

USER MANUAL

All in One system

5KW-PV6000-48V



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1. Information on this Manual

1.1 Product range

This manual is valid for the following devices:

- 5000W All in one system

1.2 Scope

This manual describes the assembly, installation, operation and troubleshooting of the all in one system. Please read this manual carefully before installations and operations.

1.3 Target Group

This manual is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training on how to deal with the hazards and risks associated with installing and using electrical devices
- Training on the installation and commissioning of electrical equipment and devices
- Knowledge of the applicable standards and directives
- Understand and comply with this manual and all safety information

1.4 Label Description

In order to ensure the user's personal safety when using this product, the All in one system and this manual provides relevant identification information and uses appropriate symbols to remind the user, who should carefully read the following list of symbols used in this manual.

Labels on the system

	CAUTION Do not disconnect the load!
	Danger:High Voltage! Danger:Risk electric shock
	Start maintaining the All in one system at least 5 minutes after the system disconnected from all external power supplies.
	Read instructions carefully before performing any operation on the Frequency Converter.



Grounding: The system must be firmly grounded for operator safety.

Labels in the documentation

 WARNING!	<p>A high level of potential danger, which, if not avoided, could result in death or serious injury to personnel.</p>
 CAUTION!	<p>A moderate or low level of potential danger, which, if not avoided, could result in moderate or minor injuries to personnel. In some extreme situation, it could result in death or serious injury to personnel.</p>

1.5 Safety Instructions



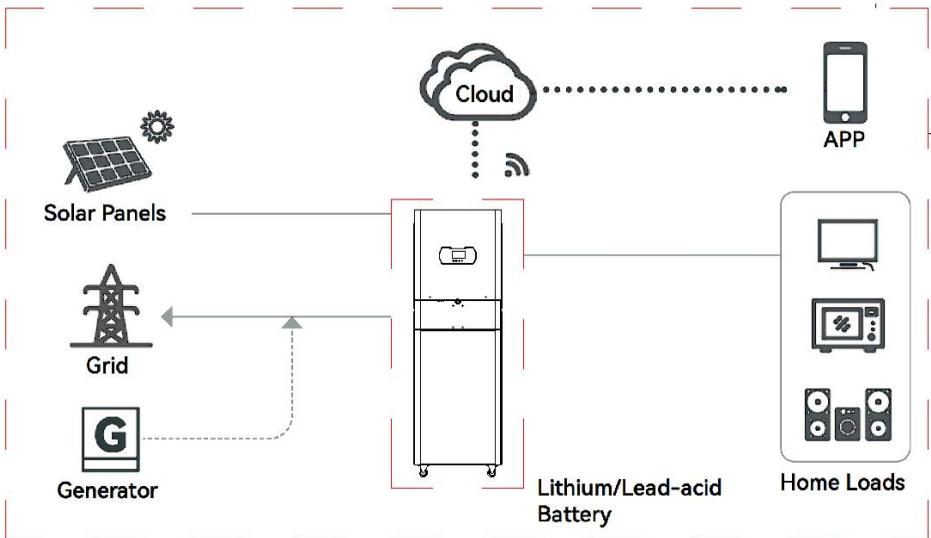
WARNING!

This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. As inverter in this equipment can support a variety of battery systems, the lithium mode already pre-selected to combine with this our battery before leaving the factory, so there is no need for the customer to make the selection again, if you choose the wrong system, the all in one system will not work properly.
2. Before using the system, read all instructions and warning signs on the device and all related sections of this manual. If the installation is not carried out in accordance with the instructions in this manual and the device is damaged, the company will not be entitled to provide quality assurance.
3. All the operation and connection must be carry out by professional electrical or mechanical engineer.
4. All the electrical installation must comply with the local electrical safety standards.
5. Do not disassemble the system. When service or repair is required, take it to a qualified service center. Improper reassembly may result in the risk of electric shock or fire.
6. To reduce risk of electric shock, please disconnect all cables before attempting any maintenance or cleaning. Turning off the system will not reduce this risk.
7. Please select appropriate cables according to the required specifications. Which is critical to ensure the operation of the device.

8. Be extra careful when using metal tools on or around batteries. Improper use of metal tools may cause a short circuit in batteries or electronic components, which may cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10. GROUNDING INSTRUCTIONS -The all in one system should be connected to a permanent grounded cable system. When installing this system, local requirements and regulations must be strictly followed.

2.Introduction



Hybrid Solar Energy Storage System

This is a multifunctional solar energy storage system that integrates MPPT solar charger, high frequency pure sine wave energy storage inverter and UPS function module, Ideal for off-grid backup power and self-use applications. The inverter inside this system can work even if the battery is faulty, and can also work when the grid or PV power is connected.

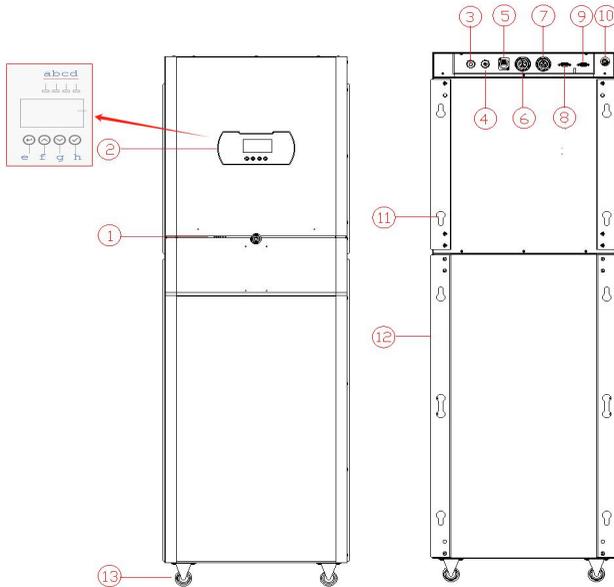
This system also need other devices to achieve complete operation, such as PV modules, generator, or city grid. Please consult with your system integrator for other possible system architectures depending on your requirements. The WiFi / GPRS module is a plug-and-play monitoring device to be installed on the system. With this device, users can monitor the

status of the PV system from the mobile phone or from the website anytime anywhere.

2.1 Features

- Rated power 5000W, power factor 1
- MPPT ranges 120V~450V, 500Voc
- High frequency inverter with small size and light weight
- Pure sine wave AC output
- Solar and city grid can power loads at the same time
- With RS485 for BMS communication
- Integrated inverter has the ability to work without battery
- Parallel operation up to 9 units (only with battery connected)
- WIFI/ GPRS remote monitoring (optional)
- Dual AC output
- city grid connection

2.2 Product Overview



a	AC Indicator	4	PV+ port
b	Invert Indicator	5	USB port
c	Charging indicator	6	AC Output
d	Fault Indicator	7	AC Input
e	ESC Button	8	Parallel connection port
f	Up Button	9	Parallel connection port
g	Down Button	10	Overload protector
h	Enter Button	11	Screw location for Wall mounted
1	Power On/Off Switch	12	Wall mounted bracket
2	Display screen	13	Move wheel
3	PV- port		

3. Installation

3.1 Unpacking and Inspection

3.1.1 Open-box Inspection

Products have been strictly tested before leaving the factory. Please open the box to check whether the outer packaging is intact or damaged, whether the internal equipment is damaged. In case of product damage, please contact the local distributor. Signature is requested after inspection.

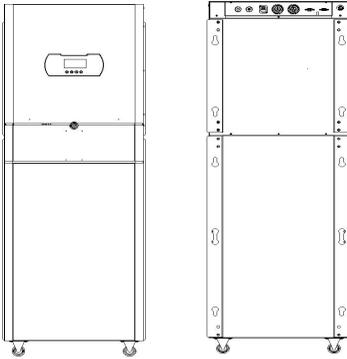
3.1.2 Installation Tools

Installation Tools	Multi-meter 	Protective gloves 	Insulated anti-smashing shoes 
	Safety Goggles 	ESD wrist strap 	Hammer drill 
	Electric screwdriver 	Phillips screwdriver 	Rubber mallet 
	Level tool 	Wire cutter / stripper 	Terminal crimping tool 

3.1.3 Packing List

No.	Item	Quantity	Description	Remarks
1	All in one system	1		
2	Wall mounted Bracket	1		
3	User manual	1	English version	
4	Tubular Terminal	2	E4010	For AC output, PV
5	Tubular Terminal	2	E6010	For AC input
6	Expansion hook	6		

3.2 Mounting our system



Before choosing the installation location to install the following point needs to be cautiously considered:

- Do not mount the system on flammable materials.
- If wall mounting is required, Install the system at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -15°C and 50°C to ensure optimal operation.
- The recommended installation location is to attach the device vertically to a wall or place it directly on the floor



WARNING!

