



30kW/60kWh

Air-Cooling Energy Storage System

Product Manual

I. Description

1. Identification description

	Warning: Failure to follow the warnings indicated in this manual may result in injury
	"High voltage and electric shock danger!"
	"High temperature!"
	"The components of the product are recyclable."
	"This side up! The packaging must always be transported, handled, and stored with the arrow
	pointing upwards."
	"Products should not be treated as waste in our daily lives."
	The packaging/product should be handled with care and should not be tipped or tilted.
	Please refer to the operation manual.
	Keep it dry! The packaging/product must be protected from excessive moisture and must be
	stored with a cover.

2. Indication before connection

1. After unpacking, please check the product and packing list first. If the product is damaged or missing parts, please contact the seller;
2. Before installation, please ensure that the battery is in off mode;
3. The battery system must be well grounded with a resistance less than 100m Ω ;
4. Please ensure that the electrical parameters of the battery system are compatible with related equipment;
5. Keep the system's battery away from water and fire.

3. During use

1. If it is necessary to move or repair the battery system, the power must be turned off and the battery fully closed.
2. Non-isolated inverter: Photovoltaic modules should have an IEC61730 Class A rating.
3. It is prohibited to disassemble this energy storage system.
4. In case of fire, only special sevoflurane/perfluorohexane can be used, and liquid fire extinguishers are strictly prohibited.
5. The N of the off-grid side is not connected to the grid-connected side of the inverter. Please refer to the requirements of the local power grid.

Please do not open, repair, or disassemble the multi-in-one energy storage system except for authorized personnel of our company. We are not responsible for any consequences or liabilities resulting from violating safety operations or design, production, and equipment safety standards.



4. Important safety information



Obtain permission from the local utility company before connecting the inverter to the grid and employing qualified personnel.

Prior to installation::

Inspect the installation location to avoid direct exposure of the product to sunlight. Check if the inverter and packaging are damaged. If there are any doubts, please contact the supplier before installing the inverter. Before connecting the photovoltaic panel, please check the voltage of the inverter and ensure it meets the specifications of the energy storage system. Follow all documents accompanying the energy storage system. The weight of the energy storage system exceeds 200kg, please handle with care during transportation/movement.

Installation:

All electrical installations must follow national wiring rules and local regulations. Only personnel who have been trained, authorized, and familiar with local electrical regulations can install the energy storage system. To ensure safety, please follow the steps described in this manual.



Grounding wire must be connected before connecting the DC input and AC output. After installation, the product identification must be clearly visible.

Disconnect the energy storage system:

First, disconnect the AC circuit, then the PV circuit, and finally the ground wire. Please note that even if the energy storage system has been disconnected from the power grid/main power supply and solar module, the voltage may still be very high and pose a risk. Please wait for at least 20 minutes after disconnecting from the power grid and photovoltaic panel.



The maintenance and installation of the equipment should be carried out by qualified personnel who possess the necessary skills and have received safety training.

Before connecting the inverter to the power grid, please ensure that the cabinet door is closed. When the system is running, please do not open it. There is a danger of electric shock.

When the photovoltaic array is exposed to sunlight, it will provide DC voltage to the device. If there are any problems, you must contact a professional for maintenance.

Performance Safety Parameters:

Unauthorized modification of performance safety parameters may result in personal injury or damage to the inverter or other equipment, as well as system operation failure. In addition, this will lead to uncertification of system operation. If non-original spare parts are used, compliance with electrical safety, EMC, and equipment safety cannot be guaranteed.

5.General safety regulations



Electrical equipment personnel should be responsible for the safety of personnel and property!

Partition

Before starting any work, please disconnect all cables that supply power to the workplace. Please note that no voltage does not mean that the cable is disconnected.

Prevent Reconnection

Prevent the reconnection of the system by marking or closing/blocking the work area. If accidentally reconnected, it may cause a serious accident.

Check for No Voltage in the System

Use a voltage tester to ensure there is no voltage in the system. Check all terminals to ensure there is no voltage on each conductor of the system.

Cover the Nearby Live Parts and Prevent Other Parts from Approaching

Cover all live system components that may cause injury during operation. Ensure that the danger area is clearly marked.

II. Overview of energy storage system

System Introduction

The energy storage system is a combined solution of photovoltaic inverter and lithium iron phosphate energy storage battery pack. It integrates the electrical components of inverter, lithium battery pack, monitoring, fire protection, etc. into a modular cabinet system, making installation more convenient and efficient. It is matched with photovoltaic power generation to form a green and energy-saving photovoltaic and energy storage system.

System Characteristics

- ① This system is non-toxic, non-polluting, and environmentally friendly.
- ② The battery system is made of LiFePO₄, which has good safety performance and long cycle life.
- ③ The BMS battery management system has functions such as over-discharge, over-charge, over-current, high/low temperature protection.
- ④ This system can automatically manage the charging and discharging status, and balance the current and voltage of each battery.
- ⑤ The system has pre-wired and tested in the factory, which can achieve fast installation.
- ⑥ The operating temperature range is -10°C to 50°C, with excellent discharge performance and cycle life.
- ⑦ It is suitable for load design of household appliances, communication base stations, photovoltaic and energy storage equipment, etc., and is easy to install and operate.

Maintenance and Upkeep

- ① This system requires minimal maintenance. Standard models simply need to be charged regularly to achieve the desired lifespan.
- ② If not in use for a long time, it is recommended to charge it once every three months.
- ③ Under normal conditions, the designed service life of the lithium battery pack is 5-15 years. If it is found to be in poor condition, it must be replaced in advance. Replacement of the battery must be carried out by professionals.
- ④ The lithium battery pack should not be replaced individually, but replaced as a whole in accordance with the user manual instructions of our company.
- ⑤ Normally, the lithium battery pack is charged and discharged once every three months, with the standard model charging for no less than 12 hours before shutdown.
- ⑥ In high-temperature areas, the battery is charged and discharged once every two months, with the standard model charging for no less than 12 hours each time.

Note: Before replacing the lithium battery pack, the inverter must be turned off and the mains input and PV input lines must be disconnected. Do not wear metal items such as rings or watches. Use an insulated handle tool and do not place tools or other metal items on the battery.



Warning: It is prohibited to short-circuit or reverse the connection of the battery's positive and negative terminals!

