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About This Manual
The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

How to Use This Manual
Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.

1. Safety Introductions

Safety signs

- The DC input terminals of the inverter must not be grounded.
- Surface high temperature, Please do not touch the inverter case.
- The AC and DC circuits must be disconnected separately, and the maintenance personnel must wait for 5 minutes before they are completely powered off before they can start working.
- Prohibit disassembling inverter case, there existing shock hazard, which may cause serious injury or death, please ask qualified person to repair.
- Please read the instructions carefully before use.
- Do Not put it in the waste bin! Recycle it by licensed professional!

- 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 need maintenance or repair, take it to a professional service center.
- Improper reassembly may result in electric shock or fire.
- To reduce 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 battery.
- Never charge a frozen battery.
- For optimum operation of this inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this inverter.
- Be very cautious when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts, even cause an explosion.
- Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to "Installation" section of this manual for the details.
- Grounding instructions - this inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
- Never cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.
2. Product Introductions

This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user configurable and easy accessible button operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

2.1 Product Overview

1: Inverter Indicators
2: LCD display
3: Function Buttons
4: DC Switch
5: Power on/off button
6: RS 485 port
7: CAN Port
8: Battery input connectors
9: Function Port
10: Meter_CON port
11: Parallel port
12: PV input with two MPPT
13: Grid
14: Generator input
15: Load
16: WiFi Interface
17: DRMs Port
2.2 Product Size

Inverter Size

Dimensions:
- Height: 708.4 mm
- Width: 445.87 mm
- Depth: 670 mm

- Height: 445.92 mm
- Width: 420 mm
- Depth: 233 mm

- Height: 358 mm
- Width: 19 mm
- Depth: 514 mm

- Height: 140 mm
- Width: 233 mm
- Depth: 670 mm
2.3 Product Features
- Supports Split phase 120/240Vac, Three-phase 120/208Vac system.
- 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 by LCD setting.
- Configurable AC/Solar/Generator Charger priority by LCD setting.
- Compatible with mains voltage or generator power.
- Overload/over temperature/short circuit protection.
- Smart battery charger design for optimized battery performance
- With limit function, prevent excess power overflow to the grid.
- Supporting WIFI monitoring and build-in 2 strings of MPP trackers
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

2.4 Basic System Architecture
The following illustration shows basic application of this inverter.
It also includes following devices to have a Complete running system.
- Generator or Utility
- 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 home or office environment, including motor type appliances such as refrigerator and air conditioner.
3. Installation

3.1 Parts List

Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:

- Hybrid inverter x1
- Stainless steel anti-collision bolt M8×80 x4
- Parallel communication cable x1
- L-type Hexagon wrench x1
- User manual x1
- Battery temperature sensor x1
- Sensor Clamp x1
- Magnetic ring for battery x1
- Magnetic ring for BMS communication cable x1
- Wi-Fi-Plug (optional) x1
3.2 Mounting instructions

Installation Precaution

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

· 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 the television Antenna or antenna cable.
· Not higher than altitude of about 2000 meters above sea level.
· Not in environment of precipitation or humidity (>95%)

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please take off the metal cover by removing 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 is recommended to be between -40~60 °C to ensure optimal operation.
· Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and have enough space for removing wires.
For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side and approx. 50cm above and below the unit. And 100cm to the front.

**Mounting the inverter**

Remember that this inverter is heavy! Please be careful when lifting out from the package. Choose the recommend drill head (as shown in below pic) to drill 4 holes on the wall, 82-90mm deep.

1. Use a proper hammer to fit the expansion bolt into the holes.
2. Carry the inverter and holding it, make sure the hanger aim at the expansion bolt, fix the inverter on the wall.
3. Fasten the screw head of the expansion bolt to finish the mounting.
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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
<th>Torque value (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>3/0AWG</td>
<td>70</td>
<td>24.5Nm</td>
</tr>
</tbody>
</table>

Chart 3-2 Cable size
For 8kW model, battery connector screw size: M10

Please follow below steps to implement battery connection:
1. Please choose a suitable battery cable with correct connector which can well fit into the battery terminals.
2. Use a suitable screwdriver to unscrew the bolts and fit the battery connectors in, then fasten the bolt by the screwdriver, make sure the bolts are tightened with torque of 24.5 N.M in clockwise direction.
3. Make sure polarity at both the battery and inverter is correctly connected.

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 recommended cables.

All wiring must be performed by a professional person.

Installation must be performed with care.

Before making the final DC connection or closing DC breaker/disconnect, be sure positive(+) must be connect to positive(+) and negative(-) must be connected to negative(-). Reverse polarity connection on battery will damage the inverter.
3.3.2 Function port definition

**TEMP (1,2):** battery temperature sensor for lead acid battery.

**CT-L1 (3,4):** current transformer (CT1) for “zero export to CT” mode clamps on L1 when in split phase system.

**CT-L2 (5,6):** current transformer (CT2) for “zero export to CT” mode clamps on L2 when in split phase system.

**G-start (7,8):** dry contact signal for startup the diesel generator.

When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

**G-valve (9,10):** reserved.

**RSD (11,12):** provide 12Vdc output when inverter is on.

**ATS:** If the conditions are met, it will output 230Vac.

**Note:** For - EU model (8kW, 230V@50Hz), 1pcs CT is needed only, and the secondary side of the CT should be connected to 5&6 port (CT-L2).
3.3.3 Temperature sensor connection for lead-acid battery
3.4 Grid connection and backup load connection

· Before connecting to the grid, a separate AC breaker must be installed between the inverter and the grid, and also between the backup load and the inverter. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current. The recommended of AC breaker is 63A for 8kW.

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

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
<th>Torque value (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>8AWG</td>
<td>6</td>
<td>1.2Nm</td>
</tr>
</tbody>
</table>

Grid connection and backup load connection (Copper wires) (bypass)

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
<th>Torque value (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>6AWG</td>
<td>10</td>
<td>1.2Nm</td>
</tr>
</tbody>
</table>

Chart 3-3 Recommended Size for AC wires

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

1. Before making Grid, load and Gen port connection, be sure to turn off AC breaker or disconnector first.
2. Remove insulation sleeve 10mm length, unscrew the bolts, insert the wires according to polarities indicated on the terminal block and tighten the terminal screws. Make sure the connection is complete.
3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten terminal. Be sure to connect corresponding N wires and PE wires to related terminals as well.

