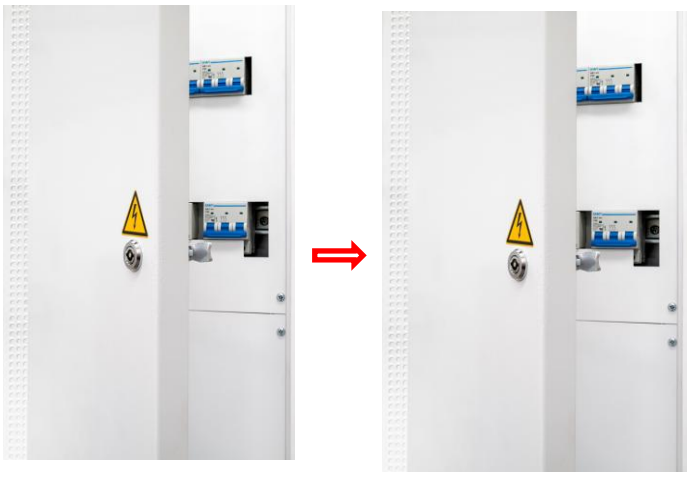
1. Remove the battery access door as previously described in this manual (Battery access).
2. Remove the central bottom door by unscrewing the screws securing it.
3. With the central bottom door removed, the installer can access the plastic protective passage elements.

5.1.6 DC Installation cables

To access the plastic protections meant for the DC wires, only the battery access door needs to be removed. Again, refer to Battery access

5.2 Access to the Sunbox for final user

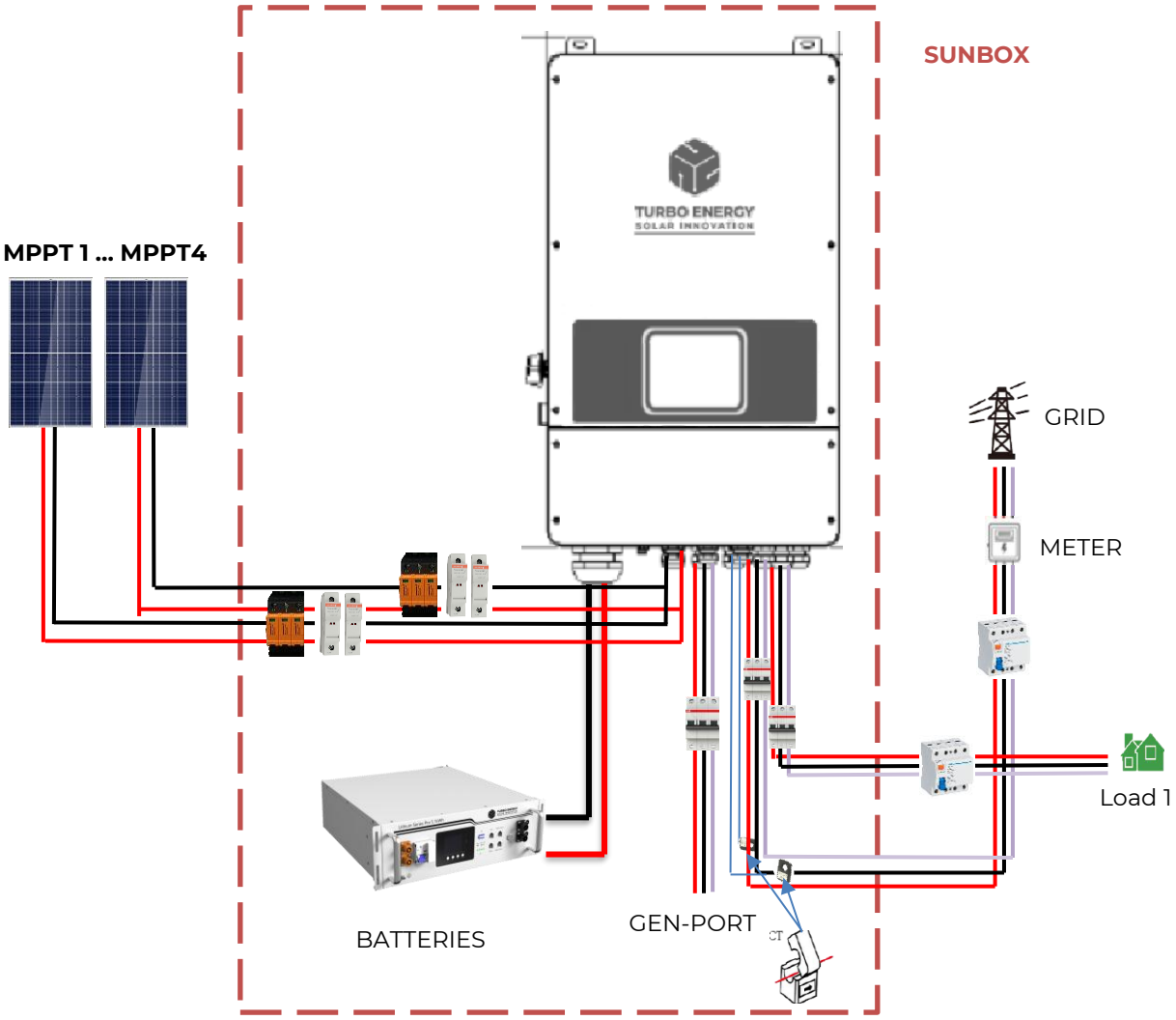
The only part of the Sunbox that can be accessed by the final user is the lockable door for the AC protections. In this way, the user can only access the circuit breakers, manual switch, and inverter buttons.



5.3 Installation configurations

For load current *less than 50A*, there are two possible connections:

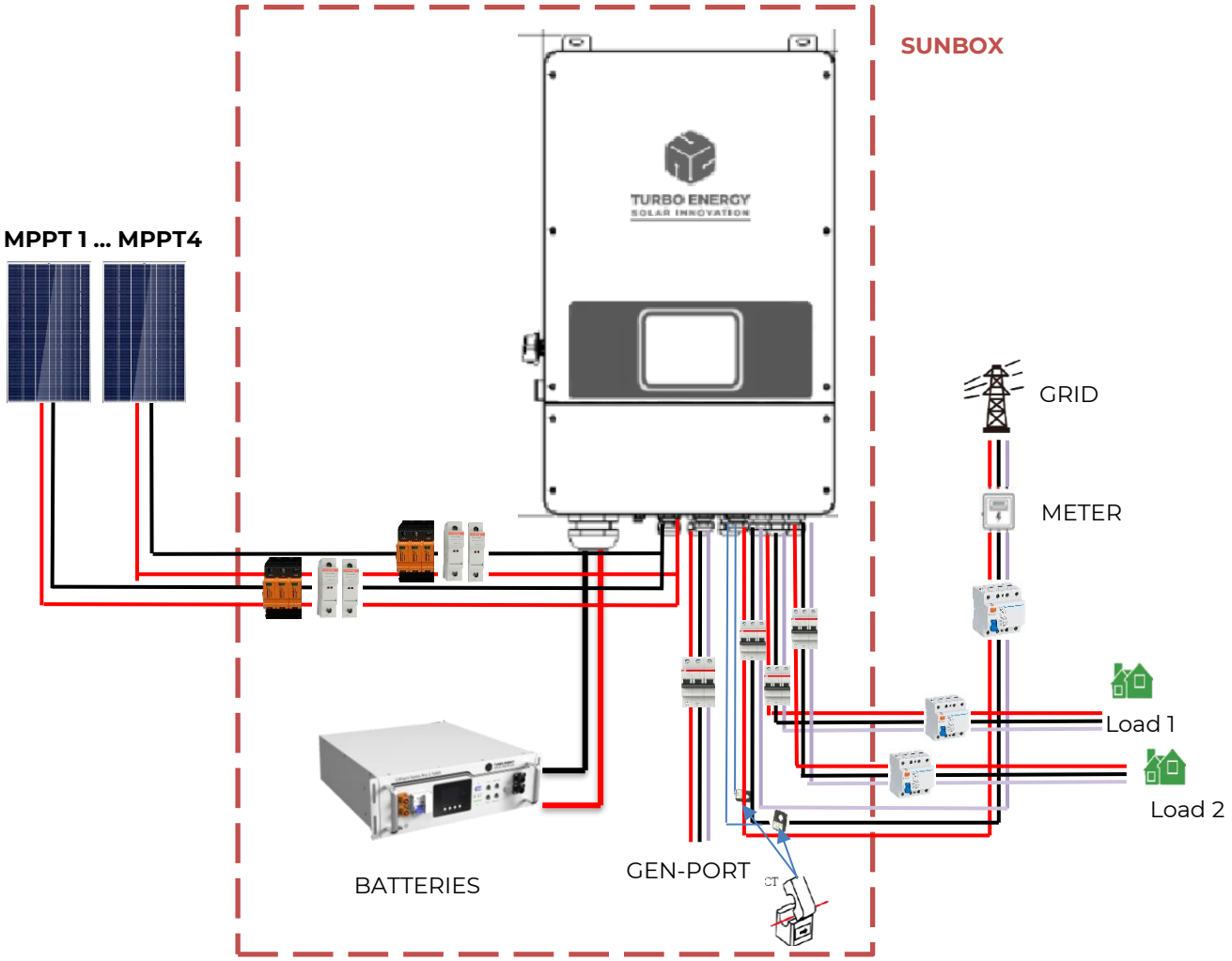
5.3.1 Option 1: Whole back-up



In this case, all the loads are connected in Load 1 which is the critical loads line. In case of a grid failure, since all the loads are connected through the Sunbox at Load 1, all loads could be still fed thanks to the automatic switching. In case of an inverter failure, using the manual changeover, all loads could still be fed using the power from the grid (as explained in Manual changeover positions)

5.3.2 Option 2: Partial Back-up

In this case, the user can select which loads are going to be critical (connected to Load 1) and which will not (connected to Load 2) but considering that the sum of both shall not exceed 50A. Additionally, the power output of Load 2 is limited to a SOC battery value of the battery that has been established.

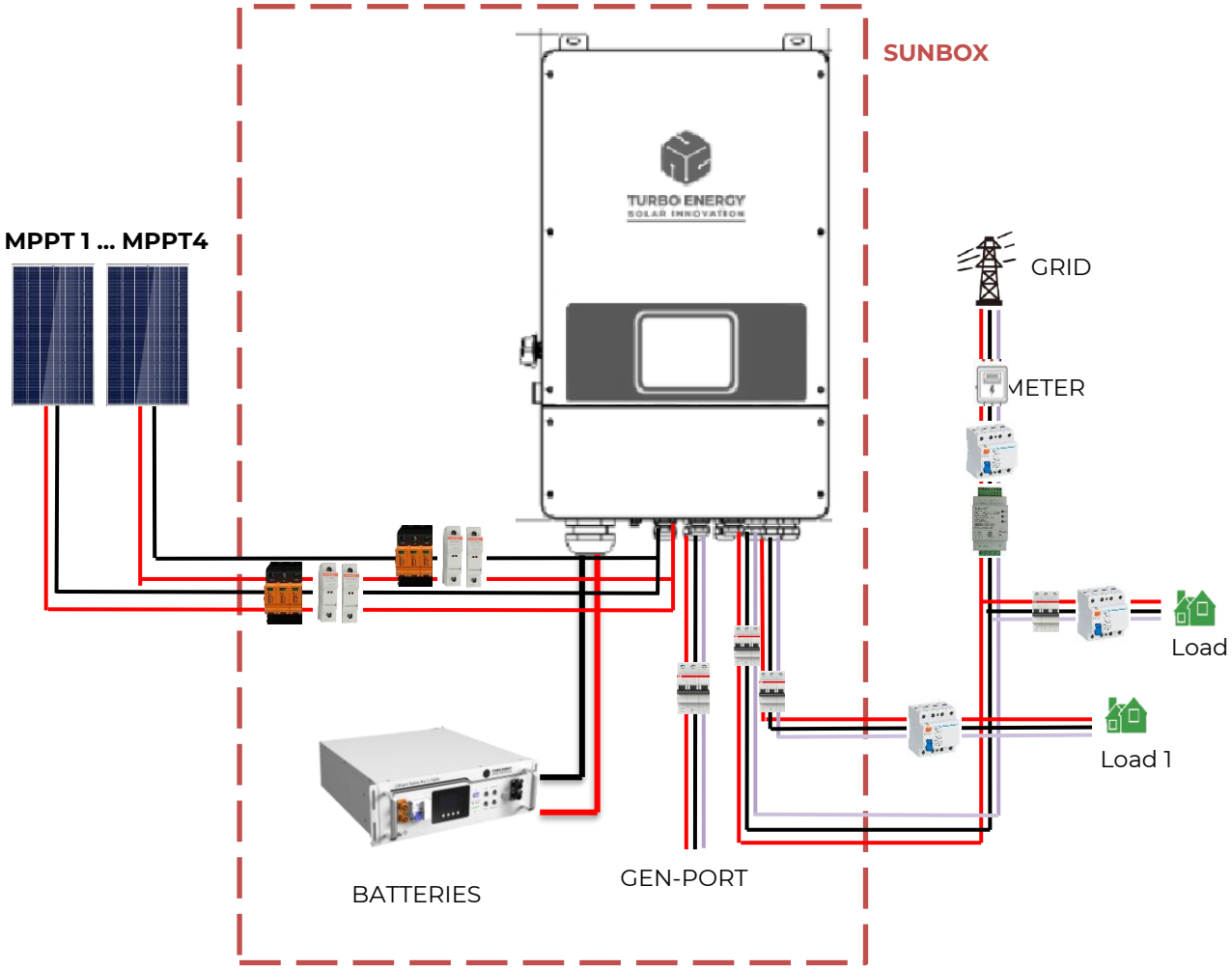


In this way, all loads connected to Load 1 can still be powered in the event of a grid failure. However, the output of Load 2 will be limited to the state of charge (SOC) of the batteries at the time of the grid failure. This output is activated/deactivated based on an SOC percentage that is set according to the user's needs. Finally, in the event of an inverter failure, using the manual changeover switch, all loads connected to the Load 1 output can still be powered by the grid (as explained in Manual changeover positions)

For load current *higher than 50A*, there are three possible connections.

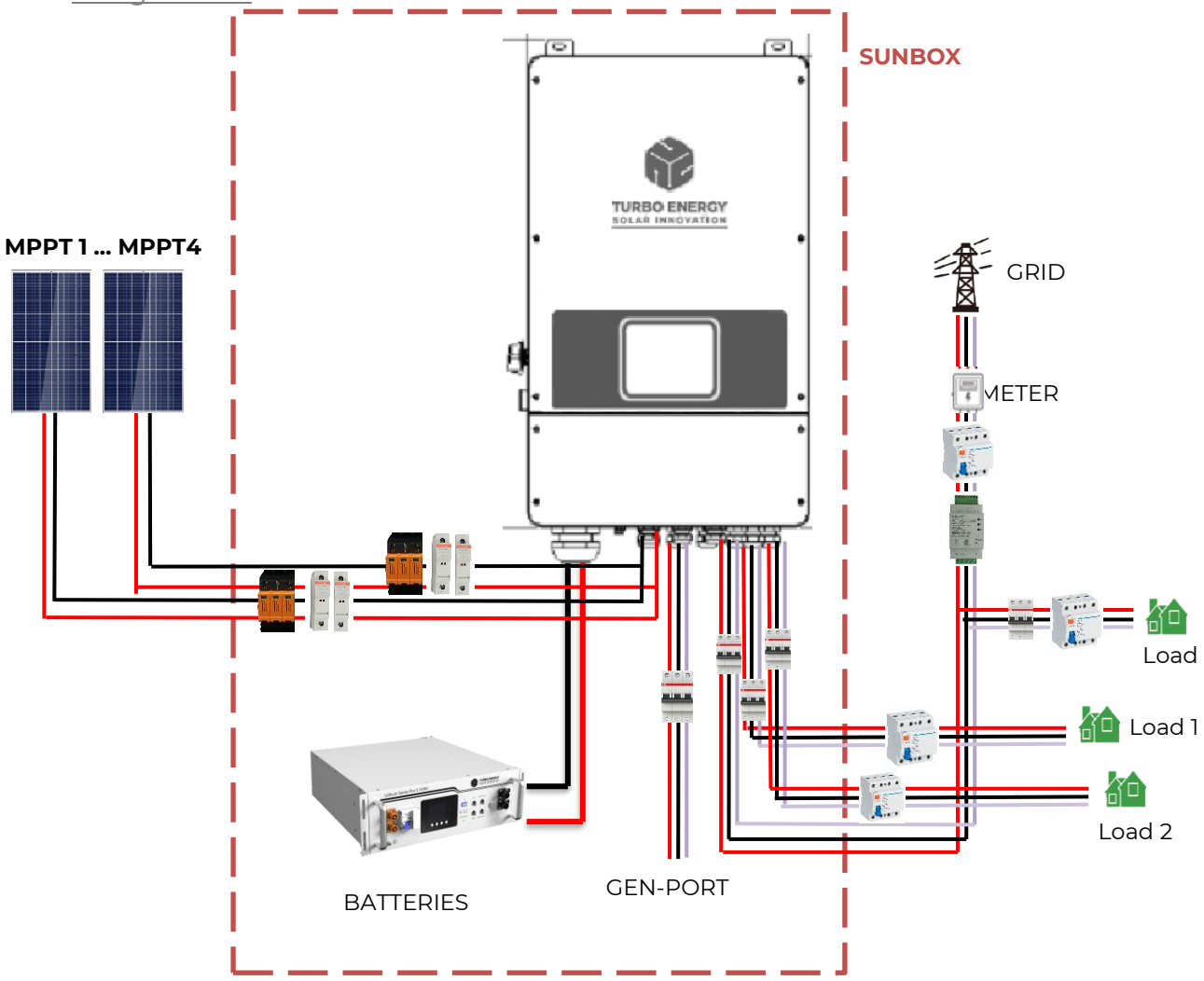
In case the load current exceeds 50A, since the output of Load 1 and Load 2 can supply a maximum of 10kW between the two, once this value is exceeded, the remaining loads must be connected to the grid side.

