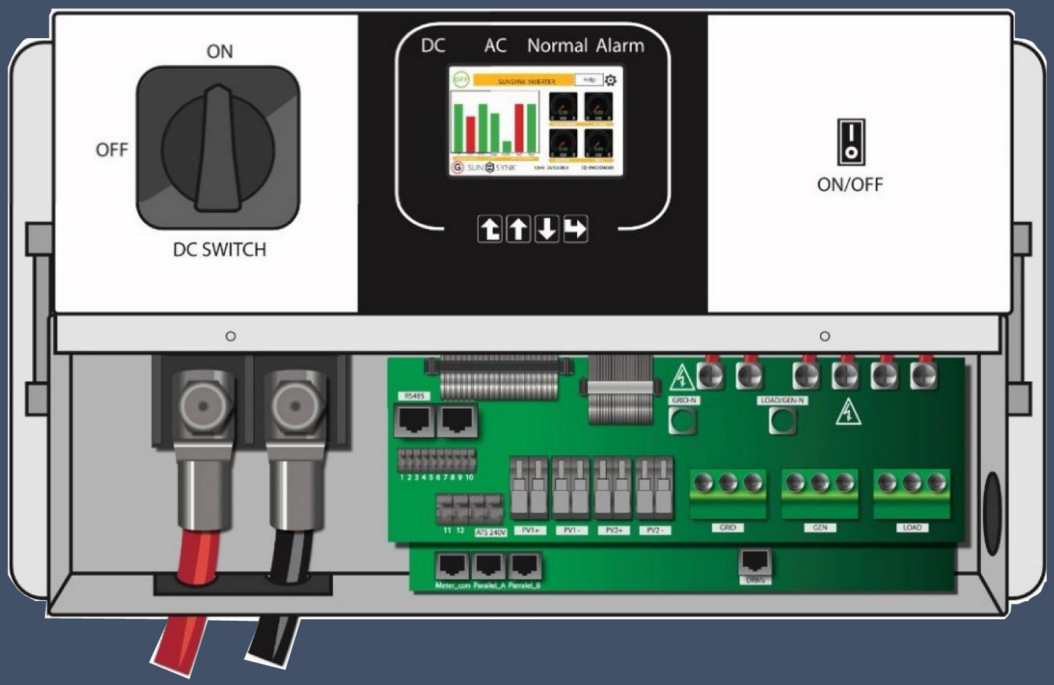
SUN SYNK

RACK-MOUNTED HYBRID PARITY (SUPER) INVERTER



DATASHEET

SUNSYNK-6K-SG02LP1 / SUNSYNK-7.6K-SG02LP1

Global Tech China Ltd, 3 Floor, Wai Yip Industrial Building.
171 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong.
Tel: +852 2884 4318 Fax: +8522884 4816
www.sunsynk.com / sales@globaltech-china.com
www.globaltechhk.com

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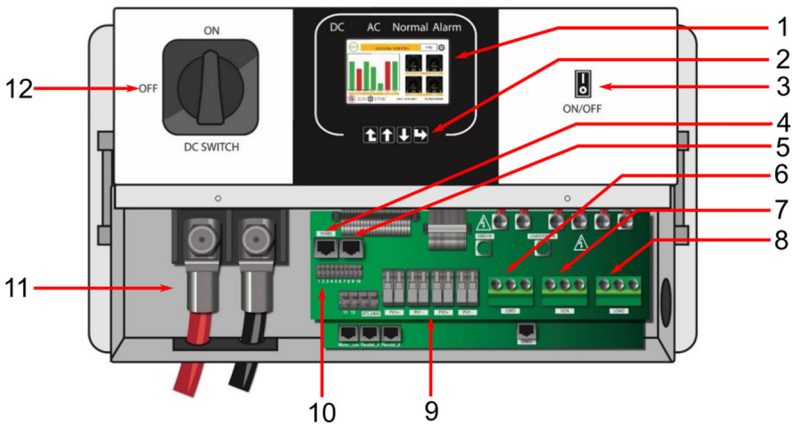
1. PRODUCT INTRODUCTION

The Sunsynk Three-Phase Hybrid Inverter is a highly efficient power management tool that allows the user to hit those 'parity' targets by managing power-flow from multiple sources such as solar, mains power (grid) and generators, and then effectively storing and releasing power as and when utilities require.

