Operation Manual

iMars BD3KTL-PS

Energy Storage Inverter



INVT Solar Technology (Shenzhen) CO., LTD

Preface

Thank you for choosing energy storage inverter.

3kW energy storage inverter is a bi-directional and high frequency isolated inverter. It is able to generate power from battery to feed the grid (utility) and also can charge the battery from the grid.

This manual contains detailed information of installation, application, trouble shooting, procedures and maintenance of 3kW energy storage inverter. In order to ensure correct use and high performance, please read this manual carefully and follow all safety precautions seriously before any moving, installing, operating and maintaining.

The monitoring software for the energy storage inverter can be achieved in our website. Please install monitoring software in your mobile phone or computer after downloading.

The inverter complies with local regulations and laws on grid feeding.

The manual needs to be kept well and can be accessed easily.

This manual is for qualified personnel. The tasks described in this manual may be performed by qualified personnel only.

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There may be data deviation because of product improving. Detailed information is in accordant with the final product.

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Chapter 1 Safety precautions

This inverter has been designed and tested strictly according to international safety regulations. Read all safety instructions carefully prior to any work and observe them at all times when working on or with the inverter.

Incorrect operation or work may cause:

- injury or death to the operator or a third party;
- damage to the inverter and other properties belonging to the operator or a third party.

This chapter describes various warning symbols in this manual. It is intended to provide the installers and the users with all safety information about installation, operation, and use of the inverter.

Disclaimer

INVT shall not be liable for any consequence caused by any of the following events:

- Damage cause by transportation;
- Storage conditions that do not meet the requirements specified in this manual;
- Incorrect storage, installation, or use;
- Installation or use by unqualified personnel;
- Failure to comply with the operation instructions and safety precautions in this manual;
- Operation in extreme environments which are not covered in this manual;
- Operation beyond specified ranges;
- Unauthorized modifications which are not covered in this document;
- Device damage due to force majeure(such as lighting, earthquakes, fire, and storms);
- Warranty expiration without extension of the warranty service;
- Installation or use in environments which are not specified in related international standards;

1.1 Warning

This manual provides relevant information with icons to highlight the physical property safety of the users to avoid device damage and physical injury.

The icons used in this manual are listed below:

Symbols	Name	Instruction	Abbreviation
 Danger	Danger	Serious physical injury or even death may occur if not follow the relative requirements	
 Warning	Warning	Physical injury or damage to the devices may occur if not follow the relative requirements	
 Do not	Do not	Damage may occur if not follow the relative requirements	
 Hot surface	Hot surface	Sides of the device may become hot. Do not touch.	
Note	Note	Physical hurt may occur if not follow the relative requirements	Note

1.2 Safety guidance

	● Before performing maintenance tasks, power off the inverter, disconnect all circuits and wait at least 5minutes.
	● Please check the product package upon receiving the product. If there is any question, please contact the transportation company and local distributor immediately. ● Use only recommended accessories from installer. Otherwise, not-qualified tools may cause a risk of fire, electric shock, or injury to persons. ● Ensure there is no strong electromagnetic interference which is generated by other electronic/electrical devices around the installation location. ● Do not disassemble this inverter yourself. It contains no user-serviceable parts. Attempt to service this inverter yourself may cause a risk of electrical shock or fire and will void the warranty from the manufacturer. ● This inverter is heavy. It should be lifted by at least two persons. ● To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that the wire is not undersized. Do not operate the inverter with damaged or substandard wiring. ● AC breaker and Battery circuit breaker are used as disconnect devices and these disconnect devices shall be easily accessible.
	● The shell or radiator may become hot during inverter running. Do not touch to avoid hurt.

	● Proper and reliable grounding is a must before operation.
	● Do not open the surface cover of inverter unless authorized. The electrical parts and components inside the inverter are electrostatic-sensitive. Take measures to avoid electrostatic discharge during relevant operation.
Note: Only certified electricians are allowed to install, connect cables for, commission, maintain, troubleshoot, and replace the inverter. They should:	
● Receive professional training; ● Read through this manual and follow all the precautions; ● Be familiar with the safety specifications about the electrical system; ● Understand the composition and working principles of the Energy-storage system and local regulations; ● Wear proper personal protective equipment(PPE);	

1.3 Transportation & installation

	● During storage and transportation, ensure that the packaging and unit are complete, dry and clean. ● This inverter is heavy. It should be lifted by at least two persons. ● To ensure the normal and safe operation of the energy storage inverter and avoid personal injury, Please select proper handling and installation tools and take mechanical protection measures to protect personal safety, such as wearing smashing shoes, coverall and so on. ● Only certified electricians are allowed to install. ● Do not install the inverter in areas with flammable or explosive materials. ● Do not install the inverter in a place where a person can easily touch it. ● To avoid a risk of electric shock, please remove rings, bracelets and other metal jewelry on your hands before installation and electrical connection. ● To avoid a risk of destroy, the input voltage should be within specified ranges ● Proper and reliable grounding is a must before operation.

1.4 Operation

	● Operate the inverter by qualified personnel after getting permission from the local power department. ● All electrical installations must be in accordance with local and national electrical codes.

	● All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned. ● Do not open the enclosure when the inverter is working or any circuits is connecting to the inverter.

1.5 Maintenance & Replacement

	● Do not disassemble this inverter yourself. It contains no user-serviceable parts. Attempt to service this inverter yourself may cause a risk of electrical shock or fire and will void the warranty from the manufacturer. ● Only certified electriciuans are allowed to maintain, troubleshoot, and replace the inverter. ● Please contact the distributor or manufacturer if need maintenance. ● Temporary warning signs or fences must be placed to prevent unauthorized personnel from entering the maintenance area. ● Authorized service personnel should reduce the risk of electrical shock by disconnecting AC and battery from the inverter before attempting any maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors can remain charged for 5 minutes after disconnecting all sources of power. ● Please observe the static electricity protection regulations and do well in anti-static measures because there are mostly electrostatic sensitive circuits and devices in the internal. ● Use only recommended accessories from installer. Otherwise, not-qualified tools may cause a risk of fire, electric shock, or injury to persons. ● Do not touch an energized inverter, because the heat sink reaches a high temperature. ● Contact your supplier if all the condition are OK but the fault still exists. ● Do not close or touch any charged metal conductor parts of the running system, otherwise it may cause a risk of electric shock or fire. ● Please pay attention to any safety signs and instructions.

1.6 Recycle

	● Do not dispose of the product as household garbage. The user has the responsibility to send the inverter to the designated organization for recycling and disposal.

Chapter 2 Product overview

This chapter mostly shows the inverter appearance, label and so on.

2.1 Energy-storage system

The energy storage system is composed of battery, inverter, distribution box, smart meter, circuit breakers and public power grid.