5.3.3 Option 3.1: 10kW connected to Load 1 and the rest connected to the grid side



In this case, all the loads connected to Load 1 can be supplied in the event of a grid failure. However, the loads connected to the grid side cannot be powered. In the event of an inverter failure, all loads could be supplied because Load 1 would be connected to the grid thanks to the manual switch, and the remaining loads are already connected to the grid side.

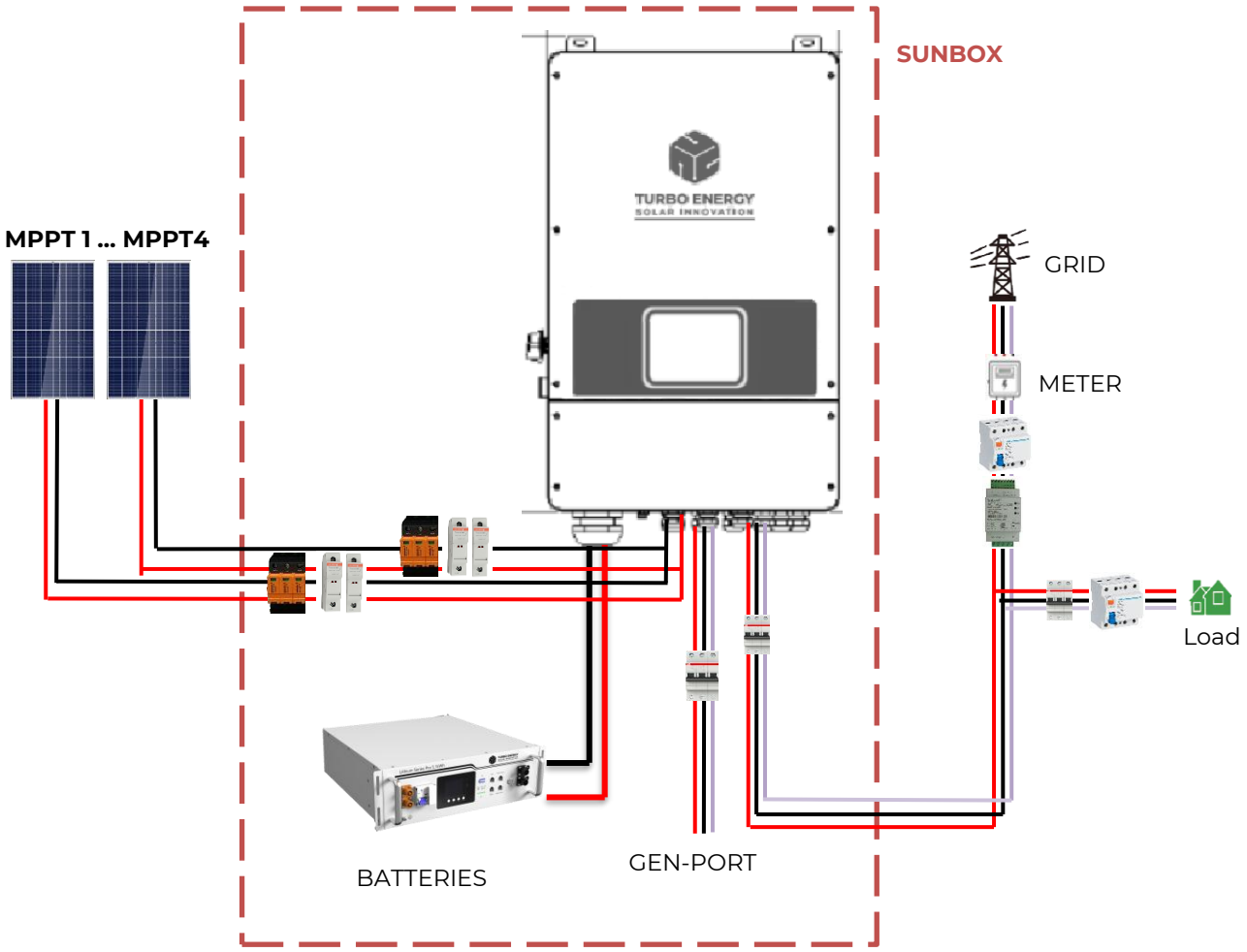
5.3.4 Option 3.2: 10kW divided between Load 1 and Load2 and the rest connected to the grid side



In this case, all the loads connected to Load 1 can be supplied in the event of a grid failure. However, the output of Load 2 will be limited to the state of charge (SOC) of the batteries at the time of the grid failure. This output is activated/deactivated based on an SOC percentage that is set according to the user's needs. Finally, in the event of an inverter failure, using the manual changeover switch, all loads connected to the Load 1 output can still be powered by the grid (as explained in Manual changeover positions) together with the loads connected to the grid side.

5.3.5 Option 4: All loads connected to the grid side

In case critical loads do not need to be connected and the installation needs to be simplified, all loads can be connected to the grid side as follows (but in case of a grid failure, the loads will be without supply despite the presence of photovoltaic generation and/or battery).

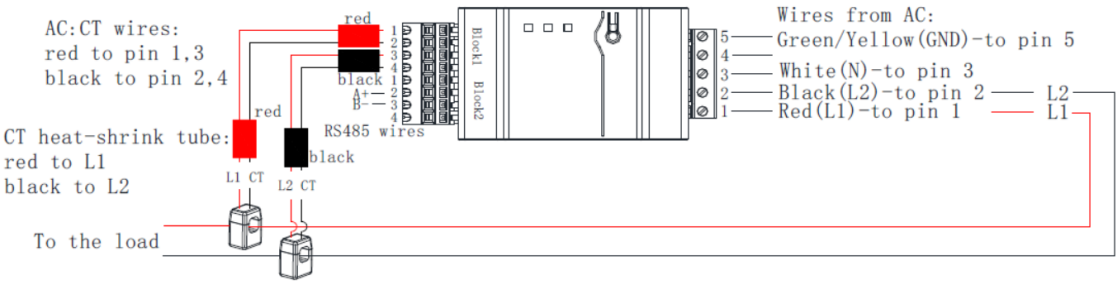


In option 3 and 4, an external meter is needed instead of the CTs. The connection for that meter should be made by using an RJ45 wire. A jack module will be placed inside the DC protection area. The installer should remove the metallic enclosure which covers DC protections (as explained in DC Protection access) and access to the Jack module. Later, the configuration that should be done on the inverter will be explained.

If the distance between the CT and the inverter is greater than 65,62ft, it is recommended to install the AGF-AE-D/200 Acrel external smart meter.

5.3.6 Meter configuration

The first step is to connect the CTs of the meter that will be used to measure. A total of two will be used (for L1 and L2), and they will be connected as shown in the diagram (Pin 1,2 for CT1 and pin 3,4 for CT2). Additionally, the cable that allows communication between the inverter and the meter must be connected to the A+ and B- pins of the meter.

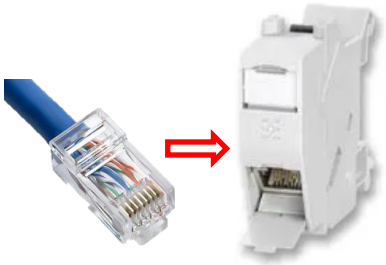


To avoid the wiring between inverter a meter, a prewired RJ45 connector is included inside the DC protection zone. This connector will be connected to RJ45 port meant for the meter that is inside the inverter.

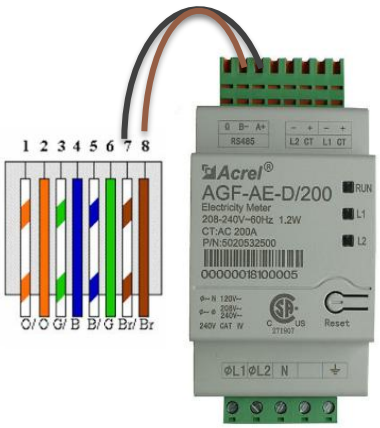
In this way, the installer must connect the meter directly to the RJ45 connector included in the Sunbox. To make the connection, the meter cable must be inserted through the lower part of the Sunbox DC Installation cables) and remove the DC protection cover (DC Protection access).

The connection cable between meter and the jack module shall be:

On one of the terminals an RJ45 type header (the part that connects to the jack module included in the DC protections area)



On the other, the cable will be cut and the connection will be made to the meter. Pins 7 and 8 of the cable will be connected to pins A+ and B- of the meter respectively.



After this, the meter must be switched on and the inverter configuration must be performed, as explained in BASIC settings.

5.4 Gen Port

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

Generator input or generator set.

The output of a generating set or generator can be connected to this input, so that the isolated installation can rely on this source for power supply. The maximum power value is 10,000 W.

Microinverter input or inverters input

The output of microinverters or inverters can be connected to this input, with a total power of up to 10,000W. This is a great advantage, since the number of photovoltaic panels in the installation can be increased.

Example of microinverter connection:

If 6 microinverters of 1,600 W are installed in series, we will have a total of 9,600 W (<10,000W). If we connect 4 photovoltaic panels of 400W per microinverter, we will have a total of 12 extra panels in our installation.

It should be noted that no more than three microinverters can be connected per phase. This ensures that there are no large unbalances between the different phases. As an example, the following table is shown in which Phase 1, Phase 2 and Phase 3 refer to the different phases in which the microinverters are connected.

Number of microinverters	Number of microinverters per phase
1	Phase 1=1
2	Phase 1=1, Phase 2= 1; or Phase 1=2, Phase 2= 0
3	Phase 1=2, Phase 2= 1, o Phase 1=1, Phase 2= 2
4	Phase 1=2, Phase 2= 1
5	Phase 1=3, Phase 2= 2, Phase 1=2; Phase 2=3
6	Phase 1=3, Phase 2= 3

Ongrid inverter input

The output of an existing Ongrid inverter can be connected to this input, allowing the installation to rely on this source for power supply. The maximum power value is 10,000W.

5.5 DC Wiring

The cabinet has the terminal blocks to make the photovoltaic connection. Those terminal blocks are placed in the DC protection area. To access to this part, please proceed as explained in DC Protection access point.

After that, the metallic enclosure that covers the DC protections can be easily removed. The terminal blocks are placed in the bottom part of the DC protections.

The size of the PV wires to be connected to the terminal blocks should be AWG 12.

5.6 Battery Wiring

To connect the master battery to the inverter, unscrew and remove the front upper door of the Sunbox cabinet. There you will find the power cables (2 red and 2 black wires) and the RJ45 inverter-battery communication wire already prewired. The red wire should be connected to the positive terminal of the master battery while the black wire should be connected to the negative terminal. As for the communication cable, you will connect the RJ45 cable to the CAN port of the battery.

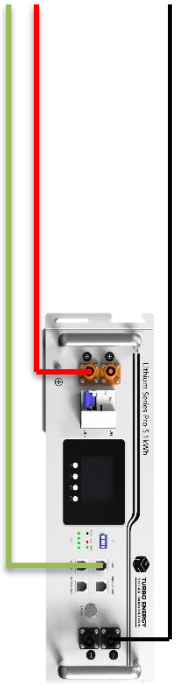
Additionally, to those wires each battery will be provided with two short power wires (one for the positive and one for the negative connection) and one communication wire to make the parallel connections when more than one battery is used.

According to the number of batteries connected, the wiring distribution changes. There are two pair of power wires, one long and one short, so the battery can be placed either in the upper or lower row. However, it is recommended to do the following battery distribution. To explain those distributions, the following numeration will be used to know in which space the battery will be placed.

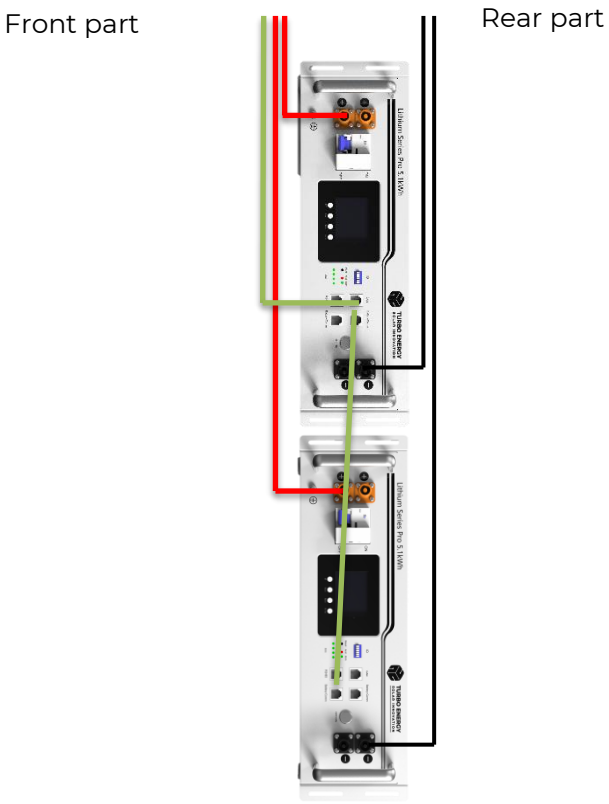
Front part Rear part

If only one battery is used, it should be placed in position one. For that, the long pair of power wires shall be used. The wiring connection will be as shown:

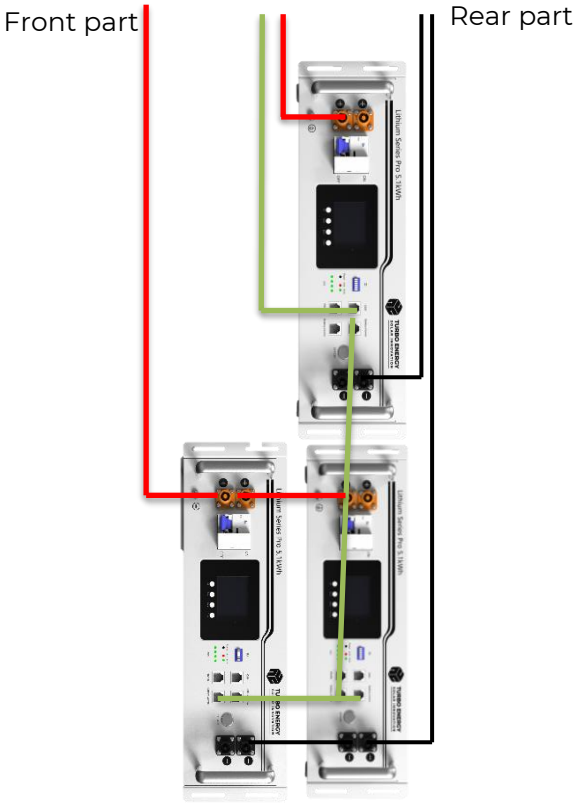
Front part Rear part



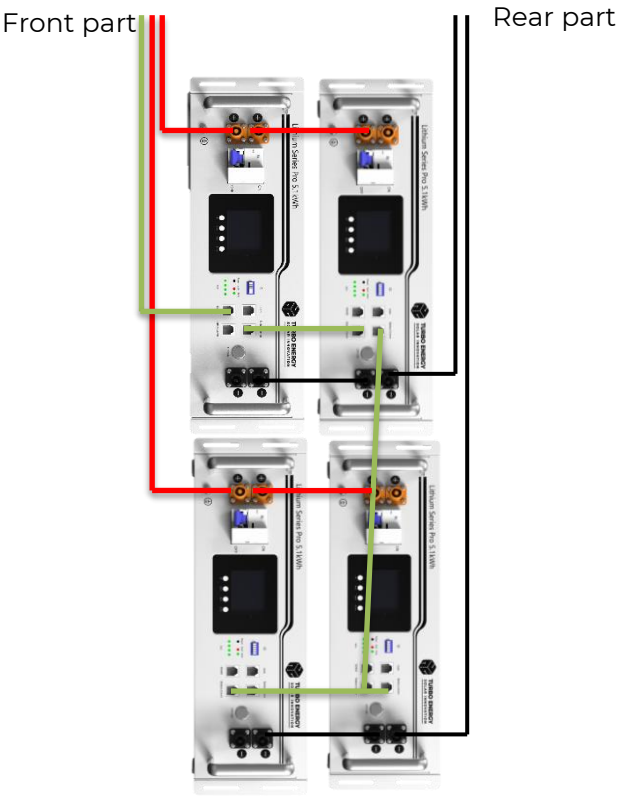
If two batteries are to be connected, they shall be placed at position 1 and 2. In this case, both pair of wires (long and short) needs to be used. The wiring connection will be as it appears in the next figure:



When three batteries are going to be placed inside the Sunbox, spaces 1, 2, and 3 need to be used. In this case, the two pairs of power wires (the ones prewired to the inverter), together with the short power and communication wires included in the battery box, will be used. The connection is as follows:



The last option is to use 4 batteries. In this case, the connection will be:



5.7 AC Wiring

To connect the grid, Load 1, Load 2, and the generator/microinverter follow the steps described in AC Installation cables section.

