BADGER POWER ELECTRONICS

HYBRID INVERTER
SOLAR/STORAGE/WIND/
BACK-UP GENERATOR
USER MANUAL
BPE-HI-3.6K & BPE-HI-5K

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WIFI/GPRS dongle installation and Solarman remote monitoring setup

Programming Quick Start Guide BPE Hybrid Inverter

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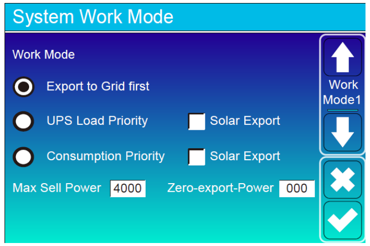
System Work Mode



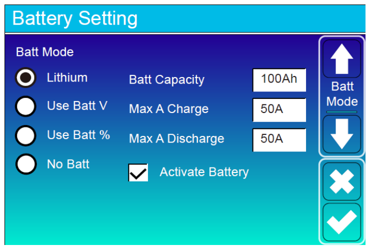
Home Screen > System Work Mode

Export to Grid First - All excess power will be exported to the grid.

UPS Load Priority - The hybrid inverter will only power the loads connected to the load port and will not produce more power than the connected loads require.
This mode by default will export ZERO to the grid unless "Solar Export" is ticked.

Consumption Priority - The hybrid inverter will push power to the whole home load (this mode requires the included CT clamp) see page 13 of the user manual.
This mode by default will export ZERO to the grid unless "Solar Export" is ticked. tǸŜăă ύKŜ ύΆǾ͕ l·ύ ύKŜ ōƨύύƨY ƨŦ ύKŜ ăΌǸŜŜƴ ύƨ ăl·ǿŜ èƨdzǸ ăŜƪŜǾύΆƨƴ͘

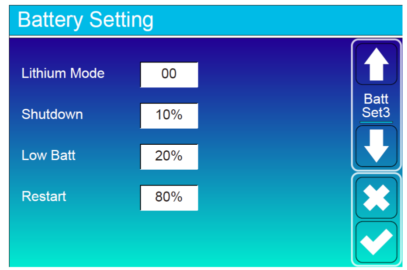
Battery Settings



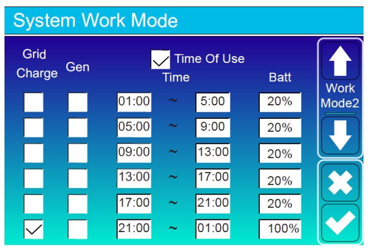
Home Screen > Battery Settings

Installing the hybrid inverter with a BPE 4.8kWh battery with integrated BMS
Select "Lithium"
Set the battery parameters as in the image
Select "Activate Battery"
Press the tick at the bottom of the screen to save your selection.

When using Time Of Use function below you will first need to change the default battery low % (page 3 in the battery settings LCD screen) to what you would like the minimum SOC that the battery will discharge too, anything below 20% can affect the life expectancy of the battery.
Press the tick at the bottom of the screen to save your selection.



Battery Settings - Time Of Use



Home Screen > System Work Mode > Arrow Down > Time Of Use Settings

This screen will allow you to set the parameters for discharging the battery to the load and also charging the battery from the grid or a generator.

Once you have completed the above step and activated the Lithium battery you will need to programme the time of use settings, selecting Time Of Use will allow the battery to be discharged to the load until a user set SOC % is reached during the pre-set 6 time periods. You can also select whether you want to charge the battery from the Grid or a Generator. For example, on the image to the left we have programmed the time of use to discharge the battery to the load between 01.00am - 21.00pm until the battery SOC reaches 20% and then for the grid to fully charge the battery between 21.00pm and 01.00am. tǸŜăă ύKŜ ύΆǾ͕ l·ύ ύKŜ ōƨύύƨY ƨŦ ύKŜ ăΌǸŜŜƴ ύƨ ăl·ǿŜ èƨdzǸ ăŜƪŜǾύΆƨƴ͘

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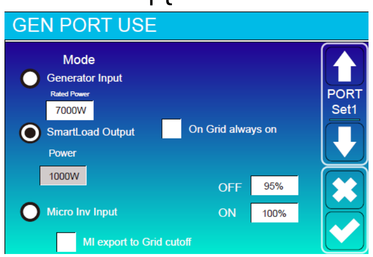

Home Screen > Gen Port Use

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Press the tick at the bottom of the screen to save your selection.

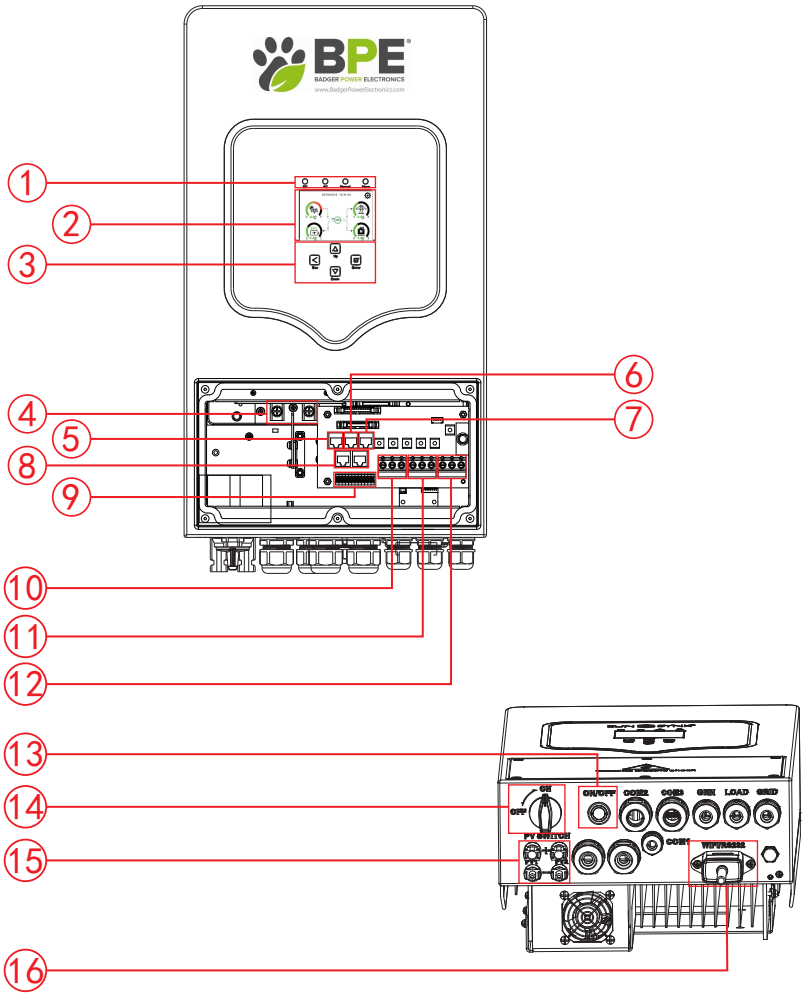
1. Safety Introductions

- This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
- Before using the inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
- Do not disassemble the inverter. If you require maintenance or repair, please take it to a professional service center.
- Incorrect reassembly may result in electric shock or fire.
- To reduce the risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
- Caution: Only qualified personnel can install this device with a battery.
- Never charge a frozen battery.
- For optimum operation of this inverter, please follow the required specification to select appropriate cable size, failure to do so will damage the inverter.
- Be very cautious when working with metal tools on or around batteries, dropping a tool may cause a spark or short circuit in the battery or other electrical parts, and even cause an explosion.
- Please follow the installation procedure when you want to disconnect AC or DC terminals. Please refer to "Installation" section of this manual for details.
- Grounding instructions - this inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulations whilst installing this inverter.
- Never cause AC output and DC input to be short circuited. Do not connect to the mains when DC input short circuits.

2. Product Introduction

This is a multi-functional inverter, combining functions of a PV/WIND inverter, battery charger and generator back-up to offer uninterruptible power support for both on-grid and off-grid applications. The comprehensive LCD touchscreen display offers users configurable and easily accessible features such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

2.1 Product Overview



1: Inverter LED Indicators
2: Touchscreen LCD display
3: Function Buttons
4: Battery input connectors
5: RS485 Port
6: CAN Port
7: DRMs Port
8: Parallel port
9: Function Port
10: Generator input
11: Load
12: Grid
13: Power on/off button
14: DC Switch
15: PV input with two MPPT
16: WiFi Interface

2.2 Product Features

- -230V Single phase Pure sine wave inverter.
- - Self-consumption and feed-in to the grid.
- - Auto restart while AC is recovering.
- - Programmable supply priority for battery or grid.
- - Programmable multiple operation modes: On-grid, off-grid and UPS.
- - Configurable battery charging current/voltage based on applications via LCD display.
- - Configurable AC/Solar/Generator Charger priority via LCD display.
- - Compatible with mains voltage or generator power.
- - Overload/over temperature/short circuit protection.
- - Smart battery charger design for optimised battery performance.
- - With limit function, prevent excess power overflow to the grid.
- - Supports WIFI/GPRS monitoring and built-in 2 strings of MPP trackers.
- -Smart programmable three stage MPPT charging for optimised battery performance.
- -Time of use function.
- -Smart Load Function.
- -Parallel function On-Grid & Off-Grid.

2.3 Basic System Architecture

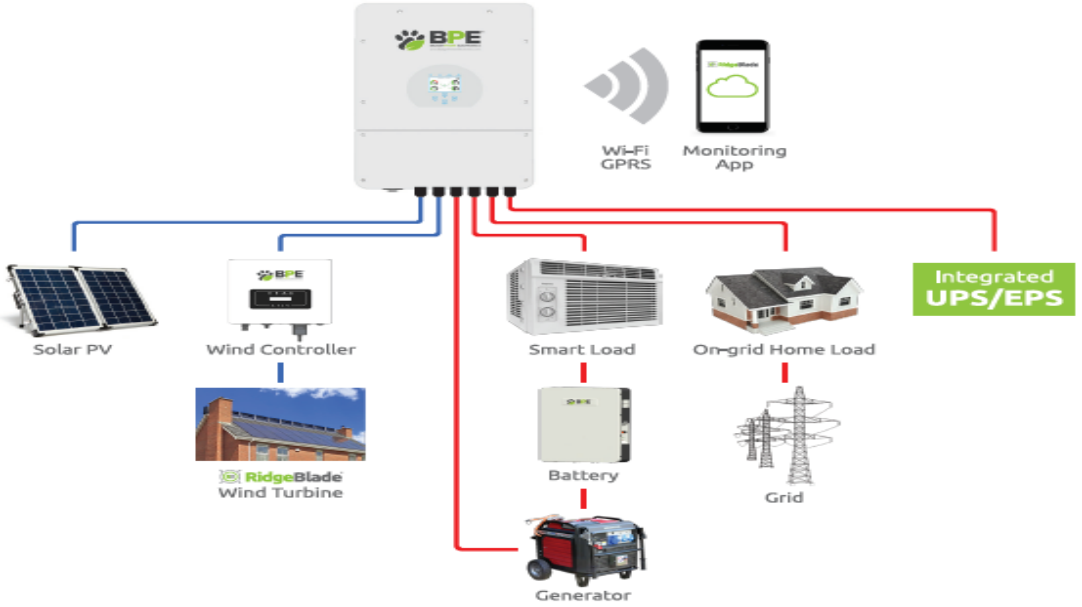
The following illustration shows basic application of this inverter.

It also includes the following devices to show a Complete running system.