4. Make sure the wires are securely connected.

5. Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.5 PV Connection

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>12AWG</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Chart 3-4 Cable size

To avoid any 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 ensure the PV+ & PV- of solar panel is not connected to the system ground bar.

It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.
3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:
1) Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.
3) The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

<table>
<thead>
<tr>
<th>PV Input Voltage</th>
<th>370V (125V-500V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Array MPPT Voltage Range</td>
<td>150V-425V</td>
</tr>
<tr>
<td>No. of MPP Trackers</td>
<td>2</td>
</tr>
<tr>
<td>No. of Strings per MPP Tracker</td>
<td>2+2</td>
</tr>
</tbody>
</table>

Chart 3-5

3.5.2 PV Module Wire Connection:

Please follow below steps to implement PV module connection:
1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.
3. Check correct polarity of wire connection from PV modules and PV input connectors. Then, connect positive pole (+) of connection wire to positive pole (+) of PV input connector. Connect negative pole (-) of connection wire to negative pole(-) of PV input connector. Close the switch and make sure the wires are tightly fixed.
3.6 CT Connection

- If the data read by the CT is wrong, you can try to point the direction of the CT to the grid.

The primary side of the CT needs to be clamped on the Grid live line.
3.6.1 Meter Connection

System connection diagram for the CHNT meter

System connection diagram for the Eastron meter
3.7 Earth Connection (mandatory)

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

Note:
When the inverter is in the off-grid state, the N line needs to be connected to the earth.

Note:
In final installation, breaker certified according to IEC 60947-1 and IEC 60947-2 shall be installed with the equipment.

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
<th>Torque value (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>8AWG</td>
<td>6</td>
<td>1.2Nm</td>
</tr>
</tbody>
</table>

Earth connection (Copper wires) (bypass)

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>Cable (mm²)</th>
<th>Torque value (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8kW</td>
<td>6AWG</td>
<td>10</td>
<td>1.2Nm</td>
</tr>
</tbody>
</table>

3.8 WIFI Connection

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug. The Wi-Fi Plug is not a standard configuration, it's optional.
3.9 Wiring System for Inverter

This diagram is an example for grid systems without special requirements on electrical wiring connection. Note: The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise, the back-up function may be abnormal when the grid fails.

When the inverter is working in backup mode, neutral and PE on the backup side are connected via the internal relay. Also, the internal relay will be open when the inverter is working in grid-tied mode.

Do not connect this terminal when the neutral wire and PE wire are connected together.

This diagram is an example for application that Neutral connects together with PE in distribution box. Such as: Australia, New Zealand, South Africa, etc. (Please follow local wiring regulations!)
3.10 Typical application diagram of diesel generator

- CAN
- L wire
- N wire
- PE wire

**Inverter**

1. DC Breaker for battery
   - JKS-8K-SG-EU: 250A DC breaker

2. AC Breaker for gen port
   - JKS-8K-SG-EU: 63A AC breaker

3. AC Breaker for backup load port
   - JKS-8K-SG-EU: 63A AC breaker

**Battery pack**

**Generator**

**Relay**

G-start (7,8): dry contact signal for startup the diesel generator.

**Backup Load**

**Remotely control signal line**

**Ground**

**Coil**

**Open contact**

**GS (diesel generator startup signal)**

**Remote**

**L**

**N**

**PE**

**DC Breaker**
3.11 Single phase (230Vac) parallel connection diagram

- Inverter No. 1 (master)
  - DC Breaker
  - AC Breaker
  - Battery pack

- Inverter No. 2 (slave)
  - DC Breaker
  - AC Breaker

- Inverter No. 3 (slave)
  - DC Breaker
  - AC Breaker

- Battery pack

- CT
  - Arrow pointing to inverter

- Grid
  - PE N L

- Home Load

- Backup Load

- Advanced Function
  - Slave Inverter
  - Parallel: Modbus SN 03
  - Slave: A Phase

- Advanced Function
  - Slave Inverter
  - Parallel: Modbus SN 02
  - Slave: B Phase

- Advanced Function
  - Slave Inverter
  - Parallel: Modbus SN 01
  - Slave: C Phase

- DC Breaker for battery
  - JKS-8K-SG-EU: 250A DC breaker

- AC Breaker for grid port
  - JKS-8K-SG-EU: 63A AC breaker

- AC Breaker for backup load port
  - JKS-8K-SG-EU: 63A AC breaker

- AC Breaker
  - Depends on Home Load

The primary side of the CT needs to be clamped on the Grid live line.
3.13 Parallel connection for 230/400 three phase

1. DC Breaker for battery
JKS-8K-SG-EU: 250A DC breaker

2. AC Breaker for backup load port
JKS-8K-SG-EU: 63A AC breaker

3. AC Breaker for grid port
JKS-8K-SG-EU: 63A AC breaker

4. AC Breaker
Depends on Home Load

Diagram: Parallel connection for 230/400 three phase system with different connections for batteries and inverters.
3.14 3pcs in parallel with diesel generator

1. DC Breaker for battery
   JKS-8K-SG-EU: 250A DC breaker

2. AC Breaker for backup load port
   JKS-8K-SG-EU: 63A AC breaker

3. AC Breaker for GEN port
   JKS-8K-SG-EU: 63A AC breaker

4. Advanced Function
   Paral. Set3

5. Parallel A, B, C

6. A Phase

7. B Phase

8. C Phase

9. A Phase Master inverter

10. B Phase Master inverter

11. C Phase Master inverter

12. CAN

13. CAN/RS 485

14. Battery pack

15. Generator

- 24 -
4. OPERATION

4.1 Power ON/OFF
Once the unit has been properly installed and the batteries are connected well, simply press On/Off button (located on the left side of the case) to turn on the unit. When system without battery connected, but connect with either PV or grid, and ON/OFF button is switched off, LCD will still light up (Display will show OFF), In this condition, when switch on ON/OFF button and select NO battery, system can still working.