The terminal blocks have different colors to make them easy to distinguish. The phases will be beige, the neutral will be blue, and the ground will be green-yellow. Additionally, each terminal is labelled and marked with its name and use.

The wires shall be AWG 8 size.

5.8 Ground connection

Connect the ground wire to the ground terminal on the grid side, which prevents electric shock if the original protective conductor fails. Through the auxiliary connection elements, we must connect the ground connection, both to the rack and to the structure of the photovoltaic modules.

Additionally, at all removable points of the Sunbox's metal enclosure, welded studs have been provided for grounding. This ensures that the entire equipment is protected.

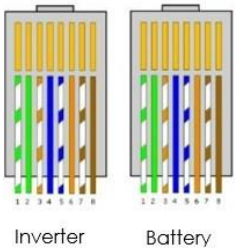
5.9 Recommendations for the installation of Lithium Series Pro 5.1kWh batteries

Each module has 6 DIP switches (Dual Inline Package) that will be configured differently depending on the number of batteries to be connected. It is possible to connect up to 64 batteries in parallel. However, only the configuration for the Sunbox Split Phase 10.0 Series, which can have up to 4 batteries per cabinet, will be explained. In case of having more than four batteries, please refer to the manual Lithium Series Pro 5.1kWh.

In this situation, the configuration is as follows:

Wiring configuration

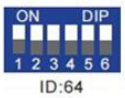
A standard pin-to-pin cable should be used with RJ45 connector.



For the connection between the inverter and the battery, the RJ45 cable will be connected to the CAN port of the battery

Additionally, to enable communication between the inverter and the batteries, the batteries must support a specific communication protocol. This protocol can be selected via the battery's LCD screen.

To set the protocol needed these steps must be followed:



1. Set the battery ID to No.64 when battery is turned off.
2. Turn on the battery, and press “Back” button for 5 seconds to enter the protocol selection screen
3. Select the CAN program
4. Press “Enter” to choose the protocol 1 (**P1-TRB**) from the list.

5. Press the “Back” button to return to the main interface and restart the battery. Now, the battery will be configured with the selected protocol.

5.10 Ventilation

The ventilation is located as shown in the following pictures:

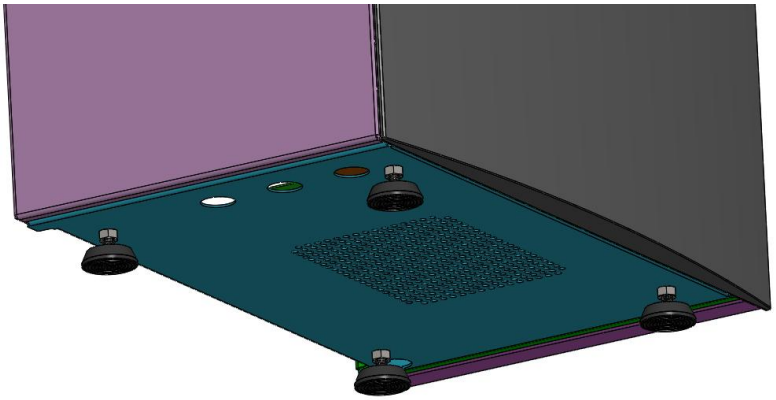
Upper and right part of the cabinet

Inner part of the cabinet

Bottom part of the cabinet

5.11 Mounting legs

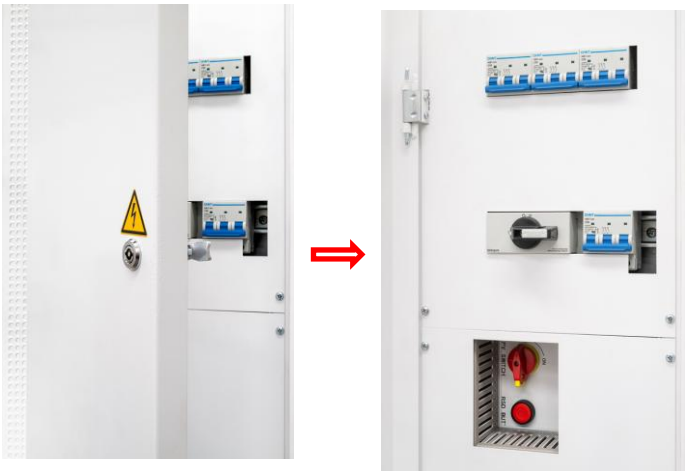
The SunBox has 4 legs that are preassembled. The legs will be threaded onto a piece that is welded to the base of the cabinet. Nevertheless, these legs have an adjustable height. The maximum height they can have once inserted into the base piece is 2.2 in(56mm), and it can be reduced to 1.4 in(36mm). That height can be adjusted by turning the nut on the leg.



5.12 Start up

Once all the connections have been completed, the equipment is ready to work. It should be proceeded as it follows:

1. Reset the AC protections that are at the left part of the cabinet.
2. Start the Batteries. To do this, press the On/Off button. The BMS will start up and both the LCD screen and the power button will light up.
3. Press the ON/OFF button at the side of the inverter and turn the isolator from continuous to ON position.

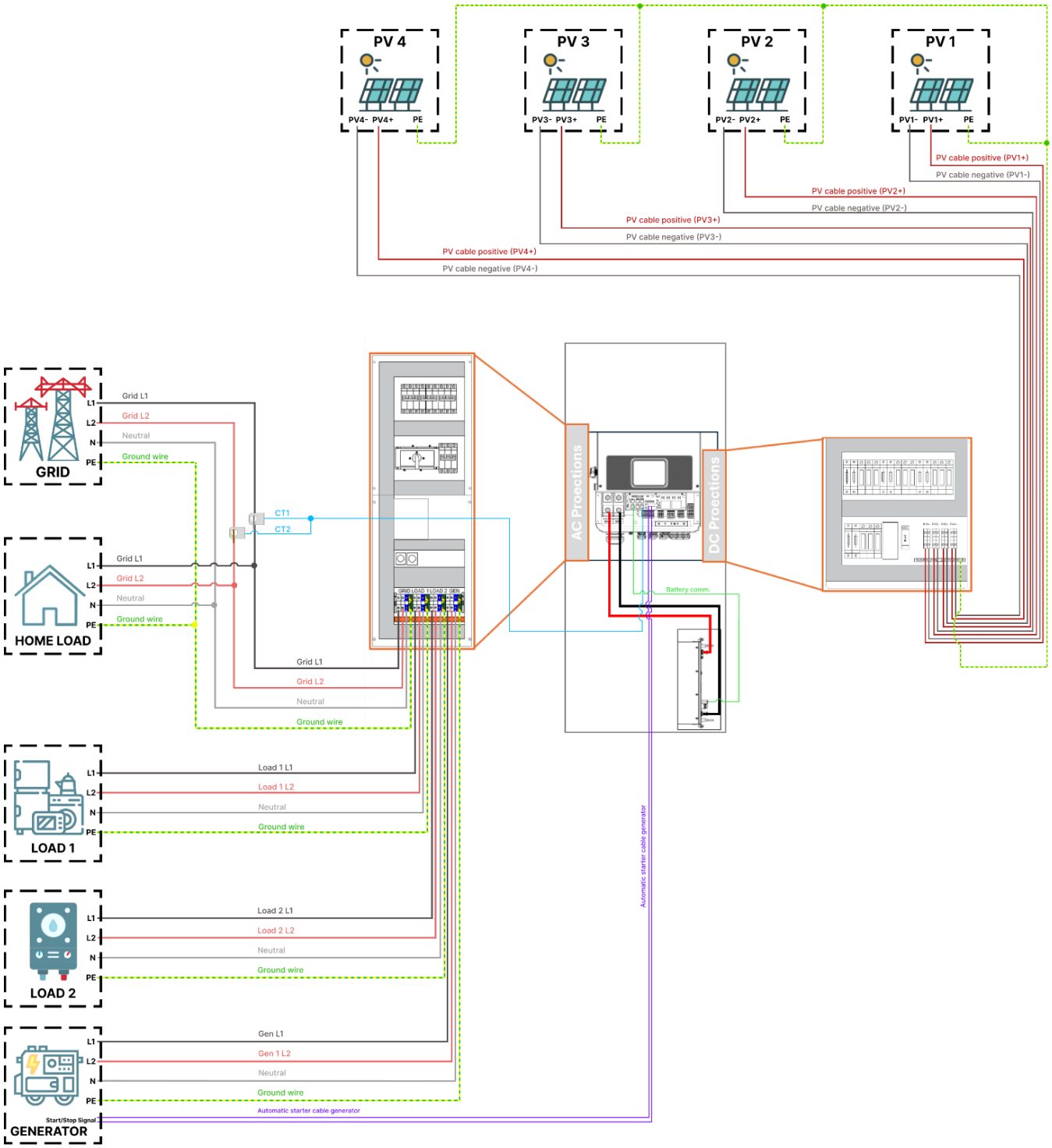


5.13 Parallel configuration

In the case of parallel connection of several units, the procedure would be as follows:

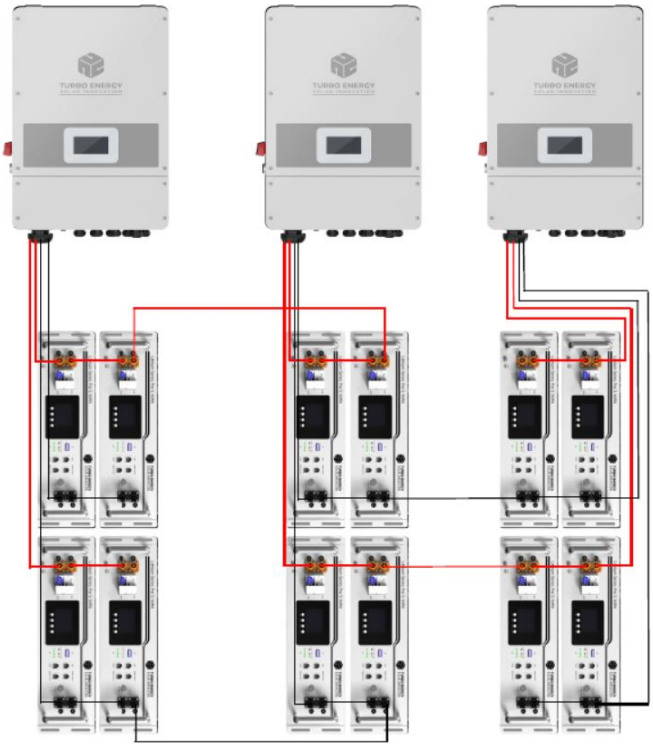
5.13.1 Sunbox configuration with CTs

Parallelizing the Sunbox Split Phase unit is a simple process. In the case of the master inverter, follow the same method as the usual Sunbox connection (connect grid, batteries, Load 1, Load 2 and solar). This configuration is the one shown in the following figure:

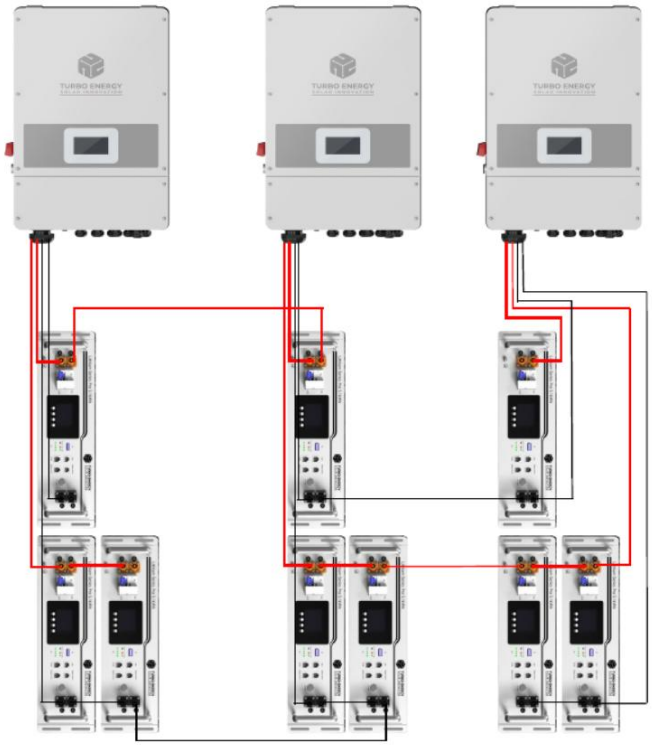


In the case of the slaves' units, their power lines must be connected to the power lines of the master. However, the solar power line is independent between each line and Sunbox. In other words, there must not be any junction point in the photovoltaic system.

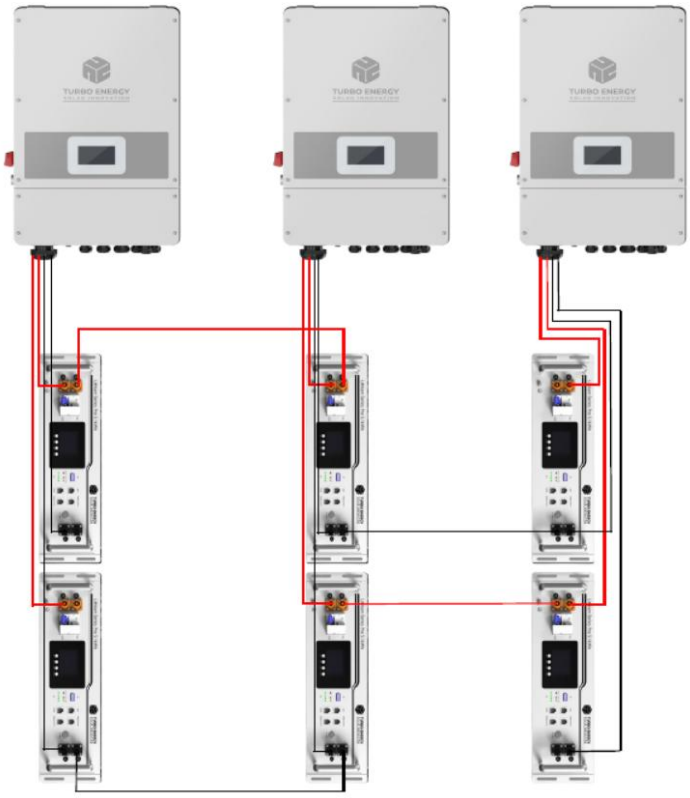
5.13.2 Parallel battery configuration with 4 batteries

