# SUN ⇄ SYNK

# THREE-PHASE HYBRID INVERTER



# DATASHEET

SUN-8K-SG04LP3 / SUN-10K-SG04LP3 / SUN-12K-SG04LP3

# INDEX

# 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.

**INTERACTIVE**

- Easy and simple to understand LCD display;
- Supporting Wi-Fi or GSM monitoring;
- Visual power flow screen;
- Built-in 2 strings for 1 MPP tracker and 1 string for 1 MPP tracker;
- Smart settable 3-stage MPPT charging for optimised battery performance;
- Auxiliary load function;
- Parallel (coming soon) / multi-inverter function: grid-tied and off-grid;

**COMPATIBLE**

- Compatible with mains electrical grid voltages or power generators;
- Compatible with wind turbines;
- 230V/400V Three-phase Pure Sinewave Inverter;
- Self-consumption and feed-in to the grid;
- Auto restart while AC is recovering;
- Maximum charging/discharging current of 190A (8kW), 210A (10kW), and 240A (12kW);
- DC and AC couple to retrofit existing solar system;
- Compatible with a 48V low-voltage battery;

**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;
- 6 time periods for battery charging/discharging

## SECURE

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

## APPLICATIONS

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

The following diagram explains the basic application and architecture of this 3-Phase Inverter. The system is composed of solar panels, batteries, a generator or utility grid, normal loads, smart loads and monitoring systems.
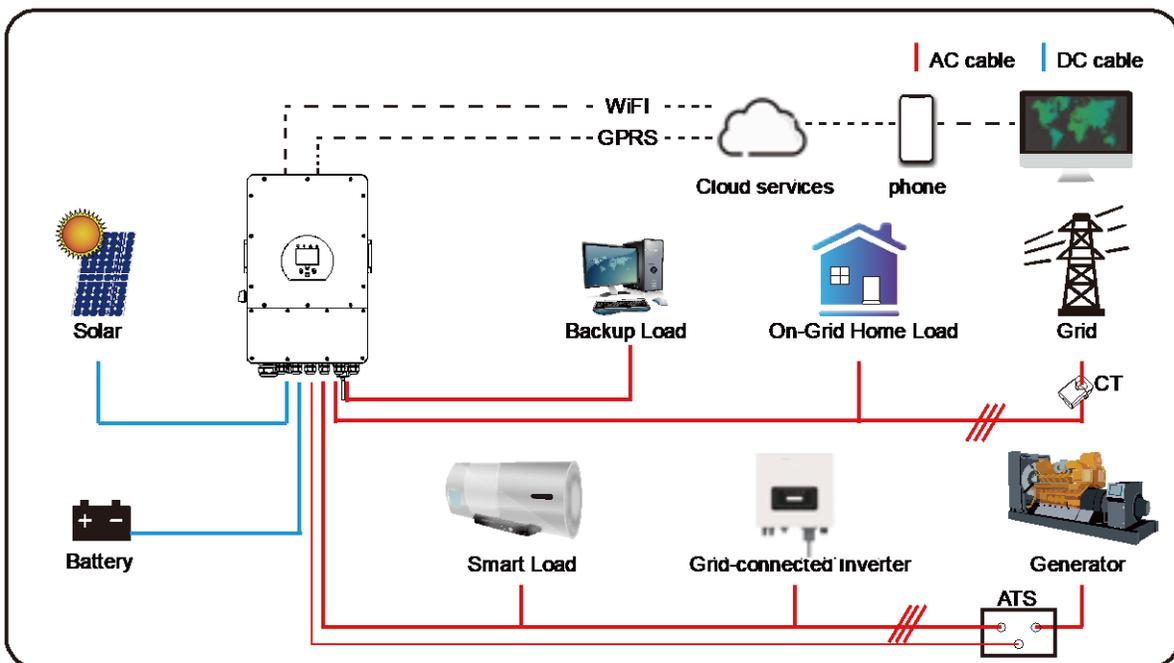
## 2. TECHNICAL SPECIFICATIONS