III. Introduction to the structure of the energy storage system

1. Energy storage battery system diagram

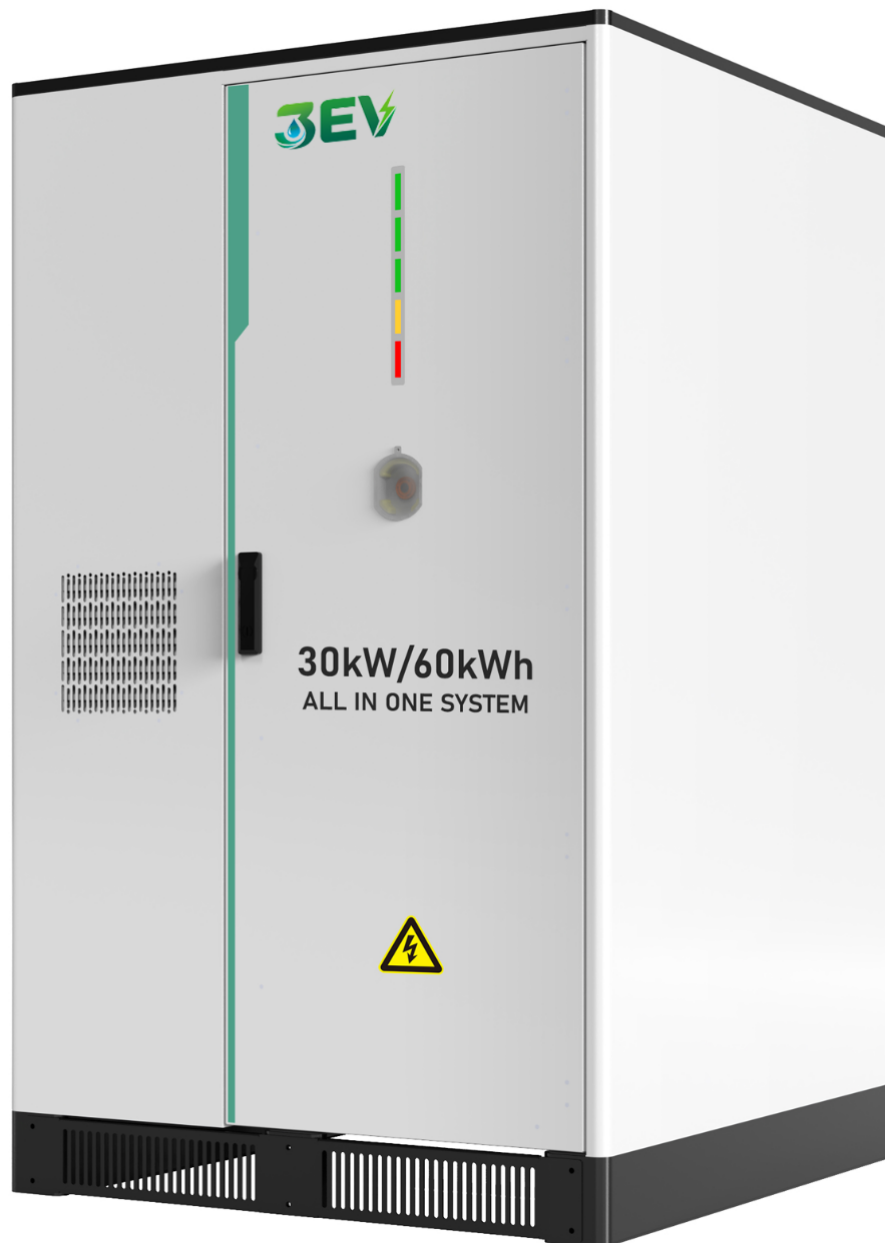


Figure 1 Outline drawing of energy storage system

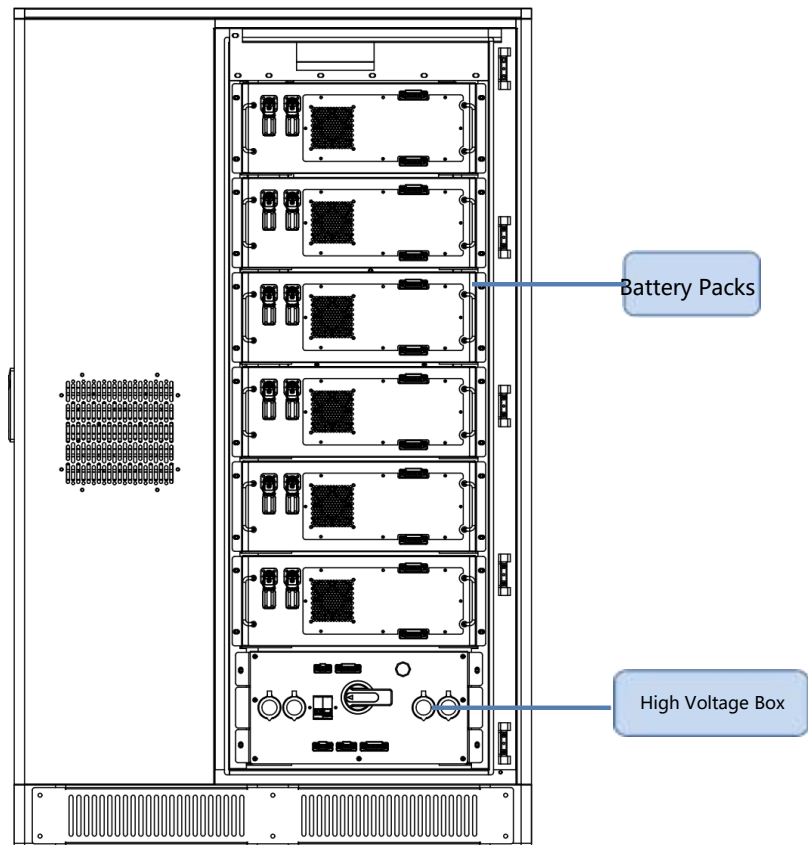


Figure 2: Diagram of energy storage lithium battery

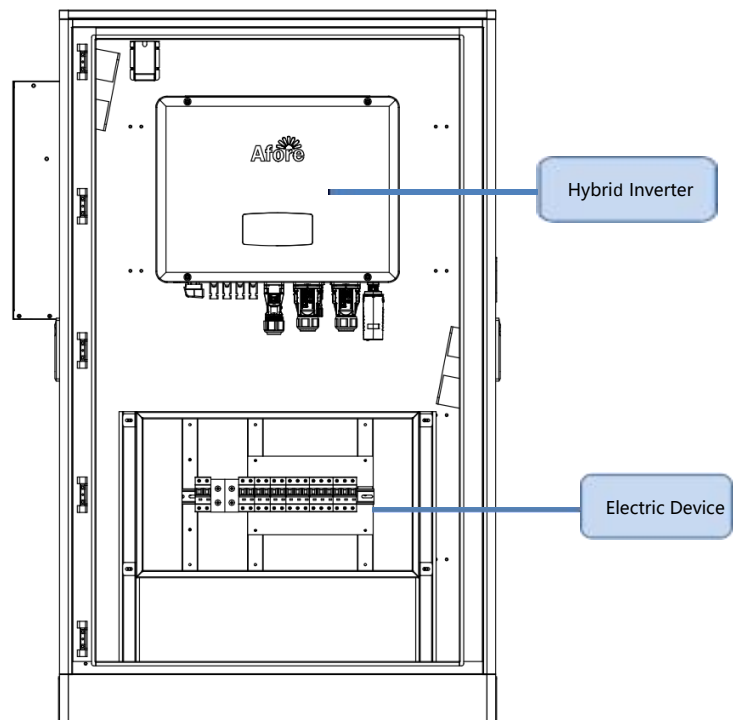
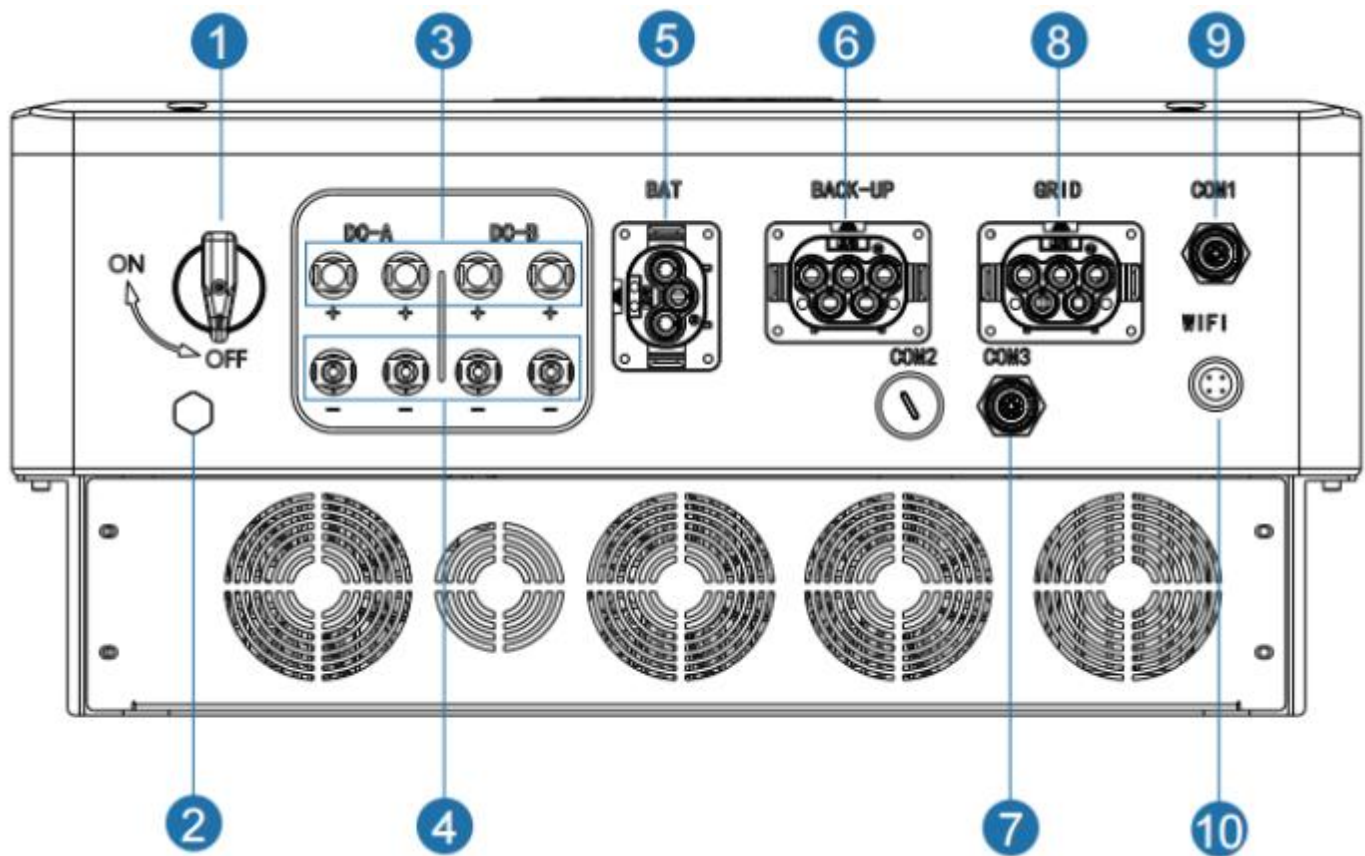
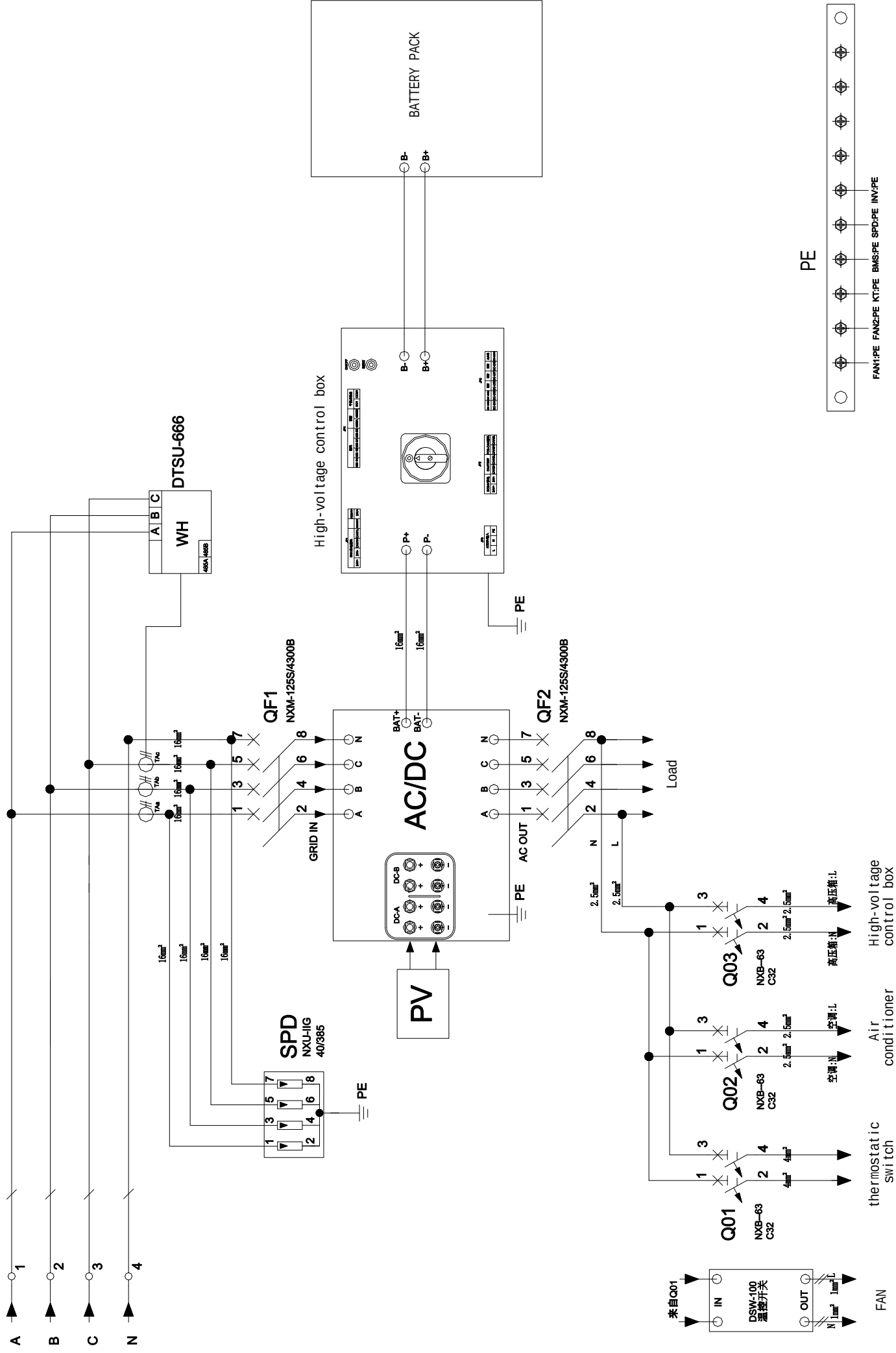


Figure 3 System diagram of solar inverter part

2. Diagram of On/off grid Solar Inverter System



Solar Hybrid Inverter			
1	DC Switch	6	Output port of inverter
2	Waterproof Ventilation Valve	7	Battery communication
3	PV String +	8	Main Grid Power
4	PV String -	9	Meter port
5	Battery Port	10	Wifi port



3.Wiring connection of solar inverter

1)AC input and AC output connection

Attention! Please do not connect the input and output terminals incorrectly as the terminals are marked "INPUT" and "OUTPUT". Please follow the steps below to connect the AC power supply.