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

<table>
<thead>
<tr>
<th>LED Indicator</th>
<th>Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>Green led solid light</td>
</tr>
<tr>
<td>AC</td>
<td>Green led solid light</td>
</tr>
<tr>
<td>Normal</td>
<td>Green led solid light</td>
</tr>
<tr>
<td>Alarm</td>
<td>Red led solid light</td>
</tr>
<tr>
<td></td>
<td>PV Connection normal</td>
</tr>
<tr>
<td></td>
<td>Grid Connection normal</td>
</tr>
<tr>
<td></td>
<td>Inverter operating normal</td>
</tr>
<tr>
<td></td>
<td>Malfunction or warning</td>
</tr>
</tbody>
</table>

Chart 4-1 LED indicators

<table>
<thead>
<tr>
<th>Function Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esc</td>
<td>To exit setting mode</td>
</tr>
<tr>
<td>Up</td>
<td>To go to previous selection</td>
</tr>
<tr>
<td>Down</td>
<td>To go to next selection</td>
</tr>
<tr>
<td>Enter</td>
<td>To confirm the selection</td>
</tr>
</tbody>
</table>

Chart 4-2 Function Buttons
5. LCD Display Icons

5.1 Main Screen

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

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

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

3. System Setup Icon, Press this set button, you can enter into the system setup screen which including Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced function and Li-Batt info.

4. The main screen displays information, including Solar, Grid, Load, and Battery. It also displays the direction of energy flow through arrows. When the power approaches the rated power of the hybrid inverter, the color on the curved bar will change from green to red, so system information can be vividly displayed on the main screen.

- PV power and Load power will always be positive numbers.
- The negative grid power means selling power to grid, while positive means buying power from grid
- Negative battery power indicates charging, while positive power indicates discharging.
5.1.1 LCD operation flow chart

Main Screen

- Solar Page
- Grid Page
- Inverter Page
- Battery Page
- Load Page

System Setup

- Battery Setting
- System Work Mode
- Grid Setting
- Gen Port Use
- Basic Setting
- Advanced Function
- Device info

Solar Graph
Grid Graph
BMS Page
Load Graph

- Pathways between different pages and settings.
5.2 Solar Power Curve

This is Solar Panel detail page.
① Solar Panel Generation.
② **Grid Tie Power**: when there’s a string inverter AC couple at the grid or load side of hybrid inverter and there’s a meter installed for the string inverter, then the hybrid inverter LCD will show the string inverter output power on its PV icon. Please make sure the meter can communicate with the hybrid inverter successfully.
③ Voltage, Current, Power for each MPPT.
④ Solar Panel energy for Day and Total.
Press the “Energy “button will enter into the power curve page.

This is Inverter detail page.
① Inverter Generation.
② 0.0Hz: frequency after DC/AC.
电压, Current, Power for each Phase.
③ *DC-T: mean DC-DC temperature,
AC-T: mean Heat-sink temperature.
*Note: this part info is not available for some LCD FW.

This is Load detail page.
① Load Power.
② Voltage, Power for each Phase.
③ Load consumption for Day and Total.
When you check “Selling First” or “Zero export to Load” on system work mode page, the information on this page is about backup load which connect on Load port of hybrid inverter.
When you check “Zero export to CT”on system work mode page, the information on this page is including backup load and home load.
Press the “Energy “button will enter into the power curve page.

This is Grid detail 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 BUY: Energy from Grid to Inverter,
SELL: Energy from Inverter to Grid.
Press the “Energy “button will enter into the power curve page.
This is Battery detail page.

if you use Lithium Battery, you can enter BMS page.

5.3 Curve Page-Solar & Load & Grid

Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, pls check on the monitoring system. Click the up and down arrow to check power curve of different period.
5.4 System Setup Menu

This is System Setup page.

5.5 Basic Setup Menu

**Basic Setting**

<table>
<thead>
<tr>
<th>Time Syncs</th>
<th>Beep</th>
<th>Auto Dim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Month</td>
<td>Day</td>
</tr>
<tr>
<td>2019</td>
<td>03</td>
<td>17</td>
</tr>
<tr>
<td>Hour</td>
<td>Minute</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

**Time Syncs**: synchronize cloud platform time. Enable the inverter to automatically

**Beep**: Used to turn on or off the beep sound in inverter’s alarm status.

**Auto Dim**: Used to automatically adjust the brightness of the LCD display screen.

**Factory Reset**: Reset all parameters of the inverter.

**Lock out all changes**: Lock programmable parameters to prevent them from being changed.

**PassWord**

When we select the “factory reset” or “Lock out all changes”, the system will require us to enter a password first to confirm the operation.

**Factory Reset Password**: 9999

**Lock out all changes Password**: 7777

**Basic Setting**

1. Click the down arrow on the left side of the "Basic Set1" page to enter the "Basic Set2" page;
2. On the “Basic Set2” page, you can set the display language of the LCD screen as needed. Click the "UP" and "DOWN" buttons below the LCD screen to switch language options. The current available options are: English, German, Polish, Hungarian, Spanish, Czech, Ukrainian.
3. After switching to the desired language, click on the check mark icon in the bottom right corner of the page to save the settings.

Note: If the current LCD screen does not have a Basic Set2 page, or if the language option on the Basic Set2 page does not include the language you need to set, please contact the after-sales support team to update the HMI firmware and language firmware package of the inverter. After the update is completed, follow the above steps to complete the setup.
5.6 Battery Setup Menu

Battery Setting

<table>
<thead>
<tr>
<th>Batt Mode</th>
<th>Batt Capacity</th>
<th>Max A Charge</th>
<th>Max A Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium</td>
<td>400Ah</td>
<td>40A</td>
<td>40A</td>
</tr>
<tr>
<td>Use Batt V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Batt %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Batt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activate Battery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disable Float Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Battery capacity: When set the "Batt Mode" as "Use Batt %", battery capacity can be used to calibrate battery SOC. Use Batt V: Use Battery Voltage for all the settings (V). Use Batt %: Use Battery SOC for all the settings (%). Max. A charge/discharge: Max battery charge/discharge current(0-190A for 8kW model). For AGM and Flooded, we recommend setting the max A charge/discharge current as no more than battery capacity x 20%. For Lithium, we recommend Ah battery size x 50% = Charge/Discharge amps. For Gel, follow manufacturer’s instructions. No Batt: tick this item if no battery is connected to the system.

Active battery: This feature will help recover a battery that is over discharged by slowly charging from the solar array or grid. Disable Float Charge: For the lithium battery with BMS communication, the inverter will keep the charging voltage at the current voltage when the BMS charging current requested is 0. It is used to help prevent battery from being overcharged.