| Model No. | SUNSYNK-8K-SG04LP3 |
|---|---|
| Product Type | Hybrid Inverter |
| Enclosure | IP65 |
| Ambient Temperature | -45ºC ~ 60ºC (>45ºC derating) |
| Protection Level | Class I |
| **Charge Mode** | |
| Battery Voltage | 48Vd.c (40Vd.c ~ 60Vd.c) |
| Battery Current | 190Ad.c (max.) |
| AC Input Voltage | 3L/N/PE 220/380Va.c, 230/400Va.c |
| AC Input Frequency | 50/60Hz |
| AC Input Rated Current | 12.1Aa.c |
| Max. AC Input Current | 18.2Aa.c (max.) |
| Max. AC Input Power | 8800W |
| Max. Apparent Output Power | 8800VA |
| PV Input Voltage | 440Vd.c (160Vd.c ~ 800Vd.c) |
| MPPT Input Voltage | 200Vd.c ~ 650Vd.c |
| PV Input Current | 13Ad.c + 13Ad.c |
| Max. PV Input Power | 10400W |
| Max. PV Isc | 17Ad.c + 17Ad.c |
| **Utility-Interactive** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 12.1Aa.c |
| Max. AC Output Current | 18.2Aa.c (max.) |
| Max. AC Output Power | 8800W |
| AC Output Rated Power | 8000W |
| AC Output Power Factor | 0.8 leading to 0.8 lagging |
| Max. AC Isc | 75Aa.c |
| Battery Discharge Voltage | 40Vd.c ~ 60Vd.c |
| Battery Discharge Current | 190Ad.c (max.) |
| Battery Discharge Power | 8000W |
| **Stand Alone** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 230/400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 12.1Aa.c |
| AC Output Rated Power | 8000W |
| Max. Continuous AC | 45Aa.c |
| Battery Discharge Voltage | 40Vd.c ~ 60Vd.c |
| Max. Discharge Current | 190A (max.) |
| Compliance | VDE-AR-N 4105:1028-11; DINVDE V 0124-100:2020-06; IEC/EN62109-1/2:2010; IEC/EN62109-1/2:2011 |

| Model No. | SUNSYNK-10K-SG04LP3 |
| --- | --- |
| Product Type | Hybrid Inverter |
| Enclosure | IP65 |
| Ambient Temperature | -45ºC ~ 60ºC (>45ºC derating) |
| Protection Level | Class I |
| **Charge Mode** | |
| Battery Voltage | 48Vd.c (40Vd.c ~ 60Vd.c) |
| Battery Current | 210Ad.c (max.) |
| AC Input Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Input Frequency | 50/60Hz |
| AC Input Rated Current | 15.2Aa.c |
| Max. AC Input Current | 22.7Aa.c (max.) |
| Max. AC Input Power | 11000W |
| Max. Apparent Output Power | 11000VA |
| PV Input Voltage | 550Vd.c (150Vd.c ~ 800Vd.c) |
| MPPT Input Voltage | 200 Vd.c ~ 650Vd.c |
| PV Input Current | 26Ad.c + 13Ad.c |
| Max. PV Input Power | 13000W |
| Max. PV Isc | 34Ad.c + 17Aa.c |
| **Utility-Interactive** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 15.2Aa.c |
| Max. AC Output Current | 22.7Aa.c (max.) |
| Max. AC Output Power | 11000W |
| AC Output Rated Power | 10000W |
| AC Output Power Factor | 0.8 leading to 0.8 lagging |
| Max. AC Isc | 75Aa.c |
| Battery Discharge Voltage | 40Vd.c~60Vd.c |
| Battery Discharge Current | 210Ad.c (max.) |
| Battery Discharge Power | 10000W |
| **Stand Alone** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 15.2Aa.c |
| AC Output Rated Power | 10000W |
| Max. Continuous AC | 45Aa.c |
| Peak Output Power | 20000W (10 seconds) |
| Battery Discharge Voltage | 40Vd.c ~ 60Vd.c |
| Max. Discharge Current | 210Ad.c (max.) |
| Compliance | VDE-AR-N 4105:1028-11; DINVDE V 0124-100:2020-06; IEC/EN62109-1/2:2010; IEC/EN62109-1/2:2011 |

