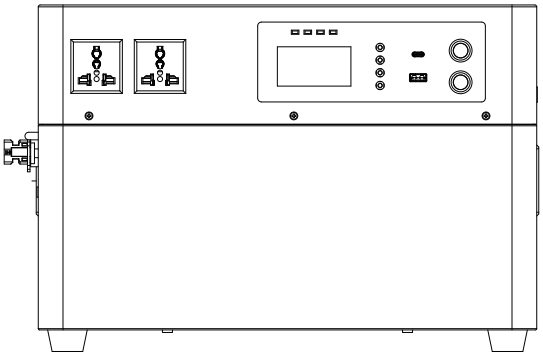
ALL-IN-ONE Energy Storage System

User Manual

LE1800-A



Thank you for choosing our company's product. In order to better experience the convenience and value that the product brings to you, please read this booklet carefully before using this product!

PREFACE

Summary:

This document mainly introduces the product introduction, application scenario, installation, commissioning, system maintenance and technical data of wall mounted household energy storage battery and battery expansion module.

Reader object:

This document is mainly applicable to the following Engineers:
- Marketing Engineer
- System Engineer
- Technical support engineer

Symbolic Convention:

The following symbols may appear in this article, and they represent the following meanings:

Symbol	Explanation
DANGER	Indicates a hazard with high risk that will lead to death or serious injury if not avoided.
Warning	Indicates a hazard with medium risk that may lead to death or serious injury if not avoided.
Attention	Indicates a hazard with low-level risk that may cause slight or moderate injury if not avoided.
Notice	It is used to transmit equipment or environmental safety warning information. If not avoided, it may lead to equipment damage, data loss, equipment performance degradation or other unpredictable results. The "instructions" do not involve personal injury.
Explanation	Indicates a hazard with high risk that will lead to death or serious injury if not avoided.

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1. Information of this volume

This manual introduces the assembly, installation, operation, and troubleshooting of this machine. Please read this manual carefully before installation and operation. Please keep this booklet properly for future reference.

1.1 Range

This manual provides safety and installation guidelines, as well as information about tools and wiring.

1.2 Target group

This document is applicable to qualified employees and end users, and tasks that do not require any specific qualifications can also be performed by end users. Qualified personnel must possess the following skills:

1. Understand the working principle and operating methods of inverters.
2. Received training on how to handle the hazards and risks associated with the installation and use of electrical equipment and installation
3. Training on the installation and commissioning of electrical equipment and installation.
4. Understand applicable standards and directives.
5. Understand and comply with this document and all safety information.

1.3 Safety instructions

1. Before using this machine, please read all instructions and warning labels on the machine manual, as well as all relevant chapters of this manual. Our company has the right not to provide quality assurance. Failure to follow the instructions in this manual during installation may result in equipment damage.

2. Please choose which battery system is needed (lithium battery system or lead-acid battery system). If the wrong system is selected, the energy storage system will not function properly.

3. Do not disassemble this machine. When maintenance or repair is required, please send it to a qualified service center. Incorrect reassembly may lead to a risk of electric shock or fire.

4. All operations and connections must be carried out by professional electrical or mechanical engineers, and all electrical installations must comply with local electrical safety standards.

5. Attention: In order to reduce the risk of injury, only deep cycle lead-acid rechargeable batteries and lithium batteries can be charged. Other types of batteries may burst, causing personal injury and damage.

6. To reduce the risk of electric shock, please disconnect all electrical wires before performing any maintenance or cleaning. Turning off the power supply does not reduce the risk of electric shock.

7. In order to ensure the optimal operation of this inverter/charger, please select the appropriate cable size according to the required specifications. It is very important to operate this inverter/charger correctly.

8. Grounding Instructions - This inverter should be connected to a permanently grounded wiring system. When installing this inverter, be sure to comply with local requirements and regulations.

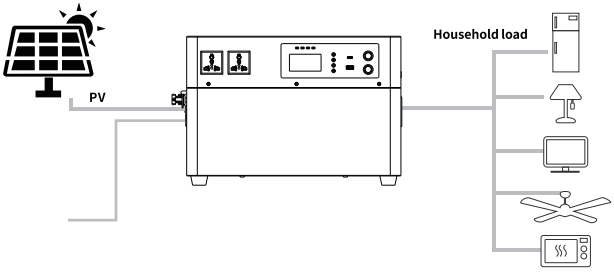
9. It is strictly prohibited to cause short circuits between AC output and DC transmission. When the DC transmission line is short circuited, it is strictly prohibited to connect to the mains.