Battery Setting

| Start =30%: When battery SOC drop to 30%, the inverter will autostart the connected generator to charge the battery. A = 40A: The maximum charging current allowed when only use generator power to charge the battery. Gen Charge: Use the AC input power of GEN port to charge the battery. Gen Signal: When conditions are sufficient, the inverter will close or open the normally open relay used to control the start and stop of generator. Gen Force: When the generator is connected, it is forced to start the generator without meeting other conditions. |
|---|---|---|
| Start | 30% | 40A |
| Gen Charge | Grid Charge |
| Gen Signal | Grid Signal |
| Gen Force | | |

This is Battery Setup page. ①

This is Grid Charge, you need select. ②

07/08/2021 11:11:10 Thu

When the "GEN signal" is active, the generator icon will appear on the main screen of inverter LCD display.
Recommended battery settings

<table>
<thead>
<tr>
<th>Battery Type</th>
<th>Absorption Stage</th>
<th>Float Stage</th>
<th>Equalization Voltage (every 30 days 3hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGM (or PCC)</td>
<td>14.2V (57.6V)</td>
<td>13.4V (53.6V)</td>
<td>14.2V (57.6V)</td>
</tr>
<tr>
<td>Gel</td>
<td>14.1V (56.4V)</td>
<td>13.5V (54.0V)</td>
<td></td>
</tr>
<tr>
<td>Wet</td>
<td>14.7V (59.0V)</td>
<td>13.7V (55.0V)</td>
<td>14.7V (59.0V)</td>
</tr>
<tr>
<td>Lithium</td>
<td>Follow its BMS voltage parameters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Click the generator icon on the main screen, you can enter the 'Generator' detail page. The information contained on this page is as follows:

1. How much power is using from generator;
2. How much energy has used from generator in today or in total;
3. The output voltage and power on each phase of generator.

When the "Lithium" mode is selected, the content on the "Batt Set 3" page is shown in the figure on the right.

**Lithium Mode:** This is the BMS communication protocol code which can be confirmed on the "Deye Approved Battery list" based on the battery model you are using.

**Shutdown:** Be valid in Off-grid mode, battery can discharge to this SOC, then the DC/AC inverter module of this inverter will be shut down and the solar power can only be used to charge the battery.

**Low Batt:** Be valid in On-grid mode, when the 'Grid charge' has been checked and the set target battery SOC on 'Time of Use' page isn't less than the "Low Batt" value, the battery SOC will remain above the value of "Low Batt".

**Restart:** Be valid in Off-grid mode, after the DC/AC inverter module of this inverter is shut down, the PV power can only be used to charge the battery. After the battery SOC has resumed to this "Restart" value, the DC/AC inverter module will restart to output AC power.

When the "Use Batt V" or "Use Batt %" mode is selected, the content on the "Batt Set 3" page is shown as the figure on the left.

**Three stage charging strategy for lead-acid and incompatible lithium battery.**

This is for professional installers, you can keep it if you do not know.

**Shutdown 20%:** Be valid in Off-grid mode, when battery SOC/voltage drop to this value, then the DC/AC inverter module of this inverter will be shut down and the solar power can only be used to charge the battery.

**Low Batt 35%:** Be valid in On-grid mode, when the "Grid charge" has been checked and the set target battery SOC/voltage on "Time of Use" page isn't less than the "Low Batt" value, the battery SOC/voltage will remain above the value of "Low Batt".

**Restart 50%:** Be valid in Off-grid mode, after the DC/AC inverter module of this inverter is shut down, the PV power can only be used to charge the battery. After the battery SOC has returned to this "Restart" value, the DC/AC inverter module will restart to output AC power.
5.7 System Work Mode Setup Menu

### System Work Mode

- **Selling First**: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid. The PV energy will be used to power the load and charge the battery, then the excess PV energy will flow to grid. Power source priority for the load is as follows:
  2. Batteries (when the actual battery SOC is higher than the target SOC).
  3. Grid.

- **Zero Export To Load**: Hybrid inverter will only provide power to the backup load connected. The hybrid inverter will neither provide power to the home load nor sell power to grid, if the "solar sell" behind is not enabled. The built-in CT will detect current flowing back to the grid, if there is, the inverter will reduce the generate power to only power the backup loads, smart loads and charge the battery.

- **Zero Export To CT**: Hybrid inverter will not only provide power to the backup load connected but also give power to the home load connected. If PV power and battery power is insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid, if the "solar sell" behind is not enabled. In this mode, a external CT or smart meter must be installed. As to the installation method of the CT or smart meter, please refer to the chapter 3.6 of this manual. The external CT or smart meter will detect the current flowing back to the grid, if there is, the inverter will reduce generate power to prevent selling power to grid.

### Work Mode

**Selling First**: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid. The PV energy will be used to power the load and charge the battery, then the excess PV energy will flow to grid. Power source priority for the load is as follows:

2. Batteries (when the actual battery SOC is higher than the target SOC).
3. Grid.

**Zero Export To Load**: Hybrid inverter will only provide power to the backup load connected. The hybrid inverter will neither provide power to the home load nor sell power to grid, if the "solar sell" behind is not enabled. The built-in CT will detect current flowing back to the grid, if there is, the inverter will reduce the generate power to only power the backup loads, smart loads and charge the battery.

**Zero Export To CT**: Hybrid inverter will not only provide power to the backup load connected but also give power to the home load connected. If PV power and battery power is insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid, if the "solar sell" behind is not enabled. In this mode, a external CT or smart meter must be installed. As to the installation method of the CT or smart meter, please refer to the chapter 3.6 of this manual. The external CT or smart meter will detect the current flowing back to the grid, if there is, the inverter will reduce generate power to prevent selling power to grid.

**Solar Sell**: “Solar sell” is for Zero export to load or Zero export to CT: when this item is active, the PV energy will first power the loads or charge the battery, then the surplus PV energy can be sold back to grid.

**Max. sell power**: Maximum power allowed to flow to grid.

**Zero-export Power**: This parameter will ensure the zero-export to the grid some small amount of energy that has been set with this value. It is recommended to set it as 20-100W to ensure the hybrid inverter won’t feed power to grid.

**Energy Pattern**: Priority of PV power usage. When "Grid charge" is enabled, the default energy pattern is "Load First", this setting will be invalid.