| Model No. | SUNSYNK-12K-SG04LP3 |
|---|---|
| Product Type | Hybrid Inverter |
| Enclosure | IP65 |
| Ambient Temperature | -45ºC ~ 60ºC (>45ºC derating) |
| Protection Level | Class I |
| **Charge Mode** | |
| Battery Voltage | 48Vd.c (40Vd.c ~ 60Vd.c) |
| Battery Current | 240Ad.c (max.) |
| AC Input Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Input Frequency | 50/60Hz |
| AC Input Rated Current | 18.2Aa.c |
| Max. AC Input Current | 27.3a.c (max.) |
| Max. AC Input Power | 13200W |
| Max. Apparent Output Power | 13200VA |
| PV Input Voltage | 550Vd.c (160Vd.c ~ 800Vd.c) |
| MPPT Input Voltage | 200Vd.c ~ 650Vd.c |
| PV Input Current | 26Ad.c + 13Ad.c |
| Max. PV Input Power | 15600W |
| Max. PV Isc | 34Ad.c + 17Ad.c |
| **Utility-Interactive** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 18.2Aa.c |
| Max. AC Output Current | 27.3Aa.c (max.) |
| Max. AC Output Power | 13200W |
| AC Output Rated Power | 12000W |
| AC Output Power Factor | 0.8 leading to 0.8 lagging |
| Max. AC Isc | 75Aa.c |
| Battery Discharge Voltage | 40Vd.c ~ 60Vd.c |
| Battery Discharge Current | 240Ad.c (max.) |
| Battery Discharge Power | 12000W |
| **Stand Alone** | |
| AC Output Voltage | 3L/N/PE 220/380Va.c, 400Va.c |
| AC Output Frequency | 50/60Hz |
| AC Output Rated Current | 18.2Aa.c |
| AC Output Rated Power | 12000W |
| Max. Continuous AC | 45Aa.c |
| Peak Output Power | 24000W (10 seconds) |
| Battery Discharge Voltage | 40Vd.c ~ 60Vd.c |
| Max. Discharge Current | 240Ad.c (max.) |
| Compliance | VDE-AR-N 4105:1028-11; DINVDE V 0124-100:2020-06; IEC/EN62109-1/2:2010; IEC/EN62109-1/2:2011 |

## 3. 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) |

## 3.1. Home Page

Press the Esc button in any page to access the Home Page:
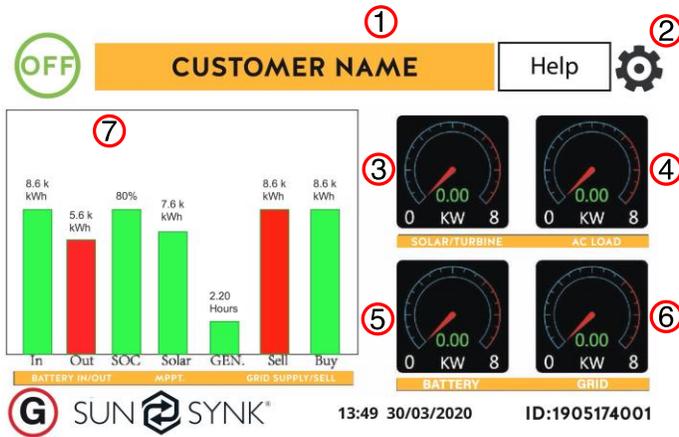


| | |
|---|---|
| 1. | Customer name |
| 2. | Access settings menu page |
| 3. | Access solar history |
| 4. | Access system status page |
| 5. | Access system status page |
| 6. | Access grid history |
| 7. | Access system flow page |

**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.

## 3.2. 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.

## 3.3. System Flow Page

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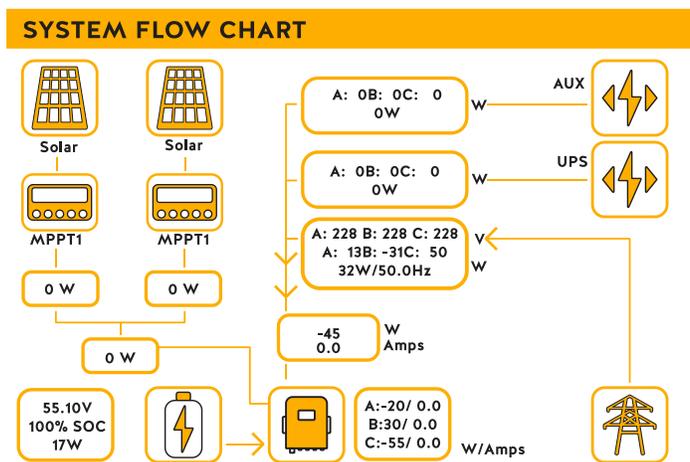


**What this page displays:**

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

## 3.4. Setup Page

To access the Settings, click on the gear icon  on the right top of the navigation menu.



**What this page displays:**

- Serial number.
- Software version.
- Time, Date, and MCU.