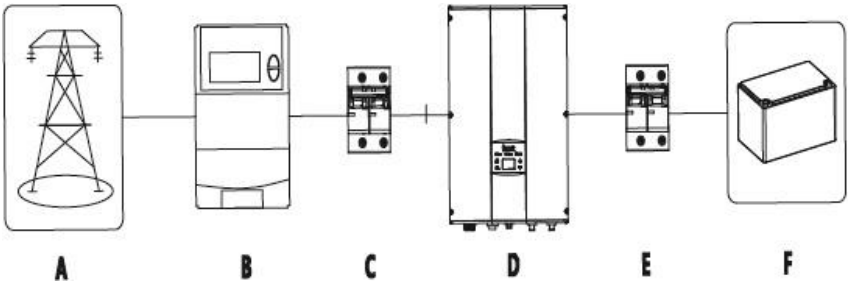


Figure 2.1 Energy-storage system

A	B	C	D	E	F
Grid	Distributor box	AC breaker	Inverter	DC switch	Battery

2.2 Product appearance

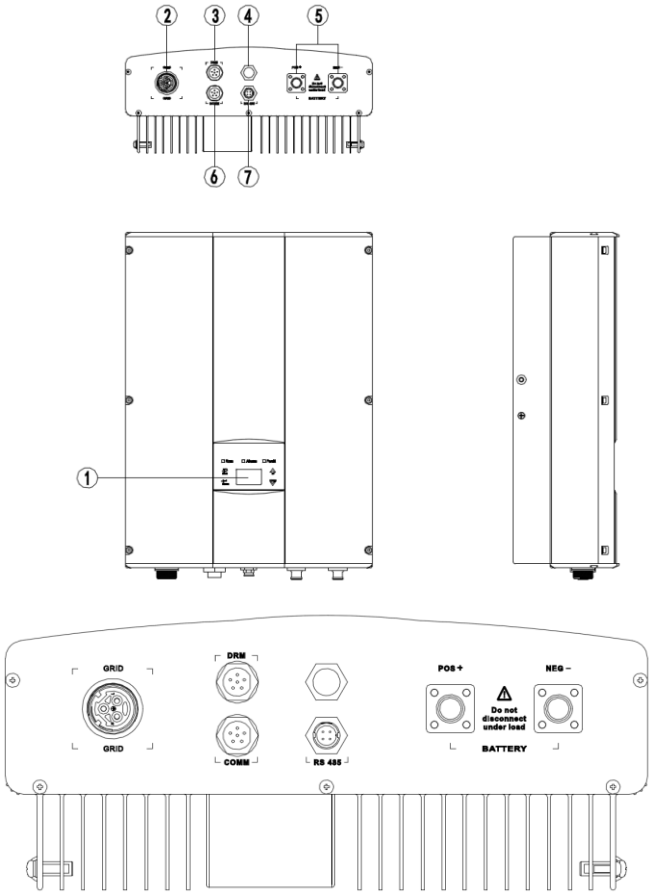
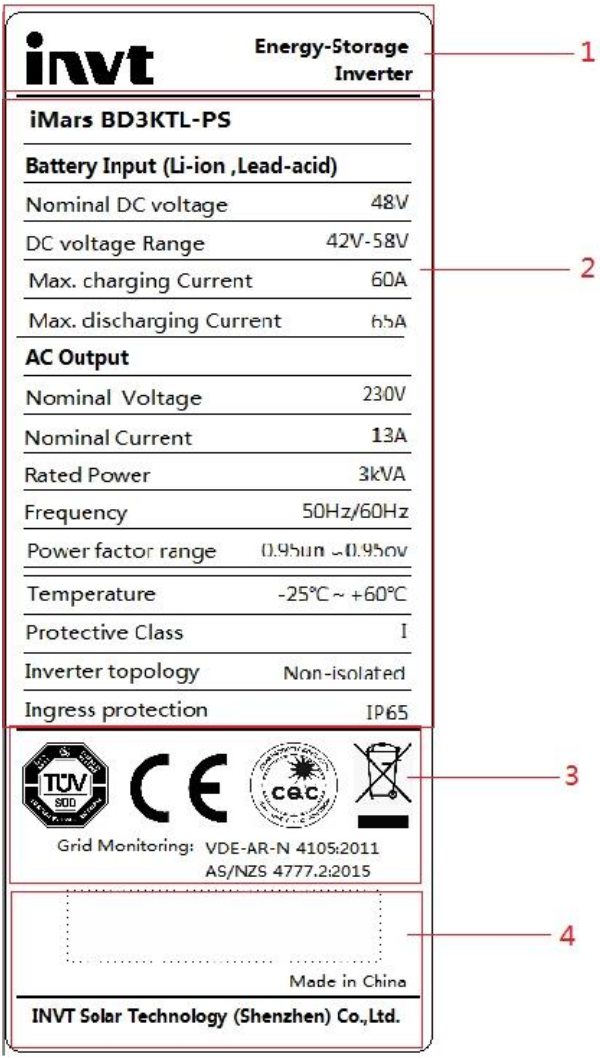


Fig 2.2 product appearance

Table 2-1 Parts instruction

No.	Name	Instruction
1	LCD display panel	LCD display, operation buttons, LEDs
2	AC Grid connectors	AC Grid input
3	DRM port	DRM0 input
4	/	/
5	Battery connectors	Battery input
6	Communication port	Communicate with monitoring system
7	RS485 communication port	Communicate with monitoring system or BMS

2.3 Label description



（1）Trademark and product model

（2）Important technical specifications

（3）Compliance symbols

（4）Company name and country of manufacture

Symbol	description
	● TUV certification identification. The inverter obtains TUV certification.
	● CE certification identification. The inverter conforms to CE instruction.
	● CQC certification identification. The inverter obtains CQC certification

2.4 DRM instruction

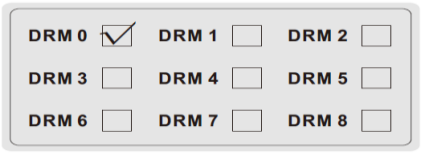


Figure 2.3 DRM label

Table 2-2 DRMs instruction

No.	Mode	Requirement
1	DRM0	Operter the disconnection devise
2	DRM1	Do not consume power
3	DRM2	Do not consume at more than 50% of rated power
4	DRM3	Do not consume at more than 75% of rated power AND Source reactive power if capable
5	DRM4	Increase power consumption(subject to constraints from other active DRMs)
6	DRM5	Do not generate power
7	DRM6	Do not generate at more than 50% of rated power
8	DRM7	Do not generate at more than 75% of rated power AND Sink reactive power if capable
9	DRM8	Increase power generation(subject to constraints from other active DRMs)

Note: The inverter only realize the DRM0 function.

2.5 Dimension and weight

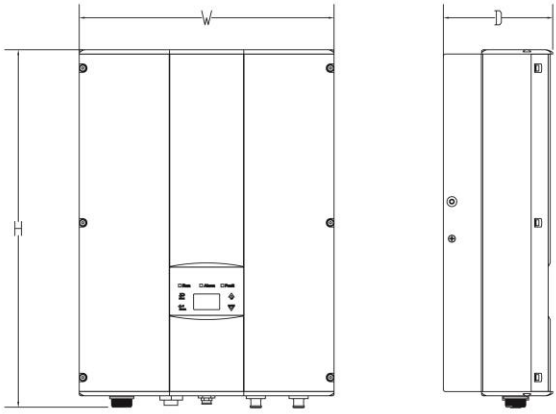


Fig 2.4 Outline dimension

Table 2-3 Outline dimension and net weight of the inverter

Model	H(mm)	W(mm)	D(mm)	N.W(kg)
3kW	507	360	150	20

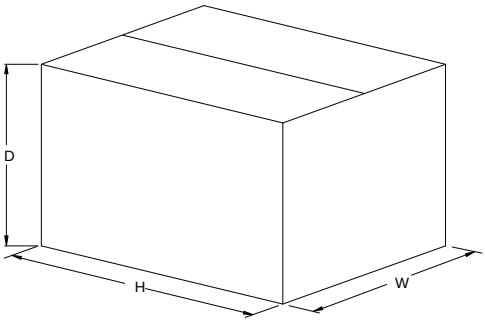


Fig 2.5 Dimension for paper package

Table 2-4 Package dimension and gross weight

Model	H (mm)	W (mm)	D (mm)	Gross weight(kg)	Packing material
3kW	630	470	284	22	Paper

Chapter 3 Storage

The following requirements should be met when the inverter needs to be stored prior to installation：

- Do not unpack.
- Store in a clean and dry place and protect from dust and water vapor corrosion.
- Keep the storage temperature at -30℃~+70℃ and the humidity at 5%~95%RH.
- It is suggested that the stacking layers should be placed according to the original delivery when multiple inverters are stacked. To avoid personal injury or device damage, stack with caution to prevent them from falling over.
- Keep away from chemical corrosive substance, otherwise it will corrode the inverter.
- Regular inspection is required during the storage. Replace the packing materials when necessary.
- After long-term storage, the inverter needs to be inspected and tested by qualified persons before it is put into use.

Chapter 4 Installation

This chapter shows installation, electrical connection. And the electrical connection contains grid connection, battery connection, communication connection.

Please read this chapter carefully before installation and make sure that the installation of the inverter is completed by a professional technician.

4.1 Unpacking confirmation

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged, and the information on the nameplate of the inverter is the ordered one. If there is any question, please contact the supplier immediately.

Please put the idle inverter in its original packing box and take measures to prevent humidity and dust.

You should have received the following items inside of the package as shown in fig 4.1 and table 4-1.