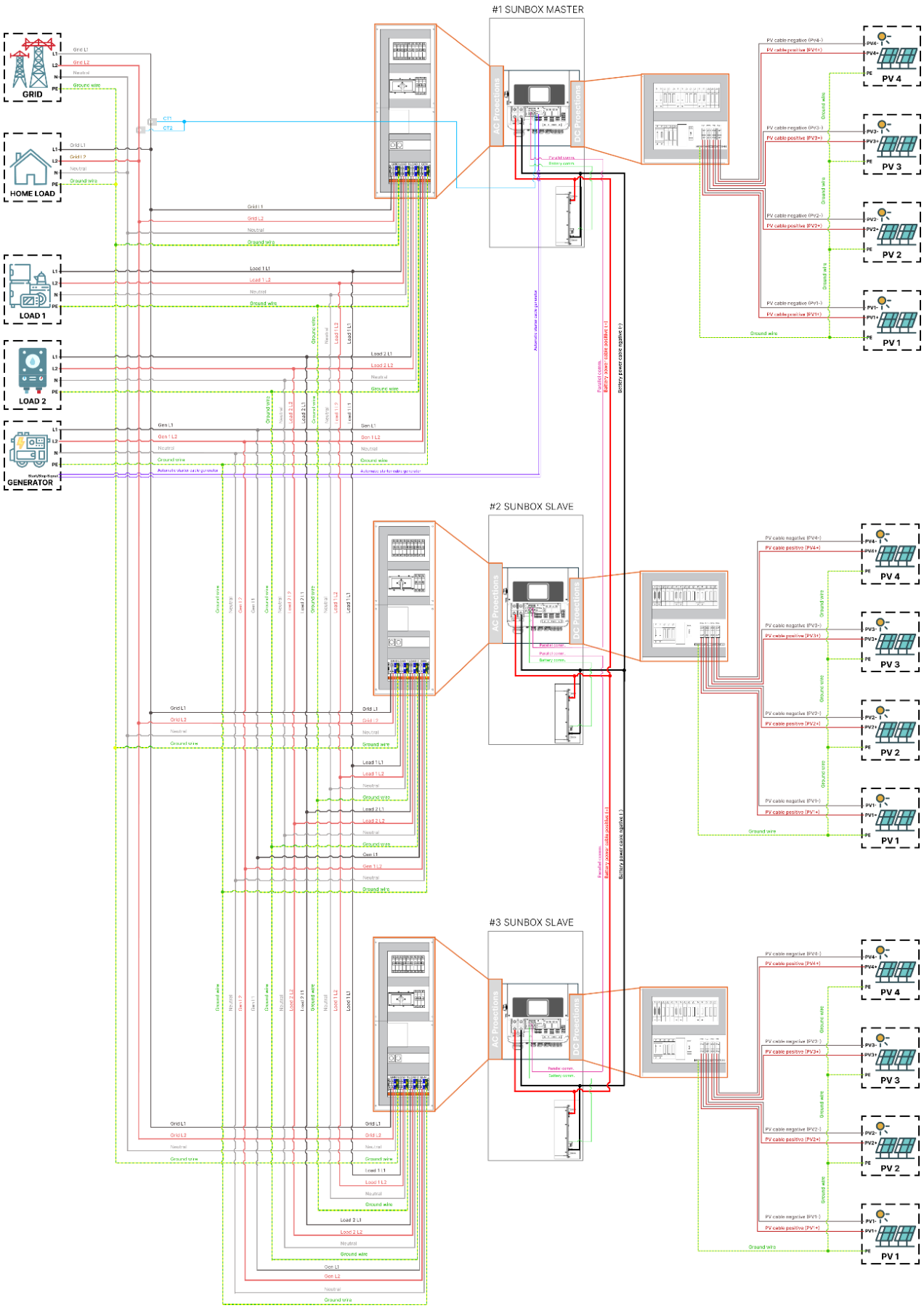


5.13.3 Parallel battery configuration with 3 batteries



5.13.4 Parallel battery configuration with 2 batteries



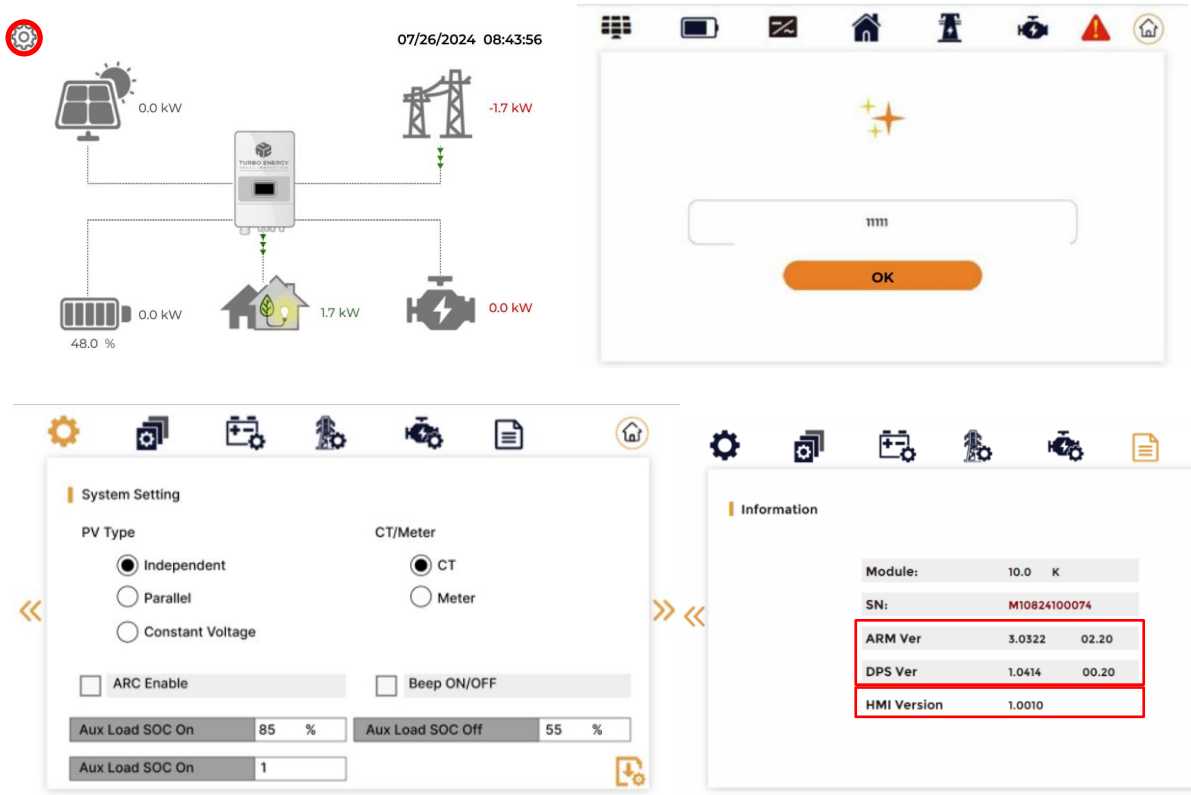


In addition, the Sunboxs' must communicate with each other. For this purpose, a pin-to-pin RJ45 cable must be used so that it is possible to control the slave devices via the master.

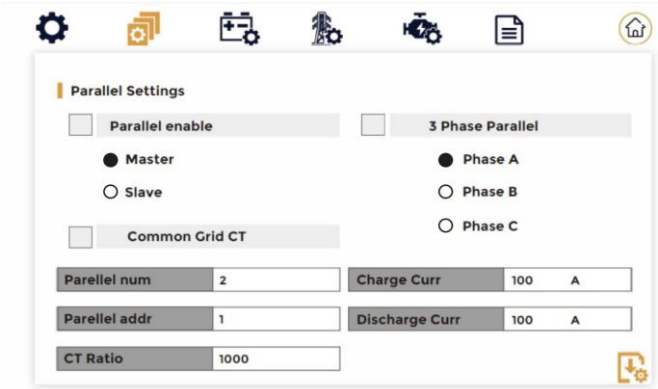
WARNING: Make sure that all manual switches on the equipment are in position 2.

Once the wiring has been done, check that all the units have the same firmware version. To verify that they all have the same version, access the configuration screen and go to the last screen. The SN, Module, DSP, ARM and HMI Version data will be displayed.

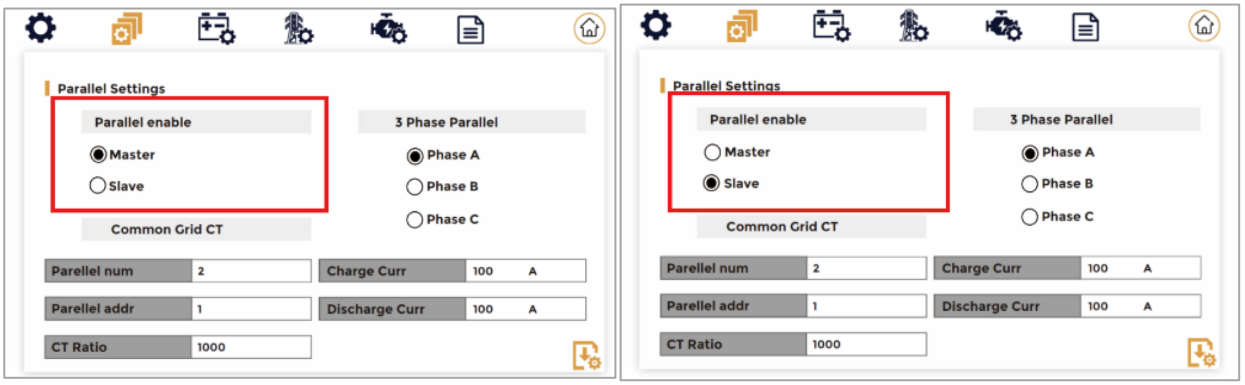
Only the ARM, DSP and HMI data should be checked



After checking that the firmware of the inverters are the same, the unit has to be configured. To configure the unit, go to the “parallel configuration” screen.

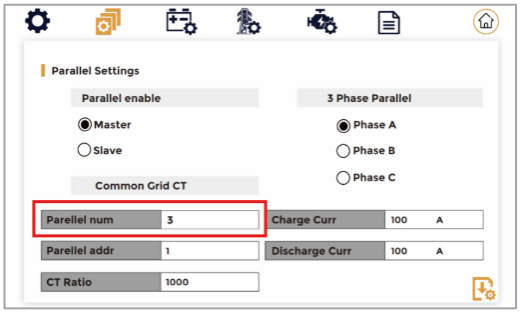


For parallel connections, it is important to determine which inverter will be the master and which the slave.



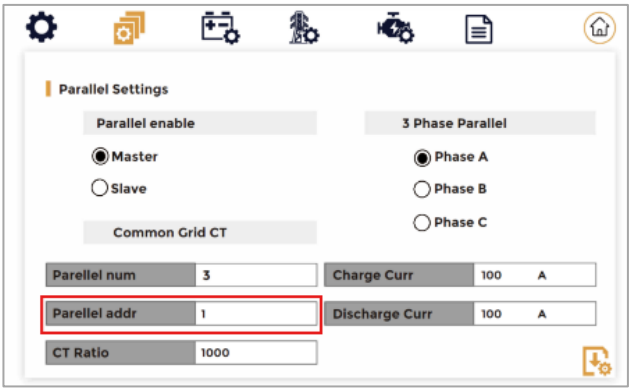
Master Inverter Slave inverter

On the other hand, in the “Parallel num” section, the total number of inverters in parallel must be indicated. In the case of an installation with 3 inverters in parallel, “Parallel num” must be set to 3 in each of the inverters.

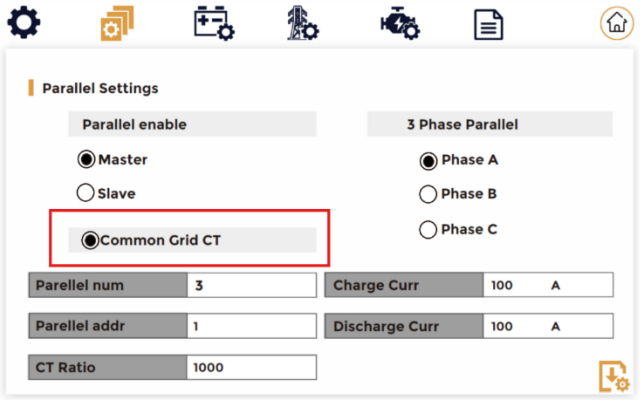


Master Inverter

The next step is to indicate the “Parallel Addr.” This parameter is used to designate the numbering of the devices depending on whether they are masters or slaves. The master will be 1 and the slaves will be 2, 3, 4... successively.



In case the CTs are common for all devices in parallel, select the option “Common Grid CT” in all inverters and connect the CTs to the master inverter. The CT must be connected to the main grid output, that is, after the busbar connection of the master and slave units.

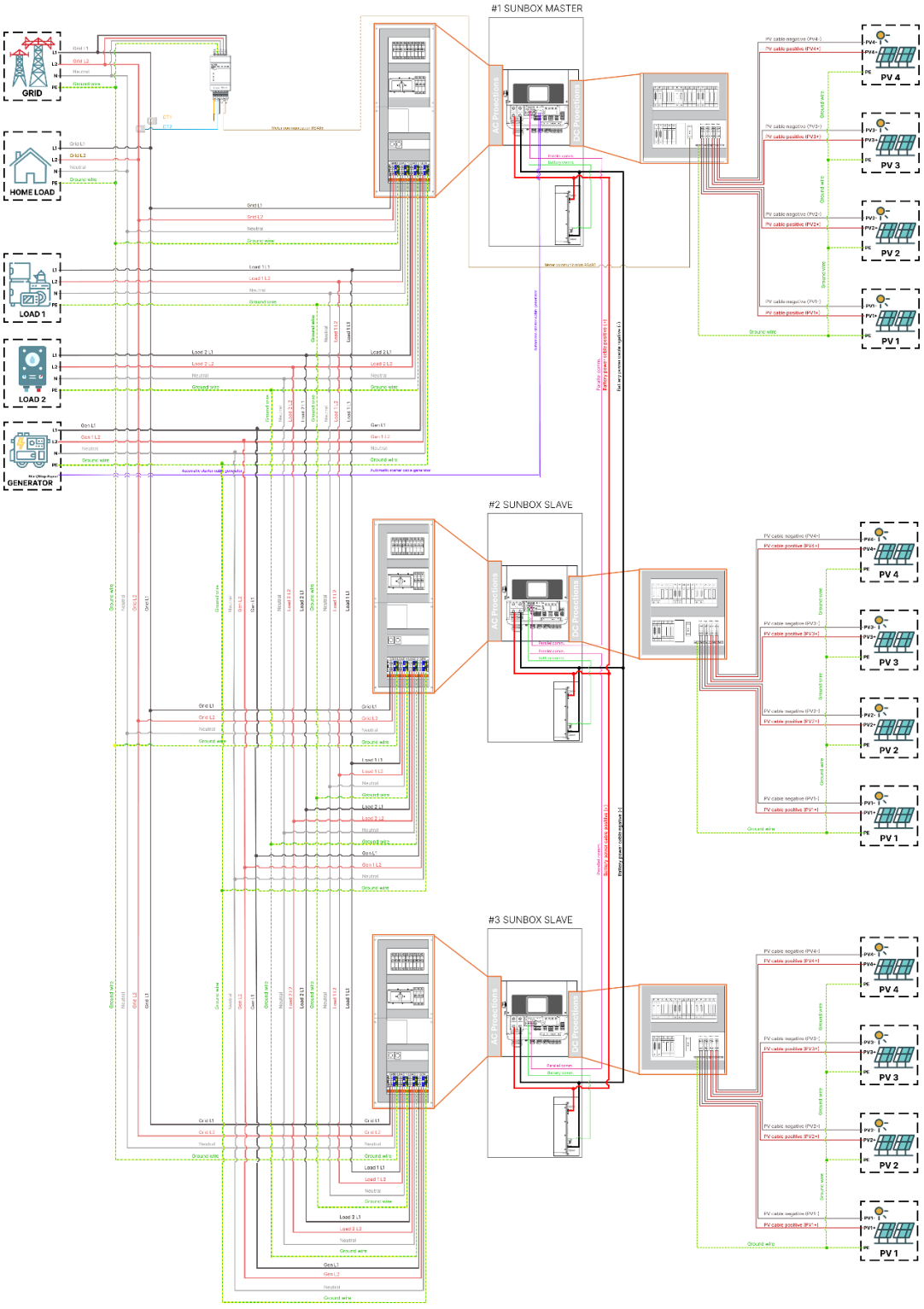


Once all the settings of the “Parallel settings” on the master inverter screen have been made, the parameters of the master inverter are copied to the slave. The SWM screen cannot be modified from the slave.

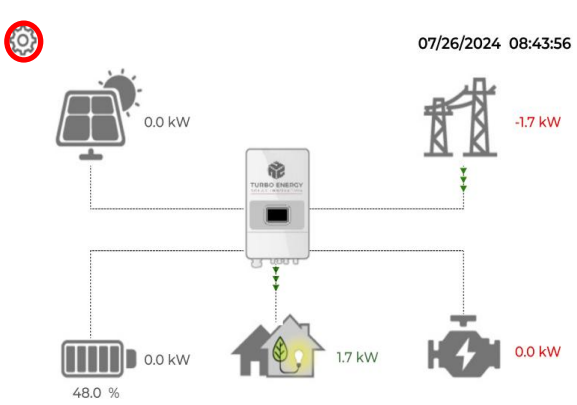
5.13.5 Sunbox configuration with meter (ACREL AGF-AE-D/200)

In case the installation requires a more precise measurement or if the Sunbox is far from the service connection, a meter will be installed. For the Sunbox Split Phase Series the chosen device is an Acrel meter model AGF-AE-D/200.

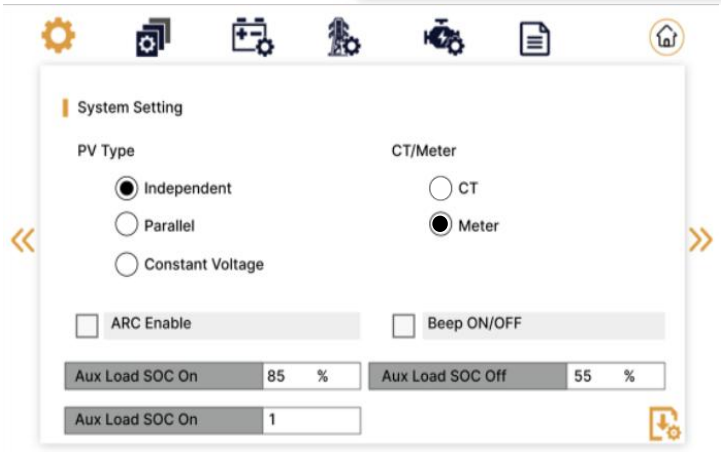
The meter must be connected at the beginning of the house to monitor all the energy in the installation. The meter has two CTs that allow to measure the energy of the installation. The meter is in charge of sending the information by means of a cable whose connection is explained in the point Meter configuration.



To perform the configuration in the inverter, the Meter option must be selected in the System Setting option.