1.1. System Overview



1. LCD Display
2. Function Buttons
3. ON/OFF Button
4. RS485 Port
5. CAN Bus Port
6. Grid Port
7. Gen Port
8. Load Port
9. MPPT Inputs
10. I/O Inputs
11. Battery Input Connections
12. DC Switch

INTERACTIVE

- Easy and simple to understand display
- Supporting Wi-Fi or GSM monitoring
- Visual power flow screen
- Smart settable 3-stage MPPT charging for optimized battery performance
- Auxiliary load function
- Parallel / multi invert function grid-tied and off-grid

COMPATIBLE

- Compatible with main electrical grid voltages or power generators
- Compatible with wind turbines
- 220V single phase, pure sinewave inverter
- Self-consumption and feed-in to the grid
- Auto restart while AC is recovering
- Auto earth bond feature (Via a relay)

CONFIGURABLE

- Fully programmable controller
- Programmable supply priority for battery or grid
- Programmable multiple operation modes: on-grid/off-grid & UPS
- Configurable battery charging - current/voltage based on applications by LCD setting
- Configurable AC / solar / generator charger priority by LCD setting

SECURE

- Overload/over-temperature/short-circuit protection
- Smart battery charger design for optimized battery protection
- Limiting function installed to prevent excess power overflow to grid

APPLICATIONS

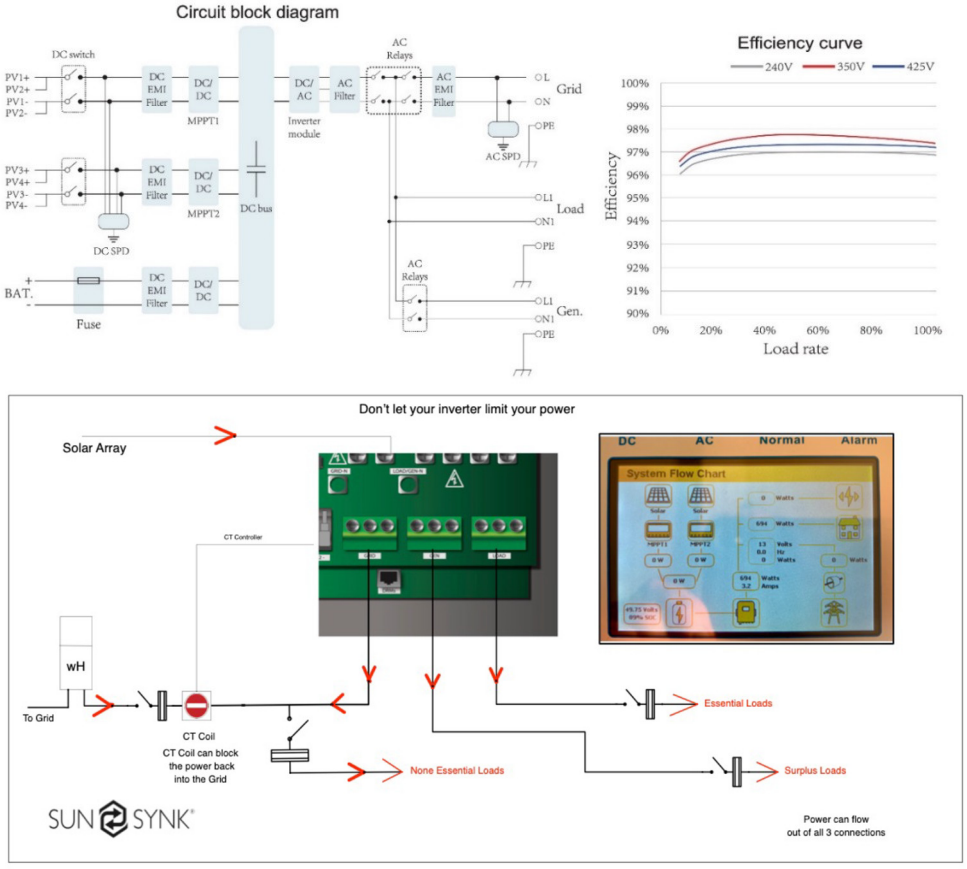
- Marine (vessel power management)
- Power shedding (home/office/factory)
- UPS (fuel-saving systems)
- Remote locations with solar and wind generators
- Building sites
- Military locations
- Telecommunication