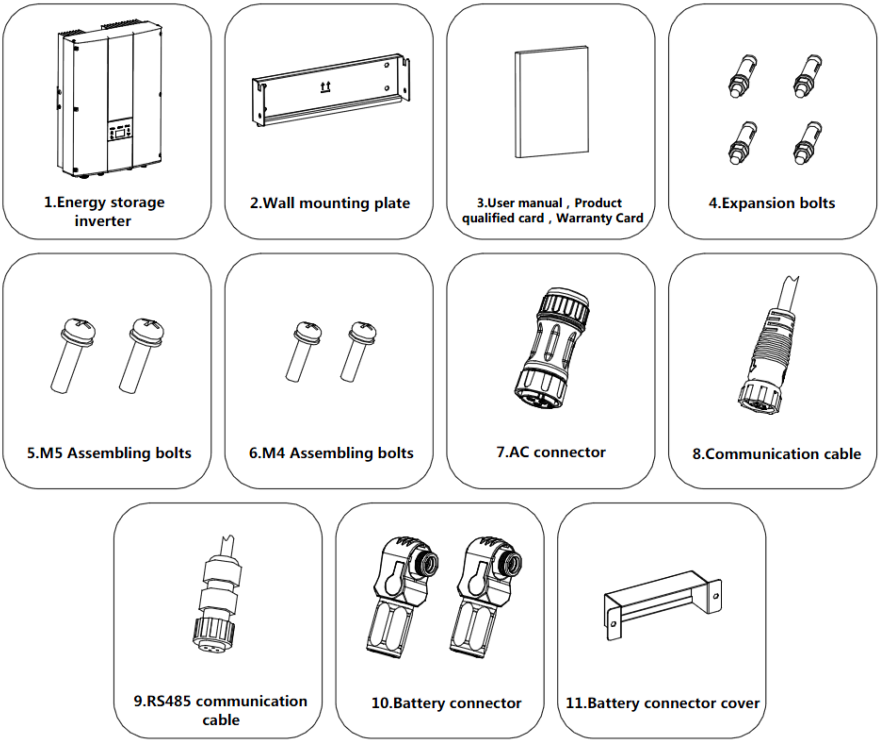


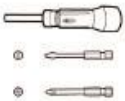
Fig 4.1 Standard packing contents

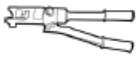
Table 4-1 Packing list for 3kW energy storage inverter

No.	Name	Qty
1	Energy storage Inverter	1
2	Wall mounting plate	1
3	User Manual	1
4	Expanding bolt M6*50	4
5	Assembling bolt M5*20	2
6	Assembling bolt M4*10	2
7	AC connectors	1
8	Communication cable	1
9	RS485 cable	1
10	Battery connectors	1(pair)
11	Battery connector cover	1

4.2 Preparation before installation

4.2.1 Tools and Instrument

Category	Tools and Instruments		
Installation	 Hammer drill (with a Φ 8 mm drill bit)	 Torque socket wrench (open end: 13 mm, applicable for M8 bolts; torque range: 0–15 N•m)	 Torque wrench (open end: 13 mm; torque range: 0–1.5 N•m)
	 Diagonal pliers	 Wire stripper	 Torque screwdriver (head: M4 or M6; torque range: 0–5 N•m)
	 Rubber mallet	 Utility knife	 Cable cutter
	 Crimping tool (model: H4TC0001; manufacturer: Amphenol)	 Open-end wrench (model: H4TW0001; manufacturer: Amphenol)	 Cable tie
	 Vacuum cleaner	 Multimeter (DC voltage measurement range ≥ 600 V DC)	 Marker

Category	Tools and Instruments		
	 Measuring tape	 Bubble or digital level	 Hydraulic pliers
	 Heat shrink tubing	 Heat gun	N/A
PPE	 Safety gloves	 Safety goggles	 Anti-dust respirator
	 Safety shoes	N/A	N/A

4.2.2 Selecting Mounting Location

Please consider the following points before selecting where to install:

(1) Do not mount the inverter on flammable construction materials;

(2) Mount on a solid and fixed object surface, such as the surface of the wall and metal bracket;

(3) Install this inverter at eye level in order to allow the LCD display to be read at all times;

(4) Select an appropriate mounting location. Install the inverter in a protected area that is in good ventilation and free from raindrops and direct sunlight;

(5) For proper air circulation to dissipate heat, allow a clearance of approx.200mm to the side and approx. 450mm above and below the unit as shown in fig 4.2;

(6) The ambient temperature should be between -25℃~60℃ to ensure optimal operation;

(7) The installation location should be away from electronic devices carrying strong electromagnetic interference;

(8) The recommended installation position is to be adhered to vertical as shown in fig 4.3;

(9) Installation position shall not prevent access to the disconnection means.

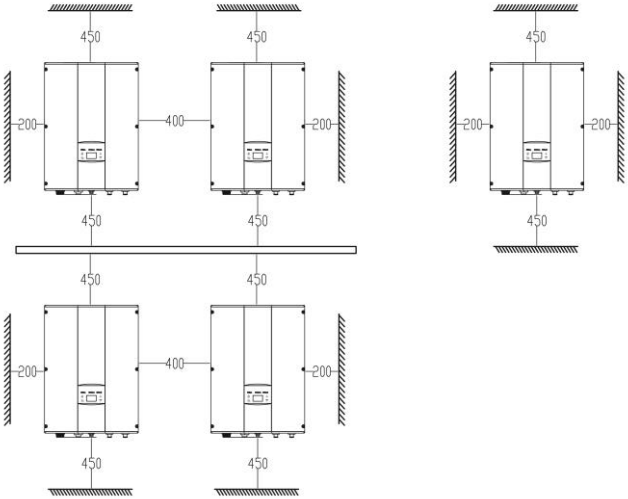


Fig 4.2 Installation space

In order to ensure good ventilation, please allow enough clearance during installation:

Table 4-2 Installation interval of inverter

Distance	Min. interval
Side distance	200mm
Top distance	450mm
Bottom distance	450mm

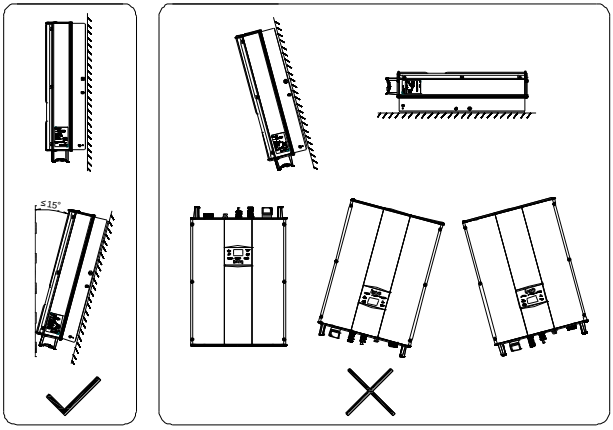


Fig 4.3 Installation position

4.3 Wall-Mounted Installation

WARNING!! Remember that this inverter is heavy! Please be carefully when lifting out from the package.

The installation steps as below:

Step 1: Determine the positions for drilling holes using the mounting bracket. Level the positions of mounting holes using a bubble or digital level, and mark the positions with a marker.

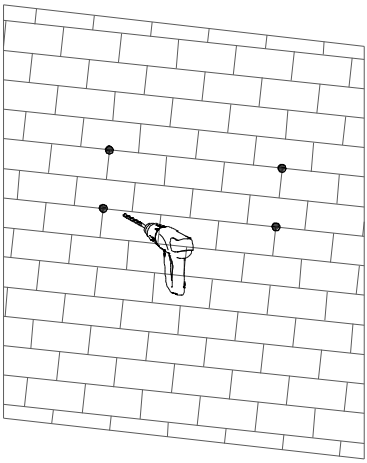


Figure 4.4 Determining hole positions

Step 2: Install expansion bolts.

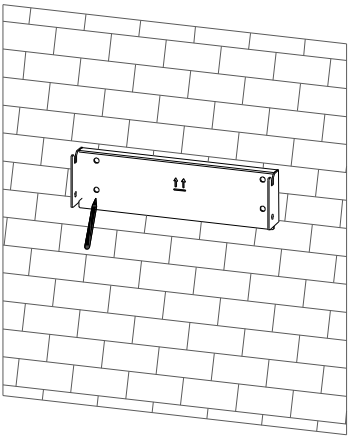


Figure 4.5 Installing an expansion bolt

Step 3: Secure the mounting bracket.

