SUN ⮀ SYNK

HYBRID PARITY (SUPER) INVERTER

DATASHEET

SUNSYNK-3.6K-SG01/03LP1, SUNSYNK-3.6K-SG02LP1, SUNSYNK-5K-SG01/03LP1, SUNSYNK-5K-SG02LP1, SUNSYNK-8K-SG01LP1, SUNSYNK-8K-SG02LP1

All models fall into two cabinet / PCB types 3.6kW / 5.5kW (Small) and 8.8kW (Large):

5.5kW Type:
SUNSYNK-3.6K-SG01/03LP1
SUNSYNK-3.6K-SG02LP1
SUNSYNK-5K-SG01/03LP1
SUNSYNK-5K-SG02LP1

8.8kW Type
SUNSYNK-8K-SG01LP1
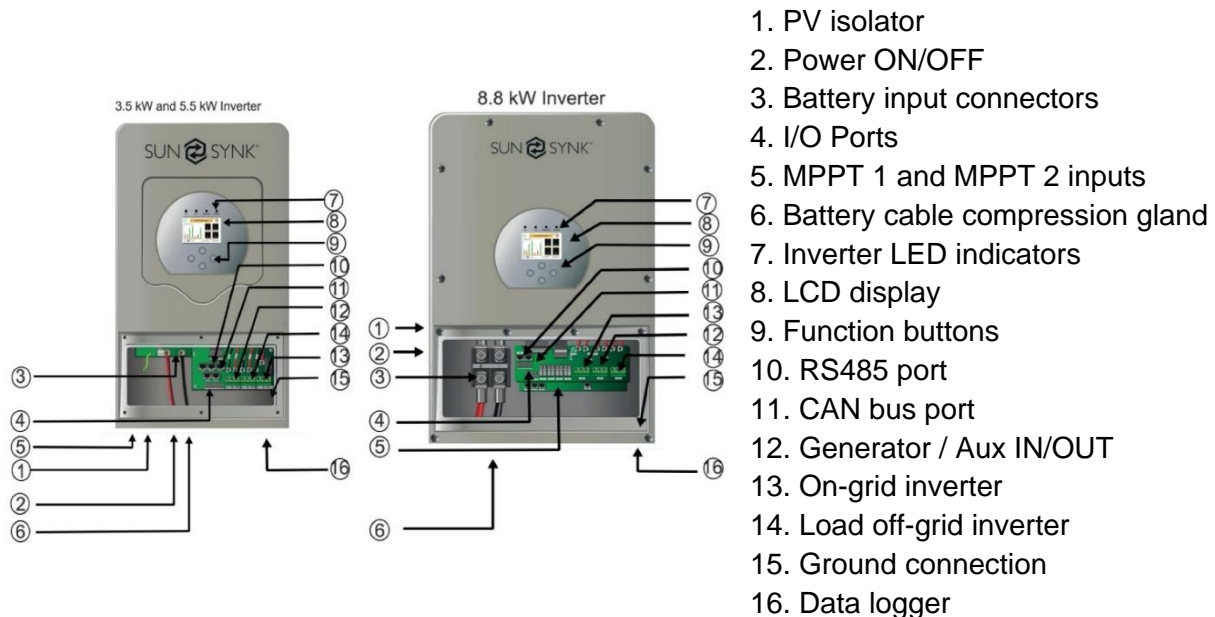SUNSYNK-8K-SG02LP1

3.6kW / 5.5kW   8.8kW

INDEX

1. PRODUCT INTRODUCTION

The Sunsynk Single-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. PV isolator
2. Power ON/OFF
3. Battery input connectors
4. I/O Ports
5. MPPT 1 and MPPT 2 inputs
6. Battery cable compression gland
7. Inverter LED indicators
8. LCD display
9. Function buttons
10. RS485 port
11. CAN bus port
12. Generator / Aux IN/OUT
13. On-grid inverter
14. Load off-grid inverter
15. Ground connection
16. Data logger