10. Please do not install the machine in harsh environments such as outdoor, damp, greasy, flammable, explosive, or dust accumulation.

11. Warning!! Only qualified maintenance personnel can repair this equipment. If the fault persists after troubleshooting according to the troubleshooting table, please return the inverter/charger to your local dealer or service center for repair.

12. The polarity of the battery output terminal of this product is prohibited from being reversed, as it may damage the equipment or cause unpredictable hazards. Before operation, please confirm that the inverter has been fully assembled.

1.4 Application Introduction



Energy storage system

The photovoltaic energy storage inverter is a new type of hybrid solar energy storage inverter control system (off grid energy storage inverter) that integrates solar energy storage and mains charging energy storage, DC output, and AC sine wave output. It adopts DSP control and advanced control algorithms, with high response speed, high reliability, and high industrial standards. There are four charging modes to choose from: solar, mains priority, solar priority, and mains & solar; This product integrates solar charging controllers, system controllers, inverters, lithium batteries, USB fast charging, Type-C PD3.0, and a battery management system. It stores clean and environmentally friendly solar energy in the battery, which can be used for home lighting, computers, low-power household appliances, mobile phone charging, etc. in indoor power outages or outdoor situations. This system has the advantages of stable performance, safety and reliability, and convenient use.

The solar charging module adopts the latest optimized MPPT tracking technology, which can quickly track the maximum power point of the photovoltaic array in any environment and obtain the maximum energy of the solar panel in real time.

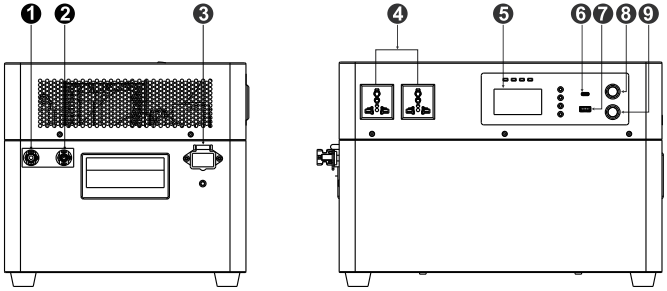
The AC-DC charging module adopts advanced control algorithms to achieve fully digital voltage and current dual closed-loop control, with high control accuracy and small size. The AC voltage input range is wide, and the input/output protection functions are complete, ensuring stable and reliable charging and protection of the battery.

The DC-AC inverter module is based on fully digital intelligent design and adopts advanced SPWM technology to output pure sine waves, converting direct current into alternating current. It is suitable for AC loads such as household appliances, electric tools, industrial equipment, electronic audio and video, etc. The product adopts a segmented LCD screen display design, which real-time displays the operating data and status of the system. Comprehensive electronic protection functions ensure that the entire system is safer and more stable.

1.5 Product Features

1. Adopting fully digital voltage and current dual closed-loop control, advanced SPWM technology, and outputting pure sine wave.
2. There are four charging modes to choose from: solar only, mains priority, solar priority, and hybrid charging.
3. Advanced MPPT technology with a tracking efficiency of up to 99.9%.
4. LCD screen design, dynamically displaying system data and operating status.
5. The panel touch button switch controls the main power supply/DC output/AC output/EV output.
6. It has a power-saving mode function to reduce no-load losses.
7. Adopting intelligent adjustable speed fans, efficient heat dissipation, and extending system lifespan.
8. Equipped with lithium battery solar and mains activation functions, supporting the connection of lead-acid and lithium batteries.
9. Equipped with multiple protection functions, providing 360 ° all-round protection.
10. Equipped with complete short-circuit protection, overvoltage and undervoltage protection, overload protection, backflow protection, etc.