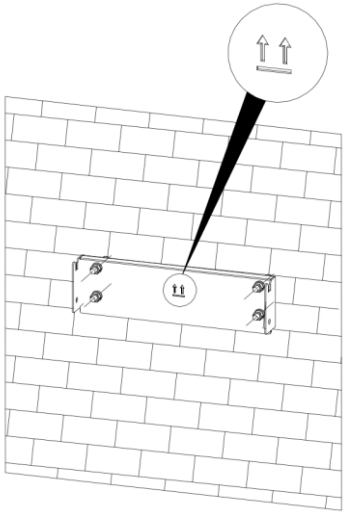


Figure 4.6 Securing a mounting bracket

Step 4: Install the inverter on the mounting bracket, and tighten screw assemblies .

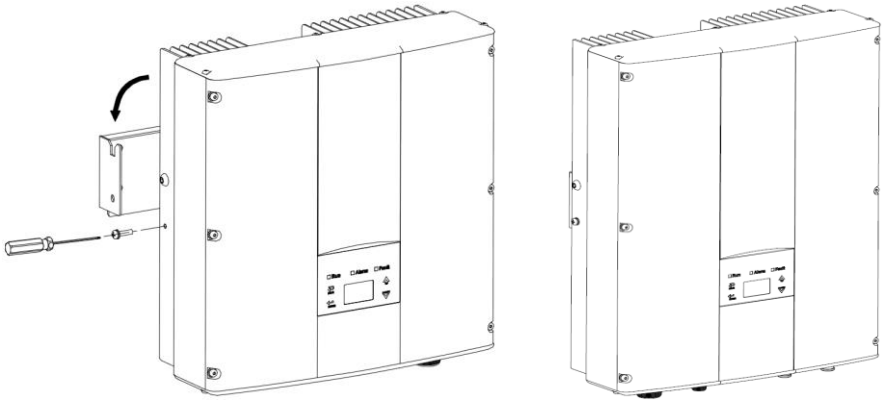


Figure 4.7 installing inverter

4.4 Electrical installation

This chapter mainly introduces electrical connections and relevant safety precautions. Fig 4.9 as below is the wiring diagram of the system.

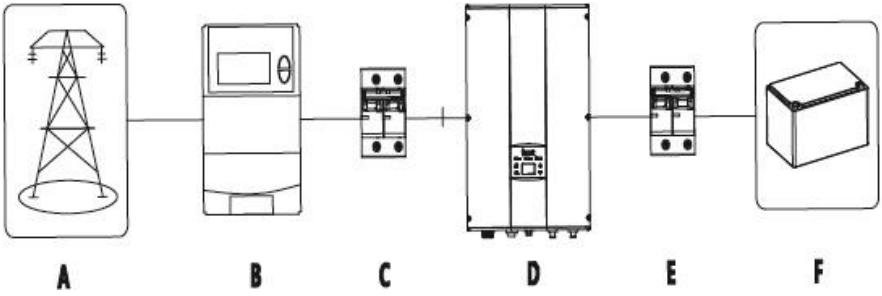


Figure 4.8 wiring diagram

A	B	C	D	E	F
Grid	Distributor box	AC breaker	Inverter	DC switch	Battery

⚠	● Improper operation during the wiring process can cause fatal injury to operator or unrecoverable damage to the inverter. Only qualified personnel can perform the wiring work. ● All electrical installations must be in accordance with local and national electrical codes. ● All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned.
Note	● Read and follow the instructions provided in this section while observing all safety warnings. ● Always note the rated voltage and current defined in this manual. Never exceed the limits.

4.4.1 Grid connection

⚠	● It's very important for system safety and efficient operation to use appropriate cable for grid (utility) connection.

Before connecting to the AC grid, please install separately an AC circuit breaker (250V/20A recommended) between the grid and inverter.

To reduce risk of injury, please use the suggested cable requirement for AC wire as below:

Table 4-3 Cable specification

Model	Mains connection
	Recommended min. cross sectional area mm²(length≤50m)
3kW	4

Please connect to the AC Utility according to the following steps:

(1) Before connecting the AC grid cable to the inverter, take surge absorber and short circuit protection measures in accordance with the local electrical safety codes;

(2) Turn off the circuit breaker;

(3) As shown in fig 4.10, connect the L,N and PE cables of 1PH public grid to AC terminal, the crimping torque is 1.2N·m, and screw down, then connect AC terminal to AC port of inverter;

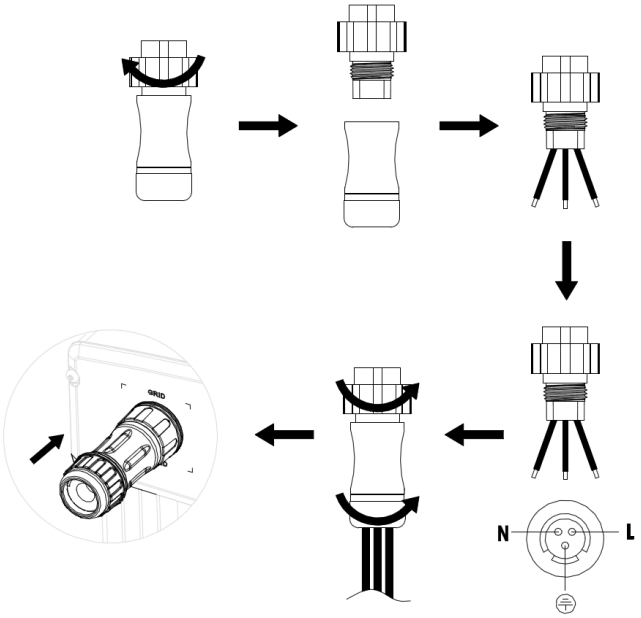


Figure 4.9 Wiring diagram of AC side

⚠	● To prevent risk of electric shock, ensure the ground wire is properly earthed before operating this inverter no matter the grid is connected or not.

4.4.2 Battery connection

⚠	● The cables connected to the inverter must be well protected according to local electrical safety regulations and conform with the technical parameters presented in this manual.

	● Reverse connection of battery polarity will damage the inverter and may cause fire and even cause personal injury! Please be cautious during cable connection, otherwise, our company will not assume liabilities and quality assurance.

Before connecting to the batteries, please install separately a DC circuit breaker (63V/80A recommended) between the battery and inverter.

It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the suggested cable requirement for AC wire as listed in table 4-4:

Table 4-4 Cable specification

Inverter model	**Battery connection**
	Recommended min. cross sectional area mm²(length≤5m)
3kW	12

Please connect the battery according to below procedures:

(1) Check the nominal voltage of batteries. The nominal input voltage for inverter is 48VDC.

(2) Disconnect the DC circuit breaker between the inverter and battery

(3) Use two battery cables. Remove insulation sleeve 18mm and insert conductor into cable ring terminal as fig 4.10.