Input/output AC line:

- ※ Before connecting the AC power input and output, please ensure that the battery circuit breaker is disconnected.
- ※ Peel off the insulation of the five wires by about 10mm.
- ※ Insert the AC cable into the terminal block according to the polarity mark on the AC input terminal (INPUT), and lock the terminal block screws. Please connect the ground wire (PE) first.



Warning:

Please ensure that the AC power supply has been completely cut off before connecting the AC line

※ Connect the positive and negative wires of the solar module input according to the polarity mark on the terminal block of the AC output terminal (OUTPUT). Please ensure that the connection between the solar module and the solar input connector is secure.

Note! Important.

BATTERY PACK
LOAD
PE
FAS
DISCONNECT
WATER
ALY
INVERTER
High-voltage
control box

Please ensure that the positive and negative wires of the AC input and output cables are connected correctly

2)PV input connection

Please follow the steps below to connect the solar panel input:

- ※ Peel off the insulation of the positive and negative wires by about 10mm.
- ※ Check if the polarity of the cable connecting the solar panel to the solar input connector is correct. Then, connect the positive wire (+) of the cable to the PV+ terminal on the inverter. Connect the negative wire (-) of the cable to the PV- terminal on the inverter.
- ※ Confirm that the wiring polarity is correct and securely connected.

5.Daily startup and shutdown of energy storage system

Startup steps:

When connected to a battery or utility power that meets the requirements (utility power needs to confirm the appropriate input range based on the output mode), you can perform a startup operation.

Utility power startup:

Connect to normal utility power, press the switch, and turn it to the ON position. The system will start up. If utility power output priority is set, after a short time, the panel will display utility mode to indicate that the startup is complete and enter utility mode.

Battery startup:

Connect to normal battery, press the switch, and establish power supply for the inverter. After a short time, the panel will display battery mode to indicate that the startup is complete and enter battery inverter mode.

Shutdown steps:

When the system is in battery inverter mode or utility power mode output, disconnect utility power and photovoltaic power, press the switch again, and turn it to OFF position. The inverter will shut down.

Operation under fault mode:

When the inverter beeps and the LED fault light is on, it indicates that the inverter is working in fault mode. You can contact the supplier or repair personnel for fault alarm information to assist in troubleshooting.

Parameter query operation:

Under normal circumstances, there are 9 display pages. Pressing the query button or PAGE button for 0.2 to 1 second will flip through the display pages, displaying input and output voltage, input and output frequency, battery, PV voltage and current, load, software version, and other information.

6.Cooling method

The cooling method of this system uses an Inventec AC power-type refrigeration air conditioner with a cooling capacity of 1100W and a heating capacity of 800W. It integrates system temperature control and can provide a suitable temperature and humidity inside the energy storage system to ensure its use for a long life and high reliability

Cooling system characteristics

1. Professional dehumidification design, effectively reducing the relative humidity inside the cabinet
2. Standard fan speed regulation function
3. Equipped with electric heating function
4. Support 4~20mA temperature and humidity signal output
5. The alarm dry contact supports DC220V and AC250V.
6. Normal operation at 6.55℃ high temperature environment
7. R134a environmentally friendly refrigerant, in line with RoHS requirements
8. Protection class IP55
9. Optional smoke detection, access control, and water immersion alarm signal output
10. With the function of automatic start-up of incoming current , and providing various alarm and protection functions



7.Firefighting plan

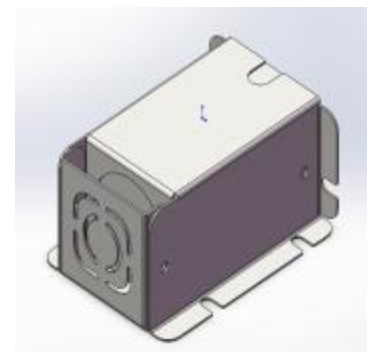
The fire protection plan for this system uses aerosol automatic fire extinguishing devices (hereinafter referred to as fire extinguishing devices) with hot aerosol gas fire extinguishing technology. It is based on national and industry standards XF499.1-2010 and is developed through extensive experiments according to the internal environment and its own characteristics of the protected object.

It is the latest generation of intelligent and fast-acting fire extinguishing products with strong extinguishing effects. This device can efficiently and quickly extinguish fires in B, D, and E categories at the beginning of the fire and can also effectively suppress deep fires in category A, creating favorable conditions for the elimination of hidden dangers.

The main fire extinguishing components of the device are connected by hot-wire linkage. When the hot-wire is ignited by an open flame or the installation environment temperature reaches its starting temperature, the fire source signal is transmitted to the main component equipped with fire extinguishing agent, and the device is activated to release fire extinguishing gas.

The installation of the device has no impact on the protected object; the gas generated after activation has no damage or corrosion to the protected object and is non-toxic and harmless to the atmosphere.

Hot aerosol automatic fire extinguishing devices feature multi-point sensing design and have the characteristics of small size and flexible mobility, making it a clean and efficient automatic fire extinguishing product.



8 . Lithium battery management system （BAMS）

This energy storage system uses a three-tier architecture (bottom battery management unit BMU, middle battery cluster management unit BCMU, and top energy storage management unit ESMU).

The BAMS, which is at the top layer of the main control system of the power station, is mainly responsible for real-time data acquisition, real time calculation, and performance monitoring of the battery cluster management unit BCMU.

Analyzing, alarm processing, protection processing, and record storage. Allows each group of batteries to achieve equal output, ensuring the system achieves optimal operating conditions and maximum operating time. The master control system BAMS is also responsible for communicating with the energy storage converter (PCS), inverter, and energy storage scheduling monitoring system (EMS).

Realize linkage. The battery management unit BAMS provides accurate and effective battery management information, which is an important basis for the load control strategy of the energy storage system.

Through battery equalization management, it can greatly improve the energy utilization efficiency of batteries and optimize load characteristics. At the same time, it can maximize the service life of batteries, the stability, safety and reliability of the energy storage system are guaranteed.

Characteristics of BAMS system

The BAMS connects to one or more battery cluster management units (BCMU) through the CAN bus to collect data, calculate the total amount of each sink and evaluate the status in real time, and forward the data to the back office (EMS) and the energy storage converter (PCS)/inverter.