2. TECHNICAL SPECIFICATIONS

Model	SUNSYNK-6K-SG02LP1	SUNSYNK-7.6K-SG02LP1
Battery Input Data		
Battery Type	Lead-acid or Lithium-ion	
Battery Voltage Range	40~60V	
Max. Charging Current	135A	190A
Max. Discharging Current	135A	190A
Charging Curve	3 Stages/Equalisation	
External Temperature Sensor	Optional	
Charging Strategy for Li-Ion Battery	Self-Adaptation to BMS	
PV String Input Data		
Max. DC Input Power	7800W	9880W
PV Input Voltage	370V (100V~500V)	
MPPT Range	125~425V	
Start-up Voltage	150V	
PV Input Current	18A+9A	22A+22A
No. of MPPT Trackers	2	
No. of Strings Per MPPT Tracker	2+1	2+2
AC Output Data		
Rated AC Output and UPS Power	6000W	7600W
Max. AC Power	6600W	8360W
Peak Power (off-grid)	2 times of rated power, 10 S	
AC Output Rated Current	25A	31.7A/33A
Max AC Output Current	27.5A	34.9A/36.3A
Max Continuous AC Passthrough	40A	50A
Output Frequency and Voltage	50/60Hz; 120/240Vac(split phase), 208Vac(2/3), 230Vac(single phase)	
Grid Type	Split phase, 2/3 phase, Single phase	
Current Harmonic Distortion	THD<3%(Linear load<1.5%)	
Efficiency		
Max. Efficiency	97.60%	
MPPT Efficiency	96.50%	
Euro Efficiency	99.90%	
Protection		
PV Arc Fault Detection	Integrated (Except European Type)	
PV Input Lightning Protection	Integrated	
Anti-islanding Protection	Integrated	
PV String Input Reverse Polarity Protection	Integrated	
Insulation Resistor Detection	Integrated	
Residual Current Monitoring Unit	Integrated	
Output Over Current Protection	Integrated	
Output Shorted Protection	Integrated	
Output Over Voltage Protection	Integrated	
Certifications and Standards		
Grid Regulation	UL1741, IEEE1547, RULE21, VDE0126, AS4777, NRS2017, G98,G99, IEC61683, IEC62116, IEC61727	
Safety Regulation	IEC62109-1, IEC62109-2	
EMC	EN61000-6-1, EN61000-6-3, FCC 15 Class B	
General Data		
Operating Temperature Range	-25~60°C, >45°C Derating	
Cooling	Fan	
Noise	<30	

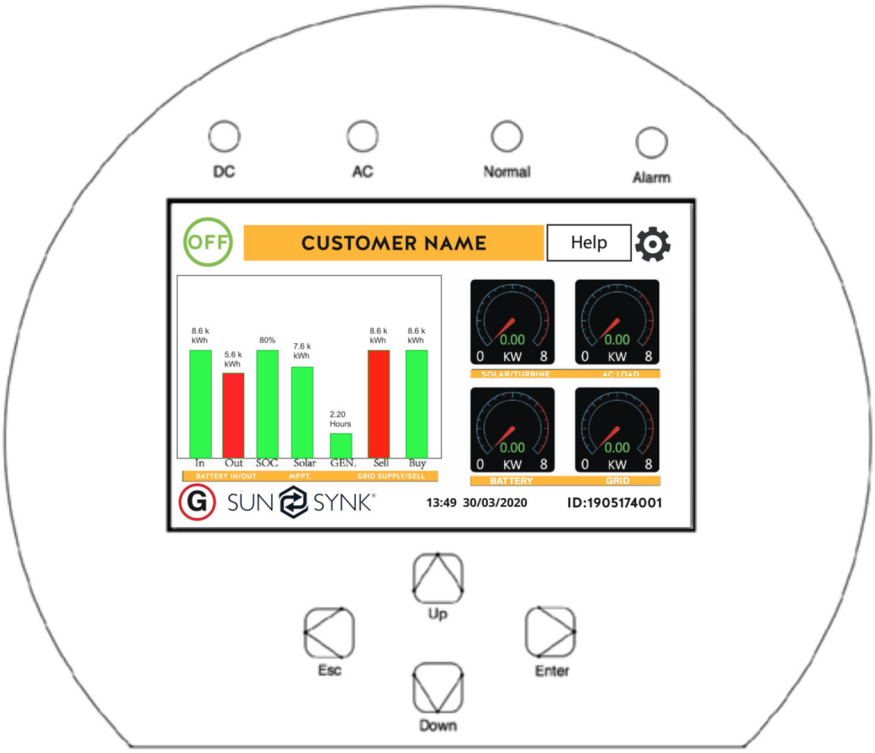
Communication with BMS	RS485; CAN
Warranty	5 years