All in one system is suitable for mounting on concrete or other non-combustible surface only.

When wall mounting the system please follow the installation steps :

1. Use M10 screws to fix the top and bottom battery bracket into backside of the battery.

2. Select a solid load-bearing wall and mark the location, marked the drilling location (has to be 1200mm above the ground), use an hammer drill to drill hole, Hole diameter needs to be 14mm and has a depth of 80mm
3. Install the M10 expansion bolts into this 6 mounting holes in sequence, with the right-angle hooks facing upwards. and tight the expansion screw hooks;
4. Lift the battery and hang it with the notch on the battery bracket on the back aligned with the expansion screw hook; Depends on the battery specifications before installing the bracket holes, make sure measure the actual object and then drill holes! Due to the heavy weight of the battery, the wall needs to be a load-bearing wall.

**CAUTION!**

Be sure to connect AC cables with correct polarity. If L and N wires are connected reversely or poorly, it may cause the system short-circuited when the system are worked in parallel operation.

3.3 AC Input / Output Connection



CAUTION!

Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 40A for 5kW system.

Suggestion for AC input wires

Model	Spec	Cable (mm ²)
5000W all in one system	9 AWG	6



WARNING!

Using appropriate cable for AC dual output connection is crucial for system safety and optimal operation. To reduce risk of injury, please use the proper cable size as below. The cable color should also follow the typical requirements.

Suggestion for AC output wires

Model	Spec	Cable (mm ²)
5000W All in one system	12AWG	4

Please make sure the cables are securely connected.



WARNING!

Make sure AC power is disconnected before attempting to connect AC power to the system. All operations during the electrical connection process, as well as the specifications of cables and components used, must comply with local laws and regulations. The cable color mentioned below is for typical reference.

**CAUTION!**

loads such as air conditioners take at least 2~3 minutes to restart because it needs enough time to balance the refrigerant gas within the circuit. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check with manufacturer of air conditioner that if it's equipped with time-delay protection before installation our system. Otherwise, Although there is relevant protection functions in the system inverter, frequent power outage of the system can still cost damage on your load.

3.4 PV Connection

**CAUTION!**

Before connecting to PV modules, please install a separate DC circuit breaker between the all in one system and PV modules.

**WARNING!**

Do not connect the positive or negative terminals of the PV module incorrectly, as this can severely damage the system.

**WARNING!**

Make sure to connect the PV terminals to the corresponding ports on the inverter, as reverse polarity connection will damage the inverter.

**WARNING!**

All wiring must be performed by a certified personnel.

**WARNING!**

Using appropriate cable for connection is crucial for system safety and optimal operation. To reduce risk of injury, please use the proper cable size as below. The cable colors mentioned below are for typical reference.

Model	Gauge	Cable (mm ²)
5000W All in one system	12AWG	4

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

1. The open circuit voltage (Voc) of the PV module shall not exceed the maximum open circuit voltage of the PV array.
2. Open circuit Voltage (Voc) of PV modules should be higher than start-up voltage.

MODEL	5000W All in one system
Max. PV Array Open Circuit Voltage	500Vdc
Start-up Voltage	150Vdc
PV Array MPPT Voltage Range	120Vdc-450Vdc



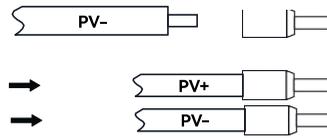
WARNING!

Please do not connect any DC switches or AC/DC circuit breakers before completing the electrical connections.

Please follow below steps to implement PV module connection:

1. Before making PV connection, be sure to open DC circuit breaker first.
2. Remove 12mm insulation sleeve from the head of cables, shorten the conductor part to 10 mm. Insert the cable into the tubular terminal. Then use terminal crimping tool make the terminal and cable connected tightly.





3. Insert PV cables according to polarities indicated on terminal block and tighten the terminal screws.

+ → PV+ (red)

--→ PV- (black)

4. Make sure the cables are securely connected

4. Operation

4.1 Power ON/OFF

Once the system has been properly installed and the batteries are connected well, simply press ON/OFF switch (located on the middle of the case) to turn on the system.

4.2 Operation and Display Panel

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

LED Indicator		Status	
a AC	Status indicator (Green)	Solid On	The grid power connection is normal and system enters the grid power operation mode.
		Flashing	The grid connection is abnormal, but system has not entered grid power operation mode.
		Off	The grid power is abnormal.
b Inverter	Invert indicator (Yellow)	Solid On	Output is powered by battery or PV in battery mode.
		Off	Other states.
c Charging	Charging indicator (Yellow)	Solid On	The battery is charging normally
		Flashing	The battery charging voltage is not stable
		Off	Other states.
D Fault	Fault indicator (Red)	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.
		Off	The inverter is working properly.



ESC



UP



DOWN

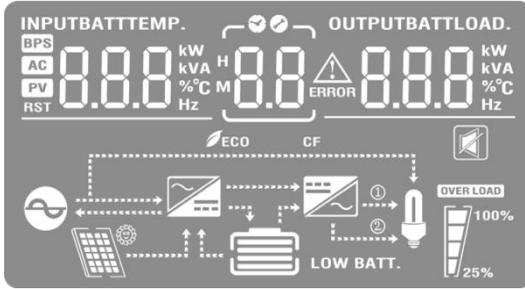


ENTER

Function Buttons

Button	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

4.2.1 LCD Display Icons



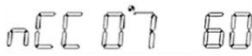
Icon	Description
AC Input Information	
	AC input icon.
	Indicate AC input power, AC input voltage, AC input frequency, AC input current.
PV Input Information	
	PV input icon.
	Indicate PV power, PV voltage, PV current, etc.
Output Information	
	Inverter icon.
	Indicate output voltage, output current, output frequency, inverter temperature.
Load Information	
	Load icon.
	Indicate power of load, power percentage of load.
	Indicate overload happened.
Battery Information	
	Indicate battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
	Indicate battery voltage, battery percentage, battery current.
Other Information	
	Indicate alarm code or fault code.
	Indicate a fault is happening.
	Indicate the alarm is disabled.
	Indicate power saving mode.

4.2.2 LCD Setting

After pressing and holding ENTER button for 2 seconds, the system will enter setting mode. Press "UP" or "DOWN" button to select setting programs. Then press "ENTER" button to confirm the selection or ESC button to exit.

Program	Description	Setting Option	
01	Output voltage	OPV 01 230.	
		230V (default) Adjustable/settable value: 208V, 220V, 230V, 240V	
02	Output frequency	OPF 02 50.	
		50Hz(default) Adjustable/settable frequency: 50Hz, 60Hz	
03	Output source priority	Solar first	OPP 03 PV
		<p>Solar energy provides power to the loads first. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, Grid will supply power to the loads at the same time. The extra power will charge the battery. If solar energy and grid are not sufficient for the load, battery will supply power to the loads at the same time. If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.</p>	
		Grid first (default)	OPP 03 G-d

		<p>Grid provides power to the loads first. Solar power will charge the battery.</p> <p>If solar is not sufficient to charge battery, grid will charge the battery at the same time.</p> <p>If grid is not sufficient to power all connected loads, solar energy will supply power to the loads at the same time.</p> <p>If solar energy and grid are not sufficient, battery will supply power to the loads at same time.</p> <p>If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.</p>	
03	Output source priority	PBG priority	OPP 03 PBG
		<p>Solar energy provides power to the loads first.</p> <p>If solar energy is sufficient, battery will be charged with solar energy.</p> <p>If solar energy is not sufficient to power all connected loads, battery will supply power to the loads at the same time.</p> <p>If solar energy and battery are not sufficient, grid will supply power to the loads at the same time.</p> <p>If solar, grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.</p>	
04	Output mode	APP: Appliance (default)	o0d 04 APP
		Applied to household appliances	
		UPS	o0d 04 UPS
		Applied to computer and other devices. Typical switching time is 10ms.	
05	Chargersource priority	PNG: PV and Grid (default)	CHP 05 PNG
		OPV: Only PV	CHP 05 OPU
		GRD: Grid first	CHP 05 G+d
		PV: PV first	CHP 05 PU

		There are four options for charging priority. The default is PNG (PV and Grid). PV and Grid are charged at the same time;. The second is OPV (Only PV). Only PV charge. The third is GRD (Grid). Grid charging takes priority. The fourth is PV. PV gives priority to charging.	
06	Grid charging current	 30A(default) Setting range is [2, 80A]	
07	Maximum charging current	 Set Max total charging current for solar and grid chargers. The default is 60A. Available options: 2/10/20/30/40/50/60/70/80A	
08	Menu Default Setting	 page setting: Set to ON. If the current page is not on the first page and no action after 1 minute, the system will return to display the first page. Set to OFF. If the current page is not on the first page and no operation after 1 minute, the system will stay on the current page.	
09	Auto restart when overload occurs	The default is ON.	