The BAMS software system is based on Qt 4.8.6 and can run on Windows, Linux, and embedded Linux platforms. The BAMS software system block diagram is shown below:

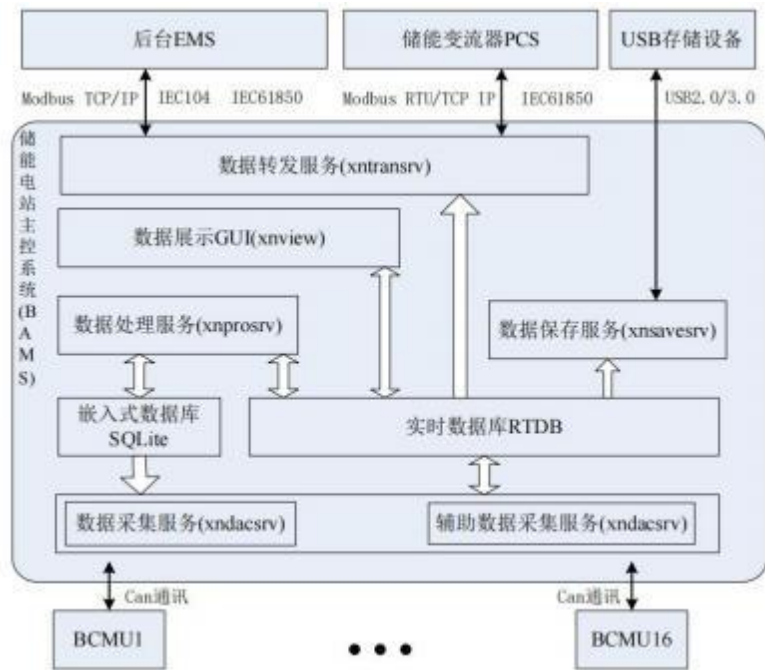


Diagram of the BAMS software system for the energy storage system

As can be seen from the figure, the BAMS of the energy storage power station is mainly divided into five modules, namely data acquisition service, data processing service, data storage service, data display, and data forwarding service. Data acquisition service includes acquisition service and auxiliary acquisition service. It collects battery cluster management unit (BCMU) data to the real-time database, reads the configuration of embedded data, and creates a real-time database (RTDB).

The acquisition service connects to the Can0 port and the auxiliary acquisition service connects to the Can1 port. The data processing service processes battery pack alarms and protections, and calculates the total amount and status amount. The data storage service stores the real-time collected data to the U disk. Supports USB2.0/3.0 protocol.

The data display module displays the operation of the main control system (BAMS) of the energy storage power station. The data forwarding service provides standard Mod-bus TCP/IP protocol, standard IEC104 protocol, and IEC61850 protocol to the outside world. It is also responsible for communicating with the energy storage converter (PCS)/inverter, and supports the standard IEC61850 protocol, Mod-bus TCP/IP protocol, and Mod-bus RTU protocol for communication with the energy storage converter (PCS)/inverter.

The main functions of the BAMS are: real-time data display, alarm reminder and query, access to one or more battery cluster management units (BCMU) (up to 36 groups), allowing up to 17 Mod-bus TCP/IP master stations to connect simultaneously. It is connected to the PCS/inverter using RS485 or network connection.

RS485 adopts standard Mod-bus RTU, while network adopts standard Mod-bus TCP or IEC104 protocol or IEC61850 (MMS+GOOSE) protocol, supporting 8-way IEC61850 data concurrency.

Hardware port description:

J4 RS232	J3 RS485	J2 CAN	J1 EARTH
① ttySAC0-RX	① NC	① CAN0-H	① EARTH
② NC	② ttySAC2-D-	② NC	② NC
③ ttySAC0-TX	③ NC	③ CAN0-L	③ NC
④ 232-GND	④ ttySAC2-D+	④ CAN-GND	④ NC
⑤ 232-GND	⑤ NC	⑤ CAN-GND	⑤ NC
⑥ ttySAC3-RX	⑥ NC	⑥ CAN1-H	⑥ NC
⑦ NC	⑦ ttySAC5-D-	⑦ NC	⑦ NC
⑧ ttySAC3-TX	⑧ NC	⑧ CAN1-L	⑧ NC
	⑨ ttySAC5-D+		⑨ NC
	⑩ NC		⑩ NC

Port	Port Description	Function Description	Definition of wire harness
24VDC/GND	24VDC INPUT	Provide power supply for BAMS	1-mm ² copper core wire
J1(1-10NC)	Optional	backup interface	
J2-1(CAN_H) J2-3(CAN_L)	CAN0 Communication 250Kbps	BAMS communicates with BCMU through CAN bus for data transmission and control.	0.3-mm ² shielded twisted pair
J2-6(CAN_H) J2-8(CAN_L)	CAN1 Communication(optional) 250Kbps	BAMS communicates with BCMU through CAN bus for data transmission and control.	0.3-mm ² shielded twisted pair
J3-2(485-2B) J3-4(485-2A)	RS485 2.4Kbps~19.2Kbps	BAMS communicates with PCS through RS485 data transmission and control	0.3-mm ² shielded twisted pair
J4-1(232-RX) J4-3(232-TX)	RX data receiving TX data transmission		
J4-6(232-RX) J4-8(232-TX)	RX data receiving TX data transmission		
LAN1	RJ45 , 10/100M	BAMS communicates with the backstage through Ethernet	Beyond type 5 shielded twisted pair
LAN2	RJ45 , 10/100M(optional)	BAMS communicates with the backstage through Ethernet	Beyond type 5 shielded twisted pair
SD	SD card interface	Used for operating system recovery	
USB flash disk	USB interface	Program upgrade, data export	

IV. Technical Parameters

Product model:		30kW/60kWh Energy Storage System
Rated power:		30kW
Rated capacity:		614V100Ah/61.44kWh
DC system voltage range:		490-690VDC
AC system voltage range:		380VAC
PV:	Working mode:	MPPT
	Rated PV input voltage:	620VDC
	MPPT tracking voltage range:	150V-850V
	Maximum PV input voltage Voc(under lowest temperatureconditions):	1000V
	Maximum PV input power:	45kW
	MPPT tracking paths (input paths):	2/4 paths
Input:	DC input voltage range:	150-800V
	Rated grid input voltage:	230/400VAC 3L/N/PE 50/60Hz
Output:	Inverter output efficiency:	98.3%(peak)
	Inverter output voltage:	230/400VAC 3L/N/PE 50/60Hz
	Inverter output waveform:	Pure sine wave
	Grid output efficiency:	>99%
	Grid output voltage range:	follow the input
	Grid output frequency range:	follow the input
	Inverter output waveform distortion:	≤3%(linear load)
	Battery mode no-load loss:	≤1% rated power
	AC output rated current:	43.5A
	Maximum AC current:	48A
	Maximum three-phase unbalanced outputcurrent:	60A
	Charging mode:	Three-stage charging (constant
Lithium battery:	Standard discharge current:	50A
	Maximum discharge current:	75A
	Working voltage range:	616-817.6VDC
	System standard voltage:	716.8VDC
	Maximum charging current per pack:	75A
	Maximum charging voltage per pack:	102.4V
	System recommended discharge depth:	DOD 80%
Working mode:		Grid priority / PV priority / battery
Conversion time:		≤10ms
Panel display:		LCD+LED
Cooling method:		intelligent fan control
Communication function (optional):		RS485/CAN communication interface /
Environment:	Operating temperature:	-10°C~40°C
	Storage temperature:	-15°C~60°C
	Noise:	≤55dB
	Altitude:	2000m(exceeding this requires derating)
	Relative humidity:	0%~95%; no condensation

Note: The above parameters are subject to change without notice!