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

- Access the Basic Setup Page (press the BASIC icon).
- Access the Battery Setup Page (press the BATTERY icon).
- Access the Grid Setup Page (press the GRID icon).
- Access the real-time programmable timer/system mode (press the SYSTEM MODE icon).
- Access the advanced settings such as Wind Turbine (press the ADVANCE icon).
- Access the auxiliary load/smart load settings (press the AUX LOAD icon)
- Access the fault code register (press the FAULT CODES icon).
- Set up Li BMS (press the LI BMS icon).

## 3.5. Set Time (Clock)

To set time, click on the BASIC icon and then on 'Time'.



**What this page displays:**

- Time.
- Date.
- AM/PM.

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

- Adjust / set time.
- Adjust / set date.
- Adjust / set AM/PM.

## 3.6. Set Company Name / Beeper / Auto dim

To set company name click on the BASIC icon and then on 'Display'.
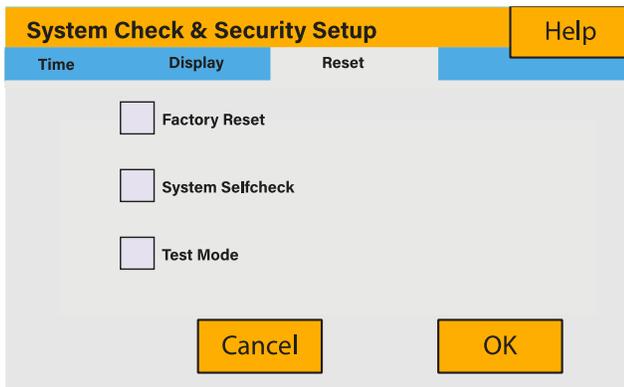


**What this page displays:**

- Beeper status (ON/OFF).
- Installers names.

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

- Set up your company name.
- Switch the beeper ON or OFF.
- Set the LCD backlight to auto dim.

## 3.7. Factory Reset and Lock Code

To set time, click on the BASIC icon and then on 'Reset'.

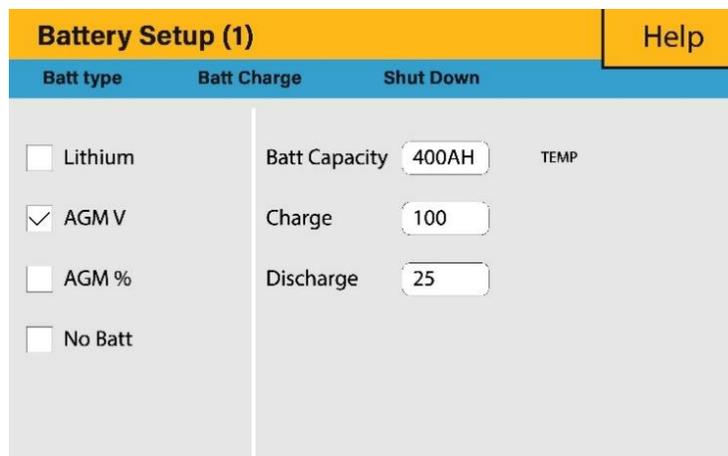| System Check & Security Setup | Help |
| --- | --- |

**What this page displays:**

- Reset status.
- Whether the 'lock code' is used or not.

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

- Reset the inverter to the factory settings.
- System diagnostics.
- Change or set the 'lock code'.

## 3.8. Battery Setup Page

To configure battery settings, click on the BATTERY icon and then on 'Batt type'.

**What this page displays:**

- Battery capacity in (Ah) – For non-BMS-batteries the range allowed is 0-2000Ah, while for lithium-ion the inverter will user the capacity value of the BMS.

- Max battery charge current (Amps).

- Max battery discharge current (Amps), which should be 20% of the Ah rating for AGM only. For Lithium, please refer to the battery manufacturer documentation. **Note:** This is a global max. discharge current for both 'grid-tied' and 'backup' modes of operation and if the current exceeds this value inverter will shut down with an overload fault.

- TEMPCO settings - Temperature coefficient is the error introduced by a change in temperature.

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

- Use battery voltage for all settings (V).

- Use battery SOC for all settings (%).
- No battery: tick this box if no battery is connected to the system.
- BMS setting.
- Active battery - This feature will help recover a battery that is 100% discharged by slowly changing from the solar array. Until the battery reaches a point where it can change normally.

## 3.9. Battery Discharge Page

To configure inverter's shutdown settings, click on the BATTERY icon and then on 'Shut Down'.



**What this page displays:**
- Inverter shutdown voltage set as either a voltage or %.
- Inverter low battery warning set as either a voltage or %.
- Restart voltage set as either a voltage or %.