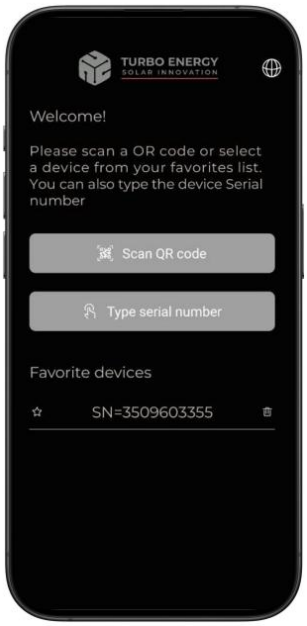

07/26/2024 08:43:56
0.0 kW
-1.7 kW
0.0 kW
48.0 %
1.7 kW
0.0 kW


11111
OK


System Setting
PV Type
Independent
Parallel
Constant Voltage
CT/Meter
CT
Meter
ARC Enable
Beep ON/OFF
Aux Load SOC On
85
%
Aux Load SOC Off
55
%
Aux Load SOC On
1

6. INVERTER CONFIGURATION- Equipment link

To link the Sunbox Split Phase Series 10.0 to Turbo Screen, you need to associate the equipment's logger with the app. There are two ways to do this:



The technician can manually enter the serial number of the logger.
The technician can scan the QR code of the logger. If this option is selected, the app will require permission to access your device's camera to scan the QR code of your logger.

Both the serial number and the QR code are located on the side of the logger.

NOTE: To avoid opening the Sunbox every time you need to access the logger, a QR label will be provided within the logger packaging. We recommend keeping this label in a convenient location for future use.

7. INVERTER CONFIGURATION-Menu Screen

Once the logger of the Sunbox Split Phase Series has been linked, you can access the main screen of Turbo Screen. This screen is subdivided into two menus: info menu and settings menu. The info menu gathers information on the main variables of each input/output of the equipment in real-time. The settings menu allows you to modify various parameters of the equipment.

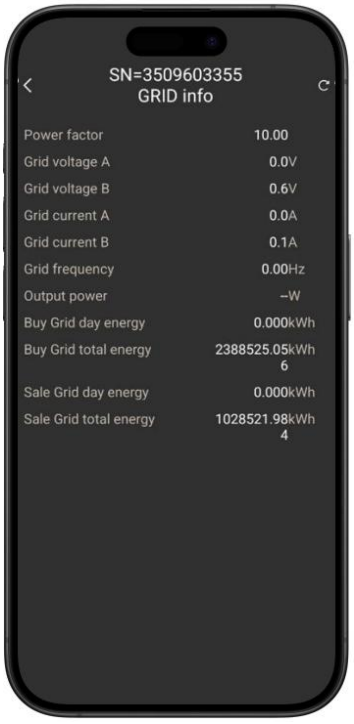
To switch from one screen to another, simply select **INFO** or **SETTINGS** to access these functions.

8. INVERTER CONFIGURATION-INFO menu

8.1 SOLAR info

- **DC Voltage 1…4:** shows real time voltage's value for string 1 to string 4
- **DC Current 1…4:** shows real time current's value for string 1 to string 4
- **DC day energy:** daily solar production
- **DC total energy:** total solar production since equipment's set up.

8.2 GRID info

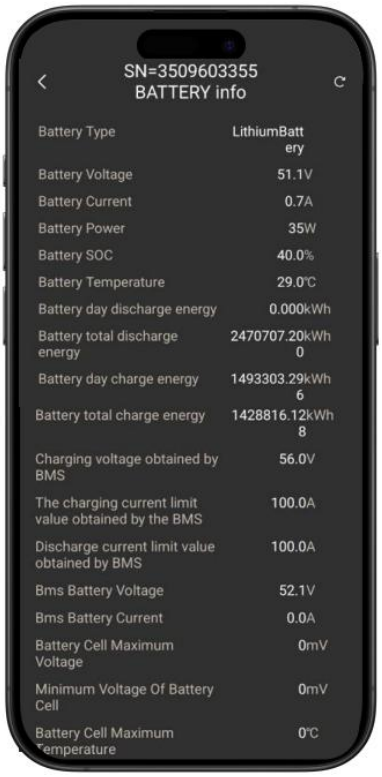


- **Power factor:** ratio between the active power and the apparent power at the inverter output.

- **Grid voltage A/B**: real time voltage at line A or B
- **Grid current A/B:** real time current at line A or B
- **Grid frequency**
- **Output power**: real time total output power of the inverter
- **Buy Grid day energy:** daily energy bought from the grid
- **Buy Grid total energy**: total energy bought from the grid since the inverter's setup.
- **Sale Grid day energy:** daily energy sold to the grid

Sale Grid total energy: total energy sold to the grid since the inverter's setup.

8.3 BATTERY info

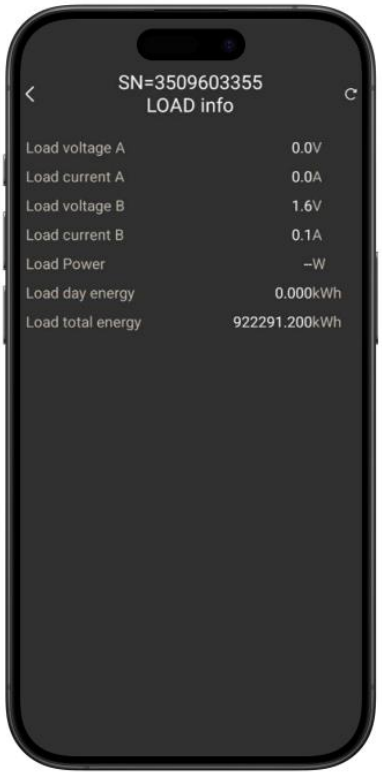


- **Battery Type**: Allows selection between lead-acid battery and lithium battery. For the proper functioning of the Sunbox with Lithium Series Pro 5.1kWh batteries, please select the Lithium batteries option.
- **Battery voltage**: battery voltage measured by the inverter
- **Battery current**: battery current measured by the inverter
- **Battery power**: battery power measured by the inverter
- **Battery SOC:** battery's state of charge. It is a measure of the current charge level relative to its full capacity expressed in percentage. It indicates how much energy is available in the battery compared to when fully charged.
- **Battery Temperature**
- **Battery day discharge energy**: daily energy that has been drawn from the battery.
- **Battery total discharge energy**: total energy that has been drawn from the battery since the equipment's setup.
- **Battery day charge energy**: daily energy that has been supplied to the battery.
- **Battery total charge energy**: total energy that has been supplied to the battery since the equipment's setup.
- **Charging voltage obtained from the BMS**: charge voltage established by the battery.
- **The charging current limit value obtained by the BMS**: charge current

established by the battery.

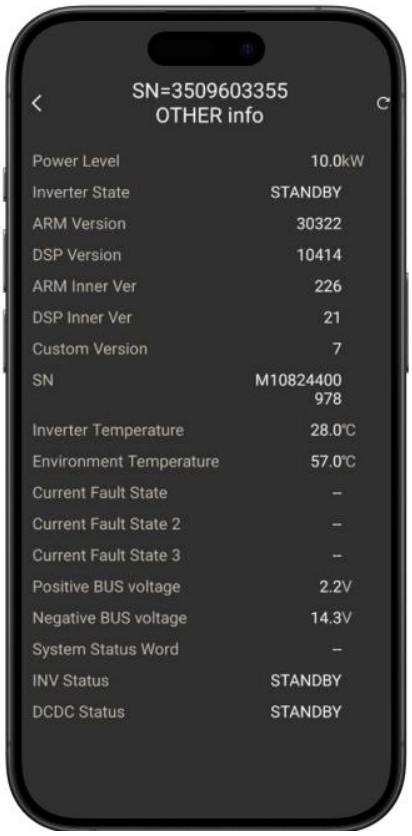
- **Discharge current limit value obtained by BMS: discharge** current established by the battery.
- **BMS battery voltage:** measured voltage obtained from the communication between the inverter and the battery.
- **BMS battery current:** measured current obtained from the communication between the inverter and the battery.
- **Battery Cell Maximum Voltage:** Displays the cell with the highest voltage (communicated via inverter-BMS cable).
- **Minimum Voltage of Battery Cell:** Displays the cell with the lowest voltage (communicated via inverter-BMS cable).
- **Battery Cell Maximum Temperature:** Displays the cell with the highest temperature (communicated via inverter-BMS cable).

8.4 LOAD info



- **Load voltage A/B:** Real-time voltage of line A/B at the load 1 and load 2 output.
- **Load current A/B:** Real-time current of line A/B at the load 1 and load 2 output.
- **Load Power**: Real-time power of load 1 and load 2 output.
- **Load day energy:** daily energy consumption of load 1 and load 2 output.
- **Load total energy:** total energy consumption of load 1 and load 2 output since the equipment's setup.

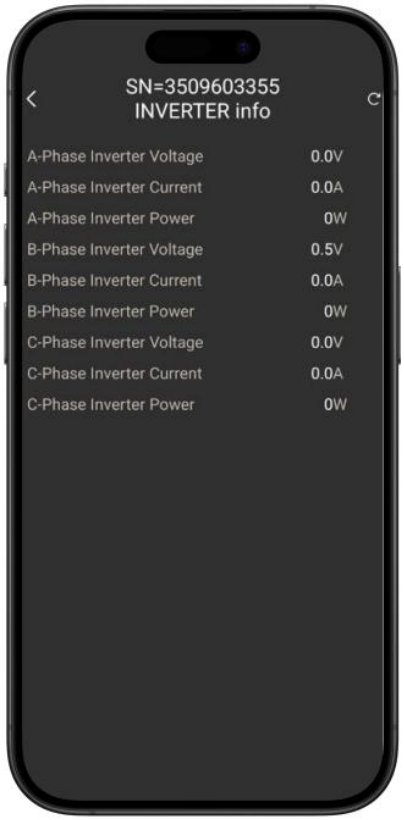
8.5 OTHER info



- **Power Level:** power of the inverter. For the Sunbox Split Phase Series, it will be 10.0 kW.
- **Inverter State:** according to the inverter's state, the following option will appear:
  - *INIT*: the machine has just been turned on and has entered initialization.
  - *STANDBY*: The machine enters standby mode when it is not operating.
  - *PV GRID:* Access to photovoltaic and grid power.
  - *BAT GRID:* Access to battery and grid power.
  - *HYBRID POW:* The inverter is in the off-grid operation stage. PV energy or batteries will be used to power the load. It means hybrid power supply.
  - *AC BAT CHG:* Battery wake-up situation, no PV, grid to charge the battery.
  - *PV BAT CHG:* Insufficient battery capacity, photovoltaic charges the battery
  - *BYP:* Battery wake-up, grid only.
  - *FAULT:* The device has an alarm.
  - SELFCHK: it happens while the machine is initiating.
  - *DSP FU:* DSP update.
  - *ARM FU:* ARM update.
- **ARM Version**: shows file version.
- **DSP Version**: shows file version.
- **Custom Version:** shows software version. For Sunbox Split Phase Series 10.0 it will be 7.
- **SN**: Serial number of the inverter.
- **Inverter Temperature**: inverter's inner temperature.
- **Environmental Temperature:** ambient temperature.
- **Current Fault State**: alarm information.
- **Current Fault State 2:** alarm information.

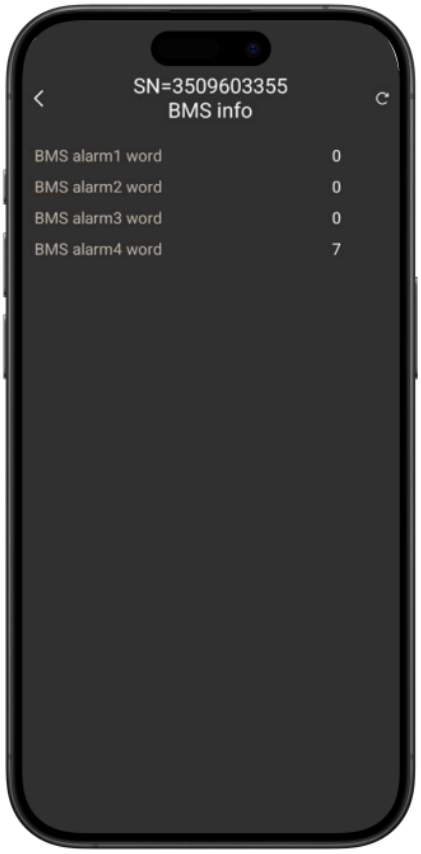
- **Current Fault State 3:** alarm information.
- **Positive BUS voltage**: voltage BUS of the DC current.
- **Negative BUS voltage**: voltage BUS of the DC current
- **System Status Word**
- **INV Status**
  - *STANDBY*: The inverter is connected but is not working.
  - *OFF GRID:* no grid connection
  - *GRID: there is grid connection*
  - *OFF* GRID PL: process in which it is detecting the network after being disconnected from it.
  - SERVICE: inverter test mode. It is used to test the drive signal in this state.
  - OPEN TEST: reserved test mode.
  - CLOSE TEST: reserved test mode.
  - INV TO PFC: state when the battery is connected to the grid and is being connected.
- **DCDC Status:** shows the interaction between PV and batteries.

8.6 INVERTER info



- **A/B/C Phase Inverter Voltage:** real-time voltage for each phase A, B or C.
- **A/B/C Phase Inverter Current**: real-time current for each phase A, B or C.
- **A/B/C Phase Inverter Power:** real-time power for each phase A, B or C.

8.7 BMS info



Each one of these parameters is used to show the type of alarm that is being sent from the battery.

8.8 GEN info

- **Generator frequency:** real-time frequency of the generator.

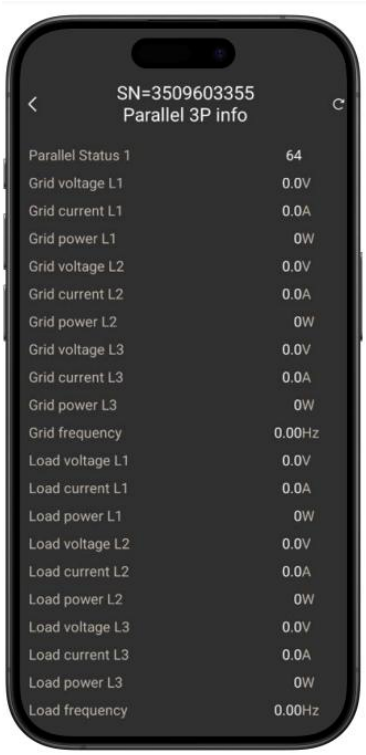
- **Generator voltage L1/L2/L3:** real-time voltage for L1, L2 or L3 of the generator.
- **Generator current L1/L2/L3:** real-time current for L1, L2 or L3 of the generator.
- **Generator power L1/L2/L3**: real-time power for L1, L2 or L3 of the generator.

8.9 HOME LOAD info

Home load refers to the sum of powers obtained in load 1 and load 2 output, together with the loads that are connected to the grid side.

- **Home Load Power L1/L2:** real-time power of the loads connected to L1 or L2.
- **Home Load Total Power:** real-time total power

8.10 Parallel 3P



- **Parallel status 1:** shows the status of the parallel machine

- **Grid voltage L1, L2, L3:** real-time voltage of each of the different phases (L1, L2, L3) of the grid.
- **Grid current L1, L2, L3:** real-time current of each of the different phases (L1, L2, L3) of the grid.
- **Grid Power L1, L2, L3:** real-time power of each of the different phases (L1, L2, L3) of the grid.
- **Load voltage L1, L2, L3:** real-time voltage of each of the different phases (L1, L2, L3) of the load.
- **Load current L1, L2, L3:** real-time current of each of the different phases (L1, L2, L3) of the load.
- **Load frequency:** real-time power of each of the different phases (L1, L2, L3) of the load.

9. INVERTER CONFIGURATION-Setting menu

9.1 System Work Mode

This menu is divided into two submenus. The first one, sets the values and conditions for the weekdays (Monday to Friday) while the second one sets the values and conditions for the weekend (Saturday to Sunday).

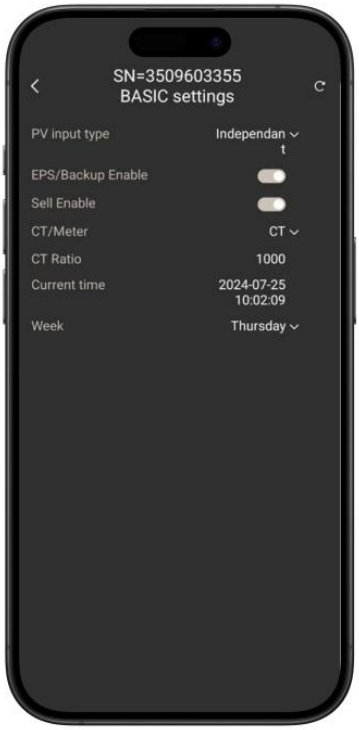
Both screens have the same parameters but are set for different time periods.