V. Faults and solutions

1.Common fault phenomena

Fault Symptom	Probable Cause	Remedy
Inverter won't start	Battery voltage is too low or overloaded	Battery charging or reducing load
Shutdown with load	Battery voltage is too low or overloaded	Battery charging or reducing load
Alarm on start-up	Battery voltage is too low or overloaded	Battery charging or reducing load
Terminal heating	Poor contact	Inspect and tighten screws

2. Inverter fault warning code and solution measures

Fault type	Code	Fault name	Fault description	Solution
PV Fault	A01	PvConnectFault	PV connection is different with settings	Check PV Module Connections and Verify PV Mode Settings.
	A02	IsoFault	ISO Check Abnormality Between PV Panels/Wires and Grounding.	Check the PV module wires to see if they are submerged or damaged, then make corrections as needed. If the fault persists and occurs frequently, please seek assistance from your local distributor.
	A03	PvAfcifault	PV Arc or Photovoltaic Arc	Check the PV module wires to see if they are submerged or damaged, then make corrections as needed. If the fault persists and occurs frequently, please seek assistance from your local distributor.
	A04	Pv1OverVoltFault	PV Voltage Too High	Reconfigure the PV strings by reducing the number of PV modules in each string to lower the PV input voltage of the inverter. It is recommended to contact your local distributor.
	A05	Pv2OverVoltFault		
	A06	Pv3OverVoltFault		
	A07	Pv4OverVoltFault		
	A08	Pv5OverVoltFault		
	A09	Pv6OverVoltFault		
	A10	Pv7OverVoltFault		
	A11	Pv8OverVoltFault		
	A12	Pv9OverVoltFault		
	A13	Pv10OverVoltFault		
	A14	Pv11OverVoltFault		
	A15	Pv12OverVoltFault		
	A16	PV1ReverseFault	PV (+) and PV (-) Reverse Connection	Check the PV (+) and PV (-) connections to ensure they are not reversed. If reversed, make the necessary corrections.
	A17	PV2ReverseFault		
	A18	PV3ReverseFault		
	A19	PV4ReverseFault		
	A20	PV5ReverseFault		
	A21	PV6ReverseFault		

Fault type	Code	Fault name	Fault description	Solution
PV Fault	A22	PV7ReverseFault		
	A23	PV8ReverseFault		
	A24	PV9ReverseFault		
	A25	PV10ReverseFault		
	A26	PV11ReverseFault		
	A27	PV12ReverseFault		
	A33	Pv1AbnormalFault	PV (+) and PV (-) Reverse Connection	Check if any PV modules are partially shaded or if there is damage to the cells. Inspect the PV module wiring and connectors for disconnections or loose connections, then proceed with repairs.
	A34	Pv2AbnormalFault		
	A35	Pv3AbnormalFault		
	A36	Pv4AbnormalFault		
	A37	Pv5AbnormalFault		
	A38	Pv6AbnormalFault		
	A39	Pv7AbnormalFault		
	A40	Pv8AbnormalFault		
	A41	Pv9AbnormalFault		
	A42	Pv10AbnormalFault		
	A43	Pv11AbnormalFault		
	A44	Pv12AbnormalFault		
	A45	Pv13AbnormalFault		
	A46	Pv14AbnormalFault		
	A47	Pv15AbnormalFault		
	A48	Pv16AbnormalFault		
	A49	Pv17AbnormalFault		
	A50	Pv18AbnormalFault		
	A51	Pv19AbnormalFault		
	A52	Pv20AbnormalFault		
	A53	Pv21AbnormalFault		
	A54	Pv22AbnormalFault		
	A55	Pv23AbnormalFault		
	A56	Pv24AbnormalFault		

Fault type	Code	Fault name	Fault description	Solution
Battery Fault	B01	PcsBatOverVoltFault	Battery Voltage Too High or Too Low	Check the connections of the battery wires and connectors to ensure they are not disconnected or loose. Corrections should be made if there is any damage or looseness. Check if the battery voltage is abnormal, and then maintain or replace the new battery as needed.
	B02	PcsBatUnderVoltFault		
	B03	PcsBatInsOverVoltFaul		
	B04	PcsBatReversedFault	Bat. (+) and Bat. (-) Reverse Connection	Check if the Bat (+) and Bat (-) connections are reversed. If reversed, make the necessary corrections.
	B05	PcsBatConnectFault	Loose Battery Wires	Check the battery wires and terminals for damage or loose connections. Make corrections as needed.
	B06	PcsBatComFault	Battery Communication Abnormality	Check the communication wires on the battery side for damage or loose connections, and make corrections as needed. Check if the battery is turned off or if there are other abnormalities, then maintain or replace the battery as needed.
	B07	PcsBatTempSensorOpen	Battery Temperature Sensor Abnormality	Check the battery temperature sensor and the connected wires for damage, and then make corrections or replace them with new ones as needed.
	B08	PcsBatTempSensorShort		
	B09	BmsBatSystemFault	All these faults will be detected or reported by the battery BMS.。	If the specific fault is high temperature or low temperature, the environmental temperature where the battery is installed should be adjusted. Restart the battery, which may allow it to operate normally. If the fault persists and occurs frequently, please seek assistance from your local distributor.
	B10	BmsBatVolOverFault		
	B11	BmsBatVolUnderFault		
	B12	BmsCellVolOverFault		
	B13	BmsCellVolUnderFault		
	B14	BmsCellVolUnbanceFau		
	B15	BatChgCurOverFault		
	B16	BatDChgCurOverFault		
	B17	BatTemperatureOverFa		
	B18	BatTemperatureUnderF		
	B19	CelTemperatureOverFa		
	B20	CelTemperatureUnderF		
	B21	BatIsoFault		
	B22	BatSocLowFault		
	B23	BmsInterComFault		
	B24	BatRelayFault		

Fault type	Code	Fault name	Fault description	Solution
Battery Fault	B25	BatPreChaFault		
	B26	BmsBatChgMosFault		
	B27	BmsBatDChgMosFault		
	B28	BMSVolOVFault		
	B29	BMSVolLFault		
	B30	VolLockOpenFault		
	B31	VolLockShortFault		
	B32	ChgRefOVFault		
	C01	GridLossFault	Grid Loss (Island Mode)	When the grid returns to normal, the inverter will automatically restart. Check the grid connections and cables connected to the inverter to ensure they are functioning properly.
	C02	GridUnbalanVoltFault	Grid Voltage Imbalance	When the three-phase grid returns to normal, the inverter will automatically restart. Check the grid connections and wires connected to the inverter to ensure they are functioning properly. Verify that the connectors and cables are in good condition.
	C03	GridInstOverVoltFault	Transient Grid Voltage Too High	When the three-phase grid returns to normal, the inverter will automatically restart. Contact your local distributor or the relevant utility company to adjust the protection parameters. .
	C04	Grid10MinOverVoltFault	Grid Voltage Too High for More Than 10 Minutes	When the three-phase grid returns to normal, the inverter will automatically restart. Contact your local distributor or the relevant utility company to adjust the protection voltage parameters for the 10-minute duration. .
	C05	GridOverVoltFault	Grid Voltage Too High	When the three-phase grid returns to normal, the inverter will automatically restart. Contact your local distributor or the relevant utility company to adjust the voltage protection parameters.
	C06	GridUnderVoltFault	Grid Voltage Too Low	
	C07	GridLineOverVoltFault	Grid Line Voltage Too High	
	C08	GridLineUnderVoltFault	Grid Line Voltage Too Low	
	C09	GridOverFreqFault	Grid Frequency Too High	When the three-phase grid returns to normal, the inverter will automatically restart. Contact your local distributor or the relevant utility company to adjust the frequency protection parameters.
	C10	GridUnderFreqFault	Grid Frequency Too Low	