(4) Take out the battery terminal cover from the accessory bag. Refer to the description of the accessory bag for details

(5) Install the battery terminal cover as shown in Figure 4.10

(6) Fix the battery terminal cover with two M4X10 screws

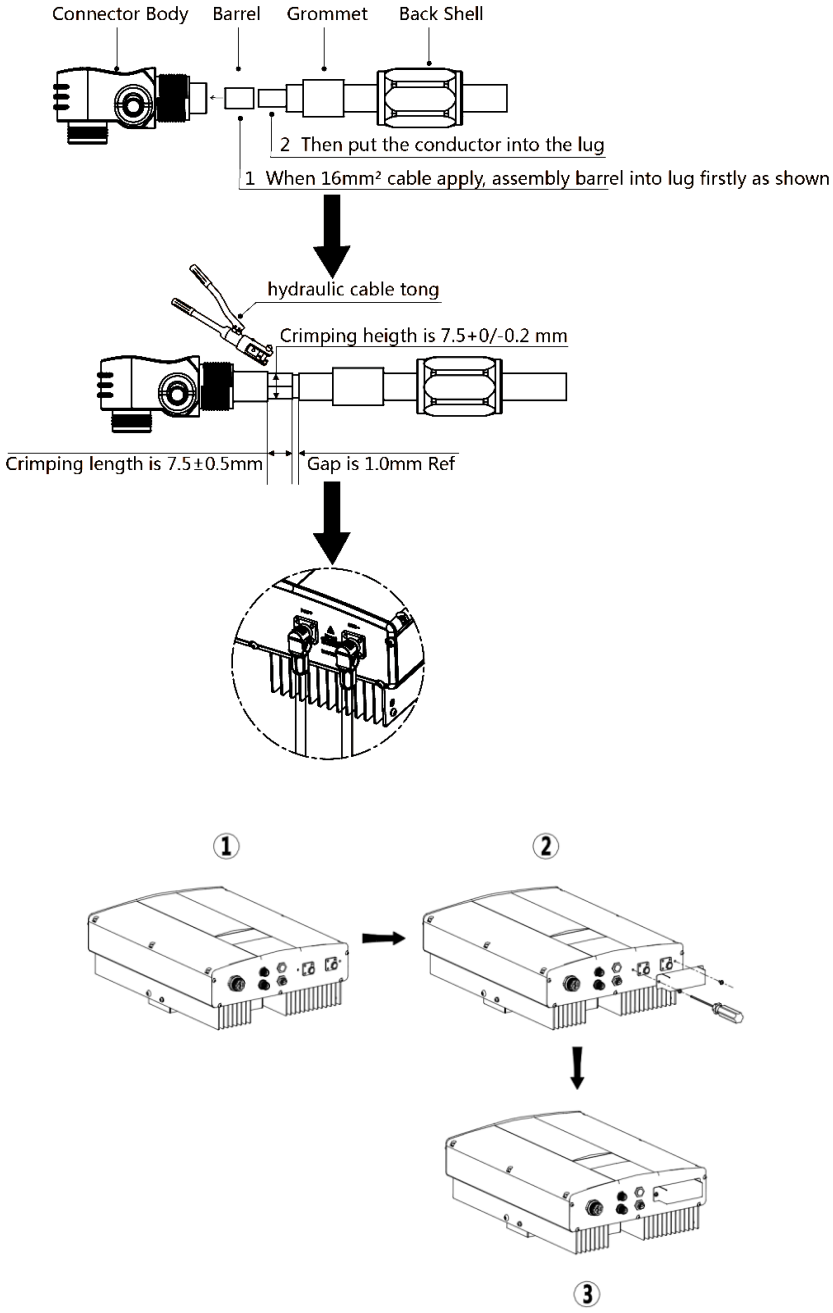


Figure 4.10 Wiring diagram of Battery side and Battery connector cover of install

4.4.3 Communication connection

The communication of inverter contains RS485 and CAN ports. RS485 is suitable to communicate with private computers, smart phones and our company's WIFI200, GPRS200 communication. The CAN communication of inverter is used to communicate with battery. The communication interface definition is shown as fig 4.12 and table 4-5.

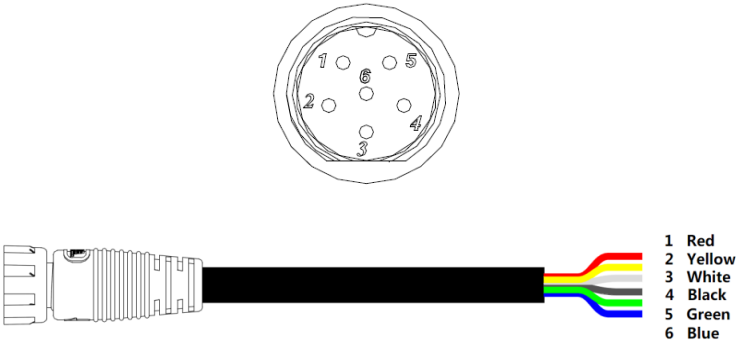


Figure 4.11 COMM interface diagram

Table 4-5 COMM interface definition

Port NO.	color	Port definition
1	red	RS485+
2	yellow	RS485-
3	white	GND
4	black	GND
5	green	CANH
6	blue	CANL

4.4.4 RS485 Communication connection

RS485 communication connection is the standard communication mode of energy storage inverter. This port can communicate with private computers, smart phones and so on. The communication interface definition is shown as fig 4.13 and table 4-6.



Figure 4.12 RS485 standard connector

Table 4-6 RS485 communication interface definition

Port NO.	color	Pin definition
1	red	+5VDC
2	Orange	A (RS485+)
3	Brown	B (RS485-)
4	black	GND

4.4.5 DRM connection

Table 4-7 DRM interface definition

Pin on inverter	Colour	Definition
1	Red	RefGen
2	Yellow	Com/DRM0
3	White	DRM1/5
4	Black	DRM2/6
5	Green	DRM3/7
6	Blue	DRM4/8

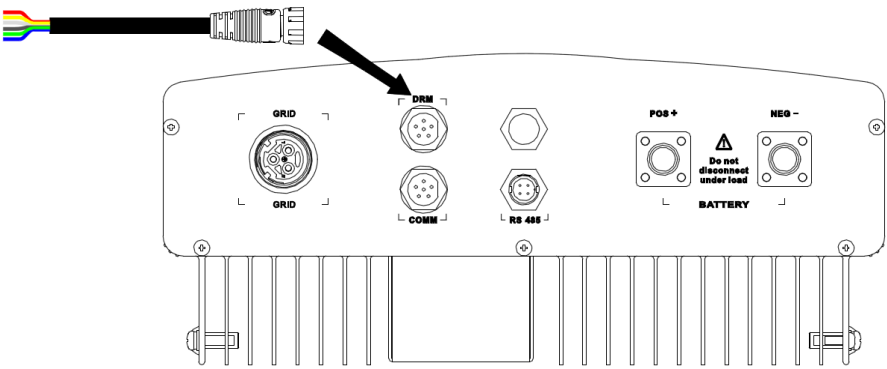


Figure 4.13 RS485-DRM pin on inverter

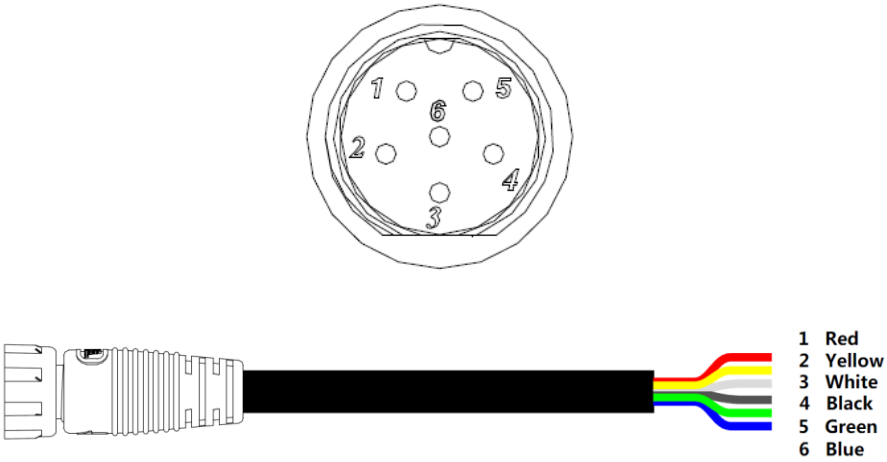


Figure 4.14 Connection cable

DRM connection steps:

(1) Weld communication cables to the DRM terminals of the inverter as figure 4.14 shows, Ensure the cable corresponds to the pin as table 4-7 shows and the welding is tight enough.

(2) According to Table 4-7, connect the communication connector pinout and the user's device, make sure the connection is correct.

Chapter 5 Commissioning

Step 1: Check the following requirements before commissioning:

1) Ensure the inverter is firmly secured.
2) Check if the open circuit DC voltage of the batteries meets requirement (Refer to Chapter 9).
3) Check if the open circuit utility voltage of the utility is at approximately same to the nominal expected value from local utility company.
4) Check if connection of AC cable to grid (utility) and connection of batteries are correctly.
5) AC circuit breaker and battery circuit breaker are installed correctly.