- Generator or Utility
- Wind Controller and Wind Turbine (sold separately)
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

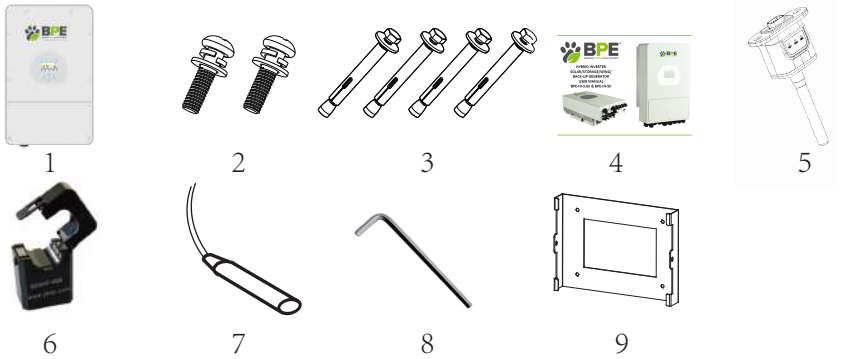
This inverter can power all kinds of appliances in the home or office environment, including motor type appliances such as a refrigerator and air conditioner.



3. Installation

3.1 Parts List

Please check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items below.



No	Description	Qty
1	BPE-HI-3.6/5K hybrid inverter	1
2	Stainless steel mounting screws M6*12	2
3	Stainless steel expansion bolts M8*80	4
4	User manual	1
5	Wi-Fi plug	1

6	Current transformer CT (Optional)	1
7	Battery sensor	1
8	L-type Hexagon wrench	1
9	Wall mounting bracket	1

Chart 3-1 Parts List

3.2 Mounting instructions

Installation Precaution

This Hybrid inverter is designed for outdoor use (IP65). Please make sure the installation site meets the below criteria:

- Not in direct sunlight.
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near a television antenna or antenna cable.
- Not higher than an altitude of 2000 meters above sea level.
- Not in an environment of precipitation or humidity (>95%)

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please remove the front cover by removing the screws as shown below:

Considering the following points before selecting where to install:

- Please select a vertical wall with load-bearing capacity for installation, suitable for installation on concrete or other non-flammable surfaces, installation is shown below.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.

- The ambient temperature should be between -25~60℃ to ensure optimal operation.
- Be sure to keep other objects and surfaces at a distance as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for accessing cables.

For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side, approx. 50cm above and below the unit and 100cm to the front.

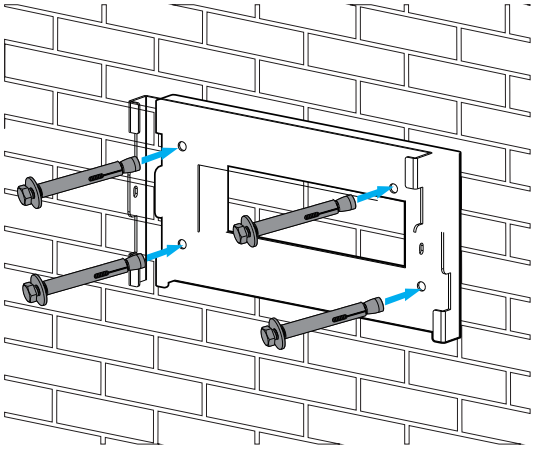
Mounting the inverter

The inverter should be installed vertically, as shown, installation procedure shown below:

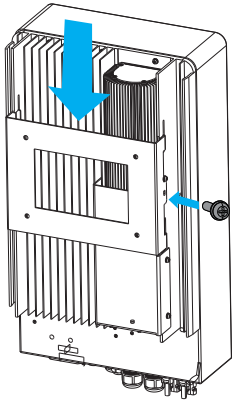
1. Position the bolts on the appropriate wall according to the bolt positions on the mounting shelves and mark the holes. The installation site must be suitable for expansion bolt installation.

2. Ensure that the position of the installation holes on the wall (A, B, C, D) are the same position of the install plate, and the mounting level is correct.

3. Hang the inverter to the top of the mounting rack and then use the M4 screw in the accessory pack to lock E and F to ensure that the inverter does not move.



Inverter hanging plate installation



3.3 Battery connection

For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the inverter. In some applications, switching devices may not be required but over-current protectors are still required. Refer to the typical amperage in the table below for the required fuse or circuit breaker size.

Model	Wire Size	Cable(mm^2)	Torque value (max)
3.6/5KW	8AWG	8.4	5.2Nm

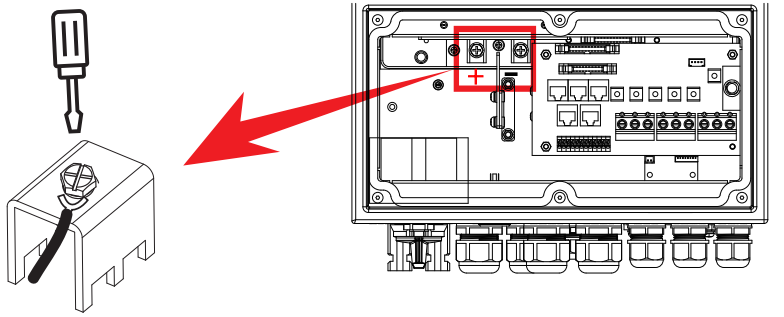
Chart 3-2 Cable size

All wiring must be performed by a professional.

Connecting the battery with a suitable cable is important for safe and efficient operation of the system. To reduce the risk of injury, refer to Chart 3-2 for the recommended cable specification.

Please follow the below steps to implement battery connection:

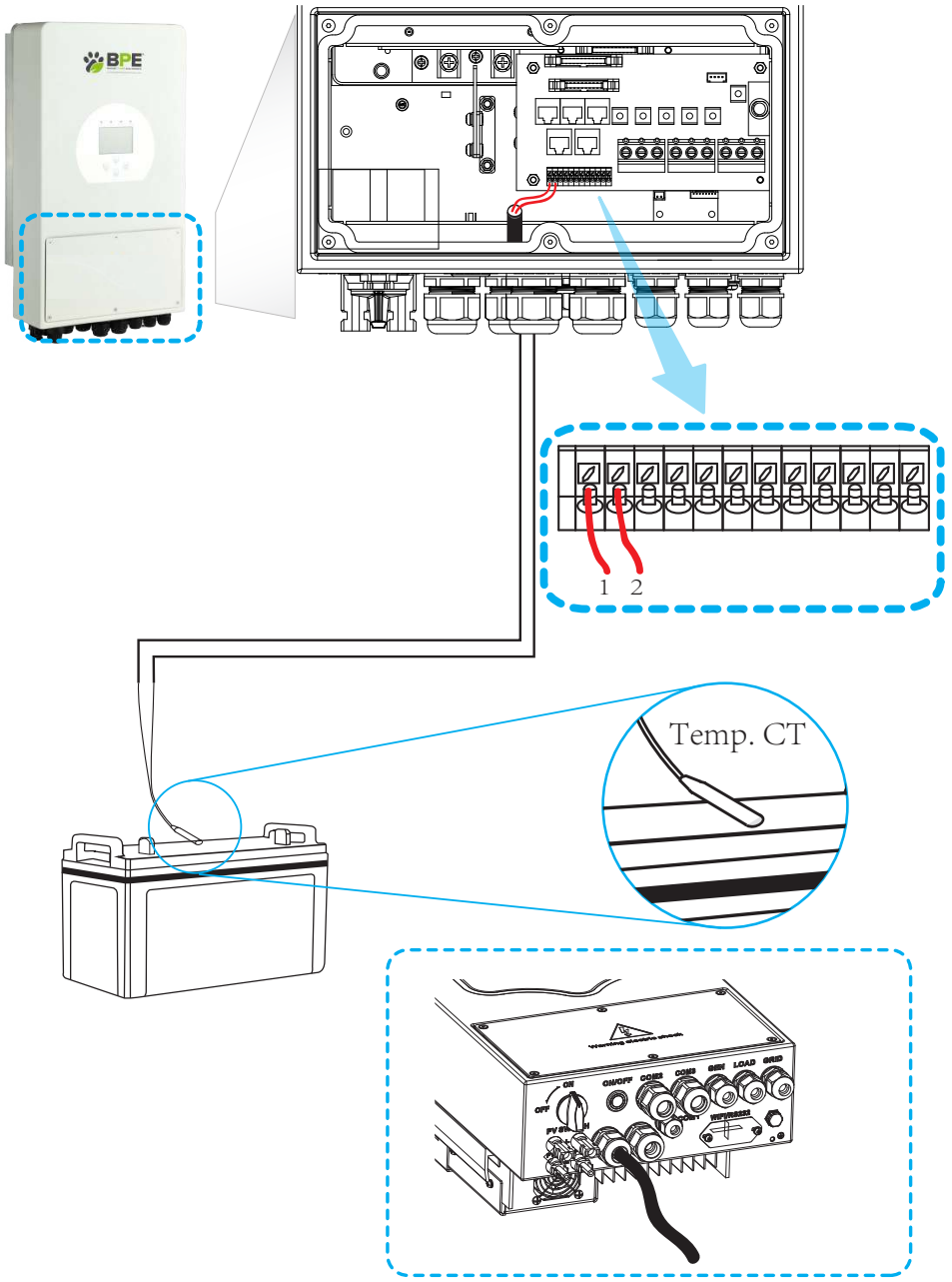
1. Please choose a suitable battery cable with the correct connector which can fit into the battery terminals.
2. Use a suitable screwdriver to unscrew the bolts and fit the battery connectors, then fasten the bolt with the screwdriver, making sure the bolts are tightened with a torque of 5.2 N.M in clockwise direction.
3. Make sure the polarity at both the battery and inverter is correctly connected.



Installation must be performed with care.

Before making the final DC connection or closing the DC breaker/ disconnect, make sure the positive (+) is connected to positive (+) and negative (-) is connected to negative (-). Reverse polarity connection on the battery will damage the inverter.

3.3.2 Battery temperature connection



3.4 AC Input/Output Connection

· Before connecting to AC input power source, please install a separate AC breaker between the inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended AC breaker is 25A for 3.6kW and 32A for 5kW.

· There are three terminal blocks with "Grid" "Load" and "GEN" markings. Please do not misconnect the input and output connectors.

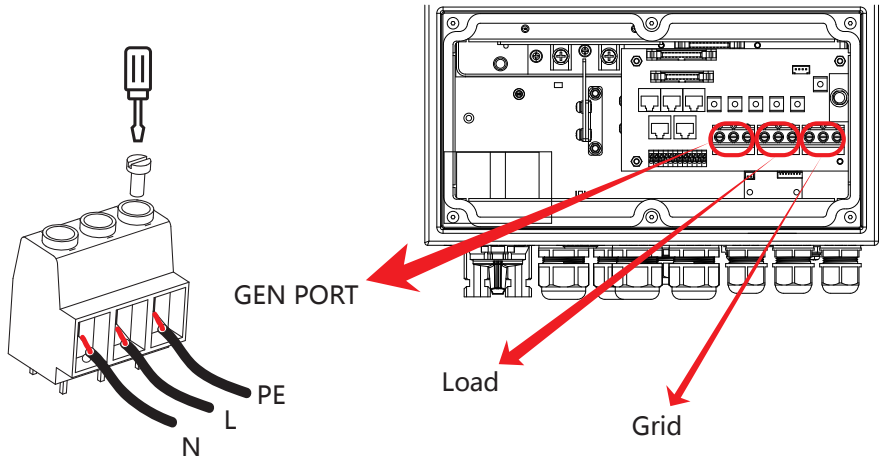
All wiring must be performed by a qualified person. It is very important for system safety and efficient operation to use the appropriate cable for AC input connection. To reduce risk of injury, please use the recommended cable as below.