**What you can do from this page:**
- Adjust battery shut down (voltage or %)
- Adjust low battery warning (voltage or %)
- Adjust restart (voltage or %)

## 3.10. Setting Up a Lithium Battery

To set up a lithium-ion battery, click on the BATTERY icon and visit the 'Batt Type' column.
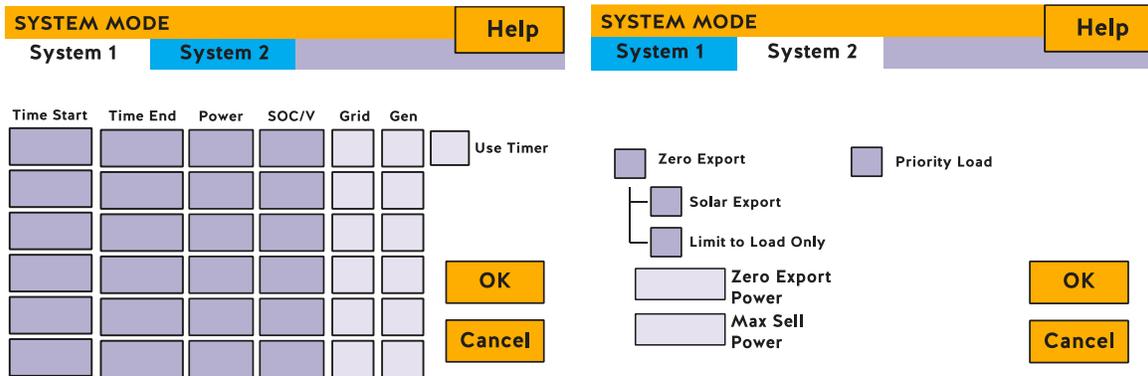


**What this page displays:**
- This information will only display if the 'Lithium' option is selected under 'Batt Type'.
- The type of communion protocol.
- Approved batteries.

**What you can do from this page:**
- Set up your lithium battery.

## 3.11. Program Charge / Discharge Times

To set 'Charge' and 'Discharge' times, click on the 'System Mode' icon after clicking on the gear icon.



**What this page displays:**

- A setting to prevent the inverter exporting power to the grid - 'Zero Export'.

- The ability to limit power supply to only the household loads - 'Solar Export'.

- Set the power limits to supply only the loads connected to the LOAD port - 'Priority to Load Only'.

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

- Set 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.

- Set the unit to charge the battery from the grid or generator ticking 'Grid' or 'Gen' and set what times this needs to occur.

- Set the time to discharge the unit to the load or export to the grid by unticking 'Grid' and 'Gen'.

## 3.12. Grid Supply Voltage and Frequency – Grid Supply Page

On the Settings Menu, click on the GRID icon.

**What this page displays:**

- Grid frequency setting

- Grid type (normally 230V three-phase)

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

- Change grid's frequency setting (normally 50 Hz)

- Set the Maximum Grid Input Voltage ('Grid Vol High')

- Set the Minimum Grid Input Voltage ('Grid Vol Low')

- Set the Maximum Grid Frequency ('Grid Hz High')

- Set the Minimum Grid Frequency ('Grid Hz Low)

✓ Select the correct Grid Type in your local area, otherwise the machine will not work or be damaged.

✓ Select the correct Grid Frequency in your local area.

## 3.13. Advanced Settings for Paralleling Inverters (UNDER DEVELOPMENT)
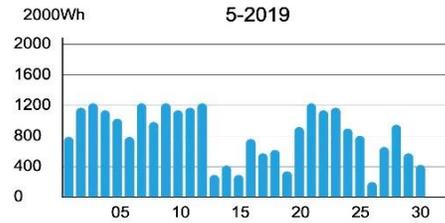
## 3.14. Solar Power Generated

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.



| Return | Day | Month | Year | Total |

2019-5-28
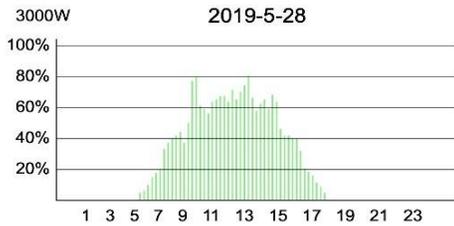
Solar Total Today=0.0KWH     Total - 0.0KWH