2. Overview



LE1800-A

Arrow Identification			
❶	PV +	❻	TYPE-C Output
❷	PV -	❼	USB-A Output
❸	AC Input	❽	POWER
❹	AC Output	❾	AC Switch
❺	Screen		

3. Install

3.1 Unpacking inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items in the package:

The following are options:

- The unit x 1
- User manual x 1
- AC Power cable x 1

3.2 Installation precautions

Consider the following points before selecting where to install:

1. Do not install the Machine on flammable building materials.
2. The ambient temperature should be between 0°C and 40°C to ensure optimal operation.
3. Be sure to keep other objects and surfaces as shown in the guarantee sufficient heat dissipation and to have enough space for removing wires.

4. INSTALLATION

4.1 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 disconnected during maintenance and fully protected from over current of AC input. The recommended spec of breaker is 25 A for 12V system.

CAUTION! ! There are two terminal blocks with " IN " and " OUT " markings. Please do NOT mis-connect input and output connectors.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wires

Rated Capacity	Gauge	Torque value
1KVA	16AWG	0.5~0.6Nm
2KVA	14AWG	0.8~1.0Nm

Please follow below steps to implement AC input/ output connection

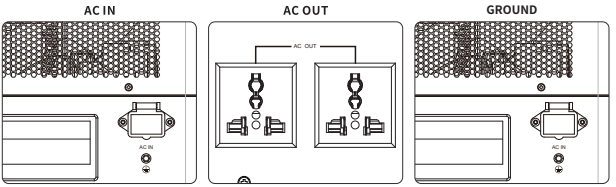
1. Before making AC input/output connection be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N3 mm.

3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor(⏚)first.

⏚→Ground(yellow-green)

L→LINE(brown or black

N→Neutral (blue)



⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

4. Make sure the wires are securely connected

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. 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 manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/ charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

4.2 PV Connection

PV Connection(Only apply for the model with solar charger)

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Typical Amperage	Gauge	Torque Value
18A	12AWG	1.4~1.6Nm

PV module selection:

When choosing the right PV module, be sure to first consider the following requirements:

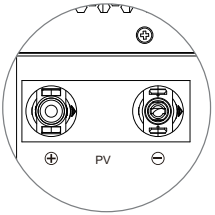
The open circuit voltage (Voc) of the PV modules does not exceed the maximum PV array open circuit voltage of the inverter. The maximum supply voltage of the PV modules should be close to the optimal PV access voltage range of the inverter for best performance. If one PV module cannot meet this requirement, it is necessary to connect multiple PV modules in series.

PV Module Wire Connection

1. Check correct polarity of wire from PV modules and PV input connectors. Then,connect positive pole(+) of connection wire to positive pole(+) of PV input connector. Connect negative pole (-)of connection wire to negative pole(-) of PV input connector. Screw two wires tightly in clockwise direction. Recommended tool: 4mm blade screwdriver.

PV+:PV input positive pole

PV-:PV input negative pole

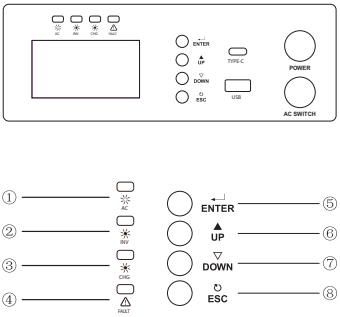


4.3 Start machine

Step1:connecting all lines.
Step2:press the power switch,the button led ring will light green,then press the AC switch,the LCD screen will be lighted.
Step3:start the load one by one according the power from small to large.

5. Operation and Display Panel

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



① AC Indicator
② Invert Indicator
③ Charging Indicator
④ Fault Indicator
⑤ ENTER
⑥ UP
⑦ DOWN
⑧ ESC

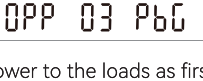
OVER LOAD	Indicate overload happened.
Battery Information	
	Indicate battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
	Indicate battery voltage, battery percentage, battery current.
Other Information	
	Indicate alarm code or fault code.
	Indicate a fault is happening.
	Indicate the alarm is disabled.
	Indicate power saving mode.

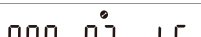
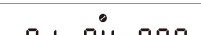
For Lead-acid battery, detailed description of battery icon is related to the settings of the battery low voltage point and battery float charging voltage point. Taking the default settings as example, the specific display is as following:

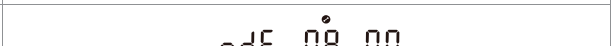
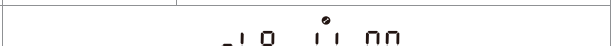
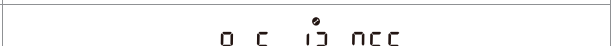
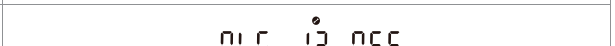
Battery Cells Voltage	Display
< 11.3V	
11.3V ~ 12.0V	
12.0V ~ 12.7V	
> 12.7V	

5.1 LCD Setting

After pressing and holding ENTER button for 2 seconds, the unit 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.