Model	Gauge	Cable(mm^2)	Torque value
3.6KW	12AWG	4	1.2Nm
5KW	10AWG	6	1.2Nm

Chart 3-3 Recommended Size for AC wires

Please follow below steps to implement AC input/output connection:

1. Before making the AC input/output connection, be sure to open the DC protector or disconnecter first.
2. Remove 10mm of the insulation sleeve, unscrew the bolts, insert the AC input cables according to polarities indicated on the terminal block and tighten the terminal screws. Making sure the connection is complete.



Be sure that the AC power source is disconnected before attempting to wire it to the unit.

3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten the terminals. Be sure to connect the corresponding N wires and PE wires to related terminals.
4. Make sure the wires are securely connected.

3.5 PV Connection

Before connecting to PV modules, please install a separate DC circuit breaker between the inverter and PV modules. It is very important for system safety and efficient operation to use the appropriate cable for PV module connection. To reduce risk of injury, please use the recommended cable size as below.

Model	Wire Size	Cable(mm^2)
3.6/5KW	1X12AWG	4

Chart 3-2 Cable size

To avoid malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please be sure there is NO grounding.

It is requested to use a PV junction box with surge protection. Otherwise, it will damage the inverter when lightning occurs on PV modules.

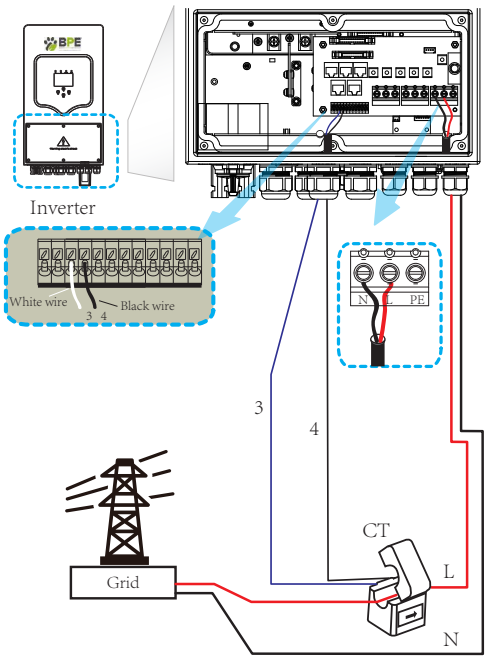
3.5.1 PV Module Selection:

When selecting PV modules, please be sure to consider the below parameters:
1) Open circuit Voltage (Voc) of PV modules doesn't exceed max. PV array open circuit voltage of inverter.
2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.

Inverter Model	3.6KW	5KW
PV Input Voltage (V)	370V(100V~500V)	
PV Array MPPT Voltage Range	125Vdc-425Vdc	
No. of MPP Trackers	2	
No. of Strings per MPP Tracker	1+1	

Chart 3-5

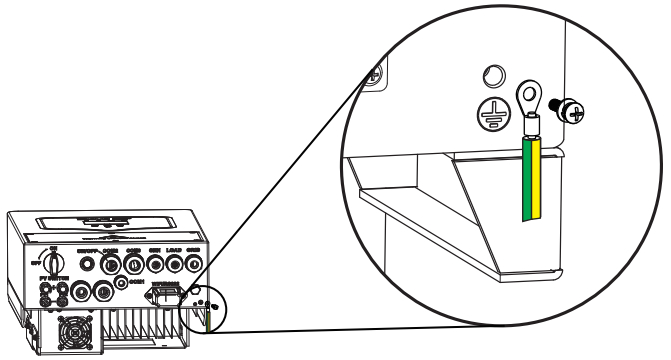
3.6 CT Connection



CT arrow points away from grid

3.7 Earth Connection(mandatory)

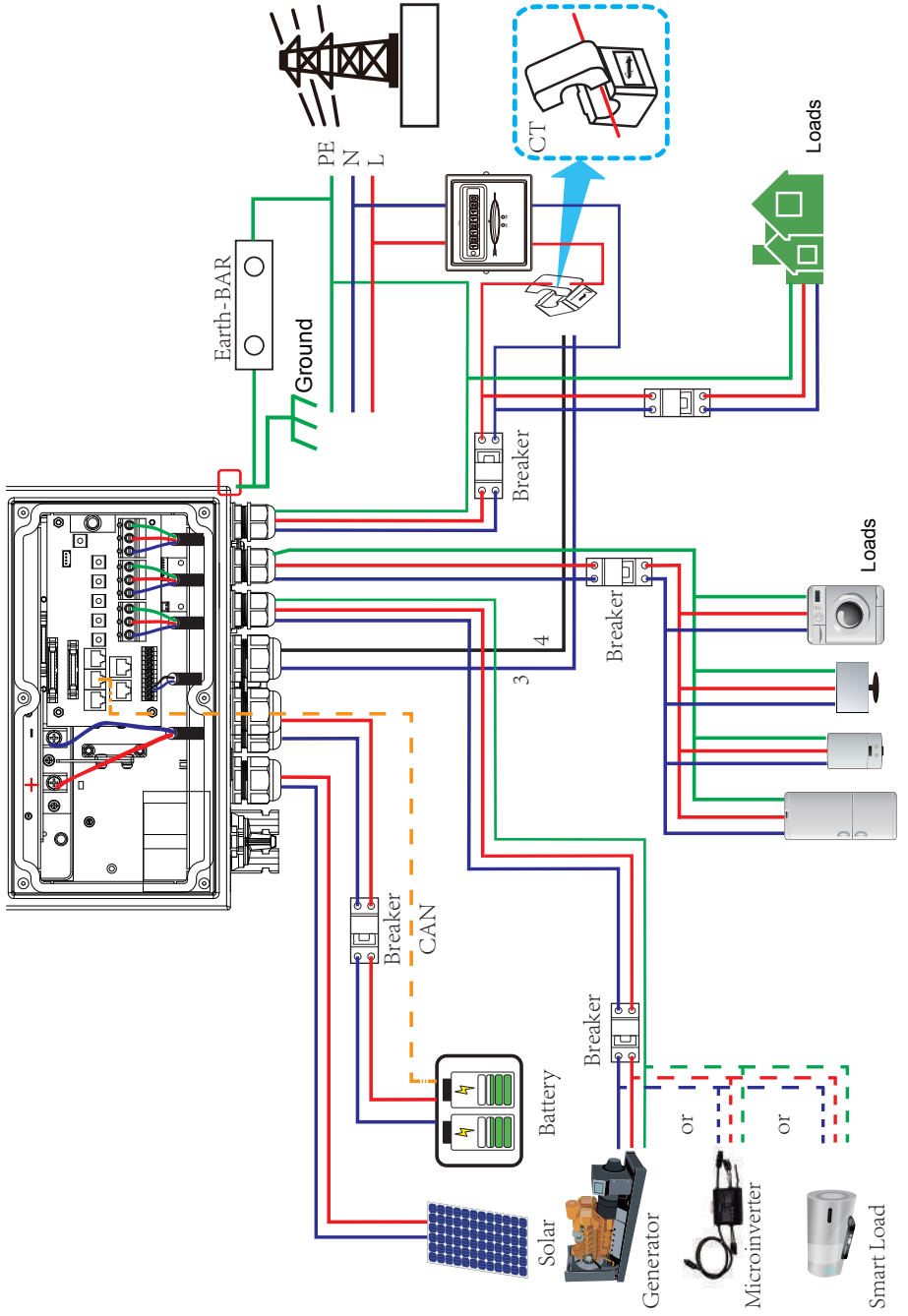
Ground cable shall be connected to ground plate on grid side to prevent electric shock if the original protective conductor fails.



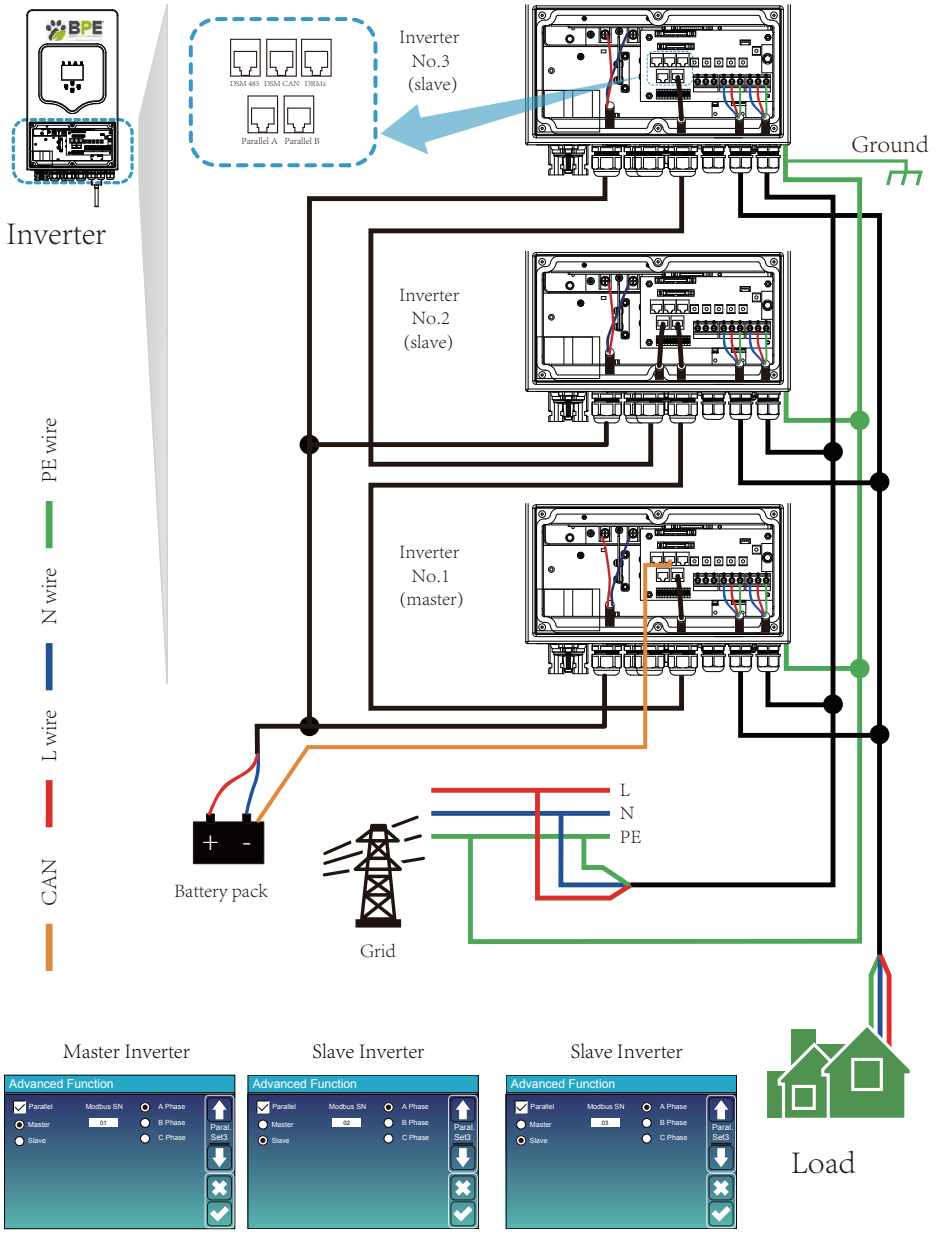
3.8 WIFI Connection

For the configuration of the Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug at the end of this user manual.