9.1.1 System Work Mode (Monday to Friday)

9.1.2 System Work Mode (Saturday & Sunday

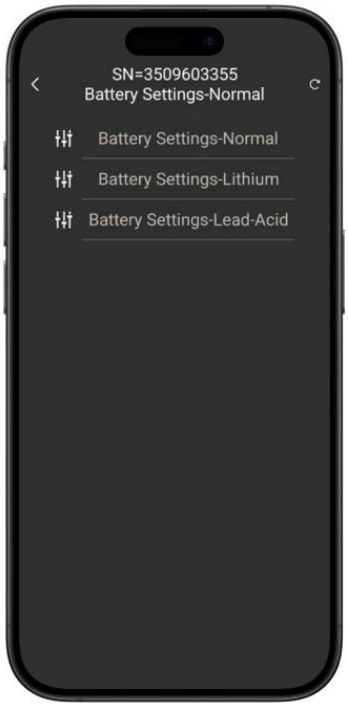
- **Time of Use Enable:** enables the time-based working system.
- **SOC 1:** Minimum value to which the battery can be discharged without shutting down. The recommended value is between 8-10%.
- **Start/End Time:** start and end of each time.
- **GM:** General mode. In this mode, loads are fed using PV and battery energy. If the batteries are below SOC2 value, energy will be taken from the grid.
- **BU:** Backup mode. In this mode, a percentage of batteries is saved. In case the percentage of batteries is below SOC2 the inverter will charge the batteries once the loads have been fed until SOC2 value is reached again.
- **BF:** once the loads have been fed, batteries are charged until they reach 100% of their capacity.
- **PS:** Priority Sell Mode. Once the loads have been fed, the amount of energy established as Power to Sell needs to be reached. Surplus energy from the PV is used together with energy from the batteries but considering that the value of SOC1 can never be reached.
- **SOC 2:** value conditioning the SWM behavior.
- **SOC 3:** maximum value not to be exceeded. If SOC3 is exceeded, the inverter will export the excess energy to the grid.
- **GPS:** Grid Peak Shaving. Maximum energy to take from the grid.
- **Power to Sell.** Maximum energy to sell to the grid
- **GEN/GRID:** allows you to use the grid or gen port to charge the batteries.

9.2 BASIC settings



- **PV input types:**
  - *Independent*: each MPPT is independent.
  - *Constant Voltage :* output voltage remains stable.
  - *Parallel:* multiple strings of solar panels in parallel to increase the current while keeping the voltage consistent.
- **EPS/Backup Enable:** By selecting this option, Load 1 output is fed in the event of a grid failure.
- **Sell Enable:** allows selling the surplus energy.
- **CT/Meter:** allows to select the type of measurement equipment. Sunbox's will have 2 CTs included in the cabinet. Therefore, this shall be the default option.
- **CT Ratio:** 1000:1 set as default. Check the CT at the lower part of this device (--A/--mA)
- **Current time:** shows date and time
- **Week:** shows which day of the week we are in.

9.3 Battery Settings- Normal



Only Battery Settings-Normal and Battery Settings-Lithium will be used for the Sunbox.

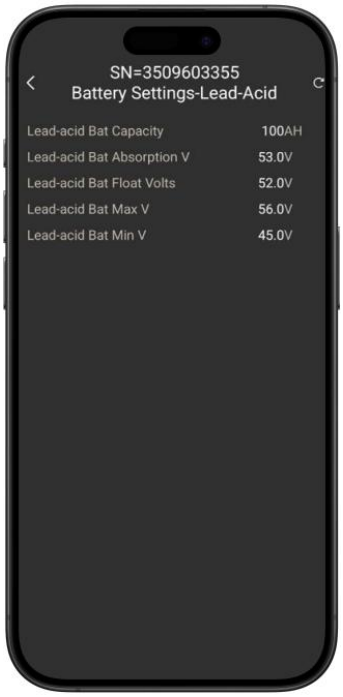
9.3.1 Battery Settings- Normal

- **Battery Type:** it can be chosen between lead-acid/Cust and Lithium. For Sunbox Split Phase Series 10.0, Lithium batteries shall be chosen.
- **BMS Host:** CAN or RS485 communication are the options available. For Sunbox Split Phase Series 10.0, CAN communication shall be chosen.
- **Bat Charge Current**: establishes the charge current for the batteries (Max. 190A).
- **Bat Discharge Power Scale:** stabilizes the discharge limit the batteries will reach based on the rated power output of the inverter.

9.3.2 Battery Settings- Lithium

- **Bat On-Grid DOD:** Percentage of maximum battery discharge when the inverter is connected to the grid
- **Bat Off-Grid DOD**: Percentage of maximum battery discharge when the inverter is not connected to the grid
- **OnGrid EodHyst** (Percentage that enables the battery discharge after reaching the DOD)
- **OffGrid EodHyst** (Percentage that enables the battery discharge after reaching the DOD)
- **Wake Up Enable:** allows the battery to be charged and switched on by using grid power after it has been switched off due to reaching low battery status.

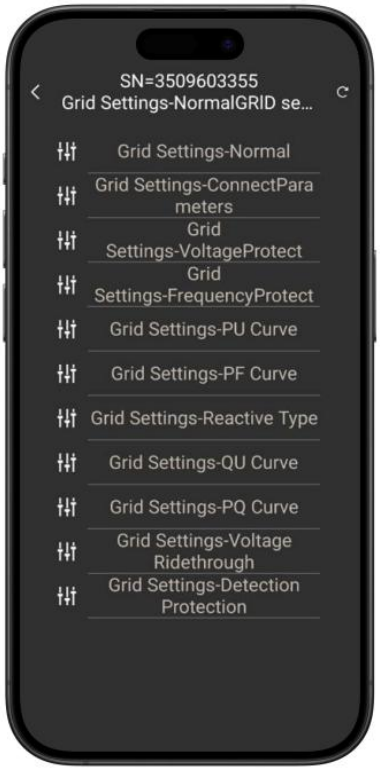
9.3.3 Battery Settings-Lead Acid



- **Lead-acid Bat Capacity:** battery capacity measured in Amper per hour (Ah)
- **Lead-acid Bat Absorption V:** absorption voltage of the battery.
- **Lead-acid Bat Float Volts**: flotation voltage of the battery.

- **Lead-acid Bat Max V:** maximum voltage of the battery.
- **Lead-acid Bat Min V**: minimum voltage of the battery.

9.4 Grid Settings-Normal GRID Settings



9.4.1 Grid Settings- Normal

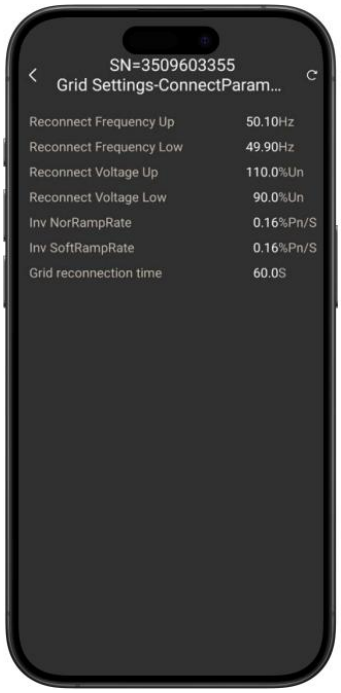
- **Grid Standard:** type of standard to be used according to the region/country where the equipment is going to be installed. For Sunbox Split Phase Series 10.0, select US Standard.
- **Grid Set**: grid type. Split Phase shall be selected.

When selecting “Custom” among grid standard options, the following parameters can be

modified according to the needs of the installation

- **Vac Min:** minimum grid voltage.
- **Vac Max:** maximum grid voltage.
- **Fac Min**: minimum grid frequency.
- **Fac Max**: maximum grid frequency.
- **Grid Power Scale**: limits the amount of energy that can be fed into the grid. In the case of the Sunbox, its nominal power is 10kW. In case you want to limit the export to 5kW, you should set this value to 50%.

9.4.2 Grid Settings- Connect Parameters



This screen shows the safety parameters set in case the inverter reconnects to the grid after an inverter failure or shutdown.

- **Reconnect Frequency Up:** upper frequency limit for reconnection to the grid.
- **Reconnect Frequency Low:** lower frequency limit for reconnection to the grid.
- **Reconnect Voltage Up**: upper voltage limit for reconnection to the grid.
- **Reconnect Voltage Low:** lower voltage limit for reconnection to the grid.
- **Inv NorRampRate:** security parameter.
- **Inv SoftRampRate:** security parameter.
- **Grid reconnection time:** Time to reconnect to the grid after the inverter has stopped due to a fault, cut-off or button shutdown.

9.4.3 Grid Settings- Voltage Protect Grid

This parameter is determined by the national grid standard. If the user needs to use over-voltage and under-voltage protection, please contact the supplier.

- **HV** means high voltage trip protection.
- **LV** means low voltage trip protection.

9.4.4 Grid Settings-Frequency Protect

This parameter is determined by the national grid standard. If the user needs to use over-voltage and under-voltage protection, please contact the supplier.

- **HF** means high frequency trip protection.
- **LF** means low frequency trip protection.

9.4.5 Grid Settings- PU Curve

The following parameters are determined by the national grid standard:

- **Generating Voltage Response:** When the grid voltage is abnormal, the active power is limited, and the function is activated when required by the standard norm.
- **Charging Voltage Response:** When the grid voltage is abnormal, the active power is limited, and the function is activated when required by the standard norm.
- **Vac Pwr Start:** Start of P-U Curve.
- **Vac Pwr Stop:** End of P-U Curve.
- **Vac Pwr RspTime:** Frequency response of power generation.

9.4.6 Grid Settings- PF Curve

The following parameters are determined by the national grid standard:

- **Generating Frequency Response:** Inverter power adjustment as a function of the frequency of the grid voltage.
- **Charging Frequency Response:** Inverter power adjustment as a function of the frequency of the grid voltage.
- **Fac Pwr HFDb**: over Frequency PF Curve.
- **Fac Pwr HFK**: over frequency deadband.
- **Fac Pwr HFRspTime:** over frequency response rate.
- **Fac Pwr LFDb**: under frequency PF curve.
- **Fac Pwr LFK:** under frequency deadband.
- **Fac Pwr LFRspTime:** under frequency response rate.

Overfrequency recovery dead band

9.4.7 Grid Settings- Reactive Type

The following parameters are determined by the national grid standard:

- **Reactive Type:** there are different options for this parameter:
  - *Power factor:* The input value should be between L0.80 and L0.99 or C0.8 to C1.00.
  - *Reactive Power*: The input value should range from -60% and +60%, which varies according to the standard.
- *QU/QP Curve:* see Grid Settings- QU Curve and Grid Settings- PQ Curve
- **Power Factor:** power factor regulation connected to the grid.
- **Reactive Power:** reactive power regulation connected to the grid.

9.4.8 Grid Settings- QU Curve

The following parameters are determined by the national grid standard:

- **Vac VarV1/V2/V3:** U curve parameter 1,2,3.
- **Vac VarQ1/Q2/Q3:** Q curve parameter 1,2,3.
- **Var Var RspTime:** Q-curve response rate.
- **lockinPwr and lockoutPwr:** security parameters for grid connection.

9.4.9 Grid Settings- PQ Curve

The parameters shown in the previous screen are determined by the national grid standard. The parameters are related to the security when connected to the grid.

9.4.10 Grid Settings- Voltage Ride through

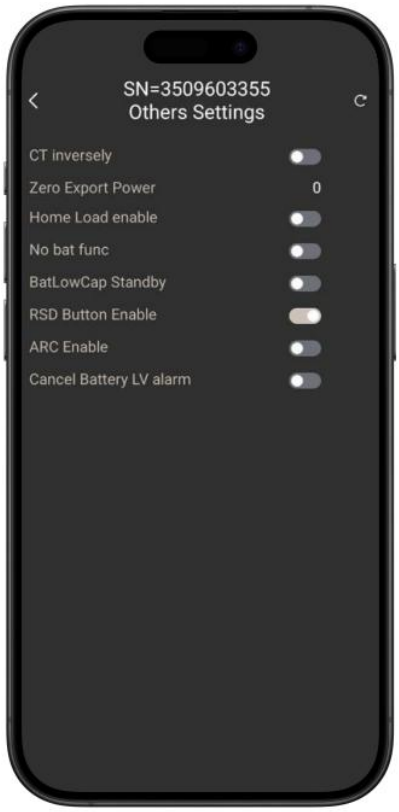
- **LVRT enable:** enables low voltage ride through function of the inverter.
- **HVRT enable:** enables high voltage ride through function of the inverter.

9.4.11 Grid Settings- Detection Protection

- **Active Island:** When the grid goes down, inverter will detect the loss of power and disconnect from the grid within milliseconds. It prevents your solar panels from feeding electricity into a downed power line. The default option is enabled
- **Leak Current**: Leak current detect. The default option is enabled.

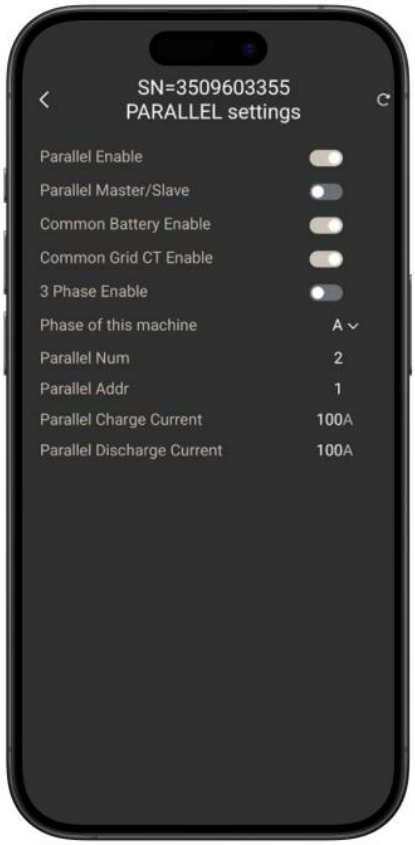
- **Insulation detection**: When the insulation detection function is enabled in the grid connected state, the insulation detection is performed once a day when the photovoltaic energy comes in, and the inverter switches to the By-pass band load. If the inverter is off-grid, the output will be disconnected during insulation detection and the load will stop working. The default option is enabled.

9.5OTHER Settings



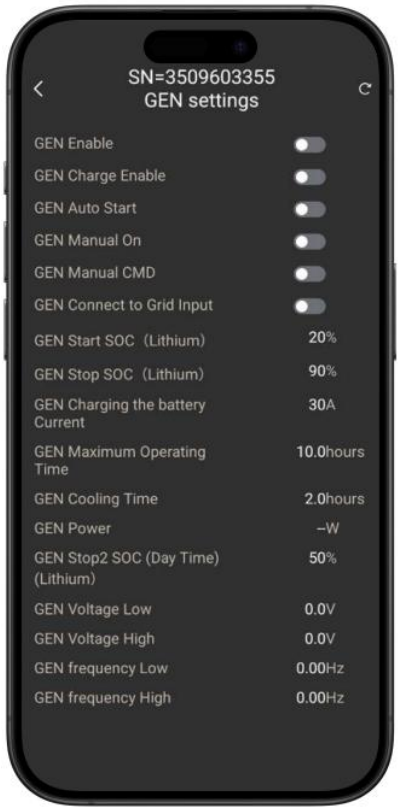
- **CT inversely:** Reverse the CT measurement direction.
- **Zero Export Power:** In this mode, CT limiters must be installed at the grid port input of the inverter. The hybrid inverter will not sell power to the grid. The user can use the Zero Export Power parameter to ensure that the inverter does not sell power to the grid (Neither PV power nor excess battery power is sold to the grid). Value shall be set between 20-200W.
- **Home Load enable:** Enable to view the data of Home Load (loads connected to the grid side).
- **No bat func:** If this function is enabled, when no battery is connected, the BMS communication is abnormal, and *the battery not connected alarm* will not be displayed.
- **BatLowCap Standby:** if enabled, low-capacity battery alarm will not appear.
- **RSD Button Enable:** If you want to use the RSD button to turn the inverter on and off, you must enable this function.
- **ARC Enable:** ARC function detection.
- **Cancel Battery LV alarm:** disables the low voltage battery alarm.

9.6 PARALLEL Settings



- **Parallel Enable:** enables the parallelization of multiple equipment. Enable only when more than one Sunbox is going to be used.
- **Parallel Master/Slave:** indicates if the selected equipment is the Master or the Slave of the configuration.
- **Common Battery Enable:** when activated, enables to use one battery for the different equipment connected in parallel.
- **Common Grid CT Enable:** when activated, enables to use one CT for all the parallelized equipment.
- **3 Phase Enable**: enables the creation of a three-phase installation using Split phase inverters. Do not activate Sunbox Split Phase Series 10.0.
- **Phase of this machine:** in case of having a three-phase installation created from Split phase inverters, this parameter indicates which phase is the equipment controlling.
- **Parallel Num:** number of equipment connected in parallel.
- **Parallel Addr:** according to the amount of equipment connected in parallel, this parameter shows its number. Number 1 will be assigned to the master, and the slaves will continue the numbering 2,3, and so on.
- **Parallel Charge Current:** charging current the parallel equipment will have.
- **Parallel Discharge Current**: discharging current the parallel equipment will have.