2.1. System Diagram



3. OPERATION

3.1. Display



LED indicator		Meaning
DC	Green LED solid light	PV connection normal
AC	Green LED solid light	Grid connection normal
Normal	Green LED solid light	Inverter functioning normally
Alarm	Red LED solid light	Fault

Function Key	Description
Esc	To exit the previous mode
Up	Increase the value of a setting
Down	Decrease the value of a setting
Enter	Confirm setting change (If not pressed each time the setting will not be saved)

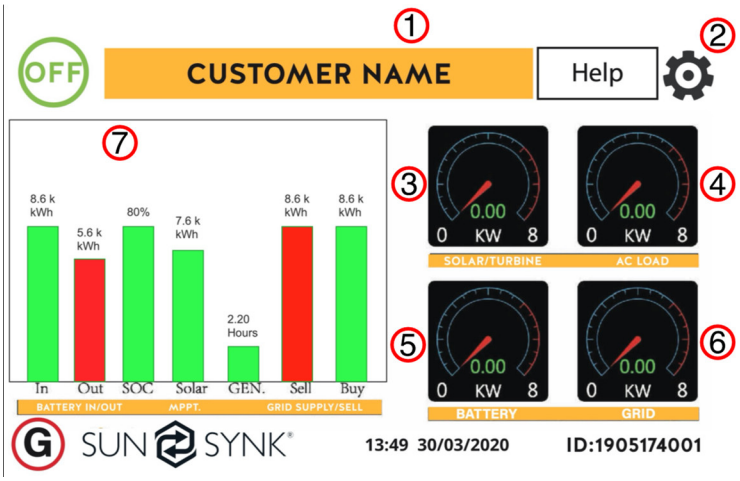
3.2. Switching ON/OFF

Once the inverter has been correctly installed and the batteries have been connected, press the ON/OFF button (located on the left side of the case) to activate the system.

When the system is connected without a battery but connected with either PV or grid and the ON/OFF button is switched off, the LCD will still illuminate (display will show off). In this condition, when switching on the ON/OFF button and selecting 'No Battery', the system can still work.

3.3. Home Page

Press the Esc button any page to access the home page:



Daily readings **Real time readings**

1. Customer name
2. Access settings menu page
3. Access solar history
4. Access system status page
5. Access system status page
6. Access grid history
7. Access system flow page

What this page displays:

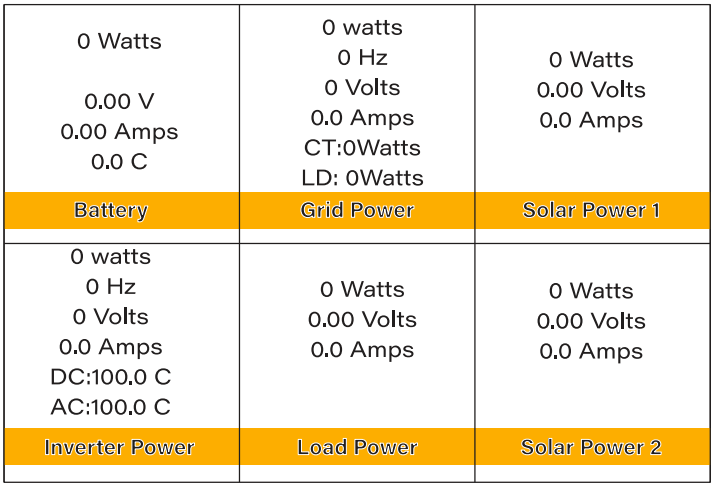
- Total daily power into the battery (kWh).
- Total daily power out of the battery (kWh).
- SOC (State of charge of the battery) (%).
- Total daily solar power produced in (kWh).
- Total hourly usage of the generator (Time).
- Total daily power sold to the grid (kWh).
- Total daily power bought from the grid (kWh).
- Real-time solar power in (kW).
- Real-time load power in (kW).
- Real-time battery charge power in (kW).
- Real-time grid power in (kW).
- Serial number.
- Time date.
- Fault condition.
- Access stats pages.
- Access status page.
- Access fault diagnostic page.

3.4. Status Page

To access the Status page, click on the BATTERY or AC LOAD dial on the Home page.

What this page displays:

- Total solar power produced.
- MPPT 1 power/voltage/current.
- MPPT 2 power/voltage/current.
- Grid power.
- Grid frequency.
- Grid voltage.
- Grid current.
- Inverter power.
- Inverter frequency.
- Inverter voltage.
- Inverter current.
- Load power.
- Load voltage.
- Battery power charge/discharge.
- Battery SOC.
- Battery voltage.
- Battery current.
- Battery temperature.