| Return | Day | Month | Year | Total |

5-2019

Solar Total Month=0.0KWH     Total - 0.0KWH



| Return | Day | Month | Year | Total |

2019
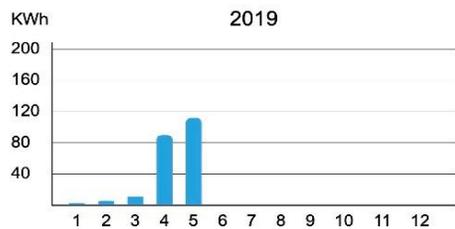
Solar Total Year=0.0KWH     Total - 0.0KWH
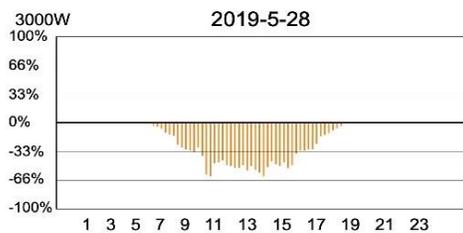


| Return | Day | Month | Year | Total |
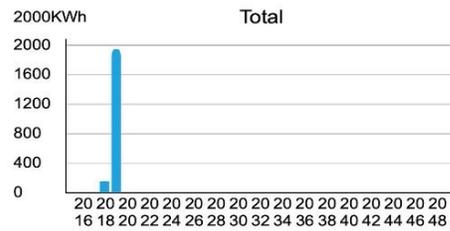
Total

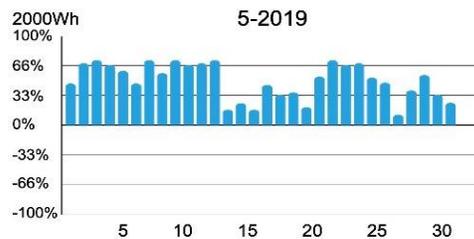Solar / Turbine Power Total :- 135.20 kWh

## 3.15. 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 |

2019-5-28

Grid Power Import / Export :- Day



| Return | Day | Month | Year | Total |

5-2019

Grid Power Import / Export :- Month

| Return | Day | Month | Year | Total |
|--------|-----|-------|------|-------|

**Grid Power Import / Export :- Year**
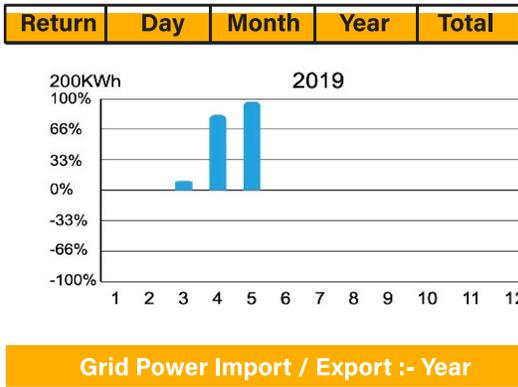


## 3.16. Advanced Settings for Wind Turbine

To configure wind turbine settings, click on the ADVANCE icon.

**What this page displays:**

■ If one or both of the MPPTs are connected to a wind turbine.

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

■ Select the MPPT to be used as a turbine input.

## 3.17. Advanced Settings for Auxiliary Load

To configure Auxiliary Load (previously known as "smart load") settings, click on the AUX LOAD icon.

| AUX Load | Help |
|---|---|
| ◯ Gen input   ☐ Gen peak shaving power   1000W | |
| ◯ Aux load output | |
| ◯ For Micro inverter input   ☐ MI Zero Export | |
| Aux Load OFF Batt   95% | |
| Aux Load ON Batt   100%   Solar Power(W)   1000W | |
| Cancel   OK | |

**What this page displays:**

■ Use of the Gen (Aux) input or output.

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

■ Set up a generator input.
■ Set up an auxiliary (smart) load.
■ Set up Peak Power Shaving.
■ Use an additional inverter or micro inverter.

## 3.18. Fault Codes

To check te fault codes click on the FAULT CODES icon on the settings menu.

| Fault Codes | Help ❓ |
|---|---|
| **Alarms** | **Occurred** |
| F56 DC_VoltLow_Fault | 2018-10-24 01:07 |
| F56 DC_VoltLow_Fault | 2018-10-24 01:07 |
| F56 DC_VoltLow_Fault | 2018-10-24 01:00 |
| F56 DC_VoltLow_Fault | 2018-10-24 00:55 |
| F56 DC_VoltLow_Fault | 2018-10-24 00:43 |
| F56 DC_VoltLow_Fault | 2018-10-24 00:10 |
| F56 DC_VoltLow_Fault | 2018-10-24 00:08 |
| F56 DC_VoltLow_Fault | 2018-10-24 00:07 |