10	Auto restart when over temperature occurs	The default is ON.	
11	Main input cut warning	<p>Enable/Disable grid or PV loss alarm.</p> <p>The default setting is ON. If the grid input detected as lost connection, the buzzer will sound for 3 seconds. when set to OFF, after the grid input is lost, the buzzer will not sound.</p>	
12	Energy-saving mode	<p>The default setting is OFF. When set to ON, in battery mode, if the load is lower than 50W, the system will stop output for a period then resume. If the load is still lower than 50W, the system will do the loop back. Once the load is higher than 100W, the system will resume its normal output.</p>	
13	Overload transfer to bypass mode	<p>The default setting is OFF. When set to ON, in the case of PV priority output, if there is an overload, the system will immediately transfer to bypass mode (grid power output, also known as bypass mode).</p>	

14	Silent mode setting	nbt 14 OFF	
		<p>Enable/disable buzzer sound. The default setting is OFF. When set to ON, in any situation such as alarms or faults, the buzzer will not sound. This setting can be applied to all modes .</p>	
15	Battery to grid cutoff voltage point	btg 15 460	
		<p>When the battery is set to the CUS (Customer Setting Type) mode. The adjustable range is [44V, 52V]. .</p>	
		<p>When the battery is set to the AGM (Lead Acid Battery) or FLD (Flooded Battery) mode. The default setting is 46V, and it can be adjusted within a range of [44, 52V].</p>	
		<p>When the battery is set to the LIB (Lithium Battery) mode. The default is 47.6V, and it can be adjusted within a range of [40, 50V].</p>	
16	Grid to battery cutoff voltage points Switching back to battery mode	btb 16 520	
		<p>When the battery is set to CUS (Customer Set) mode, The default setting is 52V, The voltage range is [48, 58V].</p>	
		<p>When the battery is set to AGM (Lead Acid Battery) or FLD (Flooded) mode, The default is 52V. It can be adjusted within a range of [48, 58V].</p>	
		<p>When the battery is set to LIB (Lithium Battery) mode, The default setting is 54.4V. It can be adjusted within a range of [46, 58V].</p>	
17	Battery type	AGM(default)	bat 17 AGM
		Flooded	bat 17 FLD
		Lithium	bat 17 LIB
		User-Defined	bat 17 CUS

18	Battery low voltage point	<p style="text-align: center;">BAL 18 440</p> <p>It is not possible to set the battery definition mode to AGM or FLD mode. The initial default setting is 44V. When the battery type is set to CUS, the adjustable range for the battery voltage is [42, 54V].</p> <p>Battery low voltage alarm setting. When the battery type is set to LIB, the default setting is 47.6V. The adjustable range for the voltage is [41.2, 50V].</p>
19	Battery shutdown voltage point	<p style="text-align: center;">BAU 19 420</p> <p>The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting is 42V. When the battery type is set to CUS, the default setting is 42V. The adjustable range for the voltage is [40, 48V].</p> <p>When the battery type is set to LIB, the battery shutdown point can be modified. The default setting is 46V, and the adjustable range is [40, 48V].</p>
20	Constant voltage mode voltage point setting	<p style="text-align: center;">BCV 20 56.4</p> <p>When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured separately. The default setting for AGM mode is 56.4V, for FLD mode is 58V.</p> <p>When the battery type is CUS, It can be set within the range of [48, 60V] for the constant voltage charging set point. It is important to note that the constant voltage set point voltage needs to be higher than the float charge voltage setting point.</p> <p>When the battery type is set to LIB, the default constant voltage charging set point is 56.4V, and it can be adjusted within the range of [48, 60V]. It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.</p>
21	Floating charge mode voltage point setting	<p style="text-align: center;">BFL 21 54</p> <p>When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured separately. The default setting for AGM/FLD mode is 54V. When the battery type is CUS, It can be set within the range of [48, 60V] for the floating charging voltage set point. If the battery type is LIB, the default setting for the floating charging point is 55.2V. The setting range is between 50V and 58V. It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.</p>

22	Grid low voltage point setting	LLV 22 154
		<p>If output mode is APP, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V.</p> <p>If output mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.</p>
23	Grid high voltage point setting	LHV 23 264
		<p>If output mode is APP, Grid high voltage point can be set within a range of 264V to 280V. The default setting is 264V.</p> <p>If output mode is UPS, Grid high voltage point is set as 264V.</p>
24	Low power discharge sleep time setting	Lvd 24 8
		<p>When in battery mode and operating under a low power load, unrestricted discharge for an extended period can deplete the battery, affecting its lifespan. When the inverter reaches the set low power discharge sleep time, the low voltage shutdown point will be raised to 44V. The default low power discharge time is 8 (8 hours), adjustable range [1, 8]. In inverter mode, the low power discharge sleep time setting, the default is 8(8 hours), the setting range is [1, 8].</p> <p>In battery mode, after the continuous discharge time exceeds 8 hours and the battery cutoff point has not been reached, the battery cutoff voltage point will be change to 44V, and the system will alarm for 1 minute when the battery reaches 44V. Then shut down again. When the battery voltage exceeds 52.8V exceeds 30s, the battery discharge sleep time will be reset..</p>
25	Inverter soft start setting	STE 25 OFF
		<p>Default setting is OFF.</p> <p>If it set to ON, the inverter output gradually increases from 0 to the target voltage value. If OFF, the inverter output directly increases from 0 to the target voltage value.</p> <p>Setting Condition: It can be set in single-machine operation mode.</p>

26	Reset factory setting	<p style="text-align: center;">Std 26 OFF</p> <p>Restore all settings to factory default values.</p> <p>Before the setting, this interface is displayed as OFF. When set to ON, the system will restore to default settings. After the setting is completed, this interface will display OFF again.</p> <p>The setting can be applied immediately in grid and standby modes, but cannot be set during battery mode.</p>
27	Parallel mode setting	<p style="text-align: center;">PAR 27 SIG</p> <p>Set the parallel operation mode.</p> <p>It can be set in grid mode and standby mode (StandBy: no output but screen is on), but cannot be set in battery mode. Other models cannot be set.</p> <p>The default setting is SIG (single mode), which can be set to PAR (parallel mode) single-phase parallel operation mode, 3P1 (R phase mode), 3P2 (S phase mode), 3P3 (T phase mode).</p> <p>When using the parallel operation function, first make sure the parallel system connection is correct, and then set the parallel operation mode of each system separately. If there is a machine set to SIG in the parallel system, it will report a fault 24. If there are machines set to 3P1, 3P2, and 3P3 in the parallel system, all machines must be set to one of these three modes, and at least one machine must be set for each mode. Otherwise, all machines set to these three modes will report a fault 24.</p>
28	Battery Disconnection Alarm	<p style="text-align: center;">SbA 28 OFF</p> <p>Enable/Disable battery disconnection alarm.</p> <p>Default setting is OFF. When set to OFF, there will be no battery disconnection, low battery voltage, or battery under voltage alarms when the battery is disconnected.</p>
29	Battery Equalization Mode	<p style="text-align: center;">Eqn 29 OFF</p> <p>Enable/Disable Battery equalization.</p> <p>Default setting is OFF. If it is set to ON, the controller will start to enter the equalization phase when the set equalization interval (battery equalization period) is reached during the float charging stage, or the equalization is activated immediately.</p>