Fault type	Code	Fault name	Fault description	Solution
Off-Grid Fault	D01	UpsOverPowerFault	Off-Grid Load Exceeded	Reduce Load If overload occurs occasionally, it can be ignored when the power generation is sufficient to recover. If these faults persist and occur frequently, please seek assistance from your local distributor.
	D02	GridConflictFault	Grid Connected to Inverter BACK-UP Output	Check if the off-grid port connection is correct; disconnect the off-grid port and the grid port.
	D03	GenOverVoltFault	Generator Overvoltage Fault	Adjust the generator operating parameters to keep the output voltage and frequency within the allowable range. If this fault persists and occurs frequently, please seek assistance from your local distributor.
	D04	GenUnderVoltFault	Generator Voltage Insufficient Fault	
	D05	GenOverFreqFault	Generator Frequency Too High Fault	
	D06	GenUnderFreqFault	Generator Frequency Too Low Fault	
DC Fault	E01	Pv1 HwOverCurrFault	PV Current Too High, Triggered by Hardware Protection Circuit	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E02	Pv2 HwOverCurrFault		
	E03	Pv3 HwOverCurrFault		
	E04	Pv4 HwOverCurrFault		
	E05	Pv5 HwOverCurrFault		
	E06	Pv6 HwOverCurrFault		
	E07	Pv7 HwOverCurrFault		
	E08	Pv8 HwOverCurrFault		
	E09	Pv9 HwOverCurrFault		
	E10	Pv10 HwOverCurrFault		
	E11	Pv11 HwOverCurrFault		
	E12	Pv12 HwOverCurrFault		
	E13	Pv1 SwOverCurrFault	PV Current Overload, Triggered by Software Logic.	Turn off the power, then turn it back on, and restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E14	Pv2 SwOverCurrFault		
	E15	Pv3 SwOverCurrFault		
	E16	Pv4 SwOverCurrFault		
	E17	Pv5 SwOverCurrFault		
	E18	Pv6 SwOverCurrFault		
	E19	Pv7 SwOverCurrFault		
	E20	Pv8 SwOverCurrFault		

Fault type	Code	Fault name	Fault description	Solution
DC Fault	E21	Pv9 SwOverCurrFault		
	E22	Pv10 SwOverCurrFault		
	E23	Pv11 SwOverCurrFault		
	E24	Pv12 SwOverCurrFault		
	E33	Boost1SelfCheck(boost)Fault	Abnormal PV Boost Circuit During Self-Check	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E34	Boost2SelfCheck(boost)Fault		
	E35	Boost3SelfCheck(boost)Fault		
	E36	Boost4SelfCheck(boost)Fault		
	E37	Boost5SelfCheck(boost)Fault		
	E38	Boost6SelfCheck(boost)Fault		
	E39	Boost7SelfCheck(boost)Fault		
	E40	Boost8SelfCheck(boost)Fault		
	E41	Boost9SelfCheck(boost)Fault		
	E42	Boost10SelfCheck(boost)Fault		
	E43	Boost11SelfCheck(boost)Fault		
	E44	Boost12SelfCheck(boost)Fault		
	E45	BusHwOverVoltFault	Bus Voltage Too High	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E46	BusHwOverHalfVoltFault		
	E47	BusSwOverVoltFault		
	E48	BusSwOverHalfVoltFault		
	E49	BusSwUnderVoltFault	Insufficient Bus Voltage During Operation	
	E50	BusUnbalancedFault	DC Bus Voltage Imbalance	
	E51	BusBalBridgeHwOver-CurFault	Bus Controller Current Too High	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E52	BusBalBridgeSwOver-CurFault		
	E53	BusBalBridgeSelf-CheckFault	Abnormal Bus Controller During Self-Check	
	E54	BDCHwOverCurrFault	BiDC Current Too High	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	E55	BDCSwOverCurrFault		
	E56	BDCSelfCheckFault	Abnormality During BiDC Self-Check	
E57	BDCSwOverVoltFault	Abnormality During BiDC Self-Check		
E58	TransHwOverCurrFault	BiDC Current Too High		

Fault type	Code	Fault name	Fault description	Solution
	E59	BDCFuseFault	BiDC Fuse Broken	Replace the fuse.
	E60	BDCRelayFault	BiDC Relay Abnormality	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
AC Fault	F01	HwOverFault	All Current/Voltage Provided by Protection Hardware	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	F02	InvHwOverCurrFault	AC Overcurrent Achieved Through Protection Hardware	
	F03	InvROverCurrFault	R Phase Current Too High	
	F04	InvSOverCurrFault	S Phase Current Too High	
	F05	InvTOverCurrFault	T Phase Current Too High	
	F06	GridUnbalanCurrFault	Grid Current Imbalance	
	F07	DcInjOverCurrFault	DC Input Current Too High	
	F08	AcOverLeakCurrFault	AC Side Leakage Current Over current	Check the AC insulation and grounding connections to ensure they are good, then proceed with repairs. Shut down and then restart. If this fault persists and occurs frequently, please seek assistance from your local distributor.
	F09	PLLFault	PLL Abnormality	Shut down and then restart. If this fault persists and occurs frequently, please seek assistance from your local distributor.
	F10	GridRelayFault	Grid Relay Abnormality	
	F11	UpsRelayFault	UPS Relay Abnormality	
	F12	GenRelayFault	Generator Relay Abnormality	
	F13	Relay4Fault	Relay 4 Abnormality	
	F14	UpsROverCurrFault	Off-Grid Output Current Too High	During off-grid operation, the load startup pulse current is too large; reduce the startup pulse current load. Shut down and then restart. If this fault persists and occurs frequently, please seek assistance from your local distributor.
	F15	UpsSOverCurrFault		
	F16	UpsTOverCurrFault		
	F17	GenROverCurrFault	Generator Current Too High	Check if the generator's output voltage and frequency are stable, and adjust the generator as needed.
	F18	GenSOverCurrFault		
	F19	GenTOverCurrFault		
	F20	GenReversePowerFault	Generator Active Power Input	Shut down and then restart. If this fault persists and occurs frequently, please seek assistance from your local distributor.