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

■ **SUNSYNK-3.6K-SG01/03LP1**

Model	SUNSYNK-3.6K-SG01/03LP1
Battery Input Data	
Battery Type	Lead-acid or Lithium-ion
Battery Voltage Range	40~60V
Max. Charging Current	90A
Max. Discharging Current	90A
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	4680W
PV Input Voltage	370V (100V~500V)
MPPT Range	125~425V
Full Load DC Voltage Range	240~425V
Start-up Voltage	150V
PV Input Current	11A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	1+1
AC Output Data	
Rated AC Output and UPS Power	3600W
Max. AC Power	3960W
Peak Power (off-grid)	2 times of rated power, 10 S
AC Output Rated Current	15.7A
Max AC Output Current	18A
Max Continuous AC Passthrough	35A
Power Factor	0.8 leading to 0.8 lagging
Output Frequency and Voltage	50/60Hz; 220/230/240Vac (single phase)
Grid Type	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 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	VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727, RD1699:2011, XP C15-712-3:2019-05
Safety Regulation	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3
General Data	
Operating Temperature Range	-25~60°C, >45°C Derating
Cooling	Natural Cooling
Noise	<30dB
Communication with BMS	RS485; CAN
Weight	20.5kg
Size (Length x Width x Height)	580 x 330 x 208 mm
Protection Degree	IP65
Warranty	5 years

■ **SUNSYNK-3.6K-SG02LP1**

Model	SUNSYNK-3.6K-SG02LP1
Battery Input Data	
Battery Type	Lead-acid or Lithium-ion
Battery Voltage Range (V)	40~60V
Max. Charging Current (A)	90A
Max. Discharging Current (A)	90A
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 (W)	7000W
Voc Max. (V)	500V
MPPT Range (V)	125~425V
Full Load DC Voltage Range (V)	240~425V
Start-up Voltage (V)	150V
PV Input Current (A)	11A+11A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	1+1
AC Output Data	
Rated AC Output and UPS Power (W)	3600W
Max. AC Power (W)	3960W
Peak Power (off-grid)	2 times of rated power, 10 S
AC Output Rated Current (A)	15.7A
Max AC Output Current (A)	18A
Max Continuous AC Passthrough (A)	35A

Power Factor	0.8 leading to 0.8 lagging
Output Frequency and Voltage	50/60Hz; 220/230/240Vac (single phase)
Grid Type	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 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	VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727, RD1699:2011, XP C15-712-3:2019-05
Safety Regulation	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3
General Data	
Operating Temperature Range (℃)	-25~60°C, >45°C Derating
Cooling	Natural Cooling
Noise (dB)	<30
Communication with BMS	RS485; CAN
Weight (kg)	20.5
Size (Length x Width x Height)	580 x 330 x 208 mm
Protection Degree	IP65
Installation Style	Wall-mounted

■ **SUNSYNK-5K-SG01/03LP1**

Model	**SUNSYNK-5.5K-SG01/03LP1**
Battery Input Data	
Battery Type	Lead-acid or Lithium-ion
Battery Voltage Range	40~60V
Max. Charging Current	120A
Max. Discharging Current	120A
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	6500W

PV Input Voltage	370V (100V~500V)
MPPT Range	125~425V
Full Load DC Voltage Range	240~425V
Start-up Voltage	150V
PV Input Current	11A+11A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	1+1
AC Output Data	
Rated AC Output and UPS Power	5000W
Max. AC Power	5500W
Peak Power (off-grid)	2 times of rated power, 10 S
AC Output Rated Current	21.7A
Max AC Output Current	25A
Max Continuous AC Passthrough	35A
Power Factor	0.8 leading to 0.8 lagging
Output Frequency and Voltage	50/60Hz; 220/230/240Vac (single phase)
Grid Type	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 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	VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727, RD1699:2011, XP C15-712-3:2019-05
Safety Regulation	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3
General Data	
Operating Temperature Range	-25~60°C, >45°C Derating
Cooling	Fan
Noise	<30dB
Communication with BMS	RS485; CAN
Weight	20.5kg
Size (Length x Width x Height)	580 x 330 x 208 mm
Protection Degree	IP65
Warranty	5 years