30	Equalization Voltage Point Setting	<p style="text-align: center;">E94 30 58.4</p> <p>The default setting is 58.4, with a configurable range of [48, 60V].</p>
31	Equalization Charging Time Setting	<p style="text-align: center;">E9E 31 60</p> <p>During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization timer is reached. The default setting is 60 minutes, with a configurable range of [5, 900], setting interval is 5 min.</p>
32	Equalization Delay Time Setting	<p style="text-align: center;">E90 32 120</p> <p>During the equalization stage, if the battery equalization time expires and the battery voltage has not risen to the battery equalization voltage point, the charging controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization delay setting is completed and the battery voltage is still below the battery equalization voltage, the charging controller will stop equalization and return to the floating stage. The default setting is 120 minutes, with a configurable range of [5, 900], setting interval is 5 min.</p>
33	Equalization Interval Time Setting	<p style="text-align: center;">E91 33 30d</p> <p>When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (small equalization period) is reached. The default setting is 30 days, the settable range is [1,90], setting interval is 1 day</p>
34	Enable Equalization Immediately	<p style="text-align: center;">E97 34 OFF</p> <p>The default setting is OFF, the function is not turned on; when it is set to ON, and system is in the float charging stage and the battery connection is detected. The balance charging mode will activated immediately, and the controller will start to enter the equalization stage.</p>

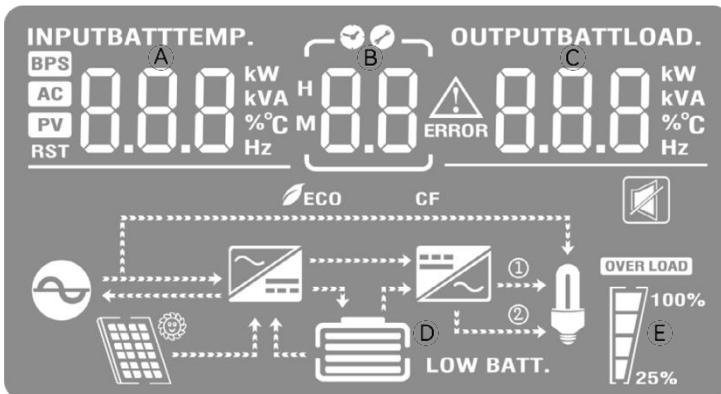
35	On-grid inverter function	<p style="text-align: center;">CH 35 OFF</p> <p>Set whether the inverter should feed power to the grid in PV priority grid mode or PBG grid mode. The default setting is OFF, and the function is not enabled. When set to ON, the inverter tracks the maximum power point, and the excess energy is fed into the grid. After the function is turned on, if a communication abnormality occurs, an alarm 56 is generated, and the inverter no longer determines the operation logic according to the BMS information.</p>
36	Battery dual output low voltage shutdown point	<p style="text-align: center;">dbv 36 58.4</p> <p>When enabled, the secondary output of the system is enabled by default. In battery mode, when the battery voltage drops below the set point, the secondary output is turned off. When the battery voltage rises above the set value plus 1V per additional battery cell, the secondary output is turned on. The default setting of 48V, with a configurable range of [44, 60]V. When the set point is higher than the constant voltage charging (CV) point - 1V per cell, the recovery voltage is set to the constant voltage charging point.</p>
37	Battery dual output duration	<p style="text-align: center;">dbt 37 OFF</p> <p>When enabled, the secondary output of the system is enabled by default. In battery mode, when the battery discharge time reaches the set point, the secondary output is turned off. Default setting is OFF, the function is not enabled. The configurable range is [5,890] in minutes. When set to FUL, the secondary output has unlimited output time.</p>
38	BMS Communication Function	<p style="text-align: center;">bn5 38 OFF</p> <p>Enable/Disable lithium battery communicates with inverter. Default setting is OFF, if a communication abnormality occurs, alarm 56 is generated and the inverter no longer operates based on the BMS information.</p>

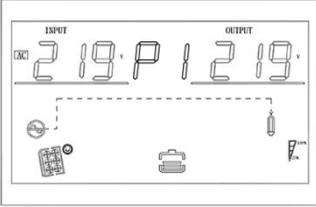
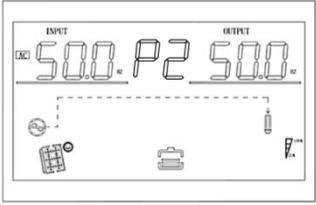
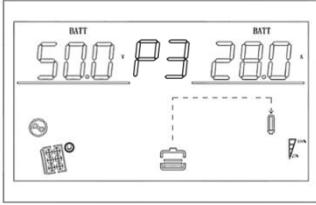
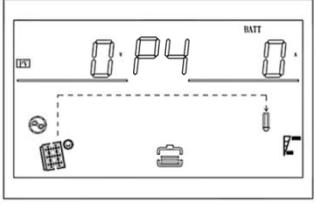
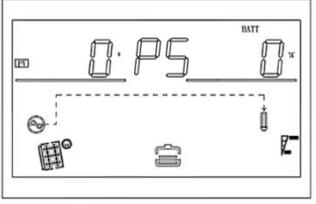
39	Low SOC Shutdown	<div style="text-align: center; font-family: monospace; font-size: 24px; margin-bottom: 10px;">b5U 39 OFF</div> <p>Set the inverter to shut down when the State of Charge (SOC) of the battery is low. Default setting is 20, with a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68. The alarm 68 is cleared when the SOC returns to the set value + 5%. In standby mode, the inverter can switch to battery mode only when the SOC reaches the set value + 10%. If it does not reach this threshold, alarm 69 is generated. Once the function is enabled, alarm 69 is triggered when the lithium battery SOC reaches the set value + 5%, and it is cleared when it returns to the set value + 10%. It can be set to OFF, in which case the inverter no longer performs shutdown, startup, or alarm operations based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.</p>
40	High SOC to Battery	<div style="text-align: center; font-family: monospace; font-size: 24px; margin-bottom: 10px;">5t6 40 OFF</div> <p>Set the SOC value for the inverter to switch to battery mode. Default setting is 95, with a configurable range of [10, 100]. In PBG priority mode, when the lithium battery SOC reaches the set value in grid mode, the inverter switches to battery mode. Once enabled, the inverter will only switch to battery mode when the SOC is above the set point and the battery voltage is higher than the voltage point to switch back to battery mode It can be set to OFF, in which case the inverter no longer switches from grid mode to battery mode based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.</p>

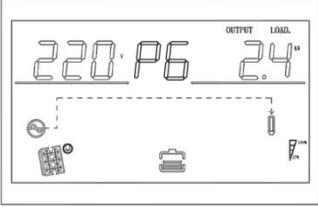
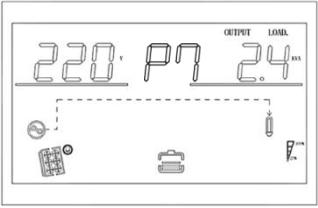
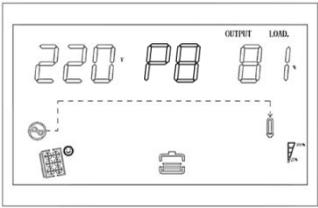
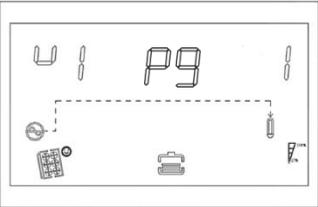
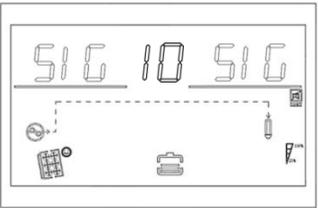
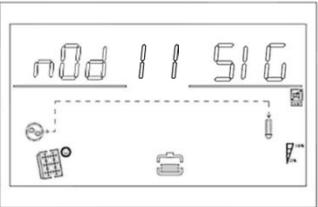
<p>41</p> <p>Low SOC to Grid</p>	
	<p>Set the SOC value for the inverter to switch to grid mode. The default setting is 50, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enabled, the inverter will switch to grid mode when the SOC is below the set point or the battery voltage is lower than the voltage point to switch back to grid mode.</p> <p>It can be set to OFF, in which case the inverter no longer switches from battery mode to grid mode based on the SOC condition.</p> <p>Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.</p> <p>When this setting is higher than the STB point, STB and STG will no longer take effect after the next activation.</p>

4.3 Display Information

The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: voltage, frequency, current, power, firmware version.