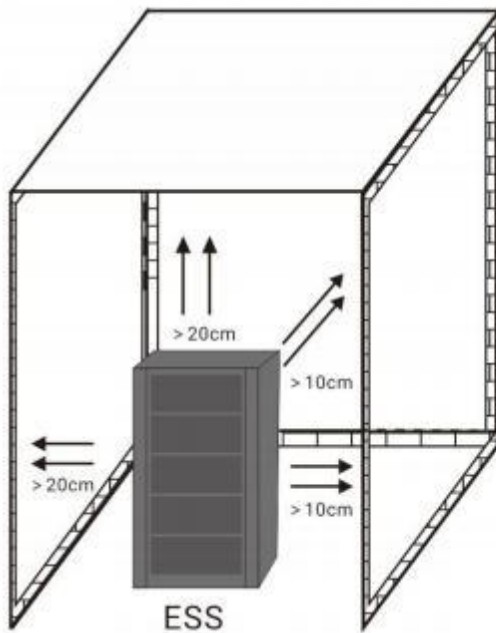
Fault type	Code	Fault name	Fault description	Solution
AC Fault	F21	UpsOverVoltFault	Off-Grid Output Voltage	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	F22	UpsUnderVoltFault	Too High or Too Low	
	F23	UpsOverFreqFault	Off-Grid Output Frequency	
	F24	UpsUnderFreqFault	Too High or Too Low	
	F25	DclnjOverVoltFault	Off-Grid DC Input Voltage Too High	
System Fault	G01	PV1CurAdChanFault	Sampling Hardware Abnormality	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	G02	PV2CurAdChanFault		
	G03	PV3CurAdChanFault		
	G04	PV4CurAdChanFault		
	G05	PV5CurAdChanFault		
	G06	PV6CurAdChanFault		
	G07	PV7CurAdChanFault		
	G08	PV8CurAdChanFault		
	G09	PV9CurAdChanFault		
	G10	PV10CurAdChanFault		
	G11	PV11CurAdChanFault		
	G12	PV12CurAdChanFault		
	G13	BDCCurrAdChanFault		
	G14	TransCurAdChanFault		
	G15	BalBrigCurAdChanFault		
	G16	RInvCurAdChanFault		
	G17	SInvCurAdChanFault		
	G18	TInvCurAdChanFault		
	G19	RInvDciAdChanFault		
	G20	SInvDciAdChanFault		
	G21	TInvDciAdChanFault		
	G22	LeakCurAdChanFault		
	G23	VoltRefAdChanFault		
	G24	UpsRCurAdChanFault		

Fault type	Code	Fault name	Fault description	Solution	
System Fault	G25	UpsSCurAdChanFault			
	G26	UpsTCurAdChanFault			
	G27	GenRCurAdChanFault			
	G28	GenSCurAdChanFault			
	G29	GenTCurAdChanFault			
	G30	UpsRDcvAdChanFault			
	G31	UpsSDcvAdChanFault			
	G32	UpsTDcvAdChanFault			
	G37	TempAdChanFault	All Temperature Sensors Abnormality	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.	
	G38	VoltAdConflictFault	Inconsistent Sampling Values for PV, Battery, and Bus Voltage		
	G39	CPUAdConflictFault	Inconsistent Sample Values Between Main CPU and Server CPU		
	G40	PowerCalcConflictFault	Inconsistent Power Values Between PV, Battery, and AC Output		
	G41	EnvirOverTempFault	Installation Ambient Temperature Too High or Too Low	Change or Raise the Installation Ambient Temperature to Ensure Appropriate Operating Temperature.	
	G42	EnvirLowTempFault			
	G43	CoolingOverTempFault	Cooling Temperature Too High or Too Low		
	G44	CoolingLowTempFault			
	G45	OverTemp3Fault	Temperature 3 Too High or Too Low		Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	G46	LowTemp3Fault			
	G47	CpuOverTempFault	CPU Temperature Too High		
	G48	ModelConflictFault	Version Conflict with Inverter	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.	
Internal Warning	I01	InterFanWarning	Fan Abnormality	Remove foreign objects from the fan. If these faults persist and occur frequently, please seek assistance from your local distributor.	
	I02	ExterFanWarning			
	I03	Fan3Warning			

Fault type	Code	Fault name	Fault description	Solution
Internal Warning	I04	EnvirTempAdChanWarning	Partial Temperature Sensor Abnormality	Warning is not of significant impact. Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	I05	CoolingTempAdChanWarning		
	I06	Temp3AdChanWarning		
	I07	ExtFlashComWarning	Flash Abnormality	Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	I08	EepromComWarning	Eeprom Abnormality	
	I09	SlaveComWarning	Communication Abnormality Between Main Server CPU and Main CPU	
	I10	HmiComWarning	HMI Abnormality	
	I11	FreqCalcConflictWarning	Frequency Abnormality	
	I12	UnsetModel	Operating Model Is Not the Initial Model	Contact your local distributor.
External Warning	J01	MeterComWarning	Meter/CT Abnormality	Check if the smart meter model, connectors, or joints are correct and secure. If they are not normal, please repair or replace them. Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	J02	MeterConnectWarning	Incorrect Meter Connection Type	Check the meter/CT connections, installation position, and installation direction. If there are any abnormalities, please reinstall. Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	J03	SohWarning	Low Battery SOH	Please contact the battery manufacturer.
	J04	GndAbnormalWarning	Please contact the battery manufacturer.	Check the grounding wire connections or grounding connection impedance. If there are any abnormalities, please make adjustments. Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.
	J05	ParallelComWarning	Abnormal Parallel Communication Between Master and Slave	Check for damaged parallel AC lines, loose joints, and whether the connection ports are correct. If there are no issues, please make adjustments. Shut down and then restart. If these faults persist and occur frequently, please seek assistance from your local distributor.

VI. Installation method

1. Before connecting the load and energy storage system, please turn off all loads;
2. To ensure safety, please confirm that the product is properly grounded before use and before turning on the power.
3. When the load is a motor/compressor/laser printer/special lighting load, the inverter power should be calculated based on the load starting power due to the high starting power of the operation. The load starting power is generally 2-3 times the rated power.
4. The placement location of the energy storage system



Avoid direct sunlight



Avoid dampness and contact with liquids



Avoid dust



Avoid overheating



Installed horizontally on the ground

VII. After-sale Warranty Regulations

1. Product Warranty

The system is integrated with a photovoltaic inverter and an energy storage lithium battery, and is specifically designed to ensure the performance of the battery module for five years from the date of manufacture. This warranty does not include any accessories or tool kits that come with the product.

This warranty covers only the repair or replacement of defective products. We will repair or replace the product (if the product is defective and returned within the warranty period). The repaired or replaced product will continue to have the original remaining warranty period. In either case, it should not be used as a reason for renewing the warranty period.

2. Warranty conditions

The product-related guarantees only apply in the following circumstances:

1. Purchased from the company or its authorized dealer.
2. Have an official serial number;
3. Install, operate, and maintain the product according to the Product Manual;
4. Use photovoltaic (PV) energy storage at 80% depth of discharge on a daily basis.

3. Scope of warranty

To the extent permitted by law, the company does not assume any liability for damages caused by the product or defects caused or contributed to by the following reasons:

1. The product is installed with an inverter/PCS/EMS that has not been certified by the company;
2. Failure to correctly install or operate the system/battery according to the product manual;
3. Neglect or treat the product in any other inappropriate way, including using the product beyond the recommended environmental, temperature, and humidity conditions;
4. Transportation, including but not limited to dropping, trampling, deformation, impact, or puncturing sharp objects;
5. Storage, installation, debugging, modification or repair of products performed by other personnel: other personnel outside the company's certified installation procedures;
6. Abuse, misuse, negligence, accident or force majeure events, including but not limited to lightning, floods, fires, extreme cold weather, or other events that the company cannot reasonably control;
7. Any attempt to extend or shorten the product life without the written confirmation of the company, whether through physical means, programming, or other means;
8. Water, conductive dust or corrosive gases; normal wear or deterioration, or surface defects, dents or marks that affect product performance
9. The product has been connected to different types of battery modules;
10. Failure to install, operate, or maintain the product in accordance with the product manual; theft or intentional destruction of the product or any of its components.