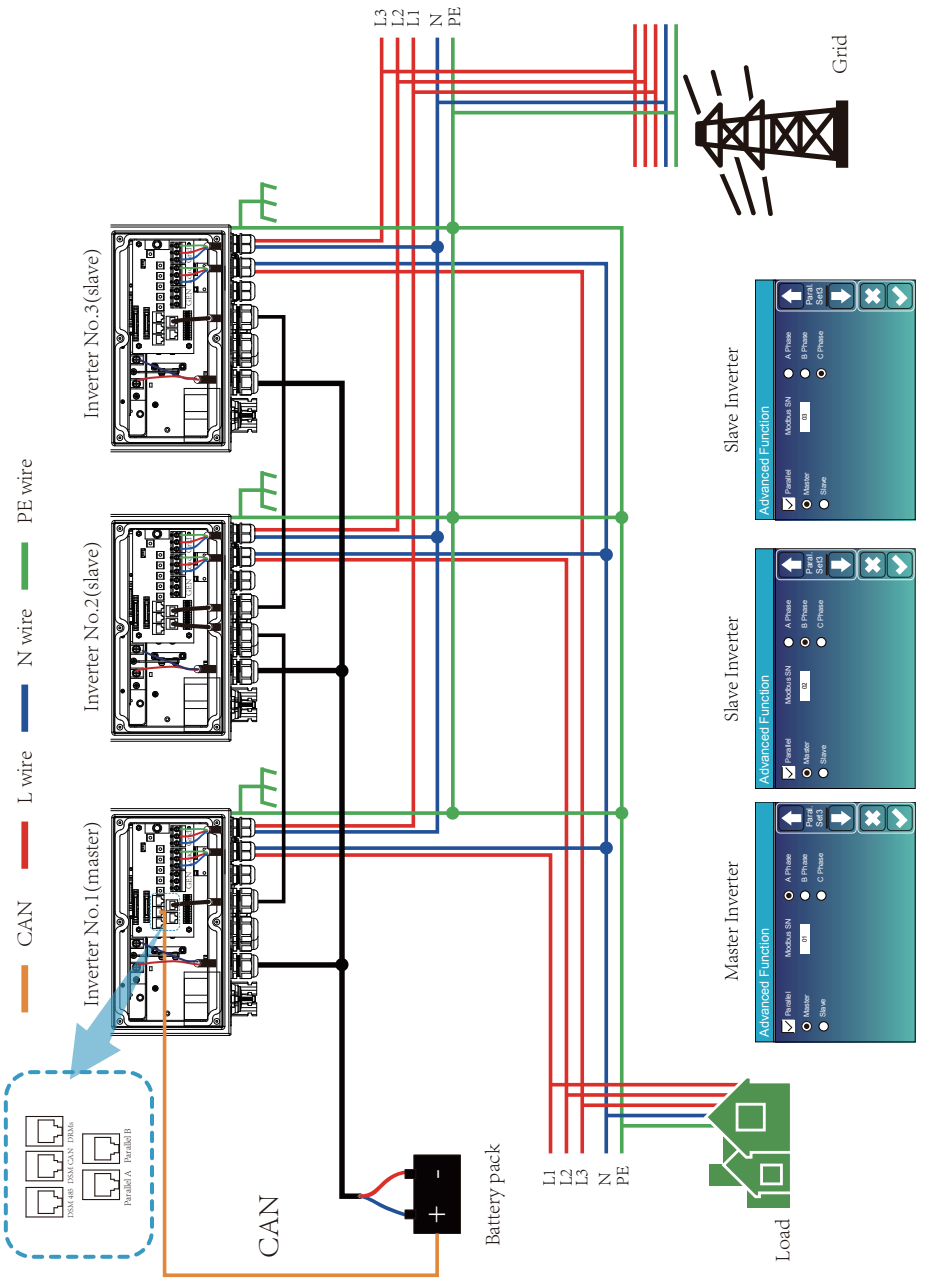
3.9 Wiring System for Inverter



3.10 Single phase parallel connection diagram



3.11Three phase Parallel Inverter



4. OPERATION

4.1 Power ON/OFF

Once the unit has been correctly installed and the batteries are connected, simply press the On/Off button (located on the underside of the inverter) to turn the unit on. When a system without a battery is connected, and connected with either PV or grid, and the ON/OFF button is switched off, the LCD will still light up (Display will show OFF), in this setup, press the ON/OFF button and select no battery and the system can still be operated.

4.2 Operation and Display Panel

The operation and display panel, shown in the below chart, is on the front panel of the inverter. It includes four LED indicators, four function keys and a touchscreen LCD display, indicating the operating status and input/output power information.

LED Indicator		Messages
DC	Green led solid light	PV Connection normal
AC	Green led solid light	Grid Connection normal
Normal	Green led solid light	Inverter operating normal
Alarm	Red led solid light	Malfunction or warning

Chart 4-1 LED indicators

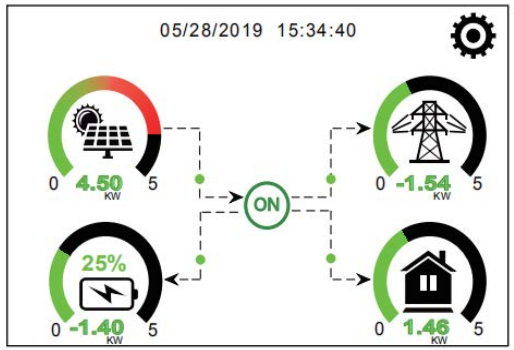
Function Key	Description
Esc	To exit settings mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

Chart 4-2 Function Buttons

5. LCD Display Icons

5.1 Main Screen

The LCD is touchscreen, the below screen shows the overall information of the inverter.



1.The icon in the center of the home screen indicates that the system is in Normal operation. If it displays "comm./F01~F64", this means the inverter has communication errors or other errors, the error message will be displayed under this icon (F01-F64 errors, detailed error info can be viewed in the System Alarms menu).

2.At the top of the screen is the time & date.

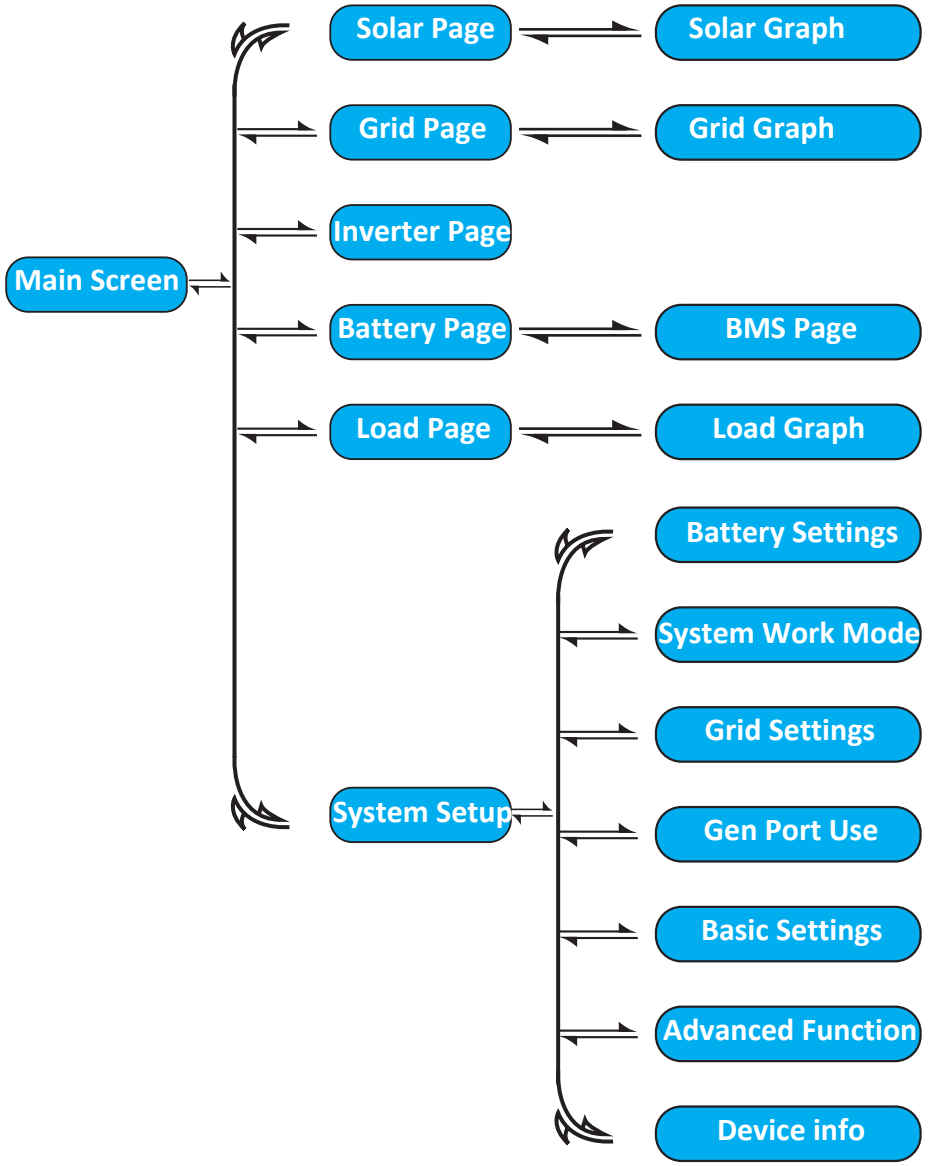
3.System Setup Icon, by pressing this button you will enter into the system setup screen which includes Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced functions and Li-Batt info.

4.The main screen will also show info including Solar, Grid, Load and Battery. It also displays the energy flow direction by arrow. When the power is approximate to high level, the colour on the panels will change from green to red so the system info shows vividly on the main screen.

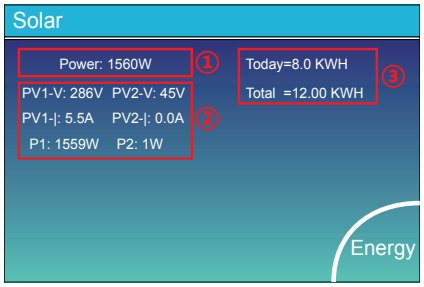
- PV power and Load power always keep positive.
- Grid power negative means export to grid, positive means import from grid.

- Battery power negative means charge, positive means discharge.

5.1.1 LCD operation flow chart



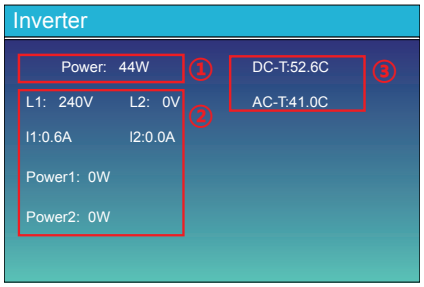
5.2 Solar Power Curve



Solar Panel details page

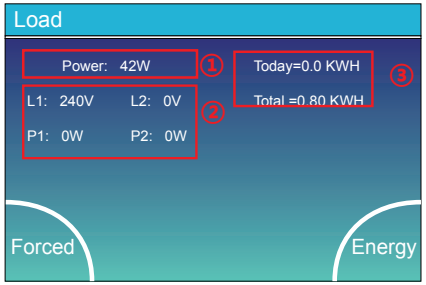
① Solar Panel Generation.
② Voltage, Current, Power for each MPPT.
③ Solar Panel generation for Day and Total.

Pressing the "Energy " button will take you to the power curve page.



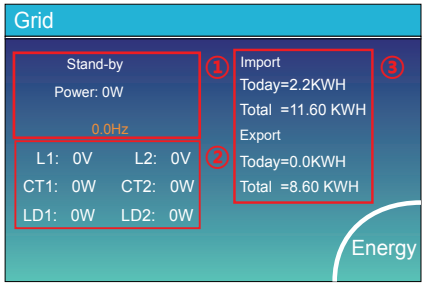
Inverter details page

① Inverter Generation.
② Voltage, Current, Power for each Phase.
③ **DC-T:** Displays DC-DC temperature,
AC-T: Displays Heat-sink temperature.