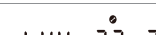
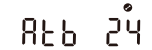
<table>
<tr><th>Program</th><th>Description</th><th colspan="2">Setting Option</th></tr>
<tr><td rowspan="2">01</td><td rowspan="2">Output voltage</td><td colspan="2">  </td></tr>
<tr><td colspan="2">230V (default)
Adjustable/settable value: 208V, 220V, 230V, 240V.</td></tr>
<tr><td rowspan="2">02</td><td rowspan="2">Output frequency</td><td colspan="2">  </td></tr>
<tr><td colspan="2">50Hz(default)
Adjustable/settable frequency: 50Hz, 60Hz.</td></tr>
<tr><td rowspan="6">03</td><td rowspan="6">Output source priority</td><td>Grid first (default)</td><td>  </td></tr>
<tr><td colspan="2">Grid provides power to the loads as first priority.
Solar power will charge the battery.
If solar is not sufficient to charge battery, grid will charge the battery at the same time.
If grid is absent and solar is sufficient ,solar will power the loads.
If grid is absent and solar is not sufficient ,solar and battery will power the loads.
If grid is absent,solar and battery are not sufficient to power loads at the same time,inverter will go to standby and charge battery.</td></tr>
<tr><td>Solar first</td><td>  </td></tr>
<tr><td colspan="2">Solar energy provides power to the loads as first priority.
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.
If grid is absent and solar is not sufficient ,solar and battery will power the loads.
If grid is absent,solar and battery are not sufficient to power loads at the same time,inverter will go to standby and charge battery.</td></tr>
<tr><td>PBG priority</td><td>  </td></tr>
<tr><td colspan="2">Solar energy provides power to the loads as first priority.
If solar energy is sufficient, solar will charged the battery.
If solar energy is not sufficient,battery will also supply power.</td></tr>
</table>

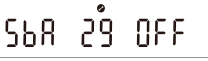
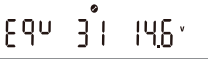
03	Output source priority	If solar and battery energy are not sufficient, grid will supply power to the loads and solar charges the battery. If battery is charged to be sufficient solar and battery will power the loads instead of grid. If grid is absent,solar and battery are not sufficient to power loads at the same time,inverter will go to standby and charge battery.	
		MKS priority	
		Generator provides power to loads as first priority. When generator PV, battery all exist, the work mode is as PBG. When generator and battery exist (no PV), the work mode is as GPB. When generator and PV exist (no battery), the work mode is as GPB.	
04	Output mode	APP: Appliance (default)	
		Applied to household appliances.	
		UPS	
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	
		Applied to connect generator by using grid input port.	
05	Charger source priority	PNG: PV and Grid (default)	
		PV and Grid are charging at the same time.	
		OPV: Only PV	
		The second is OPV (Only PV). Only PV charge.	
		PVF: PV first	
		When both PV and Grid power exist, only PV charging occurs.. When only PV exists, PV charging occurs. When only grid power exists, grid charging occurs.	
06	Grid charging current		
		20A(default) Available options: 2/10/20/30/40/50/60/70/80/90/100A.	

07	Maximum charging current		
		Set total charging current for solar and grid chargers. The default setting is 60A. Available options: 2/10/20/30/40/50/60/70/80/90/100A.	
08	Menu default		
		During setting: Set to ON. If the current page is not on the first page and no operation with 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 with 1 minute, the system will stay on the current page.	
09	Auto restart when overload occurs	ON(default)	
10	Auto restart when over temperature occurs	ON(default)	
11	Main input cut warning		
		Enable/Disable Grid or PV loss alarm. The default setting is ON. If the main input detected lost, the buzzer will sound for 3 seconds. When set to OFF, after the main input is lost, the buzzer will not sound.	
12	Energy-saving mode		
		The default setting is OFF. When set to ON, in battery mode, if the load is lower than 25W, the system will stop output for a period then resume. If the load is still lower than 25W and lower than 100VA, the system will do the loop stop then resume. If the load is higher than 35W or higher than 120VA, the system will resume continuous normal output.	
13	Overload transfer to bypass		
		The default setting is OFF. When set to ON, in the case of PBG priority output, if there is an overload, the system will immediately transfer to bypass mode (utility power output, also known as bypass mode).	