Solar Column: Shows total PV (Solar) power at the top and then details of each of the two MPPT's below L1 & L2 voltage.

Grid Column: Shows grid total power, frequency, voltage, and current. When selling power to grid the power is negative. When consuming from the grid the power is positive. If the sign of the grid and HM (home) powers are not the same when the PV is disconnected and the inverter is only taking energy from the grid and using the CT connected to Limit-2, then please reverse the polarity of the CT coil. **Important**: See Section 4.6 ('Connecting the CT coil').

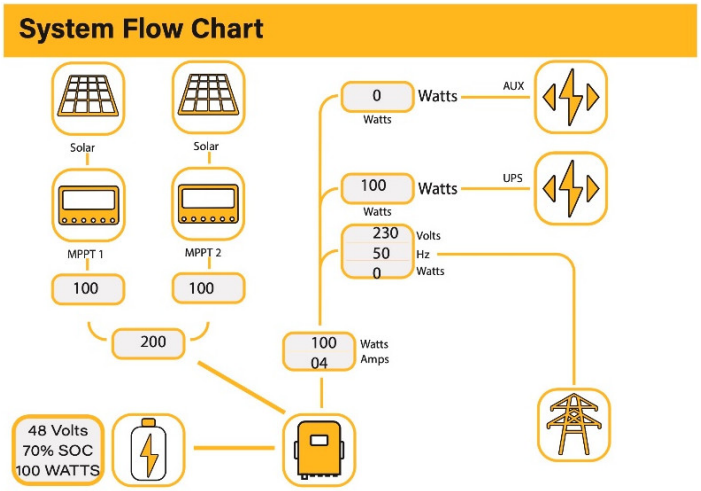
Inverter Column: Showing inverter total power, frequency, L1, L2, voltage, current, and power.

Load Column: Showing total load power, load voltage, and power on L1 and L2.

Battery Column: Showing total power from the battery, battery SOC, battery voltage, battery current (negative means charge, positive means discharge) battery temperature (shows zero if the battery temperature sensor is not connected). DC transformer temperature and AC heatsink temperature (When the temperature reaches 90°C it will display in red and the performance of the inverter will start deteriorating when it reaches 110°C. Subsequently, the inverter will shut down to allow it to cool and reduce its temperature.

3.5. System Flow Page

Access by clicking on the bar chart on the Home Page.



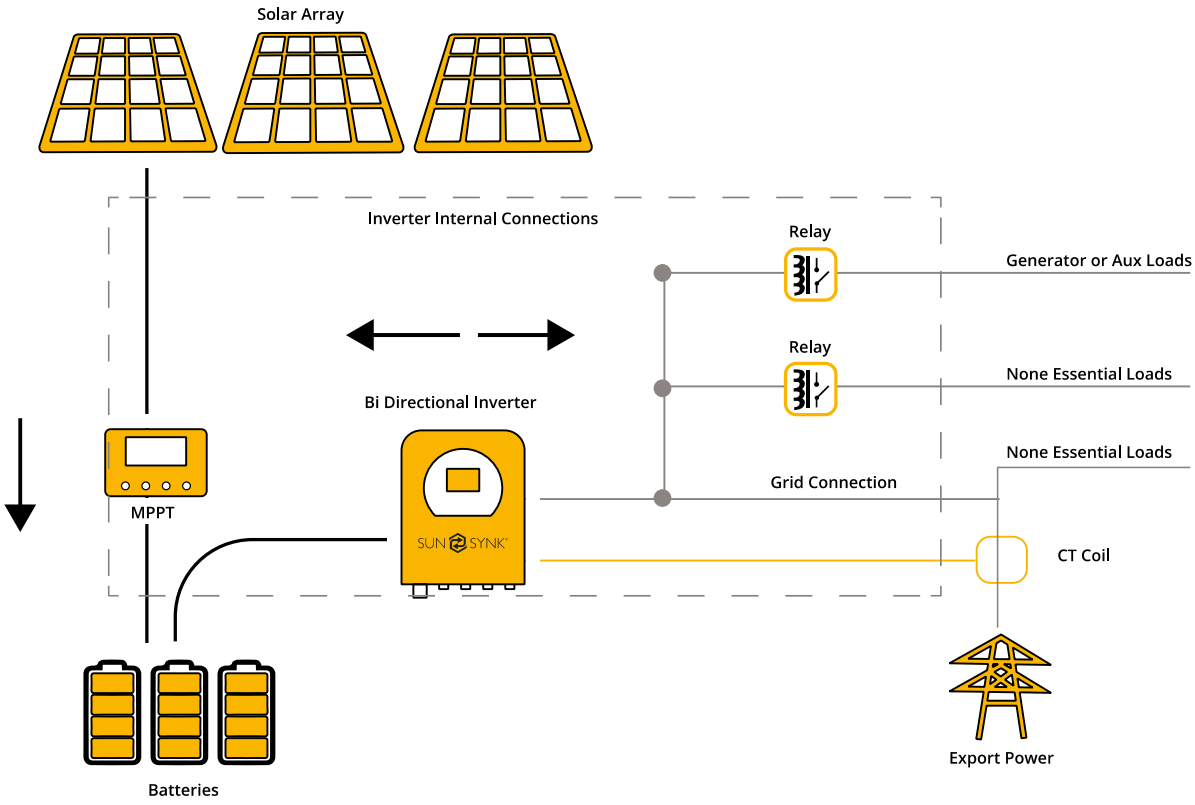
What this page displays:

- The system flow.
- MPPTs power.
- Battery status.
- Power distribution to load or grid.

To better understand the functioning of your system, take a look at the figure bellow:

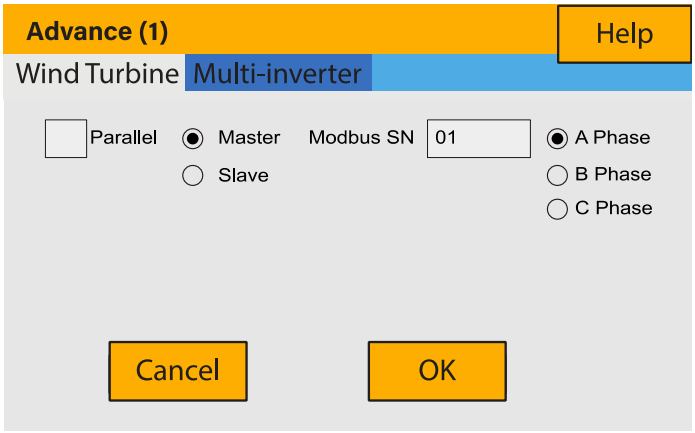
1. The PV modules charge the batteries.
2. When the batteries reach a specific level (programmable) the battery power is fed into the inverter.

3. The inverter can then supply power to the grid (export or no export), load, and auxiliary or smart load.
4. CT coil controls the export power.



3.6. Advanced Settings for Paralleling Inverters

To configure multi-inverter settings, click on the ADVANCE icon.



What this page displays:

- If the inverter operates as a master or a slave.
- Modbus Device ID – 'Modbus SN' that must be unique for each inverter connected to the bus/wire.

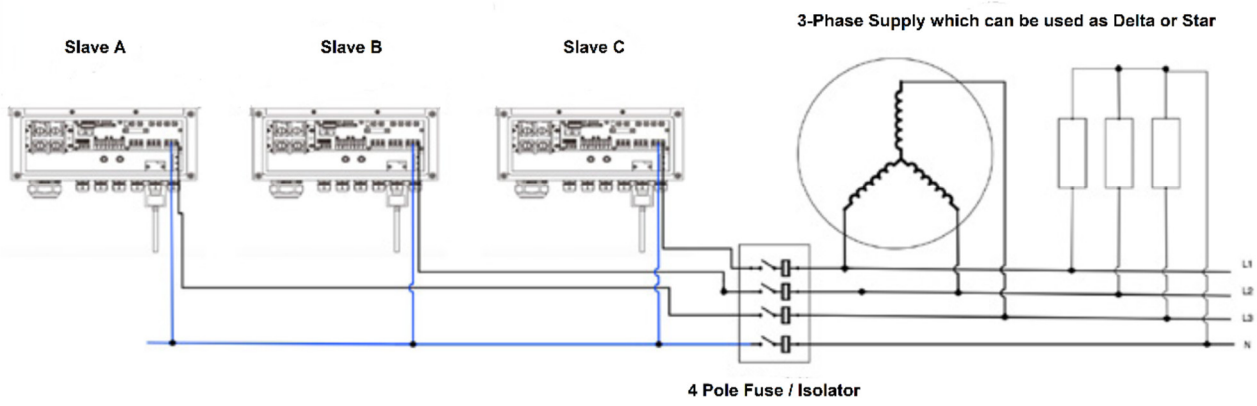
What you can do from this page:

- Set the inverter as a master or slave per bus/wire.
- Set the phase in which the inverter will be paralleled.
- Set the Modbus SN for

The Sunsynk parity inverter can be wired standalone or where more power is required it can be connected in parallel either single or 3 phase configuration. The maximum number of inverters that can be paralleled in a single phase utility grid is three (10.8kW, 16.5kW, and 26.4kW for the 3.6kW, 5.5kW, and 8.8 kW model, respectively) and the maximum number that can be paralleled in a three phase utility grid is nine (32.4kW, 49.5kW, and 79.2kW for the 3.6kW, 5.5kW, and 8.8 kW model, respectively).

To parallel six inverters in a three phase utility grid is necessary to set three inverters as master and three as slaves:

- Phase A: Master A and Slave A
- Phase B: Master B and Slave B
- Phase C: Master C and Slave C



For stability, all the batteries need to be connected in parallel. It is recommended a minimum cable size of 50mm diameter with fuse isolators to each inverter.

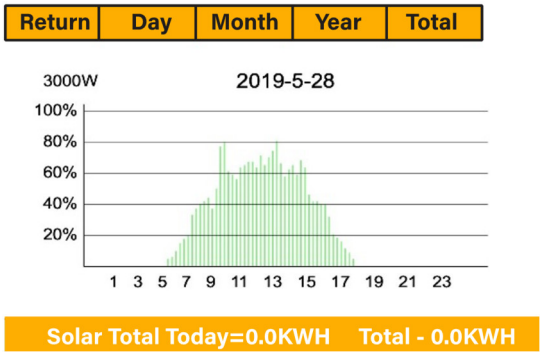
Each invert will require a fuse isolator with surge protection and each group circuit will require an RCD. If the batteries as supplying power to the main load during the outage then a change over switch will also be required or a split load can be used.

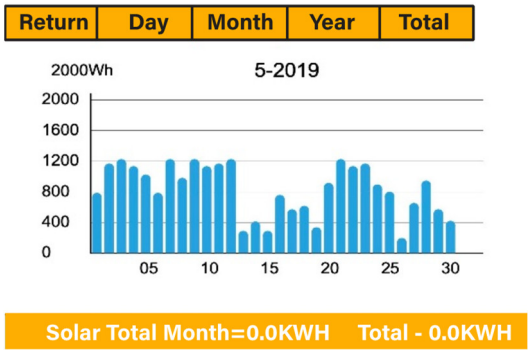
- The CT coils used to limit export power must only be connected to the master. Therefore, if six inverters are paralleled, three CT coils will be required.
- Connect a RJ45 communication cable between each inverter; the order is not important since both sockets are the same, so there is no IN or OUT.
- Each phase must only have one master and the others set to slave.
- Each inverter must have a unique Modbus number.
- The maximum length of the communication cables is 2 meters (do not exceed this value)
- All batteries must be connected in parallel and the MPPTs must be kept separate.

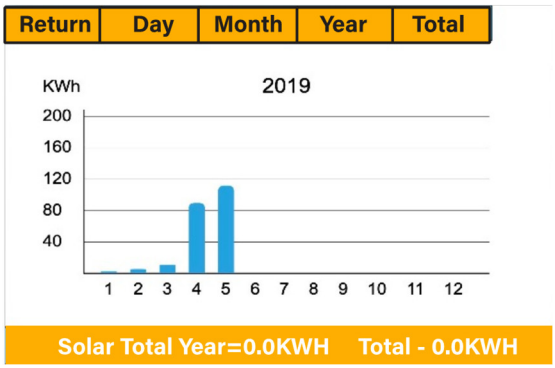
If you need further help please refer to the Sunsynk website where you will find training videos and Frequently Asked Questions www.sunsynk.com. From here you can also update the inverter operating system if required. In most cases, our inverters are fine as they are and no upgrades are needed.