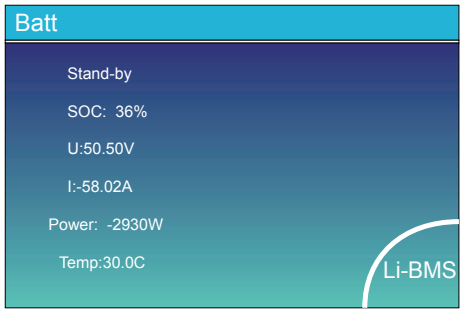
Back-up Load details page

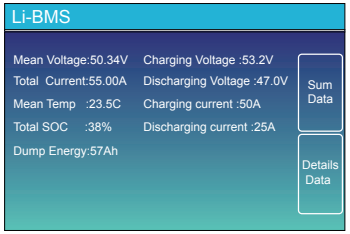
① Back-up Power.
② Voltage, Power for each Phase.
③ Back-up consumption for Day and Total. Pressing the "Energy " button will enter into the power curve page.
Pressing the "Forced " button for 6 seconds will force open the smart-load (When GEN PORT is utilised as Smart-load output).

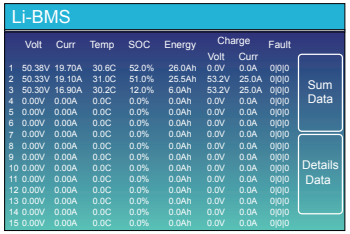


Grid details page

① Status, Power, Frequency.
② **L1 & L2:** Voltage for each Phase
CT1 & CT2: External Current Sensor Power
LD1 & LD2: Internal Current Sensor Power.
③ **IMPORT :** Energy from Grid to Inverter.
EXPORT : Energy from Inverter to Load.
Pressing the "Energy " button will enter into the power curve page.

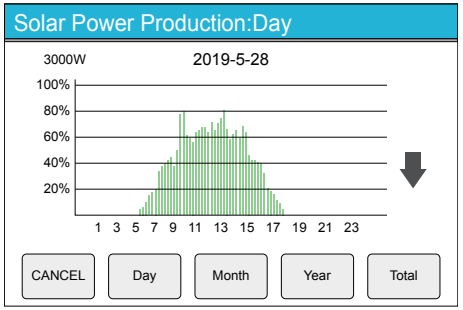


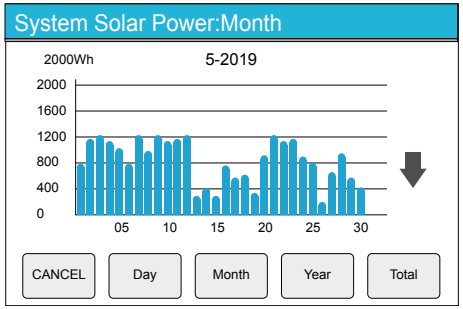


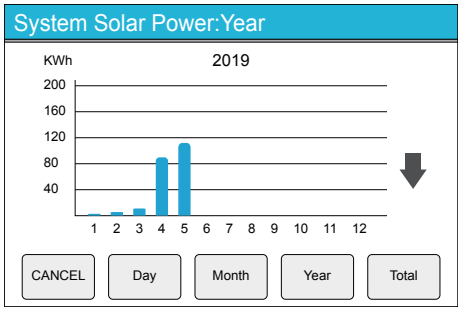


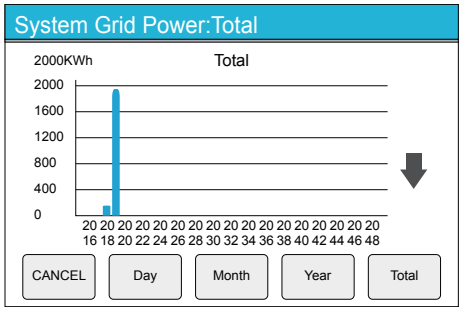
This is the Battery details page.
if you use a Lithium Battery, you can enter the BMS page.

5.3 Curve Page-Solar & Load & Grid



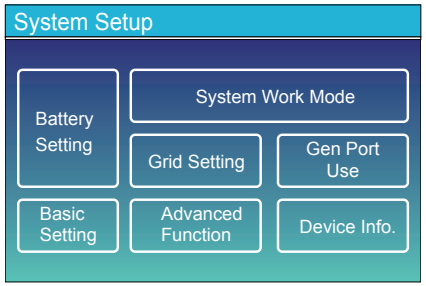






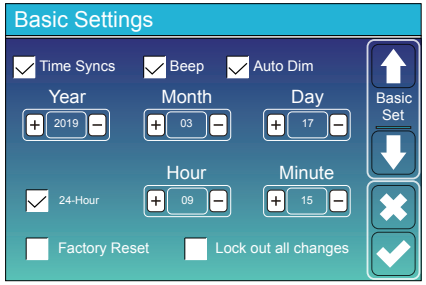
Solar power curve for daily, monthly, yearly and total can be checked on the LCD.
For more accurate power generation, please view the online monitoring system.
Press the up and down arrow to check the power curve of a different period.

5.4 System Setup Menu



System Setup page

5.5 Basic Setup Menu



Basic Setup page

Beep - De-selecting Beep will silence any alarms.

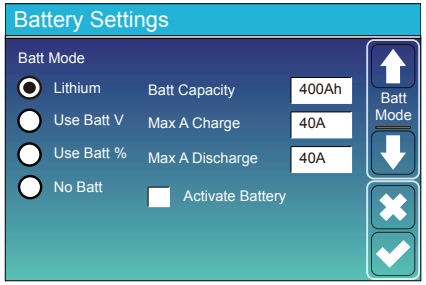
Auto Dim - (recommended) Selecting this will automatically dim the LCD display when not in use.

Factory reset all settings.

Lock out all changes - This will allow you to set a 4-digit passcode to prevent any changes to the inverter's current configuration.

Please always press the tick to save settings.

5.6 Battery Setup Menu



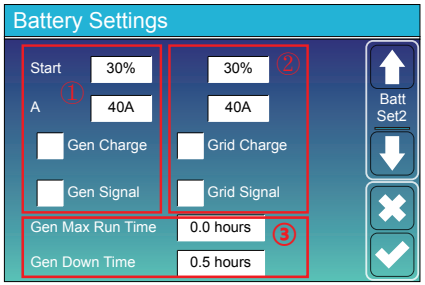
Lithium Battery

Batt Mode-------- Lithium
Max A charge-------- 0-125A
Max A Discharge-----0-125A
Activate Battery------Enable

AGM Battery

Batt Mode-------- Use Batt V or Batt V%
Capacity----------50-2000Ah
Max A charge-------- 0-125A
Max A Discharge-----0-125A
Activate Battery ------Enable

No Batt --- No need to set other parameters, keep the default values.



Battery Setup page. ①③

Start - 30% - Indicates that the Generator will start when the Battery capacity is less than 30% in Off-grid mode.

A - 40A - Indicates the Current that the Generator charges the Battery after starting.

Gen Charge - Indicates the Switch that the Generator charges the Battery.

Gen Signal - Indicates whether the Generator's ATS signal is on or off.

Gen Max Runtime - Indicates the longest time the Generator can run in one day, when the preset time is up, the Generator will turn off. if you select 24h the generator will not turn off.

Gen Down Time - Indicates the time delay for the Generator to shut down after it has reached the preset running time.

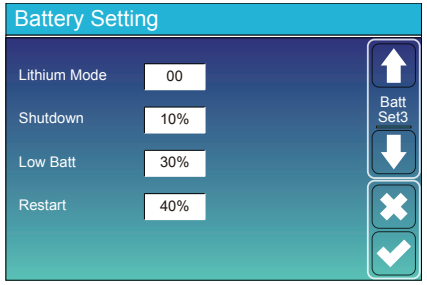
This is Grid Charge, you need to select. ②

Start - 30% - Don't use, Just for customisation.

A - 40A - Indicates the Current that the Grid charges the Battery.

Grid Charge - Indicates the Switch that the Grid charges the Battery.

Grid Signal - Disable.



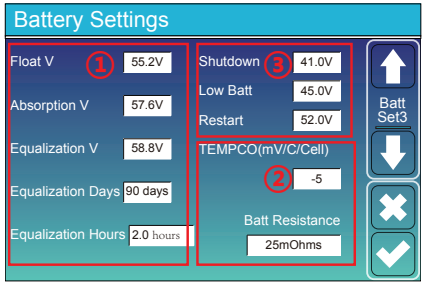
Off-Grid Battery Setup

Lithium Mode - This is BMS protocol. Please reference the document（Approved Battery-BPE).

Shutdown 10% - Indicates the inverter will shutdown if the SOC falls below this value.

Low Batt 20% - Indicates the inverter will sound an alarm if the SOC falls below this value.

Restart 40% - Indicates the SOC level when the battery will restart to discharge



There are 4 stages of charging the Battery . ①

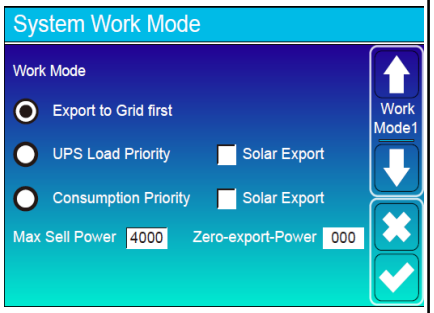
This is for professional installers, this is only relevant if you are not using a recommended Li-ion battery storage system with compatible battery management software (BMS) 2

Shutdown - The inverter will shutdown if the Voltage is below this value.

Low Batt - The inverter will alarm if the Voltage falls below this value. ③

Restart - Restart level when the inverter shutsdown.

5.7 System Work Mode Setup Menu



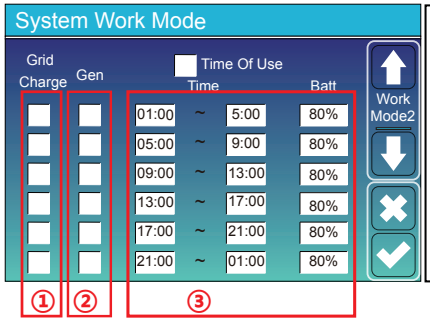
Export to Grid First - When the inverter is grid connected any excess energy will be exported to the grid.

UPS Load Priority - In this mode the inverter will prioritise the U/EPS load. The output from the system will attempt to match the U/EPS load using a combination of the renewable energy generation and battery capacity, by default this will also export zero to the grid, unless "Solar Export" is ticked.

Consumption Priority - This mode will deliver the renewable energy to the battery & building load, based on the reading the inverter receives from the CT clamp. By default this will also export zero to the grid, unless 'Solar Export' is ticked.

Max Sell Power - The maximum wattage to export back to the grid at any one time (watts).

Energy Pattern - When a battery is connected the priority will always be **Generation>Battery>Load>Export**



Time of use

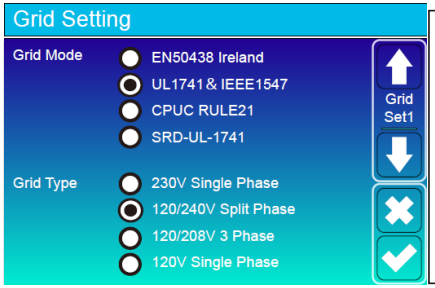
① Selection for Grid charging the battery.

② Selection for Gen charging the battery.

③ There are six time periods that can be set, each period must be higher than the previous.

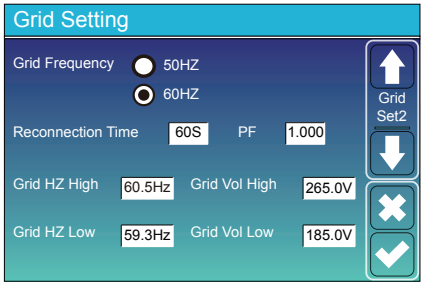
The Batt % indicates the SOC of the battery before the Grid/Gen will start to charge it.