14	Silent mode setting		
		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 .	
15	Battery return to grid voltage point		
		When the battery is set to the AGM (Lead Acid Battery Type) or FLD (Flooded Battery Type) mode, the default setting is 11.5V, and it can be adjusted within a range of [11, 13V].	
		When the battery is set to the LIB (Ternary Lithium Battery Type) mode or CUS(Customer Set Type mode), the default setting is 11.9V, and it can be adjusted within a range of [10, 12.5V].	
		When the battery is set to the FEL(Lithium Iron Battery Type) mode, the default setting is 12.4V, and it can be adjusted within a range of [10, 12.5V].	
16	Switching back to battery mode voltage points		
		After the battery shuts down due to low voltage, it needs to reach a certain voltage level to restart in battery mode. The value can be set to FUL or batery voltage. If set to FUL, the battery will only recharge to full capacity before it can restart in battery mode.	
		When the battery is set to AGM (Absorbent Glass Mat) or FLD (Flooded) mode,The default setting is 13V. It can be adjusted within a range of [12, 14.5V].	
		When the battery is set to the LIB (Ternary Lithium Battery Type) mode, FEL(Lithium Iron Battery Type) mode or CUS(Customer Set Type mode), the default setting is 13.6V, and it can be adjusted within a range of [11.5, 14.5V].	
17	Battery type	AGM(default)	
		Flooded	
		Lithium (Ternary Lithium Battery)	
		User-Defined	
		Lithium Iron	

18	Battery low voltage point	
		Battery low voltage alarm setting. It cannot be set when battery type is AGM or FLD. The default setting is 11V.
		When the battery type is set to LIB, CUS, the default setting is 11.9V. The adjustable range for the voltage is [10.3, 12.5V].
		When the battery type is set to FEL, the default setting is 12V. The adjustable range for the voltage is [10.3, 12.5V].
19	Battery shutdown voltage point	
		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 10.5V.
		When the battery type is set to LIB, FEL or CUS , the battery shutdown point can be modified. The default setting for LIB and CUS is 11.5V, for FEL is 10.5V, and the adjustable range is [10, 12V].
20	Constant voltage mode voltage point setting	
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting for AGM is 14.1V, for FLD is 14.5V.
		When the battery type is set to LIB or CUS, the default setting is 14.1V, for FEL it is 13.8V, and it can be adjusted within the range of [12, 15V]. It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.
21	Floating charge mode voltage point setting	
		When the battery is defined as AGM or FLD mode, the voltage set point cannot be configured. The default setting is 13.5V. When the battery type is LIB, the default setting is 13.8V. It can be set within the range of [12.5, 14.5V]. When the battery type is CUS, the default setting is 13.8V. It can be set within the range of [12, 15V]. When the battery type is FEL, the default setting is 13.6V. It can be set within the range of [12.5, 14.5V]. It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.

22	Grid low voltage point setting	
		If output mode is APP/GEN, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V.
		If output mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.
23	Grid high voltage point setting	
		If output mode is APP/GEN, Grid high voltage point can be set within a range of 264V to 280V. The default setting is 264V. If output mode is UPS, the default setting is 264V and can not be changed.
24	Automatic screen shutdown setting	
		The default value is ON After turn on the function, the backlight will shutdown after 1 minutes of no button operation.
25	Inverter soft start setting	
		The default setting is OFF. 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. Setting Condition: It can be set in single-machine operation mode.
26	Reset factory setting	
		Restore all settings to factory default values. 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. The setting can be applied immediately in grid and standby modes, but cannot be set in battery mode.