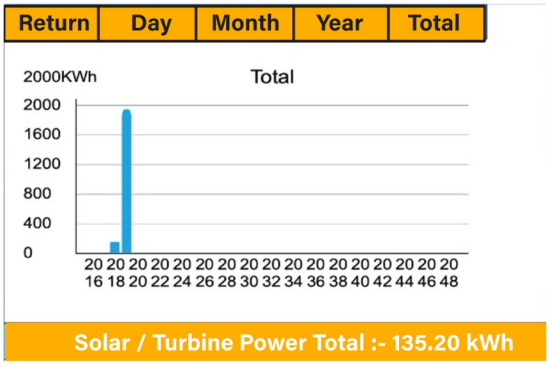
3.7. Solar Power Generated

This page shows the daily, monthly, yearly, and total solar power produced. Access this page by clicking on the ‘Solar/Turbine’ icon on the Home Page.



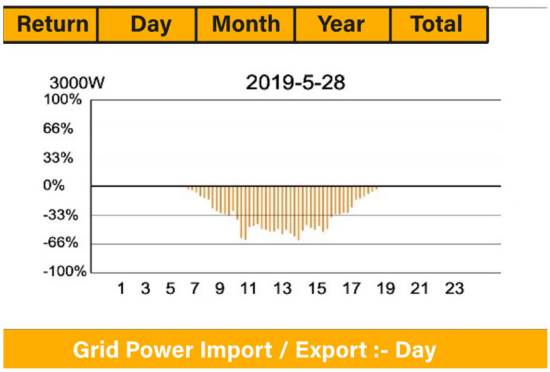


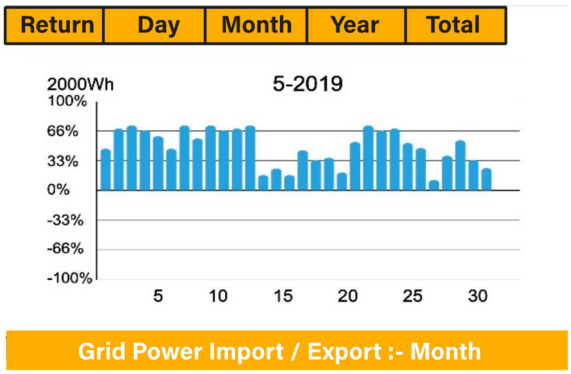


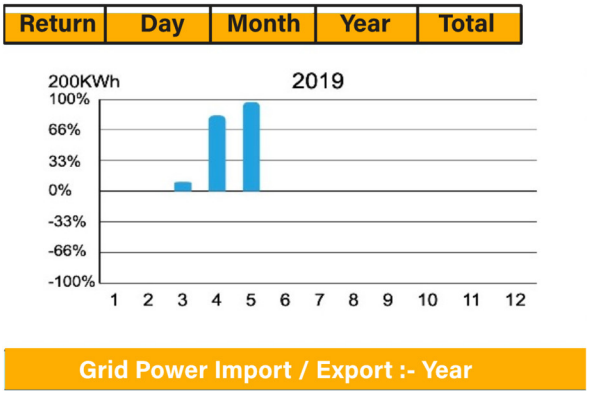


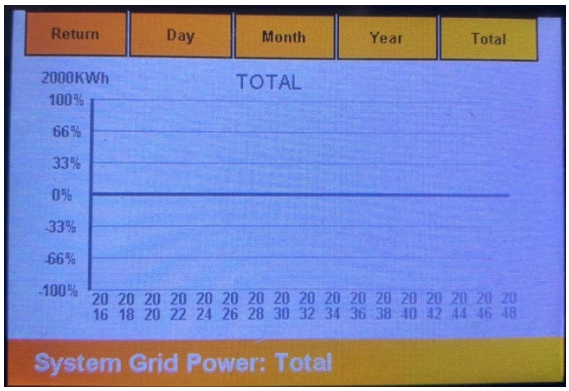
3.8. Grid Power

This page shows the Daily / Monthly / Yearly and total grid power export or consumed. Access this page by clicking on the ‘Solar/Turbine’ icon on the home page.









For more information, training videos, software upgrades, help line, forum please refer to http://www.sunsynk.com - Tech Support (Do not forget to register first on the website).

Sunsynk

@energysolutions

@sunsynkofficial

Sunsynk Limited & Global Tech China Ltd,
3 Floor, Wai Yip Industrial Building.
171 Wai Yip Street, Kwun Tong,
Kowloon, Hong Kong.
Tel. HK +852 2884 4318 Fax: +852 2884 4816
Tel. UK +44 151 528 9945
Tel. SA +27 1108 39837
sales@globaltech-china.com

Audio Training manuals on Apple Pod Cast and Spotify
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SUN SYNK

Global Tech China Ltd
3rd Floor, Wai Yip Street Kwun Tong, Kowloon, Hong Kong
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