9.7 GEN Settings



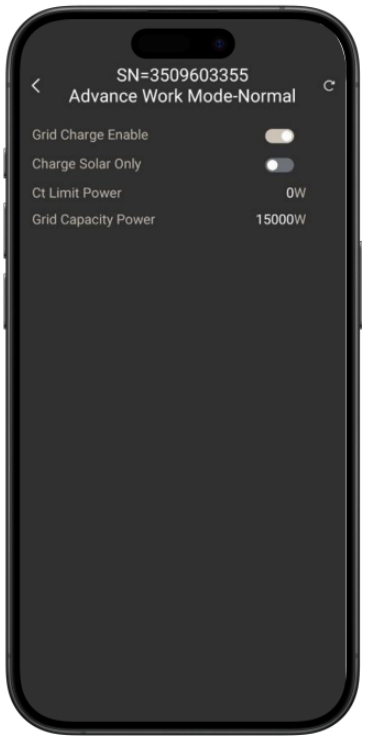
- **GEN Enable:** enables the generator
- **GEN Charge Enable:** enables the charge of the batteries using the generator.
- **GEN Auto Start:** enables the automatic start of the inverter based on the set SOC value.
- **GEN Manual On:** if selected, the generator will start and stop when a manual command is given.
- **GEN Connect to Grid Input:** it shall be activated if the generator is connected to the grid output.
- **GEN Start SOC (Lithium):** battery percentage at which the automatic start powers on the generator.
- **GEN Stop SOC (Lithium):** battery percentage at which the automatic start shuts down the generator.
- **GEN Maximum Operating Time:** maximum time that the generator can operate.
- **GEN Cooling Time:** time to cool down before the generator is used again.
- **GEN Power:** rated power of the equipment connected to the GEN-port. This power cannot exceed 10kW.
- **GEN Stop2 SOC (Day Time) (Lithium):** This option can only be used when GEN Auto Start is enabled. When the battery SOC is higher than the value established, the generator dry contact is disconnected, and the connected generator is stopped (START SOC＜STOP SOC).
- **GEN Voltage Low:** Indicates when the inverter needs to stop due to low voltage on the generator line.
- **GEN Voltage High:** Indicates when the inverter needs to stop due to high voltage on the generator line.

- **GEN frequency Low**: Indicates when the inverter needs to stop due to low frequency on the generator line.
- **GEN frequency High:** Indicates when the inverter needs to stop due to high frequency on the generator line.

9.8 Advance Work Mode- Normal

The last screen of the settings includes four more submenus:

9.8.1 Advance Work Mode- Normal



- **Grid Charge Enable:** enables the charge of the batteries using the grid.
- **Charge Solar Only:** if activated, batteries will be charged using only the energy from PV production.
- **CT Limit Power:** power limit established for the CT.
- **Grid Capacity Power:** total grid capacity.

9.8.2 AC Couple

- **AC Couple connection type:** there are three options:
  - *Disabled:* no microinverter or ac battery connected neither to gen port or load 2.
  - *Microinverter:* connected to GEN-port or Load 2.
  - *AC battery:* connected to GEN-port or Load 2.
- **AC Couple Trip SOC:** battery percentage at which the inverter will cut off the microinverter or AC battery.
- **AC Couple Response Coefficient:** reconnection time.

AC Couple Trip Frequency: Frequency that the inverter reaches once the battery is reaching the Trip Soc.

9.8.3 Operational Modes (Custom)

- **Grid Export Limit**: establishes the maximum energy that can be sold to the grid.

9.8.4 Maintenance

- **Factory Reset:** Resets all settings to factory default.
- **Clear Data:** erase all saved data.
- **Clear Energy:** erase all saved energy data.

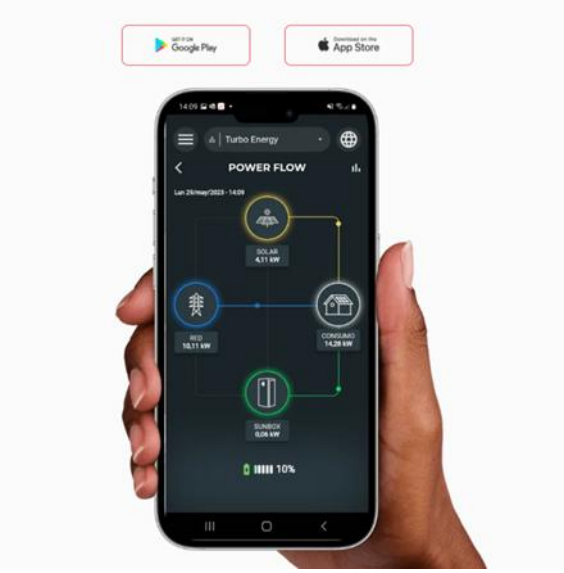
10. WIFI CONNECTION CONFIGURATION

To upload the SunBox to the cloud and be able to see the system monitoring, it is essential to connect the equipment to the Internet. Wi-Fi can be configured in two ways: using the TurboScreen app or with the help of an external device, such as a phone, tablet, or PC.

10.1 TurboScreen app

Step 0: Download the app

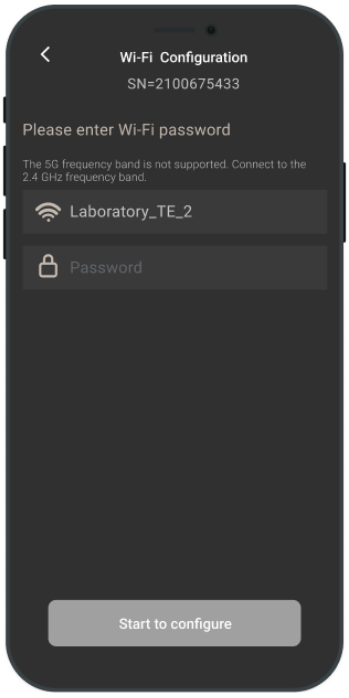
The Turbo Screen app is available for Android and iOS devices. You can download it from the Google Play Store or from the App Store. You can also find at our website the link to access either of them.



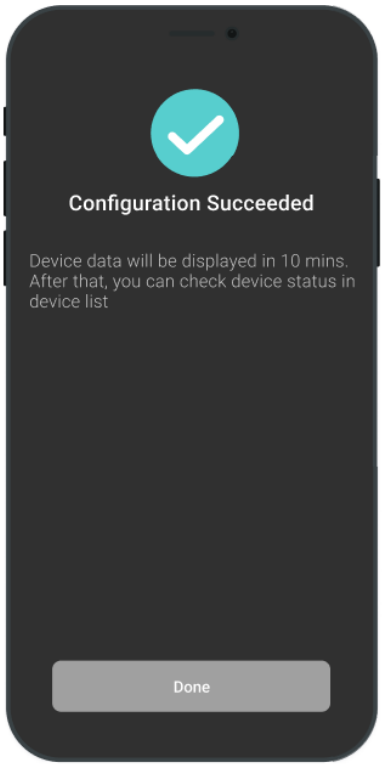
Step 1: Link your equipment

To perform the Wi-Fi configuration, select the Wi-Fi Configuration option and scan the QR code on the logger/label. Before starting the Wi-Fi configuration process, make sure that Bluetooth is enabled.

Once you have scanned the QR, the following screen will appear. Please make sure you are connected to a 2.4 network and enter the password for that Wi-Fi network.



After this step, if the connection is successful, the device will be connected to the internet.



10.2 With external device

Step 0: **Locate the serial number of Wi-Fi or logger.**

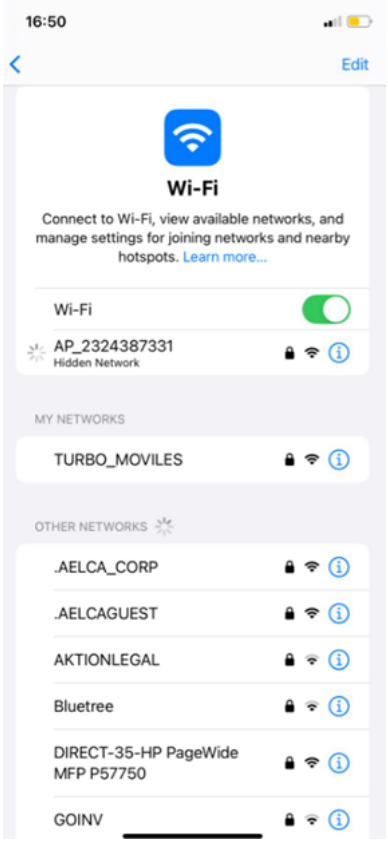
At the bottom of the inverter there is a plate with a QR code, the serial number of your logger and the password to access the logger's Wi-Fi.

The logger creates a Wi-Fi network whose name is “AP_” followed by the serial number of the logger.

NOTE: To avoid opening the Sunbox every time you need to access the logger, a QR label will be provided within the logger packaging. The label will be directly attached to the Sunbox case, next to the product's main label.

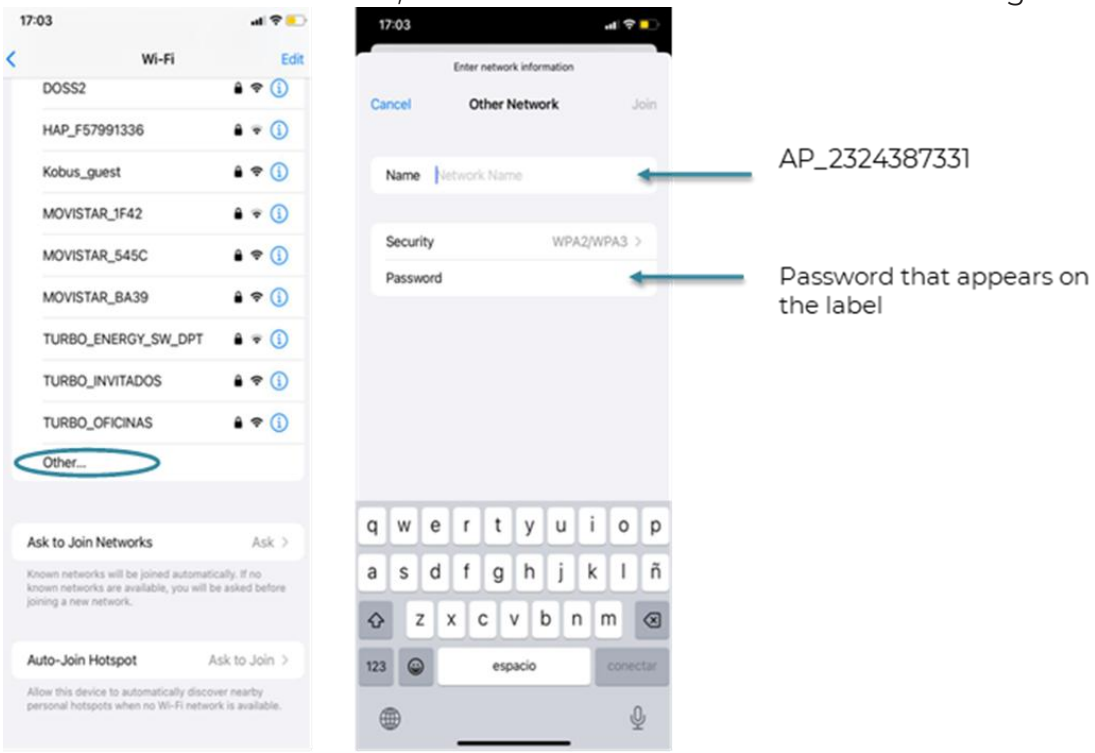
Step 1: **Connect to Wi-Fi network.**

- With an electronic device that has Wi-Fi (PC, Tablet, Smartphone...), Wi-Fi connection 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 logger serial number)



Enter the password that appears on the label/logger.

If the network is in hidden mode, it must be searched as shown in the images:

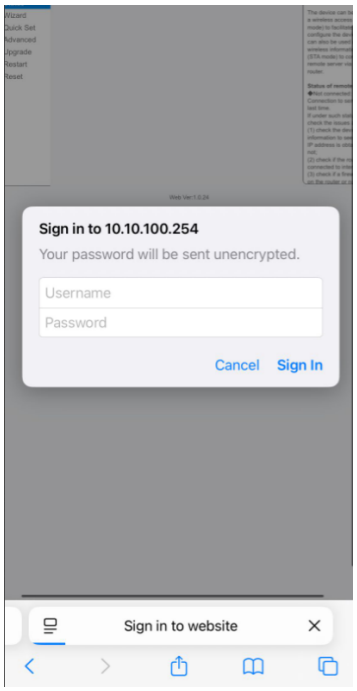


Step 2: connect to web portal.

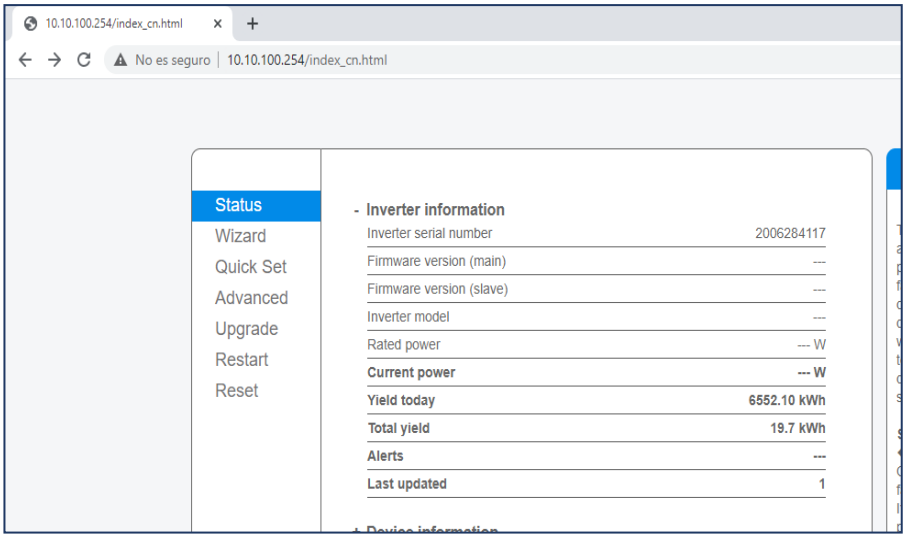
Once connected to the Wi-Fi network with your PC, Tablet or smartphone, you must access the logger's web portal.

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

Write in the address bar of the web browser the text "10.10.100.254". A login window will appear asking for a username and password. The default user and password are "admin". Once you have typed them, press Log In.



Once the logger web portal has been accessed, the "Status" page can be seen with general information of the logger.

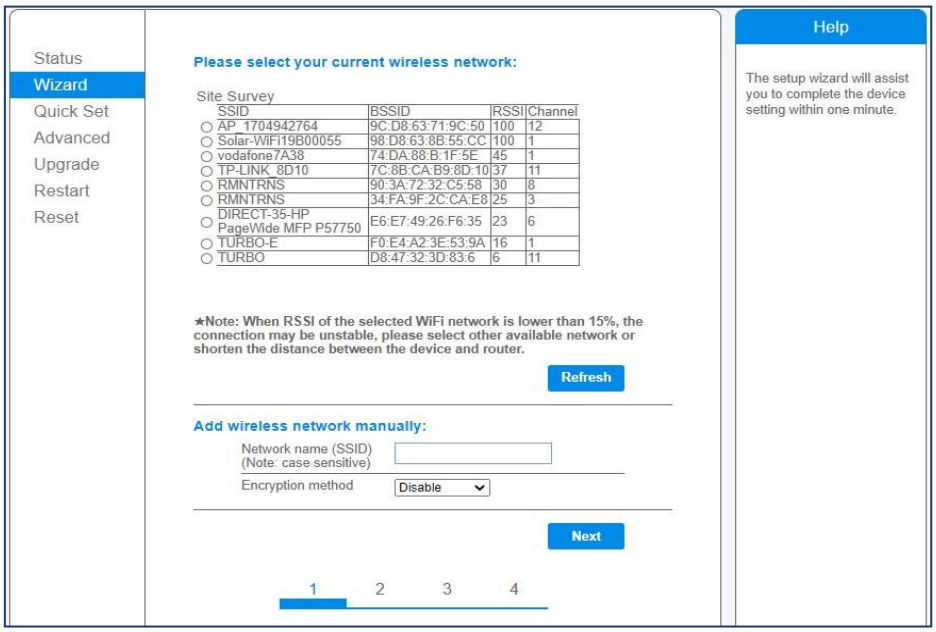


Press the link "Wizard" below the link "Status" to run the wizard to connect the logger to the Wi-Fi of the installation (the Wi-Fi of your house or your plant).

Step 3: Configure logger access to plant Wi-Fi.