■ **SUNSYNK-5K-SG02LP1**

Model	SUNSYNK-5.5K-SG02LP1
Battery Input Data	
Battery Type	Lead-acid or Lithium-ion
Battery Voltage Range	40~60V
Max. Charging Current	120A
Max. Discharging Current	120A
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	6500W
PV Input Voltage	370V (100V~500V)
MPPT Range	125~425V
Full Load DC Voltage Range	240~425V
Start-up Voltage	150V
PV Input Current	11A+11A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	1+1
AC Output Data	
Rated AC Output and UPS Power	5000W
Max. AC Power	5500W
Peak Power (off-grid)	2 times of rated power, 10 S
AC Output Rated Current	20.8A
Max AC Output Current	22.0039A
Max Continuous AC Passthrough	35A
Power Factor	0.8 leading to 0.8 lagging
Output Frequency and Voltage	50/60Hz; 220/230/240Vac (single phase)
Grid Type	Single Phase
Current Harmonic Distortion	THD<3% (Linear load<1.5%)
Efficiency	
Max. Efficiency	97.60%
MPPT Efficiency	97.00%
Euro Efficiency	99.90%
Protection	
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	

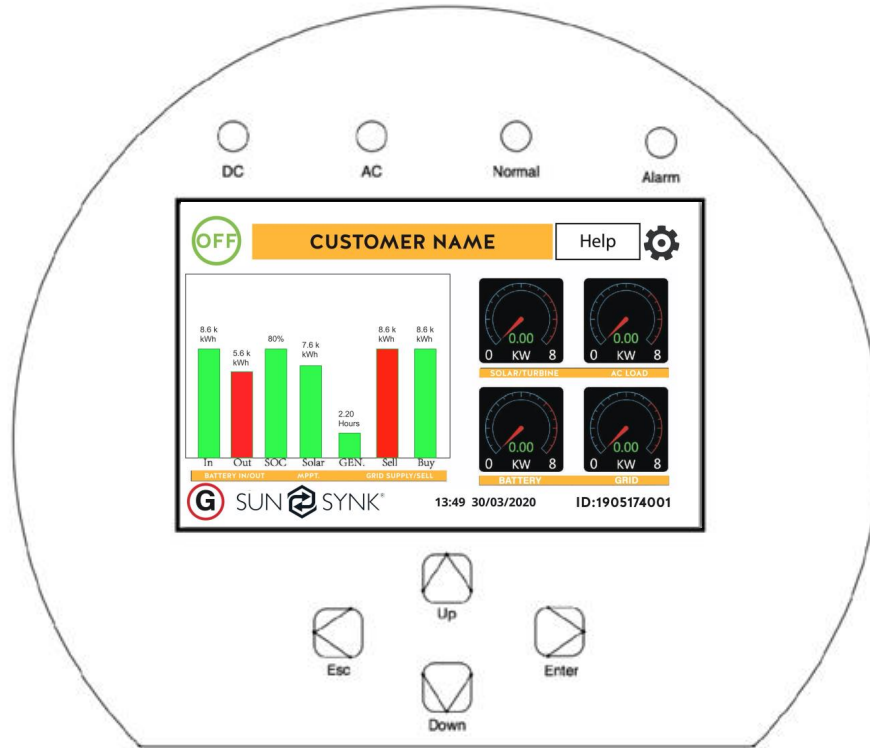| Grid Regulation	VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727, RD1699:2011, XP C15-712-3:2019-05
Safety Regulation	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3
General Data	
Operating Temperature Range	-25~60°C, >45°C Derating
Cooling	Fan
Noise	<30dB
Communication with BMS	RS485; CAN
Weight	20.5kg
Size (Length x Width x Height)	580 x 330 x 208 mm
Protection Degree	IP65
Warranty	5 years

