



# Sunsynk Hybrid Inverters with lithium-ion batteries

SUN  SYNK®

# Introduction

Sunsynk inverter(s) and lithium-ion batteries is the ideal package for self-consumption, off-grid and back-up solar PV systems. The Sunsynk hybrid inverter is a bi-directional energy storage unit that consists of the 5kW and 8kW single phase inverter models. On the other hand, the Pylontech 48V batteries and FreedomWon range models are the recommended batteries for use with the Sunsynk series inverters.



## Interfacing with the Inverter

**NB.** Only connect the batteries to the inverter until the settings are complete, no PV or grid sources. See **\*Note** in Battery section

The inverter settings are configured on the touch screen LCD of the inverter. The screen/inverter should come on when a power source is connected i.e., PV, Grid or Battery. Before installing batteries with the inverter, please ensure that they are both compatible as the system will not work if the two are not compatible. Below, Figure 1, is an image of how the settings page of the Sunsynk inverter looks like



Figure 1: Sunsynk settings page

## 2.1 Basic

This tab allows the user to enter details such as the time, display name etc. Please ensure that the correct time settings are entered as this could influence the functionality of the inverter especially if timed settings will be use.

## 2.2 Battery

**\*Note:** Ensure that the Grid and PV power sources are turned off before starting the inverter and until the battery communication and configuration is successful. Failure to do this could result in the Pylon batteries being damaged.

Before continuing with the installation, please ensure that the inverter and battery being installed are compatible with each other. When the inverter is connected to the battery, the inverter should be able to adopt the BMS parameters. This can be checked under Li-BMS in the settings menu. An example of what should be seen is in Figure 2 for CAN communication.

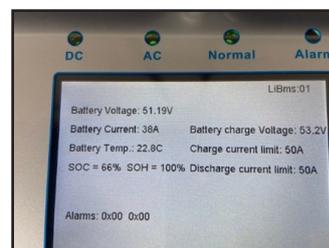


Figure 2: Li-BMS page

Go to the "Battery" under the settings menu. Press "Shut Down" and set "Shut down" at 3%, "Low Batt" at 5% as shown in Figure 3. **NB:** This differ from manufacturer, please ensure that the correct values are set for batteries not supplied by Segen.



Figure 3: Battery Shut Down settings

Press "Batt type". Choose battery mode "Lithium", input the capacity of the battery, charge/discharge currents according to the battery bank. For the protocol, please ensure that you follow the notes on the compatibility table as per manual. Then tick "BMS\_Err\_Stop" as shown in Figure 4.

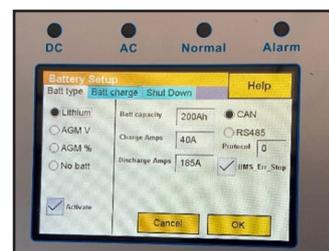


Figure 4: Battery type settings

## Sunsynk Freedom Won setup

Before commencing with the installation please ensure that the BMS cable is as per definition in Figure 5. After the communication cable is connected, please ensure that the Li-BMS page under settings is as in Figure 2. Please note that values may vary depending on the battery used.

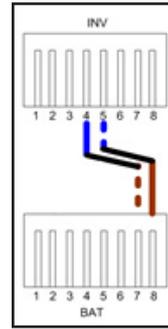


Figure 5: Sunsynk and Freedom Won BMS cable pinouts

On the “Battery” page under settings, go to “Batt type” and ensure that “Activate” is ticked and that “Lithium” is selected as in Figure 4. Freedom Won uses CAN communication so ensure “CAN” is selected and the Protocol is set to 0. The “Batt capacity”, “Charge Amps” and “Discharge Amps” will be dependent on the type of battery you have as well as the bank size. Finally, ensure that “BMS\_Err\_Stop” is ticked.