5.8 Grid Setup Menu



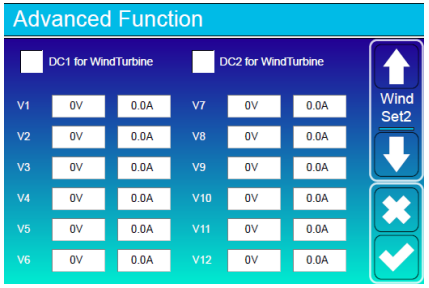
Please select the correct Grid Mode in your local area.

Please select the correct Grid Type in your local area, otherwise the inverter will not work or be damaged.



The parameters in this screen will automatically update dependent on which Grid Mode you have selected.

5.9 Wind Turbine Input

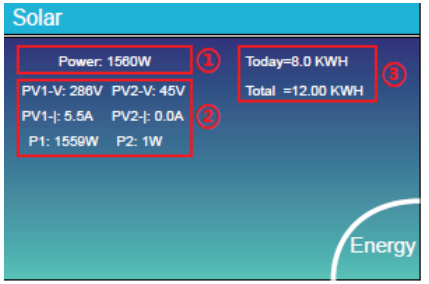


In Advanced settings you can insert the 12 power curve settings for wind.

All points must be higher then the previous.

Select if you are using string 1 or 2.

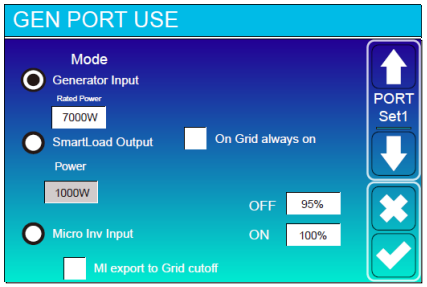
Always use a BPE wind controller to connect the wind turbine.



You can have any combination of inputs.

Wind / Wind
Solar / Wind
Solar / Solar

5.10 Generator Port Use Setup Menu



The Generator port can only be used for one input/output. It can be used for a generator input OR smart load output OR micro inverter input.

Generator Input - If connected to a generator.

Gen connected to Grid input - In off-grid applications the generator can also be connected to the Grid input port.

SmartLoad Output - See 5.12 below

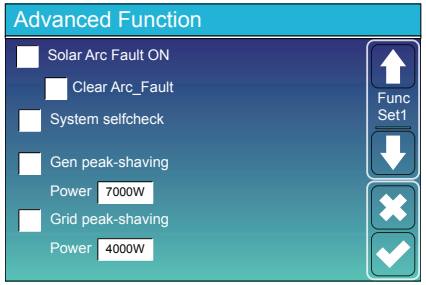
Micro Inv Input - Use the Gen Port as an AC coupled input, this will also work with "Grid-Tied" Inverters.

Off - Battery SOC to disable the AC coupled input (95-100%)

ON - Battery SOC to enable AC coupled input (50-60%)

AC Coupled priority - LOAD - BATTERY - EXPORT unless MI export to grid is deselected then the AC coupled input will turn off once the battery SOC reaches the preset "OFF" value.

5.11 Advanced Function Setup Menu



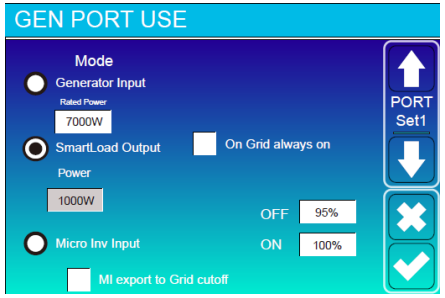
Solar Arc Fault ON---This is only for the US.

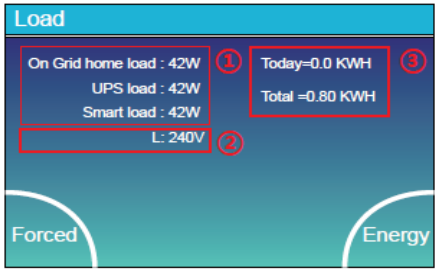
System self-check ---Disable.

Gen Peak-shaving---Enable when the power of the generator exceeds its rated value, the inverter will provide the redundant power to ensure that the generator doesn't overload.

Grid Peak-shaving---Enable when the power of the grid exceeds the set value, the inverter will provide the redundant part to ensure that the grid power does not exceed the set value.

5.12 Smart Load (Gen Load)





This mode utilises the Gen input connection as a Smart Load output which only receives power when the battery SOC and PV/Wind generation is above a user programmable threshold.

The Gen input port in the user area of the system becomes an output to high power loads such as a water heater, irrigation pump, ac unit or any other device.

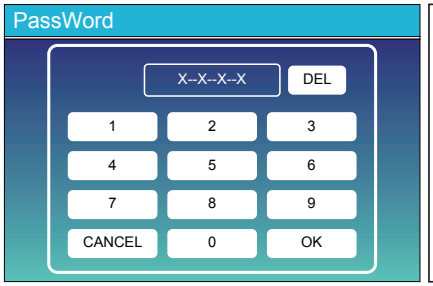
On Grid always on: When connected to the grid the smart load will be always on.

Power - Minimum PV/Wind generation (W) to enable smart load.

OFF - Battery SOC to disable Smart Load output.
ON - Battery SOC to enable Smart Load output.

By pressing the Forced icon on the Load display screen for 6 seconds this will force open the Smart Load output and manually override the user programmable settings.

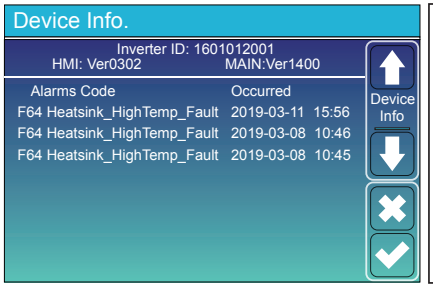
To disable Forced Smart Load please repeat the above step.



Factory restart: 9999

Lock out all changes: 7777

5.12 Device Info Setup Menu



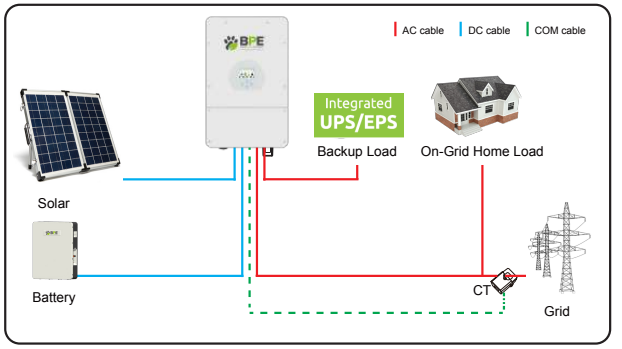
This page shows the Inverter ID,
Inverter version and alarm codes.

HMI: LCD version

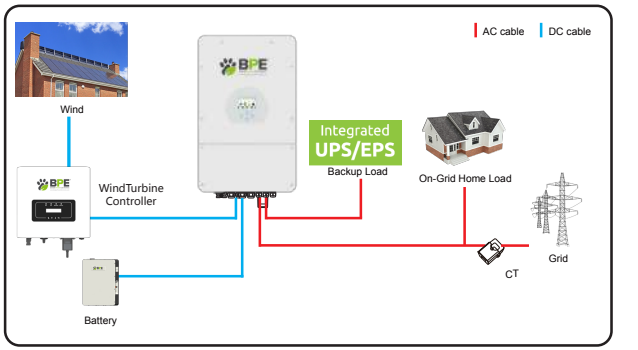
MAIN: MCU version

6. Mode

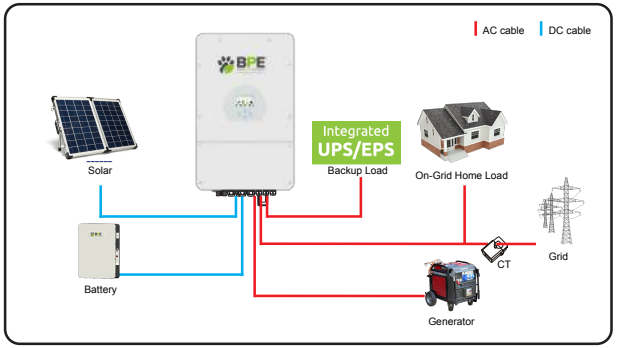
Mode I:Basic



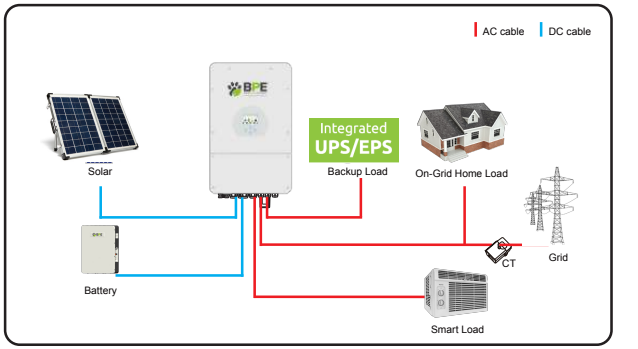
Mode II: With WindTurbine



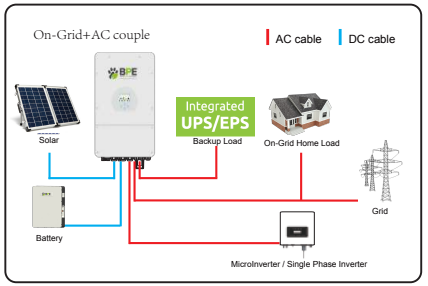
Mode III: With Generator



Mode IV: With Smart-Load



Mode Ⅶ: MicroInverter input / AC Coupled input



The 1st priority power of the system is always the PV power, then 2nd and 3rd priority power will be the battery bank or grid according to the settings. The last power backup will be the Generator if it is available.

7. Fault information and processing

The energy storage inverter is designed according to the grid-connected operation standard and meets the safety requirements and electromagnetic compatibility requirements. Before leaving the factory, the inverter undergoes several rigorous tests to ensure that the inverter can operate reliably.

If any of the fault messages listed in Table 6-1 appear on your inverter and the fault has not been removed after restarting, please contact your local dealer or service center. You need to have the following information ready.

1. Inverter serial number;
2. Distributor or service center of the inverter ;
3. On-grid power generation date;
4. The problem description (including the fault code and indicator status displayed on the LCD) is as detailed as possible.
5. Your contact information. In order to give you a clearer understanding of the inverter's fault information, we will list all possible fault codes and their descriptions when the inverter is not working correctly.

In order to give you a clearer understanding of the inverter's fault information, we will list all possible fault codes and their descriptions.

Error Code	Fault Information	Diagnosis and Solution
F13	Working_Mode_change	Inverter working mode change, please wait one minute.
F18	Tz_Ac_OverCurr_Fault	AC side over current fault; Please check the UPS load and grid connection
F20	Tz_Dc_OverCurr_Fault	DC side over current fault; Please check solar connection and battery connection; turn off the inverter, solar and grid, wait one minute, then turn on again.
F23	Tz_GFCI_OC_Fault	Leakage current fault. Please check your system connection. check if there is solar panel leakage.
F24	DC_Insulation_Fault	
F26	BusUnbalance_Fault	Wait to see if the inverter balances automatically, if not turn off the inverter, solar and grid, wait one minute, then turn on again.
F30	AC_MainContactor_Fault	
F35	AC_NoUtility_Fault	No Utility fault. Please check the GRID connection.
F41	AC_WU_OverVolt_Fault	Grid over voltage fault, Please check the GRID connection.
F42	AC_WU_UnderVolt_Fault	Grid under voltage fault, Please check the GRID connection.