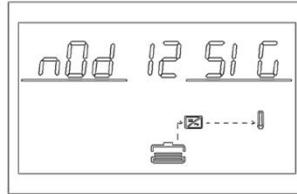
Information	LCD display
<ul style="list-style-type: none"> Ⓐ AC Input voltage Ⓑ Alarm or Fault code (Default Display Screen) Ⓒ Output voltage Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ AC Input frequency Ⓑ Alarm or Fault code Ⓒ Output frequency Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ Battery voltage Ⓑ Alarm or Fault code Ⓒ Output current Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ PV voltage Ⓑ Alarm or Fault code Ⓒ PV charging current Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ PV voltage Ⓑ Alarm or Fault code Ⓒ PV power Ⓓ Battery capacity Ⓔ Load percentage 	

<ul style="list-style-type: none"> Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ active power output Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ complex power output Ⓓ Battery capacity Ⓔ Load percentage 	
<ul style="list-style-type: none"> Ⓐ Output voltage Ⓑ Alarm or Fault code Ⓒ load percentage Ⓓ Battery capacity Ⓔ Load percentage 	
<p>Display software version</p>	
<p>Display photovoltaic power generation</p>	
<p>parallel operation status display photovoltaic power generation</p>	

After enabling BMS, the following pages are available

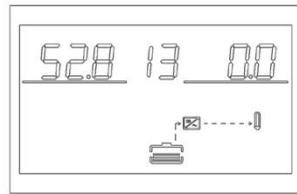
Network status of lithium battery

When the upper right display shows SIG constant, the battery pack is operating as a single mode; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple groups in series and parallel



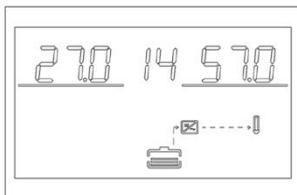
Lithium battery voltage and current information;

The upper left displays BMS battery voltage information; The upper right displays BMS battery current information. When BMS communication fails, both the upper left and upper right displays will flash ERR

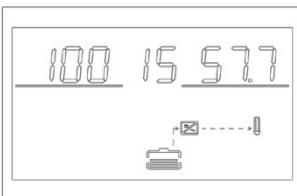


Lithium battery temperature and SOC;

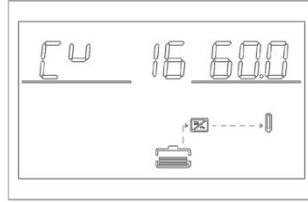
The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR



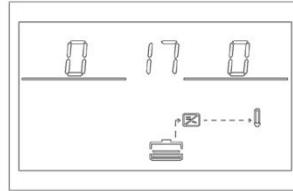
Lithium battery capacity; The upper left displays rated capacity; The upper right displays current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR



Lithium battery constant voltage point; The upper left displays the fixed letter CV; The upper right displays the fixed letter CV; The upper right displays the BMS constant voltage charging point. When BMS communication fails, the upper right display will flash ERR



Lithium battery fault alarm information; The upper left displays BMS alarm information; The upper right displays BMS alarm information. When BMS communication fails, both the upper left and upper right displays will flash ERR



5.Parallel Installation Guide

The all in one system can be used in parallel with two different operation modes.

1. Parallel operation in single phase with up to 9 units.
2. Maximum 9 units work together to support 3-phase equipment.

Check the installation instructions from above sections. Be sure to save enough clearance between every 2 unit. For AC/DC breaker/disconnector, please check the recommended size from corresponding section and how many units of inverter mounted, then selected proper model of breaker/disconnector.



WARNING!

Do not connect the same PV string to multiple unit, as this may cause damage to the inverters. Each inverter must be connected separately to different PV.



CAUTION!

To avoid overload, it is best to run the whole system properly before closing the circuit breaker on the load side.



CAUTION!

To avoid overload, it is best to run the whole system properly before closing the circuit breaker on the load side.

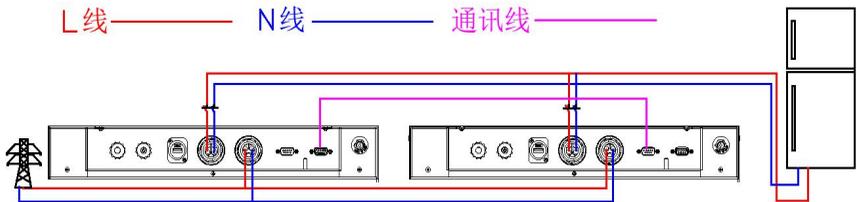
**CAUTION!**

There is a transition time in the power supply system, which may cause power outages for critical equipment that has high power requirements.

5.1 Parallel Cable Connection in Single Phase

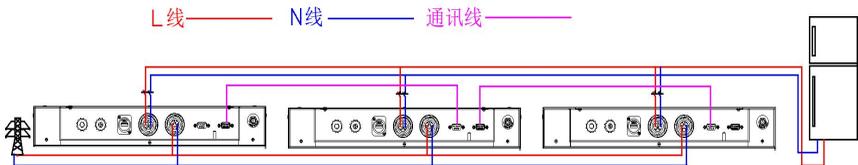
Two unit in parallel

System connection:



Three unit in parallel

System connection:

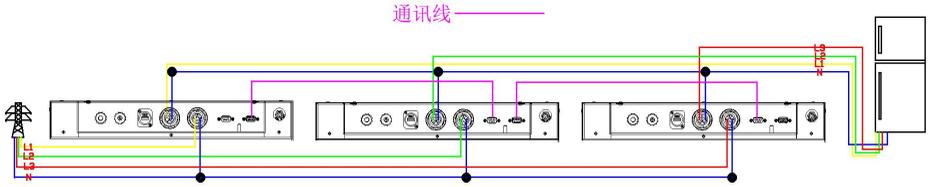


Multiple single-phase parallel connected systems can follow an extended wiring method from two single-phase parallel machines to three single-phase parallel motors.

5.2 Parallel Cable Connection in Three Phase

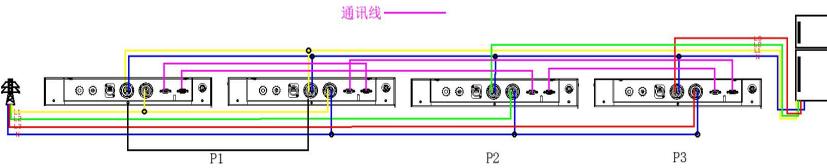
One unit per phase

System connection:



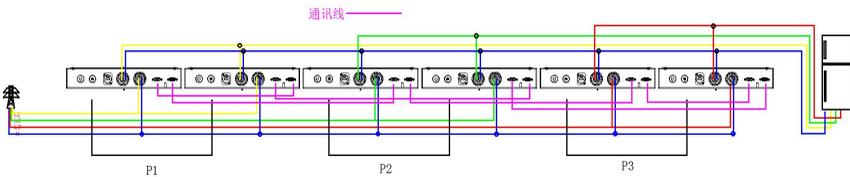
There is no difference in the connection method between single-phase and three-phase communication cables. Just connect the parallel interface of the inverters in series. Considering the length of the cable connection, we adopt the principle of connecting in series at the nearest place.

Two unit in first phase and only one unit in the other phase System connection:



Two unit in every phase

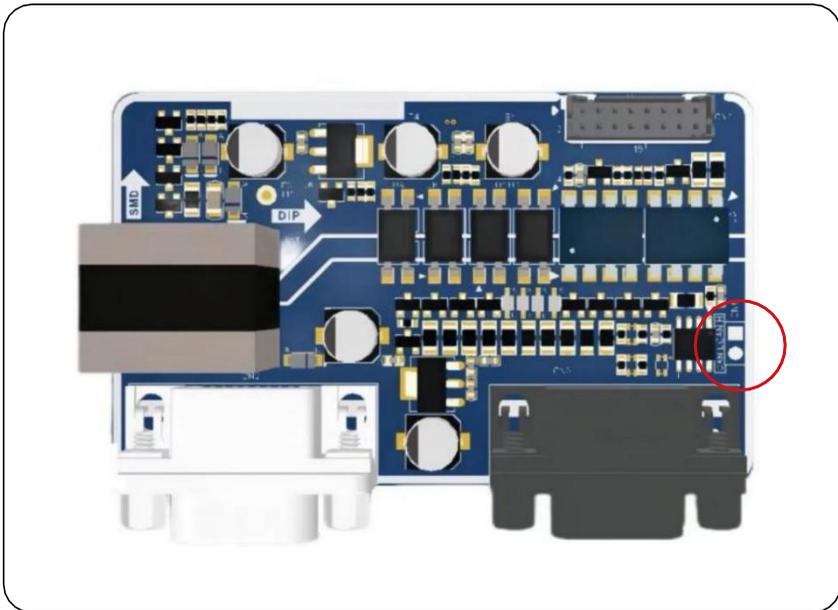
System connection:



5.3 System Setting for Parallel

**CAUTION!**

In each parallel system, select the two sets of machines with the **shortest** distance to interconnect the illustrated position with a jumper cap.