## Sunsynk US3000C/US2000C/UP5000 setup

Before commencing with the installation please ensure that the BMS cable is as per definition in Figure 6. After the communication cable is connected, please ensure that the Li-BMS page under settings is as in Figure 2. Please note that values may vary depending on the battery used.

Table 1: Suggested discharge currents

Suggested Discharge Current Limits					
No batteries per stack	Continues Discharge/Charge Current				
	1	2	3	4	5
Pylontech US2000	25	50	75	100	125
Pylontech US3000C	37	74	111	148	185
Pylontech UP5000	50	100	150	200	250

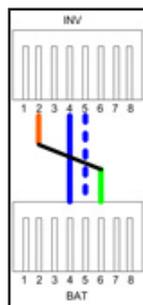


Figure 6: Pinout configurations for new Pylontech batteries

On the "Battery" page under settings, go to "Batt type" and ensure that "Activate" is ticked and that "Lithium" is selected as in Figure 4. For Pylontech CAN communication ensure "CAN" is selected and the Protocol is set to 0. The "Batt capacity", "Charge Amps" and "Discharge Amps" will be dependent on the type of battery you have as well as the bank size. Finally, ensure that "BMS\_Err\_Stop" is ticked

## Sunsynk US3000/US2000B setup

Before commencing with the installation please ensure that the BMS cable is as per definition in Figure 7. After the communication cable is connected, please ensure that the Li-BMS page under settings is as in Figure 2. Please note that values may vary depending on the battery used.

On the "Battery" page under settings these settings will be the same as that of the other Pylontech batteries i.e., US3000C/US2000C and UP5000.

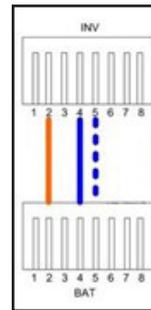


Figure 7: Pinout configurations for old Pylontech batteries

## 2.3 System Mode

The "System Mode" page is where the installer can program charge and discharge times. These settings are dependent on the application and purpose the system will serve. For further details please visit the manual. Figure 4 is an illustration of what each box does and how it can be utilized.

### Concerning the detailed Figure 4:

1. Tick this box to do not export power back to the grid (the CT coil will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load).
2. Tick this box if you wish to export your solar power back to the grid.
3. Tick this box if you only want to supply power to the load side of the inverter.
4. Zero export power is the amount of power flowing from the grid to the inverter. Set this value to 20 – 100W to force the inverter to always take this amount of power from the grid to minimize nuisance tripping "Reverse Power Detection" of sensitive prepaid electricity meters.
5. This controls the maximum overall power, both to the load and grid ports combined. It is set to low if an over current fault occurs.
6. Tick this box if you wish that the solar panels prioritize power to the load. But if you untick the solar will prioritize the power to charge the batteries.

Real Time    Power Limit    Battery % or voltage when an action is to happen    Charge from Grid  
 Charge from Gen  
 No Tick = Discharge

**SYSTEM MODE**    Help

Time    Power    SOC/V    Grid Gen

Zero Export  
 Solar Export  
 Limit to Load Only  
 Zero Export Power  
 Max Sell Power

Use Timer    Priority Load    Cancel    OK

Use controller    6

1    2    3    4    5

**What this page displays:**

- Prevent export power to the grid with "Zero Export".
- Limit power to supply to only all the house loads with "Solar Export".
- Limit power to supply only the loads connected to LOAD port with "Limit to Load only".

**What you can do from this page:**

- Define a real time to charge or discharge the battery.
- Choose to charge the battery from the grid or generator.
- Limit export power to the grid.
- Define to **charge** the battery from the grid or generator ticking Grid or Gen and define when it needs to occur.
- Define the time to **discharge** to the load or

Figure 8: System Mode page setup

The SegenSolar portal has a [System Designer](#) tool which allows you to create your systems. Please speak to your account manager if you require training on how to use the System Design tool. The design tool will allow you to create a quote quickly and easily with all the necessary components

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