Step 2: Switch on the battery circuit breaker, and then set the date/time, the charge and discharge time, and other battery related parameters after the inverter power on (Refer to Chapter 6).

Step 3: Switch on the AC circuit breaker, and then the inverter works according to the charge and discharge time which have been set.

NOTE: Parameters about the battery must be set strictly accordance with battery specifications.

Chapter 6 Display panel

This chapter describes the panel displaying and how to operate on the panel, which involves the LCD display, LED indicators and operation.

6.1 LED indicators

There are three LED indicators on the panel:

1) ”Run”, operation indicator, green;

2) ”Warn”, recoverable fault indicator, yellow;

3) ”Fault”, unrecoverable fault indicator, red.

The inverter state includes 6 states of power on, standby, self-check, charge, discharge, fault mode; LED indicators are on, off and blinking. Please refer to table 6-1 for detailed state of inverter and LED indicators.

“○”: LED indicator is off;

“◐”(green), “◐”(yellow), “◐” (red): LED indicator is blinking at every 0.25S or 0.5S;

“●”(green), “●”(yellow), “●” (red): LED indicator is on.

Table 6-1 Inverter state and LED indicators

LED indicators	Inverter state	description
◐ Run ○ Warn ○ Fault	Poweron mode	Power on and ready for self-check,or finish self-checking
● Run ● Warn ● Fault	Standby mode	Manual power off
● Run ○ Warn ○ Fault	Charge mode or Discharge mode	No fault
● Run ◐ Warn ○ Fault		Work with some recoverable warning which is no effect.
○ Run ○ Warn ● Fault	Fault mode	Stop work with serious fault

◯ Run ● Warn ◯ Fault		Stop work with some warning that can be recoverable after restart or power is ready .
◯ Run ◐ Warn ◯ Fault		Stop work with fault that can be recoverable immediately.

6.2 Operation panel

6.2.1 Button instruction

“ESC”: Return and exit

“∧”: back to the front page or data increasing;

“∨”: to the next page or data decreasing;

“ENT”: enter.

6.2.2 LCD screen

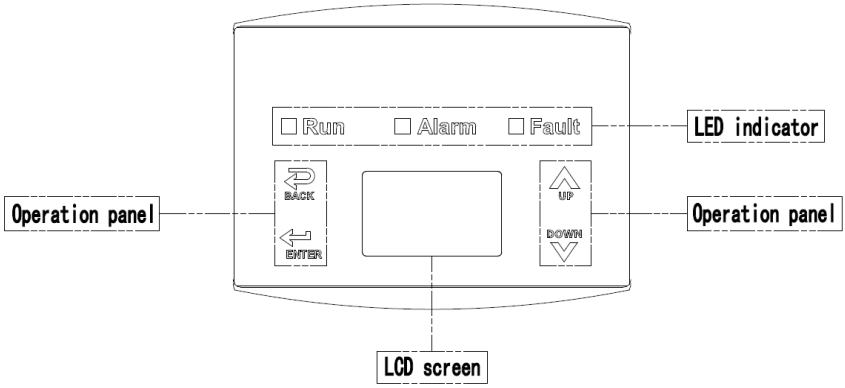


Figure 6.1 Main interface of LCD display

All information is displayed on the LCD screen. The background illumination of LCD screen will go out to save power if there is not button operation in 15 seconds. But it can be activated by pressing any button. Press “ENT” to enter into the main interface if the background illumination is on. All parameters can be viewed and set on the interface.

There are main interface and menu interfaces on the LCD screen, of which the main interface is the default one after power on, while the menu interfaces are used to watch and set parameters or other manual operation, such as viewing the monitoring parameters, system information, statistics and fault information and setting the displayed language, time, communication address, password and factory defaults.

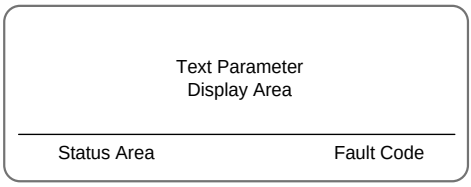


Figure 6.2 Main interface

The main interface of the LCD screen is shown as the figure above:

(1) The words on the screen display the current key parameters of the inverter. Three lines of words are displayed at a time, but if the inverter is in operation or stand-by state, the words are rolling forward at every 3s. And the user can press "∧" or "∨" to look up the information freely;

(2) 5 states of the inverter are displayed on the screen;

(3) If the inverter is in fault or warning state, up to 8 corresponding fault codes can be displaying on the screen.

6.2.3 Functions operation

Most of the parameters can be viewed and set through the LCD screen and operation panel.

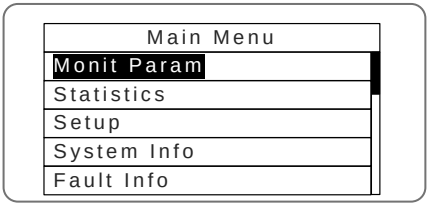


Figure 6.3 Main interface

(1) Monitoring parameters

Press "∧" and "∨" in the main interface to select "Monit Param", and then press "ENT" to view the parameters which is shown in figure 6.4. Go to the front or next page through "∧" and "∨" and return through "ESC".

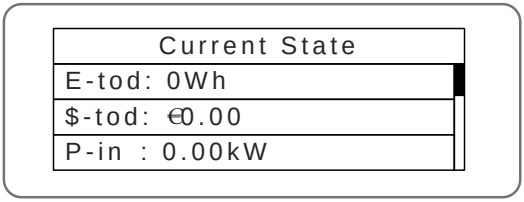


Figure 6.4 Monitoring parameters

(2) Statistics

Press "∧" and "∨" in the main interface to select "Statistics", and then press "ENT" to view the parameters which is shown in figure 6.5.

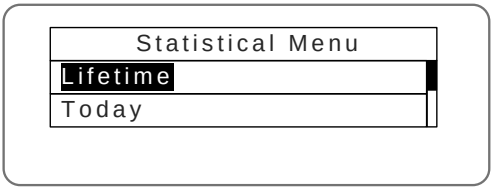


Figure 6.5 Statistic information

The information in table 6-2 can be viewed in the statistical menu.

Table 6-2 Statistic information

Content	Detailed
Lifetime	Total operation time, total power produced, total power saved, total CO_2 reduction in lifetime
Day statistics	Total power produced, total power saved, peak power and total CO_2 reduction in current day

(3) Parameter settings

Press "∧" and "∨" in the main interface to select "Setup Menu", and then press "ENT" to view the parameters which is shown in figure 6.6.

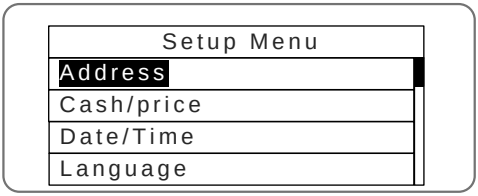
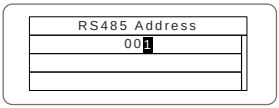
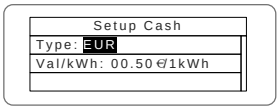
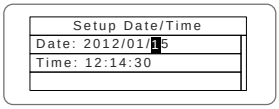
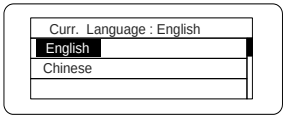
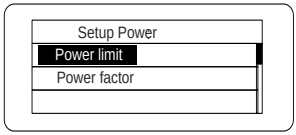
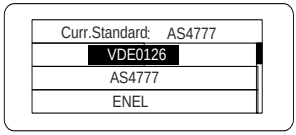


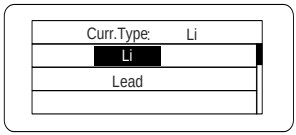
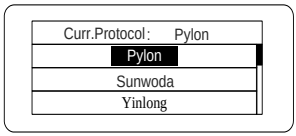
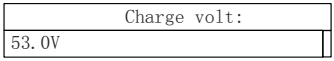
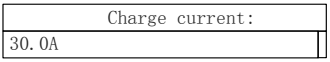
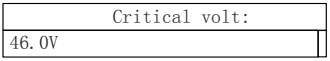
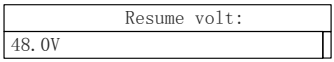
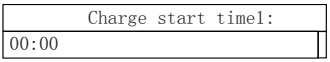
Figure 6.6 Setting information

Parameters can be set in this interface.