To perform the system setting, please refer to section 4.2.2 Mode 27 first. Single phase setting ;

Step 1: Before setting, please check if the wiring is correct. Ensure that all circuit breakers (PV, AC input, AC output battery breaker) are disconnected and that each neutral line of the inverter is connected together.

Step 2: Switch 'ON/OFF' switch to OFF on the bottom of the inverter. Make sure all inverters switched to OFF.

Step 3: Switch 'ON/OFF' switch to ON on inverter, wait until the LCD display is on. Then switch 'ON/OFF' switch to OFF.

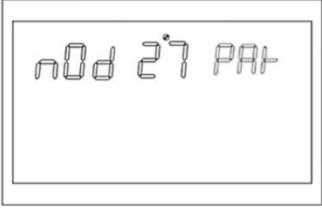
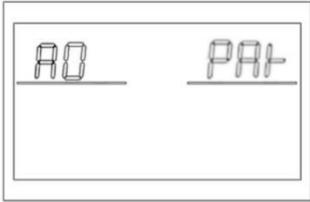
Step 4: Set "PAR" in program 27 on the LCD.

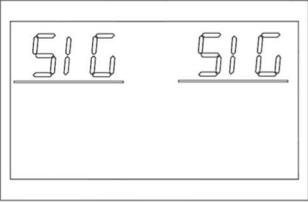
Step 5: Follow step 3&4 to set all the parallel inverter.

Step 6: Switch 'ON/OFF' switch to ON on inverter. then connect all the breakers.

Note:

1. When setting the LCD program, the ON/OFF switch must be OFF. Otherwise, it cannot be set up.
2. The master and slave devices are automatically assigned by the system. Typically, A0 stands for master device. S1 to S8 stands for the slave device.

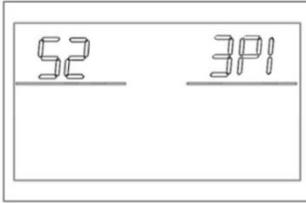
	<p>LCD setting interface single-phase parallel machine interface display</p>
	<p>Left corner: A0 or S1-S8 means parallel communication is success. Right corner: PAR means parallel setting for single phase is success.</p>

	<p>Left corner: SIG means parallel communication failed.</p> <p>Right corner: PAR means parallel setting for single phase is success.</p>
	<p>Left corner: SIG means parallel communication is failed.</p> <p>Right corner: SIG means parallel setting for single phase is failed.</p>

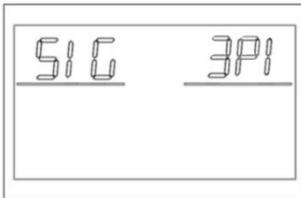
Three phase setting

Follow the steps of Single phase setting. The only difference is when set in mode 27, it should be 3P1 for first phase, 3P2 for second phase and 3P3 for third phase.

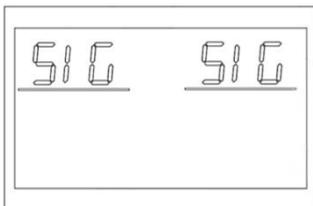
First-phase LCD is shown	Second-phase LCD is shown	Third-phase LCD is shown
		



Left corner: A0 or S1-S8 means parallel communication is success.
Right corner: 3P1/3P2/3P3 means parallel setting for three phase is success.



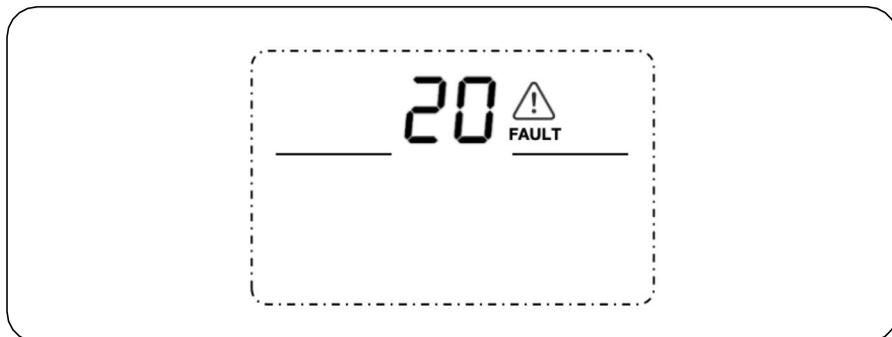
Left corner: SIG means parallel communication is failed.
Right corner: 3P1/3P2/3P3 means parallel setting for three phase is success.



Left corner: SIG means parallel communication is failed.
Right corner: SIG means parallel setting for three phase is failed.

6. Fault Reference Code

Fault display:



Function description: If alarm occurs, Fault indicator flashes and buzzer sounds every one second for 1 minute, then stop. If fault occurs, the fault indicator is always on, the buzzer sounds 10 seconds then stops. System will try to restart automatically. If the machine does not work after six times' restart, the machine and LCD display will always in the fault status. You need to completely power off (off the screen) or wait for 30 minutes to restart the machine. The fault LCD display is shown in the figure above. In fault mode fault icon is bright, in alarm state alarm icon is flashing, and contact the manufacturer to troubleshoot the abnormal situation according to the fault information.

Fault: The system enters fault mode, with a constant red LED light and LCD displaying a fault code.

Fault code sheet

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
1	Bus soft boost start failed	Turn fault mode	Bus voltage does not reach set value for more than 30 seconds.	Cannot restore.	Fault

2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Cannot restore.	Fault
3	Main power under voltage	Turn fault mode	System voltage is below the under voltage protection point.	Cannot restore.	Fault

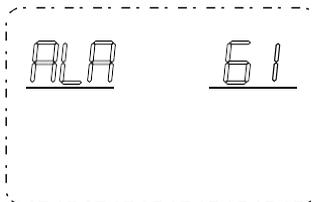
Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
4	Battery over current	Turn fault mode	TZ interrupt triggered more than 2 times within 2ms.	Cannot restore.	Fault
5	Over temperature	Turn fault mode	The PFC temperature exceeds the protection threshold. Fan stuck for more than 5 minutes.	Tried to restart six times, if failed, cannot restore.	Fault
7	Bus soft start fault	Turn fault mode	Turn fault mode. The soft start process has exceeded but the bus voltage has not reached set value.	Cannot restore.	Fault
8	Bus short circuit	Turn fault mode	Inverter on or PFC on, bus voltage below threshold.	Cannot restore.	Fault
9	Inverter soft start fault	Turn fault mode	The bus voltage is higher than protection point, or the DC component is greater than 20V. or the inverter is not completed within 5 minutes.	Cannot restore.	Fault
10	INV over voltage	Turn fault mode	The inverter voltage is higher than the set value [276V].	Cannot restore.	Fault
11	INV under voltage	Turn fault mode	Battery mode and there is no short circuit in the inverter, the inverter voltage is lower than 160V.	Cannot restore.	Fault

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
12	INV short circuit	Turn fault mode	In battery mode or Standby mode, if the inverter voltage is lower, current is greater than set value.	Tried to restart six times, if failed, cannot restore.	Fault
13	Negative power protection	Turn fault mode	In battery mode, the load power is lower than set value(negative power, such as -1200W).	Cannot restore.	Fault
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	Tried to restart six times, if failed, cannot restore.	Fault
15	Model fault	Turn fault mode	Cannot match any model in model number detection.	Cannot restore. Check whether the control board is assembled incorrectly or whether the program is burned incorrectly.	Fault
16	No boot loader	Turn to fault mode	No boot loader.	Cannot restore. Try to send command 1911000000000000.	Fault
17	Program updating	Turn fault mode	Inverter receive updating task.	Restore after updating.	Fault
19	Same SN	Turn fault mode	Same series number in parallel.	Cannot restore.	Fault
20	communication fault	Turn fault mode	Wrong number of slave machine.	Cannot restore.	Fault
21	Large voltage difference between the parallel battery	Turn fault mode	The voltage difference of the parallel battery is too large.	Cannot restore.	Fault

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
22	Voltage difference of the parallel inverter	Turn fault mode	The difference in mains voltage exceeds set value between parallel inverter.	Cannot restore.	Fault
23	Frequency difference of the parallel inverter	Turn fault mode	The difference in mains frequency exceeds set value between parallel inverter.	Cannot restore.	Fault
24	Parallel configuration difference	Turn fault mode	The local inverter is single mode, but there is a parallel machine on the bus.	Restore after set to single machine operation and disconnect parallel communication, or parallel operation condition recover.	Fault
25	Parallel disconnection	Turn fault mode	Synchronization signal lost.	Cannot restore	Fault
26	BMS fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery.	Fault
29	Inverter over current	Turn fault mode	Instantaneous current of inverter is higher than set value.	Tried to restart six times, if failed, cannot restore.	Fault

7. Alarm Reference Code

Alarm: the system does not enter the fault mode, LED red light flashing, LCD displays the Alarm code.