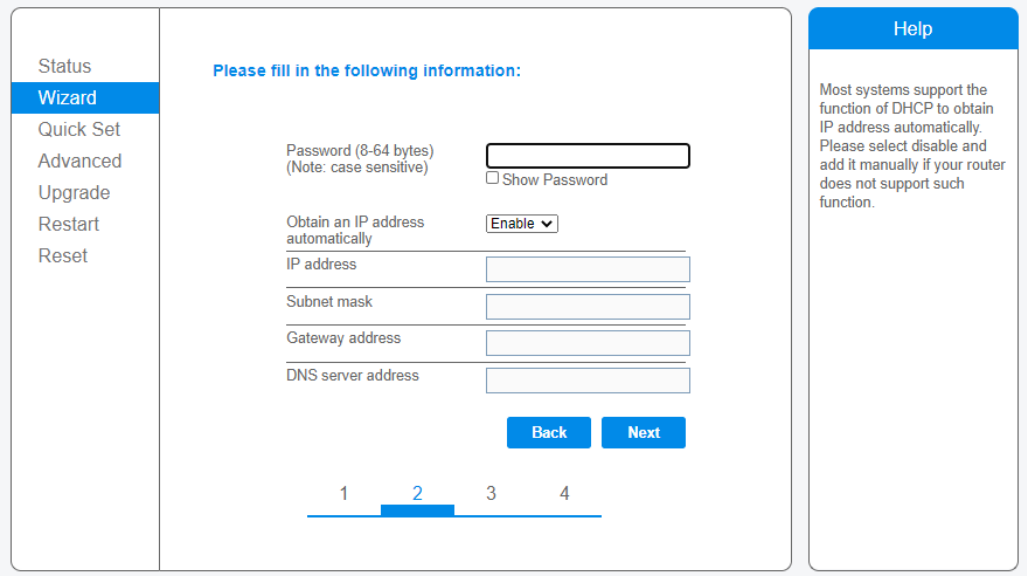
Step 3.1: select plant Wi-Fi.

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



Step 3.2: Select Wi-Fi of the residence/plant

Enter the Wi-Fi password of the plant: in the "Password" field, enter your plant's Wi-Fi password and press the “Next” button.

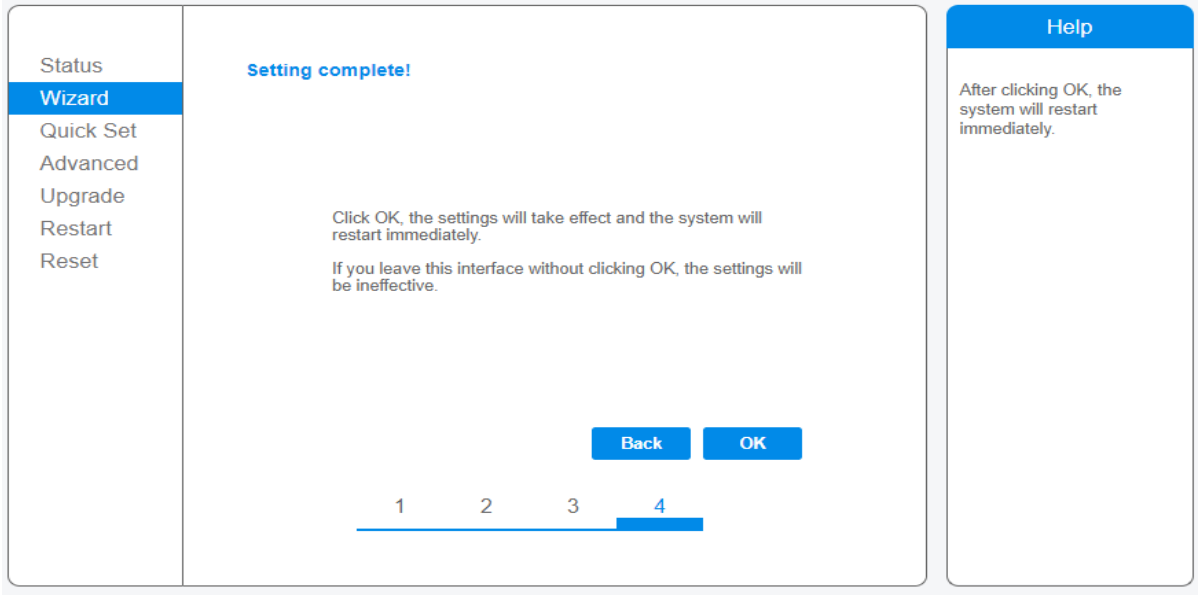


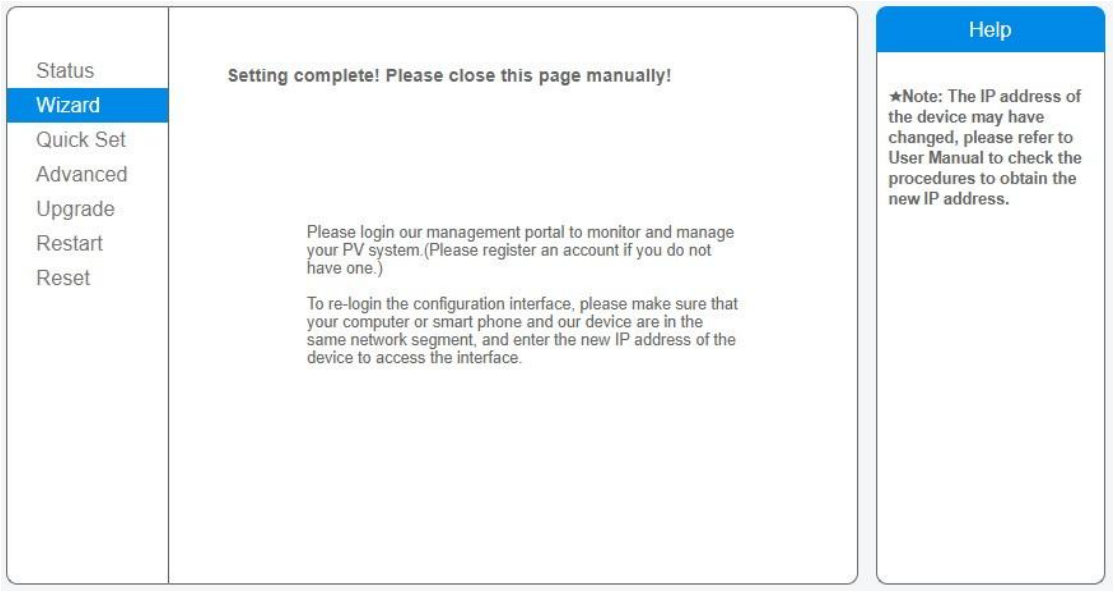
Step 3.3 (OPTIONAL): Enhance security.

In this step it is NOT necessary to select any option and then press the "Next" button. It is used to configure the security of the Wi-Fi connection. By selecting Hide AP, the Wi-Fi network will appear as a hidden network.

Step 3.4: Restart the connection.

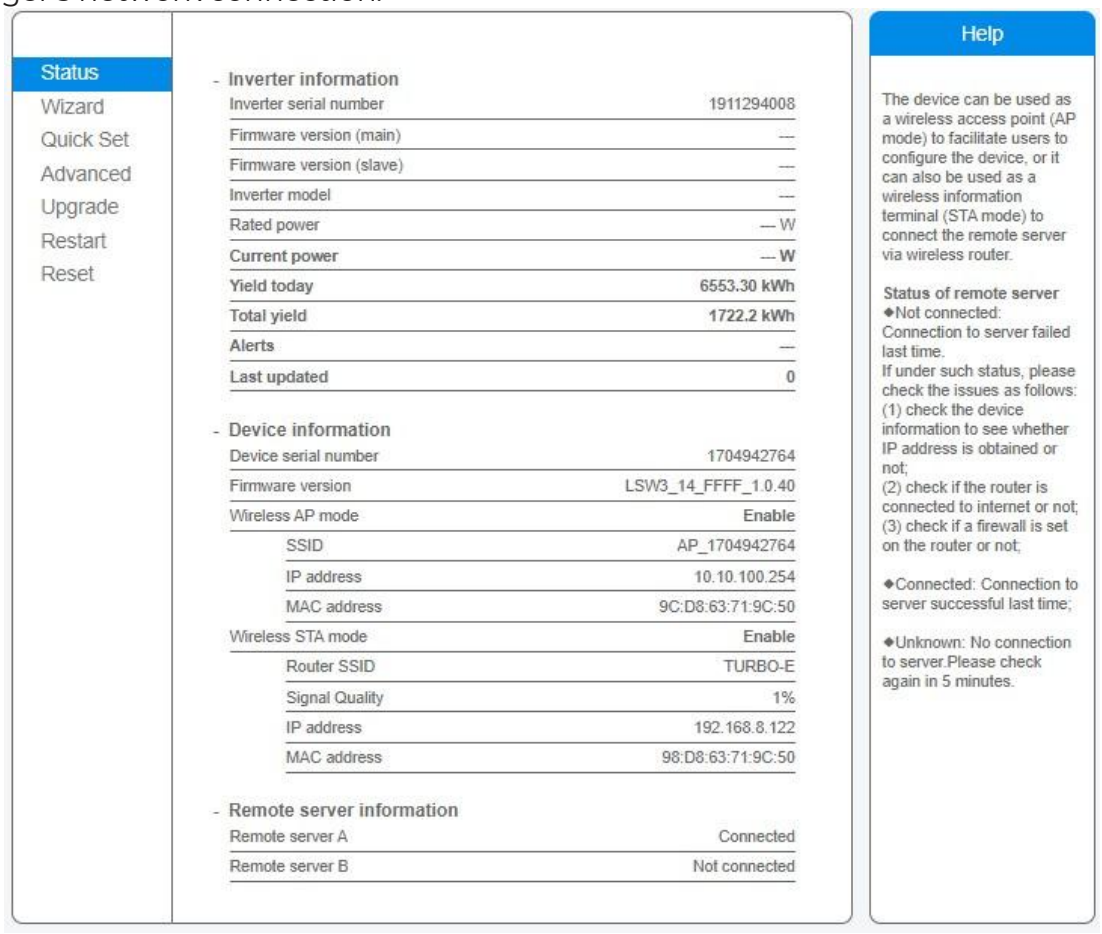
If the setting is successful, press the “OK” button to restart the connection. If the restart is successful, a message will appear indicating that it has been successful, if it does not appear then refresh the browser page.


Status
Wizard
Quick Set
Advanced
Upgrade
Restart
Reset
Setting complete!
Click OK, the settings will take effect and the system will restart immediately.
If you leave this interface without clicking OK, the settings will be ineffective.
Back
OK
1
2
3
4
Help
After clicking OK, the system will restart immediately.


Status
Wizard
Quick Set
Advanced
Upgrade
Restart
Reset
Setting complete! Please close this page manually!
Please login our management portal to monitor and manage your PV system.(Please register an account if you do not have one.)
To re-login the configuration interface, please make sure that your computer or smart phone and our device are in the same network segment, and enter the new IP address of the device to access the interface.
Help
★Note: The IP address of the device may have changed, please refer to User Manual to check the procedures to obtain the new IP address.

Step 4: Verify the connection of the logger to the Wi-Fi of the plant.

After restarting the web page, log in again to the “Status” page and check the status of the logger's network connection:



Once we have verified that the logger is connected to the plant's Wi-Fi and (that it must have internet access) it is possible to add the plant to the cloud platform.

	We recommend not changing 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 to configure the device's WiFi again.
	We recommend using a 2.4 Gh Wi-Fi network to ensure a proper connection.

11. MAINTENANCE RECOMMENDATIONS

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

i. Check the connections, and the condition of the wiring, replace the damaged wiring and retighten the connections if necessary.
ii. Review and verification of the state of the DC fuses. It is suggested, a simple verification method, sequentially disconnect the DC lines one by one to verify the energy contribution of each group of panels. For this, it is mandatory to disconnect the DC disconnector before each disconnection of DC lines.
iii. Important: each continuous line has two fuses, one for the positive and one for the negative. If applicable, replace the 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 current, contact the technical service.

12. TROUBLESHOOTING

12.1 Inverter problems

Below, we show a table that compiles the most typical errors of the inverter and the respective possible solutions.
If any of these messages listed in the table appear on your inverter and you are unable to resolve the problem with the solution provided, please contact your local technical support or supplier. You will need to have the following information ready.

1. Inverter serial number;
2. Grid connection date;
3. Description of the problem (including the error code and status indicator displayed on the LCD) in as much detail as possible.

Error code	Description	Explanation	Solutions
01	DischgOverCur	Battery discharge over current. When the battery is loaded, the load is too large.	**(1)** Nothing needed to do, wait one minute for the inverter to restart. **(2)** Check whether the load is in compliance with the specification. **(3)** Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check
02	Over Load	The load power is greater than other power. (PV, BAT)	**(1)** Check whether the load is in compliance with the maximum power of the machine. **(2)** Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check whether the load is short circuited if the fault has been eliminated. **(3)** Contact customer service if error warning continues.
03	BatDisconnect	Battery Disconnect. (Battery voltage not identified)	**(1)** Check whether the battery is connected. **(2)** Check if battery wiring port is open circuited. **(3)** Contact customer service if error warning continues.
04	Bat Under Vol	Battery voltage low that normal range.	**(1)** Checking System Settings, If so, power off and restart. **(2)** Check if the grid power down. If so, wait for grid power up, the inverter will automatically charge. **(3)** Contact customer service if error warning continues.
05	Bat Low capacity	Bat Low capacity	**(1)** Battery Low that setting capacity. (SOC<100%-DOD)
06	Bat Over Vol	The battery voltage is greater than the Inverter maximum voltage.	**(1)** Checking System Settings, If so, power off and restart. **(2)** Contact customer service if error warning continues.

Error code	Description	Explanation	Solutions
07	Gird low vol	Grid voltage is abnormal	**(1)** Check if the grid is abnormal. **(2)** Restart the inverter and wait until it functions normally. **(3)** Contact customer service if error warning continues.
08	Grid over vol		
09	Grid low freq	Grid Frequency is abnormal.	**(1)** Check if the grid is abnormal. **(2)** Restart the inverter and wait until it functions normally. **(3)** Contact customer service if error warning continues.
10	Grid overFreq		
11	gfci over	Inverter GFCI exceeds standard.	**(1)** Check PV string for direct or indirect grounding phenomenon. **(2)** Check peripherals of machine for current leakage. **(3)** Contact the local inverter customer service if fault remains unremoved.
14	bus under vol	BUS voltage is lower than normal.	**(1)** Check the input mode setting is correct. **(2)** Restart the inverter and wait until it functions normally. **(3)** Contact customer service if error warning continues.
15	bus over vol	BUS voltage is over maximum value.	**(1)** Check the input mode setting is correct. **(2)** Restart the inverter and wait until it functions normally.
16	Inv over cur	The inverter current exceeds the normal value.	**(1)** Restart the inverter and wait until it functions normally.
17	Chg over cur	Battery charge current over than the Inverter maximum voltage.	**(1)** Restart the inverter and wait until it functions normally.
18	Meter Comm Fail	Meter Comm Fail	**(1)** Check whether the meter communication line is connected correctly.
19	Inv under vol	INV voltage is abnormal	**(1)** Check if the INV voltage is abnormal. **(2)** Restart the inverter and wait until it functions normally. **(3)** Contact customer service if error warning continues.
20	Inv over vol		

Error code	Description	Explanation	Solutions
21	InvFreqAbnor	INV frequency is abnormal	**(1)** Check if the INV frequency is abnormal. **(2)** Restart the inverter and wait until it functions normally. **(3)** Contact customer service if error warning continues.
22	igbt temp high	The inverter temperature is higher than the allowed value	**(1)** Cut off all the power of the machine and wait one hour, then turn on the power of the machine.
23	bat over temp	Battery temperature is higher than the allowed value.	**(1)** Disconnect the battery and reconnect it after an hour.
25	bat UnderTemp	Battery temperature is low than the allowed value.	**(1)** Check the ambient temperature near the battery to see if it meets the specifications.
26	Relay open circuit	Grid side relay open circuit detection	**(1)** Used to detect whether the relay on the power grid side is disconnected due to a fault.
28	BMS comm.fail	Communication between lithium battery and inverter is abnormal.	**(1)** Check the cable, crystal, Line sequence. **(2)** Checking the Battery switch.
29	Fan fail	Fan fail	**(1)** Check whether the Inverter temperature is abnormal. **(2)** Check whether the fan runs properly. (If you can see it)
31	Grid Phase err	The grid fault phase.	**(1)** Check power grid wiring
32	Arc Fault	PV Arc Fault	**(1)** Check Photovoltaic panels, PV wire. **(2)** Contact customer service if error warning continues.
33	bus soft fail	Hardware may be damaged and need to troubleshoot the cause	**(1)** Restart the inverter and wait until it functions normally. **(2)** Contact customer service if error warning continues.
34	inv soft fail		
35	bus short		
36	inv short		

Error code	Description	Explanation	Solutions
37	fan fault	Fan fault.	**(1)** Check whether the Inverter temperature is abnormal. **(2)** Check whether the fan runs properly. (If you can see it)
38	PV iso low	PV iso low	**(1)** Check if the PE line is connected to the inverter and is connected to the ground. **(2)** Contact customer service if error warning continues.
39	Bus Relay Fault	The inverter may be damaged	**(1)** Restart the inverter and wait until it functions normally. **(2)** Contact customer service if error warning continues.
40	Grid Relay Fault		
41	EPS rly fault		
42	Gfci fault		
45	Selftest fail		
46	System fault		
47	Current DCover		
48	Voltage DCover		

12.2 Battery errors

In case the fault is related to the battery, consult the battery manual.