F46	AC_UV_UnderVolt_ Fault	Parallel fault. Please check the CAN connection lines.
F47	AC_OverFreq_Fault	Grid over frequency fault. Pease check the GRID connection.
F48	AC_UnderFreq_Fault	Grid under frequency fault. Please check the GRID connection.
F56	DC_VoltLow_Fault	Battery voltage too low. Check the battery voltage. Turn off the load, charge the battery first.
F63	ARC_Fault	ARC fault. This is only for US, check the solar connection, then clear the fault.
F64	Heatsink_HighTemp_ Fault	Heatsink_HighTemp_Fault,. Check if the inverter working temperature is too high. Turn off the inverter for 10 minutes then turn on again.

Chart 6-1 Fault information

Under the guidance of our company, customers may return our products so that our company can provide service and maintenance or replacement of products to the same value. Customers need to pay the necessary freight and other related costs.
Any replacement or repair of the product will cover the remaining warranty period of the product. If any part of the product or product is replaced by the company itself during the warranty period, all rights and interests of the replacement product or component belong to BPE Ltd.
Manufacturer warranty does not include damage due to the following reasons:

- Damage during transportation of equipment;
- Damage caused by incorrect installation or commissioning;
- Damage caused by failure to comply with operation instructions, installation instructions or maintenance instructions;
- Damage caused by attempts to modify, alter or repair products;
- Damage caused by incorrect use or operation;
- Damage caused by insufficient ventilation of equipment;
- Damage caused by failure to comply with applicable safety standards or regulations;
- Damage caused by natural disasters or force majeure (e.g. floods, lightning, overvoltage, storms, fires, etc.)

In addition, normal wear or any other failure that will not affect the basic operation of the product. Any external scratches, stains or natural mechanical wear does not represent a defect in the product.

8.Limitation of Liability

In addition to the product warranty described above, the state and local laws and regulations provide financial compensation for the product's power connection (including violation of implied terms and warranties). The company hereby declares that the terms and conditions of the product and the policy cannot and can only legally exclude all liability within a limited scope.

9. Datasheet

Technical Data	BPE-HI-BT-3.6K	BPE-HI-BT-5K
Battery Input Data		
Battery Type	Lead-acid or Li-Ion	
Battery Voltage Range (V)	40V-60V	
Max. Charging Current (A)	90A	120A
Max. Discharging Current (A)	90A	120A
Charging Curve	3 Stages/equalization	
External Temperature Sensor	Optional	
Charging Strategy for Li-Ion Battery	Self-adaption to BMS	
PV String Input Data		
Max. DC Input Power (W)	4680W	6500W
PV Input Voltage (V)	370V(100V~500V)	
MPPT Range (V)	125~425V	
Start-up Voltage (V)	125V	
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	5000W
Max. AC Output Power (W)	3960W	5500W
Peak Power(off grid)	2 times of rated power, 10 S	
AC Output Rated Current(A)	15.7A	21.7A
Max. AC Current(A)	18A	25A
Max Continuous AC Passthrough (A)	35A	
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%	
Euro Efficiency	96.50%	
MPPT 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,EN50438 Ireland,G98,G99	
Safety Regulation	IEC62109-1, IEC62109-2	
EMC	EN61000-6-1, EN61000-6-3	
General Data		
Operating Temperature Range (℃)	-25~60℃, >45℃ Derating	
Cooling	Fan	
Noise (dB)	<30	
Communication with BMS	RS485; CAN	
Weight (kg)	20.5KG	
Size (Width*Height*Depth mm)	580*330*217mm	
Protection Degree	IP65	
Installation Style	Wall-mounted	
Warranty	5/10 years	

SOLARMAN Business App Configuration

FOR INSTALLERS

1. Customer Account Creation

Instruct the customer to download the SOLARMAN Smart app on their smartphone and create an account. (they only need to create an account, nothing else) This will allow the customer to view their system Online on the SOLARMAN website or app once you have completed the steps below.

iPhone “SOLARMAN Smart”
Android “SOLARMAN Smart”

2. Download the SOLARMAN Business app

As the installer or business owner, download the SOLARMAN Business app onto a smartphone or tablet. Create an account if you do not already have one, then please complete the steps below in the business app.

iPhone “SOLARMAN Business”
Android “SOLARMAN Business”

3. Dongle Frequency

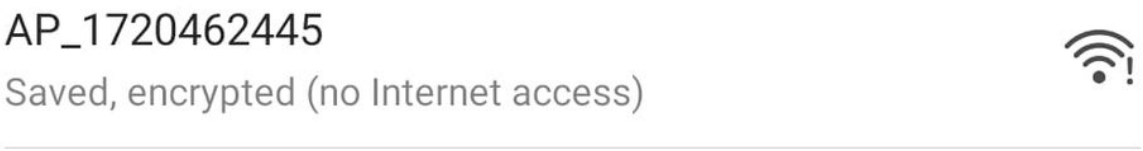
Before commencing dongle configuration, it is essential to check that your Wi-Fi router operates at 2.4 GHz. If not, please contact your ISP for details on how to switch your routers operational frequency.

4. Dongle connection

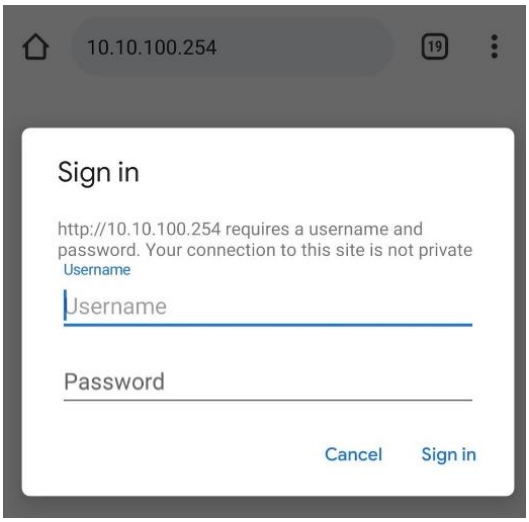
Unpackage your dongle and screw it to the WIFI/RS232 port of your inverter.

5. IP address / networking

Connect to the AP network with your device. This can be done by viewing the available Wi-Fi networks on your device and selecting the network beginning "AP" from the list. Once you have selected the AP network you will be asked for the network password. The password can be found on the dongle or on the box signified by “PWD”. Once connected the network will state “connected (no internet access)” as seen below.



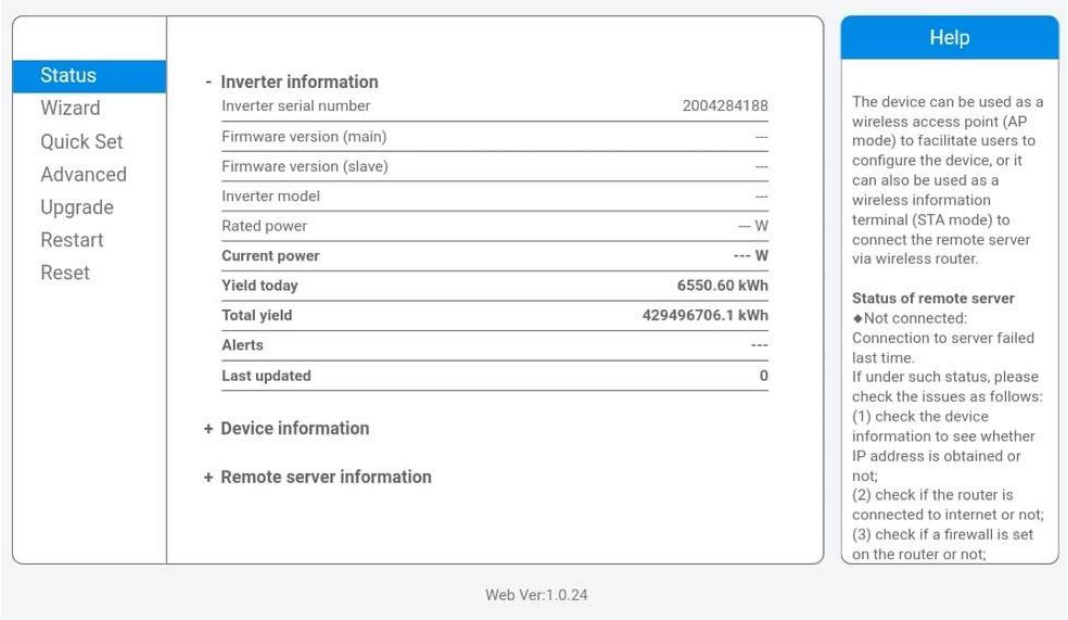
After connecting to the AP network go to your browser and type 10.10.100.254 into your URL browser, you should get the following popup.



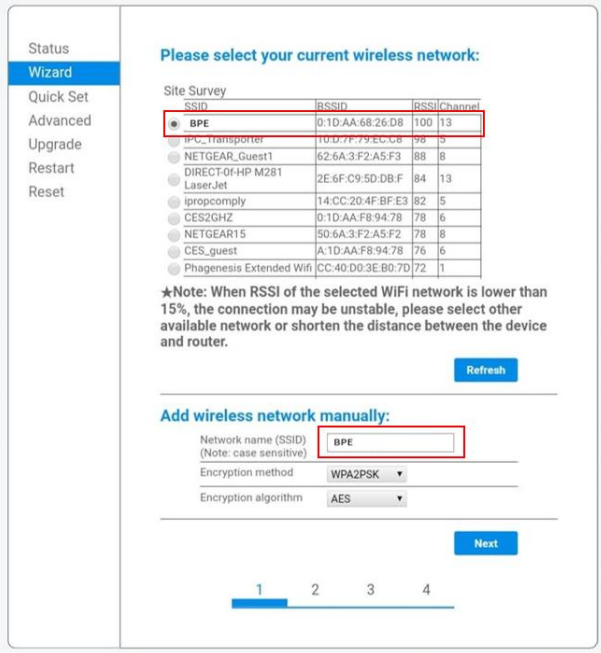
Type the following credentials:

Username: admin
Password: admin

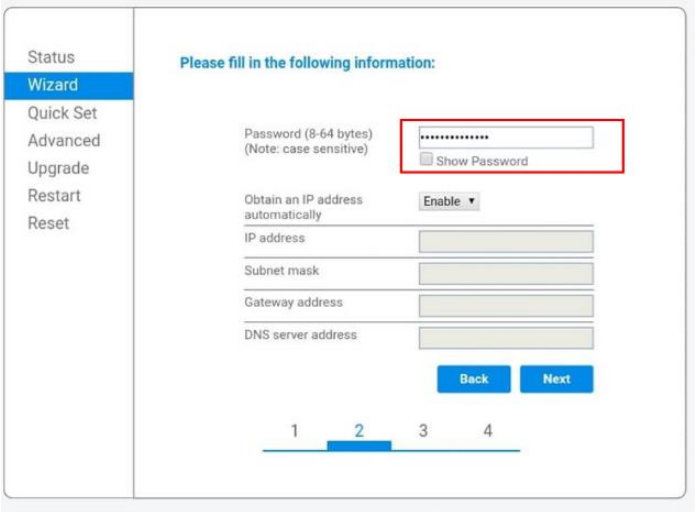
You will then be taken to an index page, titled Inverter information. From this page select “Wizard” in the menu.



Select your preferred network (LAN).