Alarm code sheet

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
50	Battery opened	Alarm, battery does not charge.	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
51	Battery low voltage shutdown	Alarm, battery low voltage shutdown or cannot power on.	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
52	Battery low voltage	Alarm	Battery voltage is below set point.	Restore after battery voltage recover.	Alarm
53	Charger short circuit	Warning, battery does not charge.	The battery voltage is less than 5V and the charging current is greater than 4A.	Cannot restore.	Alarm
54	Low power discharge	Alarm	The battery voltage is higher than 52.8V and the discharge time exceeds the set low-power discharge time.	Restore after battery voltage recover.	Alarm
55	Battery over charge	Alarm, battery does not charge.	Battery voltage is higher than the set value.	Can restore.	Alarm
56	BMS disconnect	Alarm, lock standby mode.	No correct BMS communication response within 10 seconds.	Restore after communication recover.	Alarm
57	Over temperature	Alarm, battery does not charge.	The temperature of PFC or INV is higher than the set value.	Restore after temperature is under set value.	Alarm

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
58	Fan error	Alarm, if one fan fails and the other fan is running at full speed.	Fan speed is less than the set value.	Restore after fan recover.	Alarm
59	EEPROM error	Alarm	Numerical calibration error.	Restore after calibration right.	Alarm
60	Overload	Alarm, battery does not charge.	When not in mains mode or the PV is normal and the output priority is not mains priority, the load exceeds 102% and the duration is 200-220 ms.	Restore after load back to normal	Alarm
61	Abnormal generator waveform	Alarm, continuously operating in battery mode.	Generator waveform detection result is abnormal.	Can restore.	Alarm
62	Low PV power	Alarm, turn off PV output and charging.	When the battery is not connected, the bus voltage is lower than the set value.	Restore after 10mins.	Alarm
63	Synchronization signal fail	Alarm, turn fault mode.	Host or slave with host present, no synchronization signal restored within set value	Restore after signal recover.	Alarm
64	Parallel configuration incompatible	Alarm, turn standby mode.	When parallels with 3 phases, there is one phase loss setting.	Restore when three-phase setting is correct.	Alarm
65	Parallel version incompatible	Alarm, turn standby mode.	There is an incompatible version number in the parallel system.	Restore when all machine versions in the parallel system are compatible with each other.	Alarm

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions	Fault / Alarm
66	Parallel Communication Fault	Alarm, turn standby mode.	The slave machine cannot be detected in a parallel system.	Restore after detecting slave machine access or set to stand-alone mode to restore.	Alarm
67	Line difference of the parallel inverter	Alarm	The host determines that the difference between the local mains voltage and any slave mains voltage exceeds set value.	Cannot restore.	Alarm
68	SOC Low	Alarm, turn standby mode.	Lithium battery SOC is lower than the set value.	Restore after turning off the low SOC shutdown function, or turning off the BMS communication function, or when the SOC returns to the set value + 5%.	Alarm
69	SOC Low	Alarm, if it is in standby mode, it will remain in standby mode and not power on.	Lithium battery SOC is lower than the set value + 5% (mains mode or battery mode), lower than the set value + 10% (standby mode).	Restore after turning off the low SOC shutdown function, or turning off the BMS communication function, or when the SOC returns to the set value + 10%.	Alarm

8. Specifications

8.1 Cable Specifications

Model	Item	Value	Comments	
Input Voltage	Main topology	L + N + PE		
	Nominal voltage	220VAC	Settable: 208/220/230/240 Vac	
	Input Voltage Range	90-280Vac	Settable	
	Low input power lost	154Vac (default)	Settable: 90-154	Appliance mode
		185Vac (default)	Settable: 170-200	UPS mode
	Input Low Comeback	Low Loss voltage +9V		
	High input power lost	264Vac(default)	Settable:264-280	Appliance mode
		264Vac		UPS mode
Input High Comeback	High Loss voltage -9V			
Input Frequency	Nominal Frequency	50 / 60Hz		
	Frequency Range	40 / 70Hz		
	Freq. Low loss / compensation	40/43.5Hz@50Hz(UPS mode)		
		40/40.5HZ@50HZ(APP mode)		
	Freq. High loss / compensation	50/53.5Hz@60Hz(UPS mode)		
		50/50.5HZ@60HZ(APP mode)		
Input current	Max Current (RMS)	40A	40A	

Note: When the specification of the external circuit breaker is greater than 40A, the maximum input current is 40A.

When the external circuit breaker specification is less than 40A, the maximum input current depends on the external circuit breaker specification.

8.2 Battery Specifications

	Item	Value	Comments
Battery information	Lithium iron phosphate battery	16pcs	3.2V/PCS
	Nominal capacity	100AH	
	Battery type	VRLA/LI	
	Nominal Battery voltage	51.2V	@25°C
	Battery management	BMS	
Battery protection	Battery over Voltage	56.15V	
	Battery over voltage protection	58.4V	
	Battery over voltage recovery	54V	
	Battery over discharge warning	44.8V	
	Battery over discharge protection	43.2V	
	Battery over discharge recovery	46.4V	

8.3 Charger Specifications

	Item	Value	Comments
Charger(line mode)	Charging voltage	FV MODE: 54V Settable: 53.2~55.6V CV MODE: 56.4V Settable: 56~58V	
	Temperature Compensation	No	
	Charging Current	2~80A	Settable
	Default Charging Current	30A	
	Charging mode	Two/Three/Auto Settable	Two states: CC/Float
	Charge Voltage Accuracy	±5%	Calibrated by RS232
	Charger(PV)	PV Charging method	MPPT
PV Maximum Input Power		18A/6000W	
Efficiency		99.5% max	
Battery Voltage Accuracy		±0.3%	
PV Voltage Accuracy		±2V	
Input voltage range		120-450Vdc	
Max PV voltage		500Vdc	
Max PV charge current		80A	

Max charging current /		80A (Maximum) Default: 60A	Settable
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8.4 Output Specifications

	Item	Value	Comments
Output power rating	Output topology	L1+N1+L2+N2+PE	
	Output power	5000W	When setting the Output voltage to 208V, the Output Power rating will be reduced to 90%.
Output voltage	Nominal Voltage	208/220/230/240 VAC	Default 220V, manual set by RS232 or LCD
	Waveform	Sinusoidal	
	Voltage Regulation	±5%	
	DC offset	±100mV (Bat mode)	Empty load and linear load mode
Output frequency	Nominal Frequency	50 / 60Hz	50/60Hz auto selection (default on)
	Line Mode	50Hz: (43.5 - 56.5)Hz (UPS mode) (40 - 70)Hz (APP mode) 60Hz: (53.5 - 66.5)Hz (UPS mode) (40 - 70)Hz (APP mode)	
	Battery Mode	50 / 60Hz	
	Frequency regulation	0.1%	

Charger(PV)	102%<Load ≤110%	1 minute minimum, then alarm and turn off output	
	110%< Load ≤130%	10 seconds minimum, then alarm and turn off output	
	130%<Load ≤150%	3 seconds minimum, then alarm and turn off output	
	Load>150%	200 ms minimum, then alarm and turn off output	
Output short circuit protection	Battery mode	Current limitation	
	Line mode	Breaker (40A)	

8.5 Switch Time Specifications

	Item	Value	Comments
Switch time	Line Mode To Battery Mode	10ms(typical)	UPS mode
		10ms(typical)	other mode

8.6 Efficiency Specifications

	Item	Value	Comments
Efficiency	line Mode	>99.5%@3Kva >99.5%@5Kva	Full Running load, without battery connect.
	Battery Mode	>93.5%@1Kva >93.5%@3Kva >91.5%@5Kva	Full load.
	Standby power	<50W	0 load mode, battery disconnected.