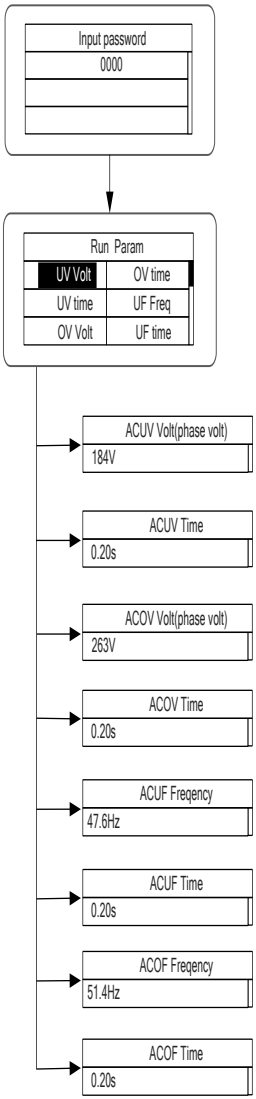
Table 6-3 Parameters setting

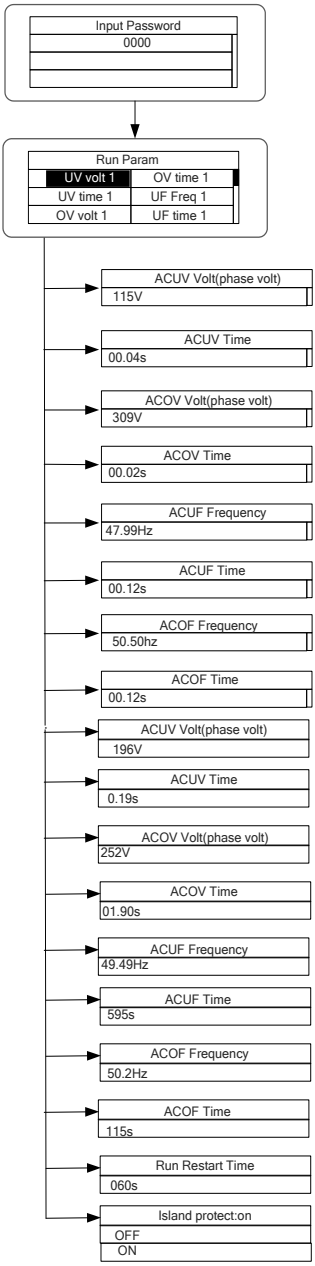
Setting item	LCD display	Instruction
RS485 Address		Enter into the interface and edit the data through "∧" or "∨". And then press "ENT" again to the next bit. After editing

Setting item	LCD display	Instruction
		the three bits, press “ENT” to save the edition and press “ESC” to exit.
Setup Cash		Enter into the interface and edit the currency type and cash through “^” or “v”. And then press “ENT” again to the next line. After editing the four bits, press “ENT” to save the edition and press “ESC” to exit. The currency types include EUR, GBP, CNY, AUD and USD.
Setup Date/Time		Enter into the interface and edit the date and time through “^” or “v”. And then press “ENT” again to the next line. After editing the four bits, press “ENT” to save the edition and press “ESC” to exit.，
Language		Enter into the interface and edit the language through “^” or “v”. And then press “ENT” again to save the edition and press “ESC” to exit. The default language is English.
Setup Power		Enter into the interface and select item through “^” or “v”. And then press “ENT” again to save the edition and press “ESC” to exit.
Setup grid standard		Enter into the interface and select grid standard through “^” or “v”. And then press “ENT” again to save the edition and press “ESC” to exit.

Setting item	LCD display	Instruction
Setup battery type		Enter into the interface and select battery type through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup battery protocol		Enter into the interface and select battery protocol through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup charge volt		Enter into the interface and change charge volt through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup charge current		Enter into the interface and change charge current through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge critical volt		Enter into the interface and change discharge critical volt through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge resume volt		Enter into the interface and change discharge resume volt through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup charge start time1		Enter into the interface and change charge start time 1 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.

Setting item	LCD display	Instruction
Setup charge end time1	Charge end time1 00:00	Enter into the interface and change charge end time 1 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge start time1	Discharge start time1: 00:00	Enter into the interface and change discharge start time 1 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge end time1	Discharge end time 1: 00:00	Enter into the interface and change discharge end time 1 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup charge start time2	Charge start time2 00:00	Enter into the interface and change charge start time 2 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup charge end time2	Charg end time2: 00:00	Enter into the interface and change charge end time 2 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge start time2	Discharge start time2: 00:00	Enter into the interface and change discharge start time 2 through "∧" or "∨". And then press "ENT" again to save the edition and press "ESC" to exit.
Setup discharge end time2	Discharge end time 2: 00:00	Enter into the interface and change discharge end time 2 through "∧" or "∨". And then press "ENT" again to

Setting item	LCD display	Instruction
		save the edition and press “ESC” to exit.
Run Param		Password is required when enter into the interface of “Run Param”. Get the password from the supplier if necessary. Set ACUV Volt, ACUV time and others under the related submenus, and then press “ ∧ ” and “ ∨ ” to modify, and finally press “ENT” to confirm.

Setting item	LCD display	Instruction
Run Param*		There are 2 protections under G83/G59(UK) and PEA(Thailand) standards, and there is only one protection under other grid tied standard. Set ACUV Volt, ACUV time and others under the related submenus, and then press “∧” and “∨” to modify, and finally press “ENT” to confirm. Generally, it is only necessary to set ACUV and ACUF value for ACUV and ACUF protection. And it is necessary to set ACOF1 and ACOF2 together for ACOF protection.

(4) System Information

Press "∧" and "∨" in the main interface to select "System Information", and then press "ENT" to view the parameters which is shown in figure 6.7.

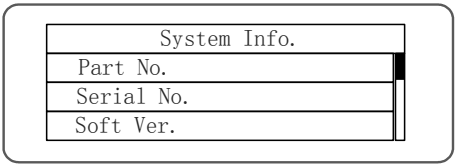


Figure 6.7 System information

The system information includes "product model", "serial No.", "software version", "Grid standard" and "Grid parameters".

(5) Fault

Press "∧" and "∨" in the main interface to review the current fault, and then press "ENT" to view the sub-menu which is shown in figure 6.8.

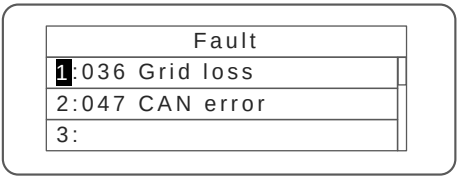


Figure 6.8 Fault information

There are 8 pieces of fault information in the record which is shown in figure 6.8; otherwise it will display "No Fault!" Refer to chapter 8 for more detailed information.

(6) Inverter control

Press "∧" and "∨" in the control interface, and then press "ENT" to view the sub-menu which is shown in figure 6.9.

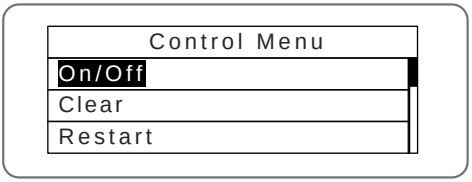
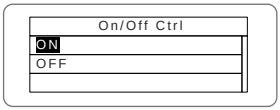
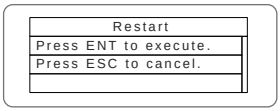
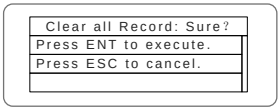
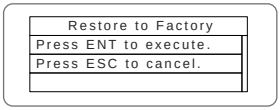


Figure 6.9 Control interface

Refer to the table as below for detailed information.