29	Battery disconnection alarm	
		Enable/Disable battery disconnection alarm. The 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.
31	Equalization voltage point setting	
		When the battery is defined as AGM/FLD/LIB or CUS mode,the default setting is 14.6V. It can be set within the range of [12, 15V]. When the battery is defined as FEL mode, the default setting is 14V. It can be set within the range of [12, 15V].
32	Equalization charging time setting	
		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 time is reached. The default setting is off, with a configurable range of [off, 5~900], and an increment of 5 minutes for each setting.
33	Equalization delay time setting	
		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], and an increment of 5 minutes for each setting.

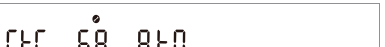
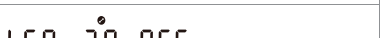
34	Equalization interval time setting	 When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period)is reached. The default setting is 30 days, the settable range is[1,90], and the increment of each setting is 1 day.
35	Enable equalization immediately	 The default setting is OFF, the function is not turned on; when it is set to ON, in the float charging stage when the equalization mode is turned on and the battery connection is detected. The equalization charging is activated immediately, and the controller will start to enter the equalization stage.
36	Grid-Tied inverter functionality	 Configure whether the inverter feeds power into the grid in PGB mode or GPB mode. The default setting is OFF, with the function disabled. Settings include OFF/ON. When set to ON, the inverter performs maximum power point tracking, feeding surplus energy into the grid supply.
37	Maximum grid-connected power	 Set the value of output power to grid. The default setting is 2.0, with a range from 0 to 2.0 and a step size of 0.2, in units of kilowatts (KW).

38	Battery dual output low voltage shutdown point	
		When enabled, the secondary output of the inverter 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 is 12V, with a configurable range of [11, 15]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.
39	Battery dual output duration	
		When enabled, the secondary output of the inverter 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 [5,900]/OFF/FUL in minutes. When set to FUL, the secondary output has unlimited output time.
40	Battery dual output low SOC shutdown point	
		When enabled, the secondary output of the inverter is enabled by default. In battery mode, when the battery SOC is lower than the set value, the secondary output is turned off. After the battery voltage is 5% higher than set value, the secondary output will turn on. The default setting is 20. The setting range is [5, 90] and OFF.

44	BMS communication function	 Enable/Disable lithium battery communicates with inverter. The default setting is OFF. Choose the corresponding option based on the battery pack type. If a communication abnormality occurs, alarm 56 is generated. Supported procotols: CVT: CVTE protocol(485) PYL: PYLON protocol(485/CAN) GRO: GROWATT protocol(485/CAN) VOL: VOLTRONIC protocol(485) IRF: IRON TOWEL protocol(485) PAC: PACE protocol(485)
45	BMS ID setting	 Setting BMS ID number to communicate with. The default setting is auto(AtO). The setting range is [0, 15]. When the item is set to auto(AtO), system will automatically poll the BMS ID from small to large. When system polls for the first ID with a correct response, it locks the ID and only asks the BMS with that ID.
46	Low SOC shutdown	 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.

47	High SOC to battery	 Set the SOC value for the inverter to switch to battery mode. Default setting is 90, with a configurable range of [10, 100]. In PBG priority mode, when the lithium battery SOC reaches the set value in normal 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.
48	Low SOC to grid	 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. 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. 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. When this setting is higher than the STB point, STB and STG will no longer take effect after the next activation.
61	Maximum discharge current function	 The default setting is OFF. The configurable range is [10, 150] or OFF, with a setting step of 5A; when set to OFF, the inverter limits the discharge current to 150A for 1 minute, and reports an overload fault after 1 minute. When not set to OFF, if the discharge current exceeds the limit current, alarm 60 will be triggered. If the continuous over-current time reaches 5 seconds, the inverter will report overload fault 14 and enter fault mode. When the BMS is connected and communication is successful, if the MDC setting item is not set to OFF, the maximum discharge current will be changed to the maximum discharge current uploaded by the BMS.