**Batt First**: PV power is firstly used to charge the battery and then used to power the load. If PV power is insufficient, grid will make supplement for battery and load simultaneously.
Load First: PV power is firstly used to power the load and then used to charge the battery. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

Max Solar Power: The maximum DC input power allowed.

Grid Peak-shaving: When it is active, grid output power will be limited within the set value. If the grid peak-shaving power plus PV power plus battery power cannot meet the power consumption of the load, the grid peak-shaving will be invalid, and the power taken from the grid can exceed this set value.

Time of use: it is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load. Only tick "Time Of Use" then the follow items (Grid, charge, time, power etc.) will take effect.

Note: when in selling first mode and click time of use, the battery power can be sold into grid.

Grid charge: utilize grid to charge the battery in a time period.

Gen charge: utilize diesel generator to charge the battery in a time period.

Time: real time, range of 01:00-24:00.

Power: Max. discharge power of battery allowed.

Batt(V or SOC %): The target value of battery voltage or SOC during the current time period. If the actual SOC or voltage of the battery is lower than this target value, the battery needs to be charged. If there is a energy source like solar power or grid, the battery will be charged; If the actual SOC or voltage of the battery is higher than this target value, the battery can discharge, and when the solar power is not enough to power the load or the “Selling First “is enabled, the battery will discharge.

Assuming that at the end of the previous time period, the actual battery level reaches or approaches the target value of the previous time period.

For example

During 00:00-05:00, if battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.

During 05:00-08:00, if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%. At the same time, if battery SOC is lower than 40%, then grid will charge the battery SOC to 40%.

During 08:00-10:00, if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.

During 10:00-15:00, if battery SOC is lower than 80%, hybrid inverter will charge the battery until the SOC reaches 80%. If the PV power is sufficient, the battery can be charged to 100%.

During 15:00-18:00, when battery SOC is higher than 40%, hybrid inverter will discharger the battery until the SOC reaches 40%.

During 18:00-00:00, when battery SOC is higher than 35%, hybrid inverter will discharger the battery until the SOC reaches 35%.

It allows users to choose which day to execute the setting of “Time of Use". For example, the inverter will execute the time of use page on Mon/Tue/Wed/Thu/Fri/Sat only.
5.8 Grid Setup Menu

Grid Setting/Connect

- **Normal connect**: The allowed grid voltage/frequency range when the inverter operates normally.
- **Normal Ramp rate**: It is the startup power ramp.
- **Reconnect after trip**: The allowed grid voltage/frequency range when the inverter reconnects to the grid after tripping from grid.
- **Reconnect Ramp rate**: It is the reconnect power ramp.
- **Reconnection time**: The waiting time for the inverter reconnects to the grid when the grid voltage/frequency return to the allowed range after tripping.
- **PF**: Power factor which is used to adjust inverter reactive power.

Grid Setting/IP Protection

- **HV1**: Level 1 overvoltage protection point; **HV2**: Level 2 overvoltage protection point; **HV3**: Level 3 overvoltage protection point.
- **LV1**: Level 1 undervoltage protection point; **LV2**: Level 2 undervoltage protection point; **LV3**: Level 3 undervoltage protection point.
- **HF1**: Level 1 over frequency protection point; **HF2**: Level 2 over frequency protection point; **HF3**: Level 3 over frequency protection point.
- **LF1**: Level 1 under frequency protection point; **LF2**: Level 2 under frequency protection point; **LF3**: Level 3 under frequency protection point.

Grid Setting/F(W)

- **F(W)**: It's used to adjust the output active power of inverter according to the frequency of grid.
- **Droop f**: percentage of nominal power per Hz
- For example, “Start freq F=50.2Hz, Stop freq F=51.5, Droop F=40%PE/Hz” when the grid frequency reaches 51.2Hz, the inverter will decrease its active power at rate of 40% per Hz. Then when frequency of grid is less than 50.2Hz, the inverter will stop decreasing output power.
- For the detailed setup values, please follow the local grid code.
Grid Setting/V(W) V(Q)

- **V(W):** It is used to adjust the inverter's active power according to the set grid voltage.
- **V(Q):** It is used to adjust the inverter's reactive power according to the set grid voltage.

These two functions are used to adjust inverter's output power (active power and reactive power) when grid voltage changes.

**Lock-in/Pn 5%:** When the inverter active power is less than 5% rated power, the VQ mode will not take effect.

**Lock-out/Pn 20%:** If the inverter active power is increasing from 5% to 20% rated power, the VQ mode will take effect again.

For example: V2=110%, P2=20%. When the grid voltage reaches the 110% times of rated grid voltage, inverter output power will reduce its active output power to 20% rated power.

For example: V1=90%, Q1=44%. When the grid voltage reaches the 90% times of rated grid voltage, inverter output power will output 44% reactive output power.

For the detailed setup values, please follow the local grid code.

Grid Setting/P(Q) P(F)

- **P(Q):** It is used to adjust the inverter's reactive power according to the set active power.
- **P(PF):** It is used to adjust the inverter's PF according to the set active power.

For the detailed setup values, please follow the local grid code.

**Lock-in/Pn 50%:** When the inverter output active power is less than 50% rated power, the VQ mode will not take effect.

**Lock-out/Pn 50%:** When the inverter output active power is higher than 50% rated power, it will enter the P(PF) mode.

**Note:** Only when the grid voltage is equal to or higher than 1.05 times of rated grid voltage, then the P(PF) mode will take effect.

Grid Setting/LVRT

- **Reserved:** This function is reserved. It is not recommended.

5.9 Generator Port Use Setup Menu

- **Generator input rated power:** allowed Max. power from diesel generator.
- **GEN connect to grid input:** connect the diesel generator to the grid input port.
- **Smart Load Output:** Use the GEN port as an AC output port, and the load connected to this port can be controlled on/off by the hybrid inverter.

**Example:** Power=500W, ON: 100%, OFF=95%: When the PV power exceeds 500W, and battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% or PV power < 500w, the Smart Load Port will switch off automatically.
Smart Load OFF Batt
• Battery SOC at which the Smart load will switch off.

Smart Load ON Batt
• Battery SOC at which the Smart load will switch on. Besides, the PV input power should exceed the setting value (Power) simultaneously and then the Smart load will switch on.

On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.
off grid immediately off: The smart load will stop working immediately when the grid is disconnected if this item is active.