Table 6-4 Inverter control

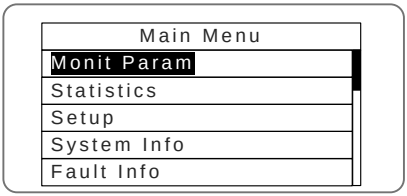
Control item	LCD display	Instruction
On/Off control		Control the “On/Off” through the panel. Press “∧” and “∨” in the control interface to select the operation. Press “ENT” to ensure the operation and press “ESC” to return.
Restart		Restart the inverter through the panel. And save the all settings and operation record. Press “ENT” to ensure restarting and the inverter will begin to self-inspect or press “ESC” to return.
Record clear		Press “ENT” to ensure clear all records or press “ESC” to return. “Record clear” is to clear all statistic records through the panel.
Restore to factory		“Restore to factory” is to clear all setting parameters and history operation records through the panel, restore to the factory setting. Press “ENT” to ensure clear or press “ESC” to return.

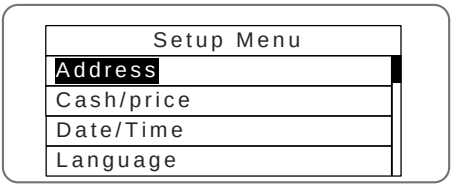
6.3 Grid standard Choice

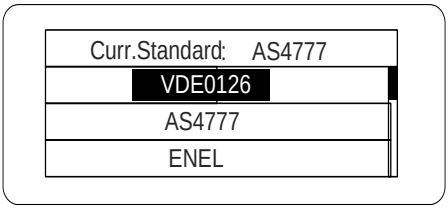
After power on the inverter by battery input for the first time, if grid frequency was 60Hz, the grid standard is changed into GNL_60Hz with related protection parameters. Otherwise, it is AS4777 with the related protection parameters at default.

The user can change Grid-connected standard through the following ways:

LCD Screen：MENU→Main Menu: Setup→Setup Menu: grid standard→grid standard:

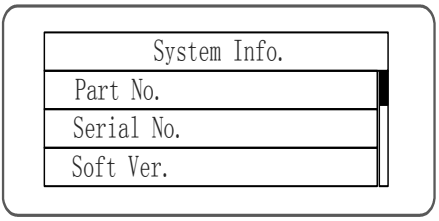


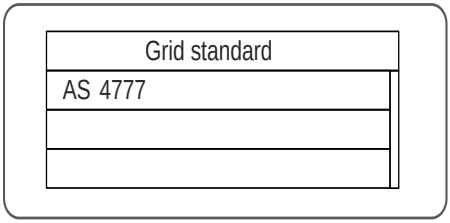




The user can query Grid-connected standard which has been set as the following ways:

LCD Screen：MENU→Main Menu: System Info→System Information: grid standard→grid standard





Chapter 7 Maintenance & Cleaning

Check the following points to ensure proper operation of whole system at regular intervals.

(1) Ensure the heat sinks are free from obstacles or dust.

(2) The inverter is not damaged or deformed.

(3) Periodically inspect the system to make sure that all wires and supports are securely fastened in place.

Warning: There are no user-replaceable parts inside of the inverter. Do not attempt to service the unit yourself.

Battery Maintenance

(1) Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.

(2) When replacing batteries, replace with the same type and number of batteries or battery packs.

(3) The following precautions should be observed when working on batteries:

a) Remove watches, rings ,or other metal objects.

b) Use tools with insulated handles.

c) Wear rubber gloves and boots.

d) Do not lay tools or metal parts on top of batteries.

e) Switch off the breakers at the AC side and the battery side.

f) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

CAUTION: A battery can present a risk of electrical shock and high shock-circuit current.

CAUTION: Do not dispose of batteries in a fire. The batteries may explode.

CAUTION: Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

Chapter 8 Troubleshooting

This chapter mainly introduces fault alarms and fault codes for users to quickly identity the inverter fault

Table 7-1 Fault code

Fault code	Fault event	Instruction
01	Ac voltage high1	Grid voltage is higher than protection point 1
02	Ac voltage high2	Grid voltage is higher than protection point 2
03	Ac voltage low1	Grid voltage is lower than protection point 1
04	Ac voltage low2	Grid voltage is lower than protection point 2
05	Ac freq. high1	Grid frequency is higher than protection point 1
06	Ac freq. high2	Grid frequency is higher than protection point 2
07	Ac freq. low1	Grid frequency is lower than protection point 1
08	Ac freq. low2	Grid frequency is lower than protection point 2
09	Ac over curr hw	Output hardware overcurrent
10	Ac over curr sw	Output software overcurrent
11	Bus over volt hw	Hardware bus overvoltage
12	Bus over volt sw	Software bus overvoltage
13	Gfci over	Leakage current exceeded
14	Gfci sensor fault	Leakage current sensor fault
15	Relay fault	Internal relay fault
16	Iso low	The resistance between PV and ground is too low
17	Ac dc over	High DC injection during AC output
18	DSP communication error	DSP communication fault
19	PV soft fault	PV boost soft start failed
20	Ac zero error	Internal components failed
21	Temperature high1	Overtemp 1
22	LLC soft fault	LLC soft start failed
23	LLC over voltage	LLC overvoltage
24	LLC over current	LLC overcurrent
25	PV1 voltage high	PV1 overvoltage
26	PV1 voltage low	PV1 undervoltage

Fault code	Fault event	Instruction
27	PV2 voltage high	PV2 overvoltage
28	PV2 voltage low	PV2 undervoltage
29	PV1 over current	PV1 overcurrent
30	PV2 over current	PV2 overcurrent
31	RTC error	Wrong setting
32	Eeprom error	Storage abnormal
33	INV soft fault	DC power phase reversal
34	Fan fault	Fan fault
35	Cmd shut down	Shutdown manually
36	Grid loss	Grid loss
37	Load over current	Output current exceeds max. value
38	Battery over current	Battery overcurrent
39	Battery volt high	Battery overvoltage
40	Battery open	Battery undervoltage
41	Quik stop	EPO is open
42	Pv1 over current hw	PV1 hardware overcurrent
43	Pv2 over current hw	PV2 hardware overcurrent
44	Bat over current hw	Battery hardware overcurrent
45	LLC over current hw	LLC hardware overcurrent
46	LLC over voltage hw	LLC hardware overvoltage
47	CAN comm error	CAN communication abnormal
48	Load over power	The inverter is loaded with more than 110% load
49	Extern Battery Alarm	Extern Battery Alarm
50	Load error hw	Grid connects to output connector
51	Battery under Volt	Battery voltage is under the critical voltage
52	PE Fault	The PE cable for the inverter is not connected
53	DRM0 Fault	DMR0 Mode
54	Time Conflict	Charge / discharge time periods are in conflict

If any problem, please contact with the supplier and provide following information:

- Model of the inverter:_____;
- Serial No. of the inverter:_____;
- System version:——version 1: _____;
  ——version 2: _____;
  ——MCU software version: _____;
- Fault code:_____;
- Fault description_____

Chapter 9 Technical parameter

Model	BD3KTL-PS
Grid output (AC)	
Rated AC output power	3000W
Max. AC output current	13A
Rated grid voltage/grid voltage range	230Vac/180-270Vac
Rated grid frequency/frequency range	50Hz(45~54Hz) / 60Hz(55~65Hz).
AC output type	Single phase (L、N、PE)
Power factor	≥0.99 (±0.90 adjustable)
Total Harmonic Distortion(THDi)	≤3%(rated power)
Maximum output fault current	50A
Battery side	
Battery type	Li-ion/Lead acid
Nominal DC voltage	48V
DC voltage range	40V-58V
Max. charging current	60A
Max. discharging current	65A
Charging curve	Three-stage
System	
Max. efficiency	93%
Topology (battery side)	High frequency isolation
Ingress Protection Rating	IP65
Protective class	I
Pollution degree	III
Overvoltage category	III
Altitude	Max.2000m
Dimension (W*D*H)	360*507*150mm
Weight	20kg(including the mounting plate)/22kg (including the package)
Protection function	DC monitoring, grid monitoring, islanding protection, short-circuit protection, overheat protection, battery anti-reverse connection protection
Operating Temperature	-25° C to +60° C
Cooling mode	Natural cooling
Humidity	4~100%, condensation
Display	LCD
Communication	RS485 (standard configuration), Wifi, (optional), CAN-BUS
Certification	VDE-AR-N4105, AS4777/3100
Warranty	1 years
Note: As our products are under continuous improvement and update, the final product and data information are subject to the physical product.	

Chapter 10 Contact us

China·Shenzhen

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