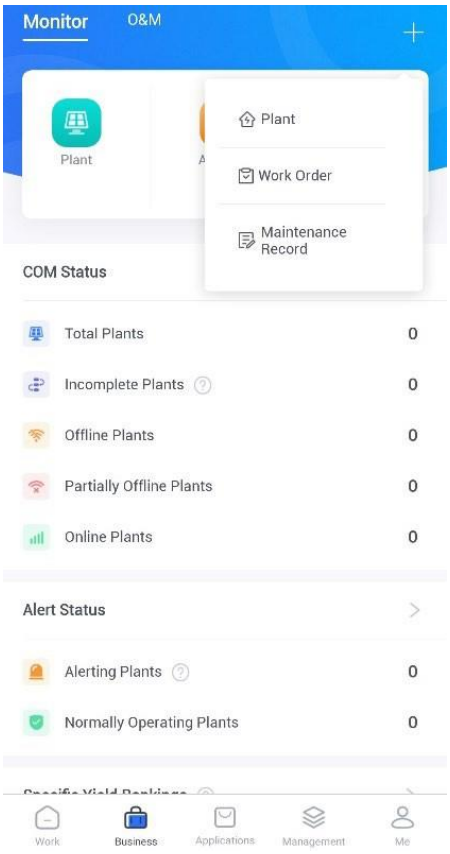
Select the next button and input your local network password.



On page 2 & 3 select "Next". Once in page four, finalise the network configuration by selecting "OK".

6. App Set-up

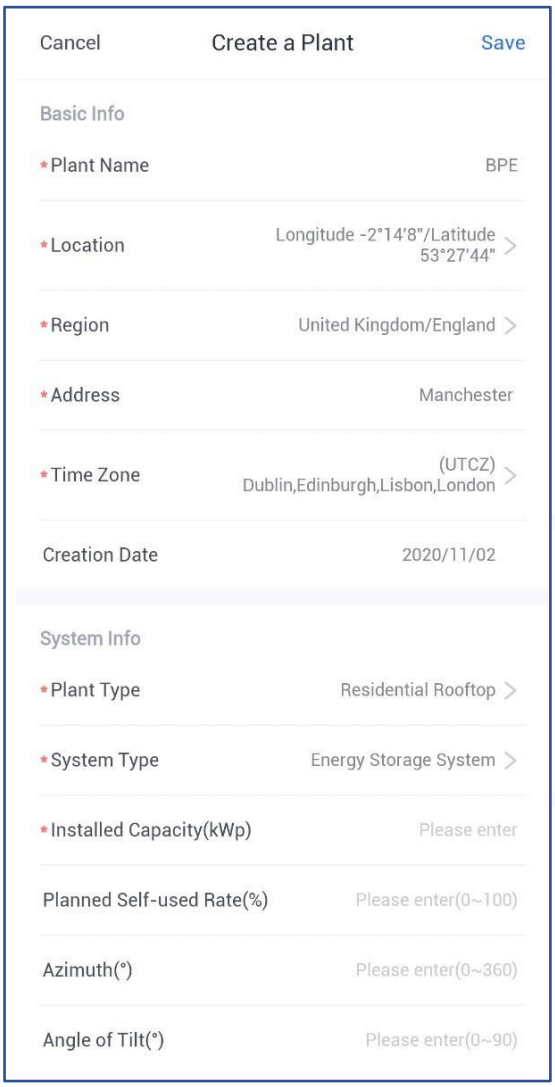
Open the app and select the + in top right-hand corner of the homescreen and select “Plant”.

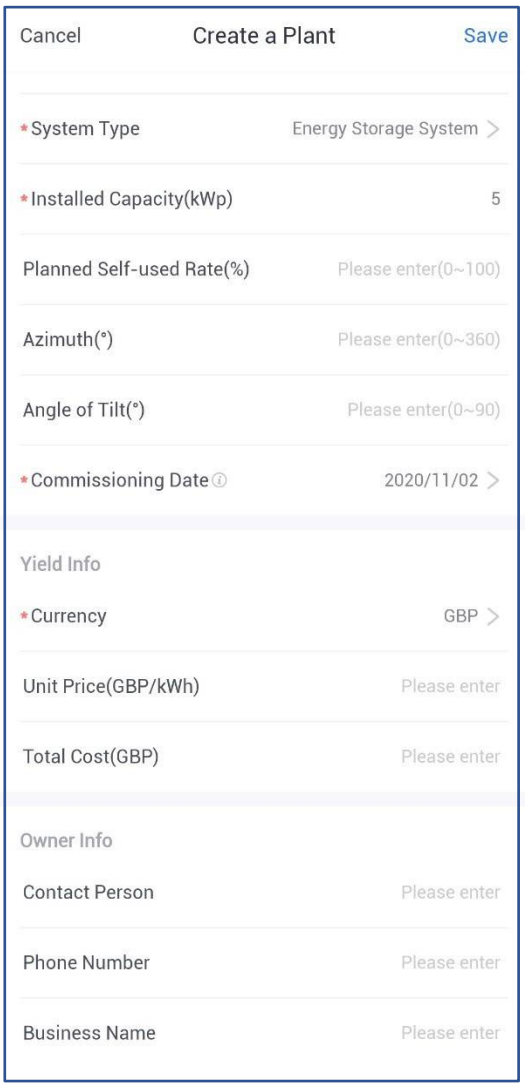


7. Create Plant

You should now be on the “Create plant” page as seen on page 7. At this point you will need to enter all the relevant detail regarding the customer’s system. For the purpose of this manual, we only enter “Plant Name” and “Installed Capacity”, but you should enter all the information you can. If your system includes batteries it is important to select “System Type”, “Storage System” and then “Yes”. Please also ensure the correct time zone is selected as the hybrid inverter will synchronise its time settings with Solarman, finally select “Done”.

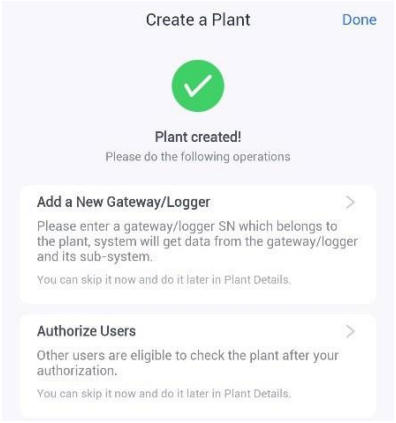

System Type
Grid-Tied
Self-consumption
Energy Storage System
Centralized


Cancel
Create a Plant
Save
Basic Info
*Plant Name
BPE
*Location
Longitude -2°14'8"/Latitude 53°27'44"
*Region
United Kingdom/England
*Address
Manchester
*Time Zone
(UTCZ) Dublin,Edinburgh,Lisbon,London
Creation Date
2020/11/02
System Info
*Plant Type
Residential Rooftop
*System Type
Energy Storage System
*Installed Capacity(kWp)
Please enter
Planned Self-used Rate(%)
Please enter(0~100)
Azimuth(°)
Please enter(0~360)
Angle of Tilt(°)
Please enter(0~90)


Cancel
Create a Plant
Save
*System Type
Energy Storage System
*Installed Capacity(kWp)
5
Planned Self-used Rate(%)
Please enter(0~100)
Azimuth(°)
Please enter(0~360)
Angle of Tilt(°)
Please enter(0~90)
*Commissioning Date
2020/11/02
Yield Info
*Currency
GBP
Unit Price(GBP/kWh)
Please enter
Total Cost(GBP)
Please enter
Owner Info
Contact Person
Please enter
Phone Number
Please enter
Business Name
Please enter

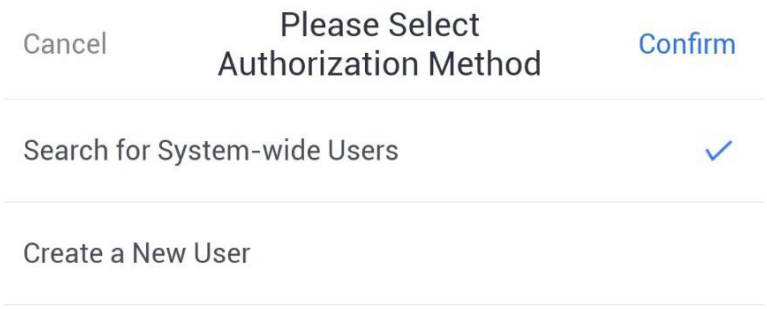
8. Add New Logger

Select “Add a new Gateway/logger”. Press the + in the top right-hand corner of the screen and scan the QR code. This can be found on the box of the dongle or on the dongle itself. After you have added the new logger, click the back button until you reach the create plant page as seen below. Then move forward to selecting the “Authorise User” icon.



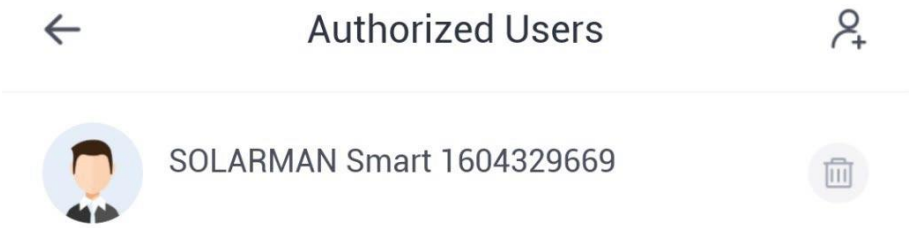
9. Authorise Customer as User

Select “Authorise User” and click the add user icon in the top right-hand corner of the screen. A pop-up menu should then appear, select “Search for System-wide User” and then “Confirm”.



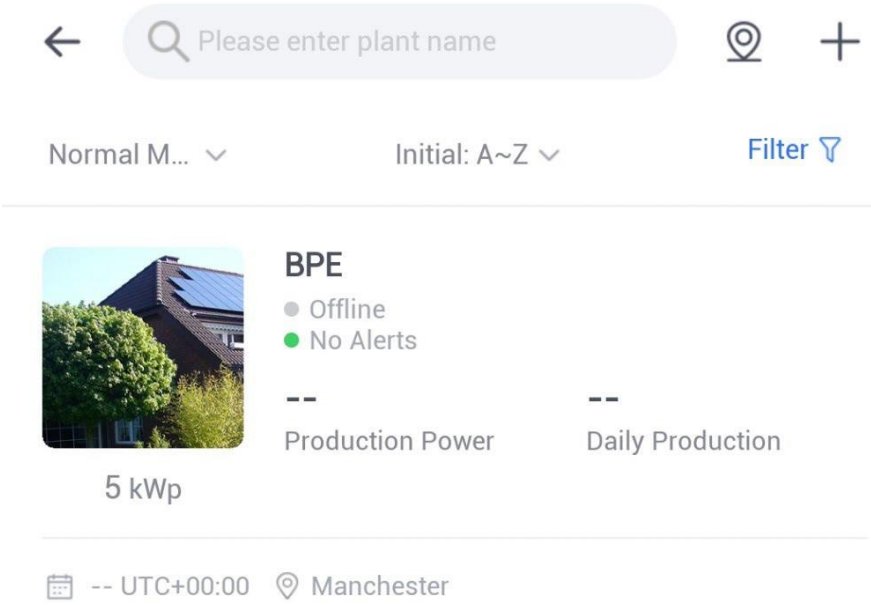
You will then need to ask the customer for the email address they registered with when they signed up for SOLARMAN Smart. You should then input this email address to the task bar and select “Search”. You can now add the customer’s account as an “Owner”.

You should now have one “Authorised User”



10. Wait for the System to Update

You will now need to wait ten minutes for the plant to configure. After this period check that both yourself and the customer have the new plant added. The customer will have to open their SOLARMAN Smart app and refresh the screen (by swiping down on the screen) to view the new plant. Once the customer has logged in to SOLARMAN Smart and the plant is visible they can press the three dots on the top right of the home page, select "Plant Info" and they can upload a picture of their PV array to have as the header image each time they log in.



11. Setup Complete

The configuration is now complete and the customer will have full visibility of their system on the SOLARMAN Smart app and you as the installer will have full visibility of ALL of your installed plants on the SOLARMAN Business app, this will only apply to new installations that are configured using the business app.