Micro Inv Input: To use the Generator input port as a AC input port of micro-inverter or other on-grid inverter.
* Micro Inv Input OFF: When the battery SOC or voltage rise to this set value and the hybrid inverter is operating in off-grid mode, the frequency of GEN port of hybrid inverter will be raised to 'AC Couple Frz High' to make the Grid-tied inverter trip. It's invalid in on-grid mode.
* Micro Inv Input ON: When the battery SOC or voltage drops below this set value, the relay on GEN port of hybrid inverter will be closed, then the Grid-Tied inverter will generate power and feed into hybrid inverter.

AC Couple Fre High: If choosing "Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre high) and the microinverter or on-grid inverter will trip from hybrid inverter.
* Note: Micro Inv Input OFF and On is valid for some certain FW version only.
* AC couple on load side: Connecting the output of on-grid inverter at the load port of the hybrid inverter. In this situation, the hybrid inverter will not able to show the load power correctly.
* AC couple on grid side: Connecting the output of on-grid inverter at the grid port of the hybrid inverter.
* Note: Some firmware versions don’t have this function.

Solar Arc Fault ON: This function is only applicable to the US market and customized customers.

System selfcheck: Disable. this is only for factory.

Gen Peak-shaving: Limit the maximum output power of the generator to the set rated power on "GEN PORT USE" page, the rest of power consumption will be provided by PV and battery to ensure that the generator will not overload.

DRM: Demand response mode, receive external commands for scheduling active power and reactive power.

Backup Delay: When the grid cuts off, the inverter will output power after this set time.
For example, backup delay: 3ms. the inverter will give output power after 3ms when the grid cuts off.
Note: for some old FW version, the function is not available.

BMS_Err_Stop: When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.

Signal ISLAND MODE: When "signal island mode" is checked and the inverter connects the grid, the ATS port voltage will be 0. When "signal island mode" is checked and the inverter disconnected from the grid, the ATS port voltage will output 230Vac voltage. With this feature and external NO type relay, it can realize N and PE disconnection or bond.
More details, please refer to left side picture.

Micro Inv Input OFF and On is valid for some certain FW version only.
* AC couple on load side: Connecting the output of on-grid inverter at the load port of the hybrid inverter. In this situation, the hybrid inverter will not able to show the load power correctly.
* AC couple on grid side: Connecting the output of on-grid inverter at the grid port of the hybrid inverter.
* Note: Some firmware versions don’t have this function.

Smart Load OFF Batt
• Battery SOC at which the Smart load will switch off.

Smart Load ON Batt
• Battery SOC at which the Smart load will switch on. Besides, the PV input power should exceed the setting value (Power) simultaneously and then the Smart load will switch on.

On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.
off grid immediately off: The smart load will stop working immediately when the grid is disconnected if this item is active.

Micro Inv Input: To use the Generator input port as a AC input port of micro-inverter or other on-grid inverter.
* Micro Inv Input OFF: When the battery SOC or voltage rise to this set value and the hybrid inverter is operating in off-grid mode, the frequency of GEN port of hybrid inverter will be raised to 'AC Couple Frz High' to make the Grid-tied inverter trip. It’s invalid in on-grid mode.
* Micro Inv Input ON: When the battery SOC or voltage drops below this set value, the relay on GEN port of hybrid inverter will be closed, then the Grid-Tied inverter will generate power and feed into hybrid inverter.

AC Couple Fre High: If choosing "Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre high) and the microinverter or on-grid inverter will trip from hybrid inverter.
* Note: Micro Inv Input OFF and On is valid for some certain FW version only.
* AC couple on load side: Connecting the output of on-grid inverter at the load port of the hybrid inverter. In this situation, the hybrid inverter will not able to show the load power correctly.
* AC couple on grid side: Connecting the output of on-grid inverter at the grid port of the hybrid inverter.
* Note: Some firmware versions don’t have this function.

Solar Arc Fault ON: This function is only applicable to the US market and customized customers.

System selfcheck: Disable. this is only for factory.

Gen Peak-shaving: Limit the maximum output power of the generator to the set rated power on "GEN PORT USE" page, the rest of power consumption will be provided by PV and battery to ensure that the generator will not overload.

DRM: Demand response mode, receive external commands for scheduling active power and reactive power.

Backup Delay: When the grid cuts off, the inverter will output power after this set time.
For example, backup delay: 3ms. the inverter will give output power after 3ms when the grid cuts off.
Note: for some old FW version, the function is not available.

BMS_Err_Stop: When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.

Signal ISLAND MODE: When "signal island mode" is checked and the inverter connects the grid, the ATS port voltage will be 0. When "signal island mode" is checked and the inverter disconnected from the grid, the ATS port voltage will output 230Vac voltage. With this feature and external NO type relay, it can realize N and PE disconnection or bond.
More details, please refer to left side picture.

Smart Load OFF Batt
• Battery SOC at which the Smart load will switch off.

Smart Load ON Batt
• Battery SOC at which the Smart load will switch on. Besides, the PV input power should exceed the setting value (Power) simultaneously and then the Smart load will switch on.

On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.
off grid immediately off: The smart load will stop working immediately when the grid is disconnected if this item is active.

Micro Inv Input: To use the Generator input port as a AC input port of micro-inverter or other on-grid inverter.
* Micro Inv Input OFF: When the battery SOC or voltage rise to this set value and the hybrid inverter is operating in off-grid mode, the frequency of GEN port of hybrid inverter will be raised to 'AC Couple Frz High' to make the Grid-tied inverter trip. It’s invalid in on-grid mode.
* Micro Inv Input ON: When the battery SOC or voltage drops below this set value, the relay on GEN port of hybrid inverter will be closed, then the Grid-Tied inverter will generate power and feed into hybrid inverter.

AC Couple Fre High: If choosing "Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre high) and the microinverter or on-grid inverter will trip from hybrid inverter.
* Note: Micro Inv Input OFF and On is valid for some certain FW version only.
* AC couple on load side: Connecting the output of on-grid inverter at the load port of the hybrid inverter. In this situation, the hybrid inverter will not able to show the load power correctly.
* AC couple on grid side: Connecting the output of on-grid inverter at the grid port of the hybrid inverter.
* Note: Some firmware versions don’t have this function.

Solar Arc Fault ON: This function is only applicable to the US market and customized customers.

System selfcheck: Disable. this is only for factory.