■ **SUNSYNK-8K-SG01LP1 and SUNSYNK-8K-SG02LP1**

Model	SUNSYNK-8K-SG01LP1 / SUNSYNK-8K-SG02LP1
Battery Input Data	
Battery Type	Lead-acid or Lithium-ion
Battery Voltage Range	40~60V
Max. Charging Current	190A
Max. Discharging Current	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	10400W
PV Input Voltage	370V (100V~500V)
MPPT Range	125~425V
Full Load DC Voltage Range	240~425V
Start-up Voltage	150V
PV Input Current	22A+22A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	2+2
AC Output Data	
Rated AC Output and UPS Power	8000W
Max. AC Power	8800W
Peak Power (off-grid)	2 times of rated power, 10 S
AC Output Rated Current	33.4A/35A
Max AC Output Current	36.7A/38.5A
Max Continuous AC Passthrough	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	<30db
Communication with BMS	RS485; CAN
Weight	32kg
Size (Length x Width x Height)	670 x 420 x 233 mm
Protection Degree	IP65
Installation Style	Wall-mounted

2.1. System Diagram

Circuit block diagram

Efficiency curve

Don't let your inverter limit your power

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.

Battery	Grid Power	Solar Power 1
0 Watts 0.00 V 0.00 Amps 0.0 C	0 watts 0 Hz 0 Volts 0.0 Amps CT:0Watts LD: 0Watts	0 Watts 0.00 Volts 0.0 Amps
Inverter Power	**Load Power**	**Solar Power 2**
0 watts 0 Hz 0 Volts 0.0 Amps DC:100.0 C AC:100.0 C	0 Watts 0.00 Volts 0.0 Amps	0 Watts 0.00 Volts 0.0 Amps

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.
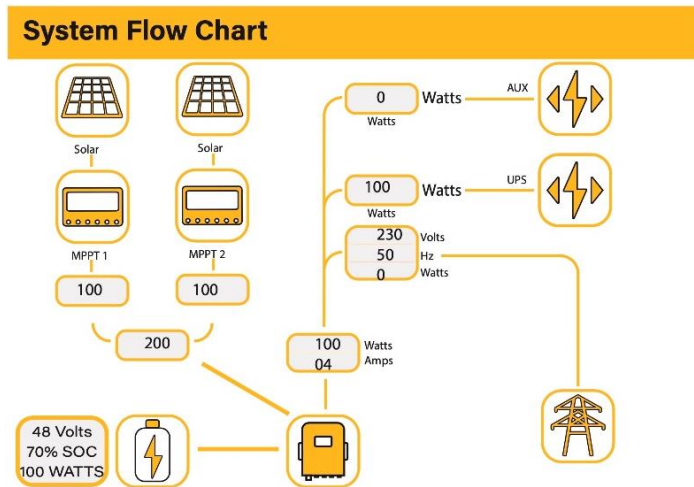
What this page displays:

- 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.
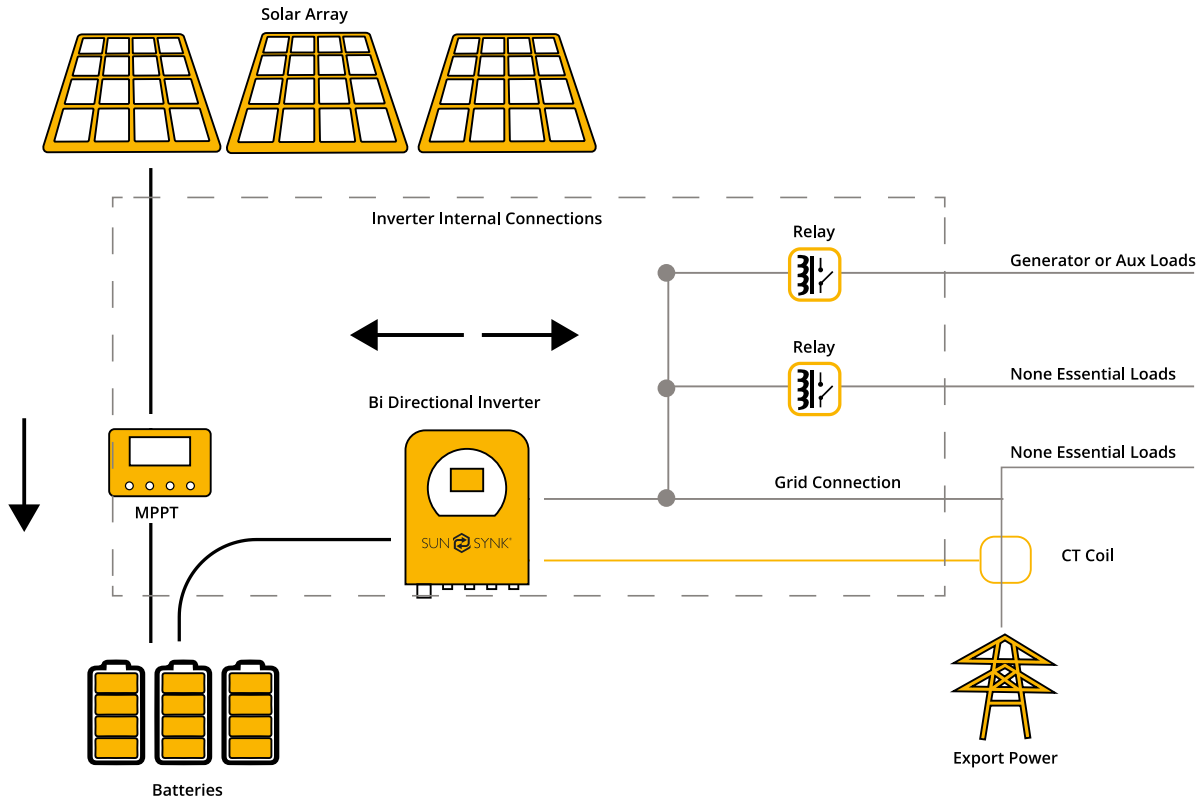
3.6. Advanced Settings for Paralleling Inverters

To configure multi-inverter settings, click on the ADVANCE icon.
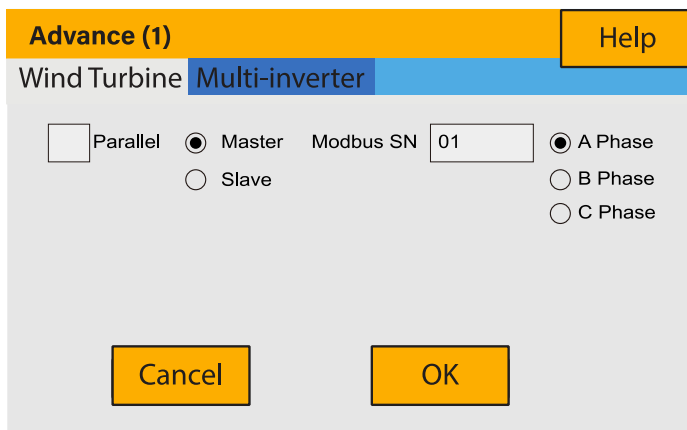
What this page displays:

- 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
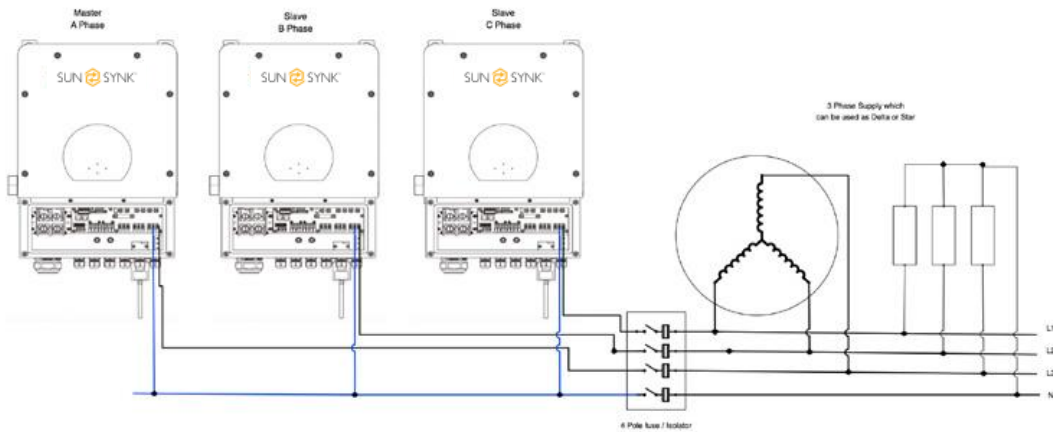
For stability, all the batteries need to be connected in parallel. It is recommended a minimum cable size of 50mm diameter with fuse isolators to each inverter.
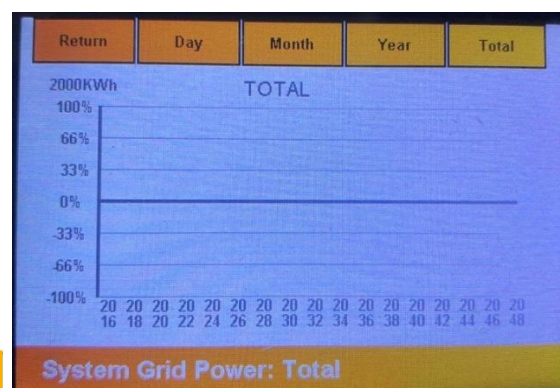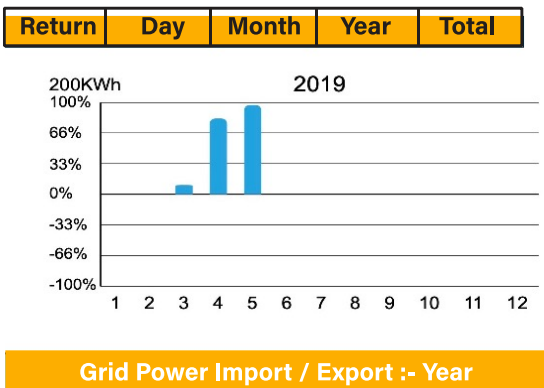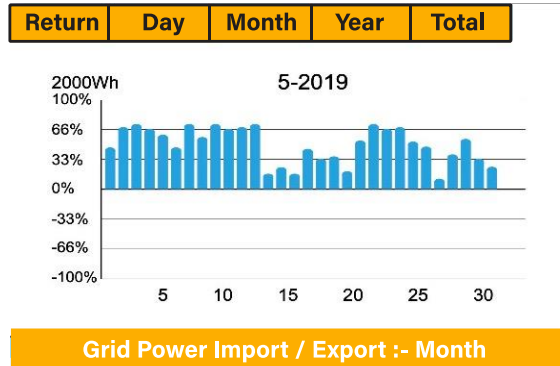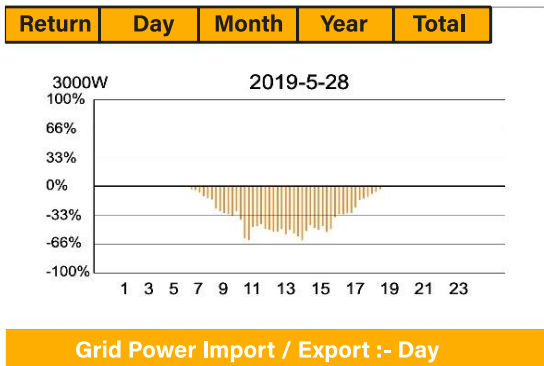
Each invert will require a fuse isolator with surge protection and each group circuit will require an RCD. If the batteries as supplying power to the main load during the outage then a change over switch will also be required or a split load can be used.

■ 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.

| Return | Day | Month | Year | Total |

Grid Power Import / Export :- Day

| Return | Day | Month | Year | Total |

Grid Power Import / Export :- Month

| Return | Day | Month | Year | Total |

Grid Power Import / Export :- Year

System Grid Power: Total

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

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Audio Training manuals on Apple Pod Cast and Spotify

Full training support, manuals and videos on www.sunsynk.com

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