9. Trouble Shooting

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 5	Over temperature	<p>1.PFC temperature exceeds the protection threshold [85°C when rotor released, 65°C when rotor locked] for more than 20 seconds.</p> <p>2.Fan locked exceeds 5 minutes.</p>	Please check if the fan is not connected or if there are loose wiring issues. If the fan is not connected for more than 5 minutes, the machine will report fault code 5.
LED screen display fault code 12	Inverter short circuit	In battery mode or standby mode, if the inverter voltage is lower than 100V and the inverter current is greater than 40A, it should respond within 80-100ms.	<p>1.Check if there is a short circuit at the output terminals (such as a screw piercing through the locking terminal causing a LN short circuit).</p> <p>2.Verify if the inverter voltage and inverter current meet the triggering conditions.</p>
LED screen display fault code 15	Model malfunction	The model number detection does not match any model number.	Check if the control board is assembled incorrectly or if the program is burned incorrectly.
LED screen display fault code 16	No boot program	The third digit of the communication is not 1.	Send command: TIDA1911000000000000

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 20	CAN communication error	In battery mode, if the battery mode is set to mains power mode and the parallel mode is set to mains power mode, the number of responses from the slave devices does not match the previously defined number of slave devices. Receiving communication from two or more devices with a slave number of 0 consecutively.	1. Check if the parallel mode is set but the machine is turned on in single machine mode. 2. Check if the parallel connection cable and the parallel board are connected according to the parallel SOP (Standard Operating Procedure).
LED screen display fault code 58	Fan malfunction	Any of the fans rotating less than 8 times within 2 seconds.	1. Check if the fan is not connected properly or if there are any loose connections. 2. If the fan is properly connected: a) Check if there is any issue with the fan detection circuit, usually caused by excessive soldering underneath the control board socket. b) Check if the fan itself is damaged.
Unable to start	Battery	Due to the need for a voltage of $\geq 11.5V/N$ to start the machine in battery mode, common reasons for failure to start include improper calibration or insufficient battery voltage.	1. Check if the battery voltage sampling is functioning properly and if the battery voltage has been calibrated. 2. Use a multi meter to measure the voltage at the battery terminals (using a DC power supply or a real battery) to see if it reaches the minimum voltage of 11.5V per cell for startup. Note: It is crucial to configure the battery voltage according to the machine model. Connecting the wrong battery voltage can cause capacitor explosion.

Problem	Fault Event	Trigger conditions	What to do
	Utility power		<ol style="list-style-type: none"> 1. Check for any short circuits at the mains terminal (such as a screw piercing through and causing a short circuit between the live and neutral terminals). 2. Check if there are any wiring errors, such as mistakenly connecting the mains input to the output terminals.
			<ol style="list-style-type: none"> 1. Check if the PV input voltage is too close to the critical threshold.
PV not charging			<ol style="list-style-type: none"> 1. For low voltage versions of the machine, check if the software version numbers of the main control is compatible. If the software versions differ significantly, the machine may not be activated. 2. Connecting the wrong battery voltage can result in damage to the auxiliary power supply on the PV side, causing a loss of power and inability to communicate with the main control.

10. Battery Maintenance.

10.1 Notes before using the inverter:

- 1) Please read and keep this manual carefully.
- 2) Please pay attention to all the warning labels on the battery, do not tear or damage the warning labels.
- 3) Check if the appearance of the lithium battery is intact, there is no obvious phenomenon such as breakage, liquid leakage, heat soak and smoke.
- 4) To ensure the safety of transportation, the lithium battery's power level is about 30% when it leaves the factory. Due to battery self-discharge during transportation and storage process, the battery level may be low or even zero when used for the first time. This is normal. Don't worry, just recharge according to the charging instructions.



- 5) In the case of low temperature, the available capacity of lithium battery will have different degrees of attenuation, the specific reference degree is:

The specific reference level is as follows: 70% of the available capacity at -10°C, 85% at 0°C, and 100% at 25°C.

If the battery has an odor, abnormal heat, deformation and other abnormalities, please stop using it immediately, stay away from the battery and contact the after-sales department.

**Warning:**

The battery is not a user-serviceable part. If any abnormality occurs, please contact the after-sales department for repair.

Disassembling the battery without permission will not be covered by the warranty and may cause the battery to generate heat, smoke, catch fire, or explode.

10.2 Charging environment:

- 1) Please charge the battery at ambient temperature $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$ and Humidity $\leq 60\%$, make sure there is no flammable material in the surrounding area and well-ventilated.
- 2) Charging time instructions, the battery charging time is not more than 12 hours, overcharging will affect the battery life, and there are security risks.
- 3) The capacity of the battery rises fast during the primary charging, and rises slow at the end, this is a program set for charging safety and is a normal situation.
- 4) When charging in winter, and the outdoor temperature is lower than -20°C , the battery will stop charging, this is a normal phenomenon, please place the battery under the appropriate ambient temperature for charging to ensure the charging effect.
- 5) During the charging process, the surface of the battery pack chassis will have a temperature rise effect, which is a normal phenomenon, please rest assured that the used, pay attention to avoid children touching.

10.3 Storage environment:

- 1) Due to the internal resistance of lithium battery itself when placing this inverter, there will be a certain self-consumption of battery power. Normally, there's power drop after placing for some time.
- 2) Please store the inverter in an ambient temperature of $-10^{\circ}\text{C} \sim 45^{\circ}\text{C}$, do not store the inverter in an environment higher than 50°C , it may cause the battery overheating, fire or functional failure, and shorten its life.

- 3) When the inverter is not used for a long period of time, please do regular maintenance and charging, otherwise it may lead to a complete depletion of battery power and irreversible damage.
- 4) The most suitable storage capacity of the battery is 30%, if less than 10% or more than 50% of the capacity for long-term storage will lead to irreversible capacity degradation of the battery.
- 5) Lithium battery safe storage of self-depletion protection mode, the technical standards are as follows:
 - * Long-term non-use, lithium batteries have a connection to the power equipment, and the safety period of up to 3 months, otherwise the battery may be over discharged and cannot be repaired.
 - * Long-term non-use, the power is not less than 30%, and it should be stored separately, a safety period of a maximum of 6 months, otherwise the battery may be over discharged and cannot be repaired.
- 6) Avoid storing the battery in a place where there is a risk of falling, which may cause uncontrollable damage to the battery and may lead to battery leakage, heat, smoke, fire, or explosion.
- 7) It is forbidden to use it in places with strong static electricity or strong magnetic fields, otherwise it will easily damage the BMS and bring potential safety problem.



Warning:

Battery under voltage causing by the improper usage above are not covered by the warranty.

10.4 Usage:

- 1) Please recharge the battery before using it for the first time, because of transportation reasons the battery storage capacity is less than 30%.
- 2) During later use, please keep the battery capacity is not less than 10%, and

timely charging, which can extend the battery cycle life.

3) During normal use, it is recommended to avoid long-term high-rate discharge and use the battery according to the battery specifications to extend the battery life.



Serious warning:

Avoid exposing the battery to rain or water, and never soak the battery in water. Internal short circuits may cause lithium batteries to explode and catch fire, and may also cause permanent battery failure.

11. Cautions

To prevent battery leakage, abnormal heating, fire, performance degradation, explosion and other accidents, please use the battery correctly according to the following specifications. We are not responsible for any accidents caused by failure to operate according to the provisions of this manual.

- 1) Hold and place the battery gently to avoid violent vibration!
- 2) Do not immerse the battery and its accessories in water or other liquids, and pay attention to moisture !
- 3) Prohibit the disassembly of the battery. Disassembling the battery may cause an internal short circuit, internal material decomposition, fire, explosion, etc. We are not responsible for any losses caused by users dismantling the equipment without authorization!
- 4) If the battery is damaged, deformed, leaking electrolyte or smelling strange odor and other abnormal phenomena, do not use the battery again; please send it to the manufacturer's authorized office or the relevant agencies for proper disposal. In addition, the battery-leaking electrolyte should be kept away from fire sources to avoid causing an explosion!
- 5) Prohibit the combination of different capacities, models, and varieties of batteries!
- 6) This product must be properly grounded before use to ensure your safety!