Gen Peak-shaving: Limit the maximum output power of the generator to the set rated power on "GEN PORT USE" page, the rest of power consumption will be provided by PV and battery to ensure that the generator will not overload.

DRM: Demand response mode, receive external commands for scheduling active power and reactive power.

Backup Delay: When the grid cuts off, the inverter will output power after this set time.
For example, backup delay: 3ms. the inverter will give output power after 3ms when the grid cuts off.
Note: for some old FW version, the function is not available.

BMS_Err_Stop: When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.

Signal ISLAND MODE: When "signal island mode" is checked and the inverter connects the grid, the ATS port voltage will be 0. When "signal island mode" is checked and the inverter disconnected from the grid, the ATS port voltage will output 230Vac voltage. With this feature and external NO type relay, it can realize N and PE disconnection or bond.
More details, please refer to left side picture.
### Advanced Function

- **Parallel:** Enable this function when several same model hybrid inverters are connecting in parallel.
- **Master:** Select any hybrid inverter in the parallel system as the master inverter, and the master inverter needs to manage the working mode of the parallel system.
- **Slave:** Set the other inverters managed by the master inverter as slave inverter.

**Modbus SN:** The Modbus address of each inverter, should be different

- **A/B/C Phase:** When forming a 3-phase system in parallel, it is necessary to set which phase of the three-phase system this inverter belongs to.

**Ex.Meter For CT:** Check this function when using "Zero export to CT" mode and use external smart meter replace the CT.

**A/B/C Phase:** When this inverter is installed in three phase grid and measured by three phase smart meter, click corresponding phase which this hybrid inverter is connected. For example, when the hybrid inverter connects to A phase of grid, please click A Phase here.

**Meter Select:** select the corresponding meter type according to the meter installed in the system.

**Grid Side INV Meter2:** When there’s a on-grid inverter AC couple at the grid or load side of hybrid inverter and there’s a meter installed for the on-grid inverter, then the hybrid inverter LCD will show the on-grid inverter output power on its PV icon. Please make sure the meter can communicate with the hybrid inverter successfully.

### ATS

- **ATS:** It is related to the output voltage of the ATS port, and it is recommended to leave it unselected.

- **Export power limiter:** It is used to setup the maximum output power allowed to flow to grid.

- **Import power limiter:** when it is active, the import power from grid will be limited. Its priority is lower then "grid peak shaving" if the "grid peak shaving" is selected.

- **Low Noise Mode:** In this mode, the sound emitted by the inverter during operation will be smaller.

- **Low Power Mode/Low Batt:** When it’s selected and battery SOC is less than "Low Bat" value, the self-consumption power of inverter will supply by grid and battery simultaneously. If unselected, the self-consumption power of inverter will supply by battery.

- **MPPT Multi-Point Scanning:** The inverter will check whether the PV is working on its Max. power point. If not, then it will adjust the voltage of MPPT to ensure the PV operates at the Max.power point.
5.11 Device Info Setup Menu

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

HMI: LCD version

MAIN: Control board FW version

6. Mode

Mode I: Basic

Mode II: With Generator

Note: Generator and Grid can't power the inverter in the same time, when the inverter is operating in on-grid mode, the relay on the GEN port of inverter will always be open.

Mode III: With Smart-Load
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. Troubleshooting

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 7-1 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 properly.

<table>
<thead>
<tr>
<th>Error code</th>
<th>Description</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>F08</td>
<td>GFDI_Relay_Failure</td>
<td>1. When inverter is in Split phase (120/240Vac) or three-phase system (120/208Vac) system, the backup load port N line needs to connect ground; 2. If the fault still exists, please contact us for help.</td>
</tr>
<tr>
<td>F13</td>
<td>Working mode change</td>
<td>1. When the grid type and frequency changed it will report F13; 2. When the battery mode was changed to “No battery” mode, it will report F13; 3. For some old FW version, it will report F13 when the system work mode changed; 4. Generally, it will disappear automatically when shows F13; 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 6. Seek help from us, if can not go back to normal state.</td>
</tr>
<tr>
<td>F18</td>
<td>AC over current of hardware</td>
<td>AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if can not go back to normal state.</td>
</tr>
<tr>
<td>F20</td>
<td>DC over current of the hardware</td>
<td>DC side over current fault 1. Check PV module connect and battery connect; 2. When in the off-grid mode, the inverter startup with big power load, it may report F20. Please reduce the load power connected; 3. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again; 4. Seek help from us, if can not go back to normal state.</td>
</tr>
<tr>
<td>F22</td>
<td>Tz_EmergStop_Fault</td>
<td>Please contact your installer for help.</td>
</tr>
<tr>
<td>F23</td>
<td>AC leakage current is transient over current</td>
<td>Leakage current fault 1. Check PV side cable ground connection. 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.</td>
</tr>
<tr>
<td>Error code</td>
<td>Description</td>
<td>Solutions</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| F24        | DC insulation impedance failure    | PV isolation resistance is too low  
1. Check the connection of PV panels and inverter is firmly and correctly;  
2. Check whether the PE cable of inverter is connected to ground;  
3. Seek help from us, if can not go back to normal state. |
| F26        | The DC busbar is unbalanced        | 1. Please wait for a while and check whether it is normal;  
2. When the hybrid in split phase mode, and the load of L1 and load of L2 is big different, it will report the F26.  
3. Restart the system 2~3 times.  
4. Seek help from us, if can not go back to normal state. |
| F29        | Parallel CANBus fault              | 1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting;  
2. During the parallel system startup period, inverters will report F29. when all inverters are in ON status, it will disappear automatically;  
3. If the fault still exists, please contact us for help. |
| F34        | AC Overcurrent fault               | 1. Check the backup load connected, make sure it is in allowed power range;  
2. If the fault still exists, please contact us for help. |
| F35        | No AC grid                         | No Utility  
1. Please confirm grid is lost or not;  
2. Check the grid connection is good or not;  
3. Check the switch between inverter and grid is on or not;  
4. Seek help from us, if can not go back to normal state. |
| F41        | Parallel system stop               | 1. Check the hybrid inverter working status. If there’s 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system.  
2. If the fault still exists, please contact us for help. |
| F42        | AC line low voltage                | Grid voltage fault  
1. Check the AC voltage is in the range of standard voltage in specification;  
2. Check whether grid AC cables are firmly and correctly connected;  
3. Seek help from us, if can not go back to normal state. |
| F47        | AC over frequency                  | Grid frequency out of range  
1. Check the frequency is in the range of specification or not;  
2. Check whether AC cables are firmly and correctly connected;  
3. Seek help from us, if can not go back to normal state. |
| F48        | AC lower frequency                 | Grid frequency out of range  
1. Check the frequency is in the range of specification or not;  
2. Check whether AC cables are firmly and correctly connected;  
3. Seek help from us, if can not go back to normal state. |
| F56        | DC busbar voltage is too low       | Battery voltage low  
1. Check whether battery voltage is too low;  
2. If the battery voltage is too low, using PV or grid to charge the battery;  
3. Seek help from us, if can not go back to normal state. |
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.

<table>
<thead>
<tr>
<th>Error code</th>
<th>Description</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>F58</td>
<td>BMS communication fault</td>
<td>1. it tells the communication between hybrid inverter and battery BMS disconnected when &quot;BMS_Err-Stop&quot; is active; 2. if don’t want to see this happen, you can disable &quot;BMS_Err-Stop&quot; item on the LCD; 3. If the fault still exists, please contact us for help.</td>
</tr>
<tr>
<td>F63</td>
<td>ARC fault</td>
<td>1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if can not go back to normal state.</td>
</tr>
<tr>
<td>F64</td>
<td>Heat sink high temperature failure</td>
<td>Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if can not go back to normal state.</td>
</tr>
</tbody>
</table>

Chart 7-1 Fault information

Under the guidance of our company, customers return our products so that our company can provide service of maintenance or replacement of products of 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 the company.

Factory 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 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

<table>
<thead>
<tr>
<th>Model</th>
<th>JKS-8K-SG01LP1-EU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Battery Input Data</strong></td>
<td></td>
</tr>
<tr>
<td>Battery Type</td>
<td>Lead-acid or Li-Ion</td>
</tr>
<tr>
<td>Battery Voltage Range(V)</td>
<td>40-60</td>
</tr>
<tr>
<td>Max. Charging Current(A)</td>
<td>190</td>
</tr>
<tr>
<td>Max. Discharging Current(A)</td>
<td>190</td>
</tr>
<tr>
<td>Charging Curve</td>
<td>3 Stages / Equalization</td>
</tr>
<tr>
<td>External Temperature Sensor</td>
<td>yes</td>
</tr>
<tr>
<td>Charging Strategy for Li-Ion Battery</td>
<td>Self-adaption to BMS</td>
</tr>
</tbody>
</table>

**PV String Input Data**

| Max. PV Input Power(W) | 10400 |
| PV Input Voltage(V) | 370(125-500) |
| MPPT Range(V) | 150-425 |
| Start-up Voltage(V) | 125 |
| PV Input Current(A) | 26+26 |
| Max.PV Isc(A) | 44+44 |
| No. of MPP Trackers | 2 |
| No. of Strings Per MPP Tracker | 2+2 |

**AC Output Data**

| Rated AC Output and UPS Power(W) | 8000 |
| Max. AC Output Power(W) | 8800 |
| Peak Power(off grid) | 2 times of rated power, 10 S |
| AC Output Rated Current(A) | 36.4/34.8 |
| Max. AC Current(A) | 40/38.3 |
| Max. Continuous AC Passthrough(A) | 50 |
| Power Factor | 0.8 leading to 0.8 lagging |
| Output Frequency and Voltage | 220/230Vac (single phase) |
| Grid Type | Single Phase |
| Total Harmonic Distortion (THD) | <3% (of nominal power) |
| DC current injection | <0.5% In |

**Efficiency**

Max. Efficiency | 97.60% |
Euro Efficiency | 96.50% |
MPPT Efficiency | >99% |

**Protection**

PV Arc Fault Detection | Integrated |
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 |
Surge Protection | TYPE II(DC), TYPE II(AC) |
Over Voltage Category | OVC II(DC), OVC III(AC) |
### Certifications and Standards

<table>
<thead>
<tr>
<th>Grid Regulation</th>
<th>EN 50549, UNE 217002, NRS 097, IEEE 1547.1, SRD V2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC / Safety Regulation</td>
<td>IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2, FCC, UL 1741</td>
</tr>
</tbody>
</table>

### General Data

<table>
<thead>
<tr>
<th>Operating Temperature Range (°C)</th>
<th>-40 to +60°C, &gt;45°C Derating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>Intelligent Air Cooling</td>
</tr>
<tr>
<td>Noise (dB)</td>
<td>&lt;30 dB</td>
</tr>
<tr>
<td>Communication with BMS</td>
<td>RS485; CAN</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>30</td>
</tr>
<tr>
<td>Cabinet size (mm)</td>
<td>420W×670H×233D (Excluding connectors and brackets)</td>
</tr>
<tr>
<td>Protection Degree</td>
<td>IP65</td>
</tr>
<tr>
<td>Installation Style</td>
<td>Wall-mounted</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 Years</td>
</tr>
</tbody>
</table>
10. Appendix I

Definition of RJ45 Ports

<table>
<thead>
<tr>
<th>No.</th>
<th>Color</th>
<th>RS 485</th>
<th>CAN</th>
<th>Meter_CON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orange&amp;White</td>
<td>RS485</td>
<td>—</td>
<td>SUNSPE-485_B</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>Meter_CON</td>
<td>GND</td>
<td>SUNSPE-485_A</td>
</tr>
<tr>
<td>3</td>
<td>Green&amp;White</td>
<td>GND</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>—</td>
<td>CANH</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>Blue&amp;White</td>
<td>—</td>
<td>CANL</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td>GND</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Brown&amp;White</td>
<td>RS485A</td>
<td>—</td>
<td>SUNSPE-485_A</td>
</tr>
<tr>
<td>8</td>
<td>Brown</td>
<td>RS485B</td>
<td>—</td>
<td>SUNSPE-485_B</td>
</tr>
</tbody>
</table>

RS232

<table>
<thead>
<tr>
<th>No.</th>
<th>WIFI/RS232</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>TX</td>
</tr>
<tr>
<td>3</td>
<td>RX</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>D-GND</td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>12Vdc</td>
</tr>
</tbody>
</table>

This RS232 port is used to connect the wifi datalogger.
11. Appendix II

1. Split Core Current Transformer (CT) dimension: (mm)
2. Secondary output cable length is 4m.