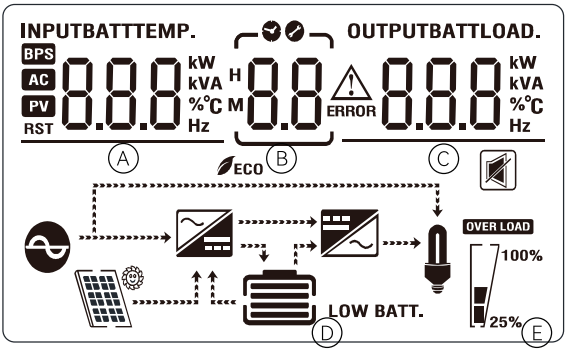
63	Battery not detected (BTE)	
		Enable battery not connected detection. Default setting is ON. During machine operation, automatic battery disconnection detection and lithium battery activation are performed; if set to OFF, the machine maintains the current battery disconnection status and will no longer perform detection or lithium battery activation during operation.
64	Battery not detected (BTI)	
		Perform battery not connected detection / lithium battery activation immediately. The default setting is OFF. When set to ON, the machine will immediately perform battery disconnection detection and lithium battery activation if the conditions for these are met. After completing the battery disconnection detection and lithium battery activation, the screen setting will automatically revert to OFF.
65	Dual output enable voltage	
		The default setting is 13V. The adjustable range is [11.5, 15]. After the dual output is turned off in battery mode, it will automatically turn on again when the battery voltage exceeds this set value. When BMS communication is normal and DES is set to a value other than OFF, the dual output will not be controlled by voltage.
66	Dual output enable SOC	
		The default setting is 90%. The adjustable range is [10%, 100%] or OFF. When set to a value other than OFF, after the dual output is turned off in battery mode, it will automatically turn on again once the battery SOC reaches or exceeds this value. When set to OFF, the dual output is controlled based on voltage conditions.
67	Alarm enable	
		The default setting is ON. If set to OFF, the machine will not provide audible or visual alerts when an alarm occurs.

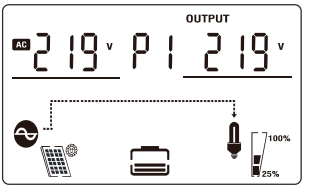
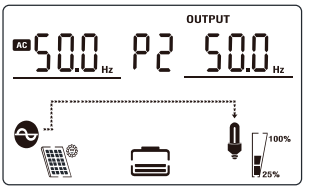
<table>
<tr><td rowspan="6">68</td><td rowspan="6">CT/MET direction</td><td>ATO (default)</td><td>  </td></tr>
<tr><td colspan="2">Set the installation direction for CT or MET connection. When configured as ATO, the device performs a direction detection upon initial grid power connection. Subsequently, it conducts daily checks as long as grid power remains connected. If three consecutive checks detect anomalies, it triggers a CT/MET connection anomaly alarm (Alarm 76).
If configured as non-ATO but the actual connection direction opposes the set direction, it will cause abnormal feed to grid without triggering an alarm.</td></tr>
<tr><td>POS</td><td>  </td></tr>
<tr><td colspan="2">When set to POS, the CT/meter direction indicates energy flowing to the utility grid.</td></tr>
<tr><td>NEG</td><td>  </td></tr>
<tr><td colspan="2">When set to NEG, the CT/meter direction indicates energy flowing from the utility grid.</td></tr>
<tr><td rowspan="2">69</td><td rowspan="2">Utility grid power compensation</td><td colspan="2">  </td></tr>
<tr><td colspan="2">Fine-tune the power measurement accuracy of the CT/electricity meter, with the default setting at 200W.
This parameter can be configured across all operational states within the range [0-400W].
For precise anti-reflux control, this parameter specifies the maximum power allowed to be drawn from the grid.</td></tr>
<tr><td rowspan="2">70</td><td rowspan="2">Battery power load in PBG mode</td><td colspan="2">  </td></tr>
<tr><td colspan="2">The default setting is OFF. In this state, when the inverter is operating in PBG mode with a sufficient battery charge:
-If grid is not connected, the battery will supply power to the load.
-If grid is connected, the battery will not supply power to the load.
When the setting is ON, and the inverter is operating in PBG mode with a sufficient battery charge:
-If grid is connected, the battery can supply power to the load. In this case, if the load power exceeds the maximum output power of the battery, the grid power will compensate for the deficit.</td></tr>
</table>

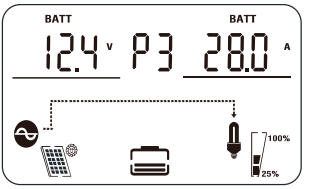
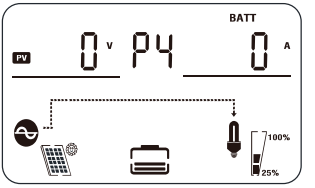
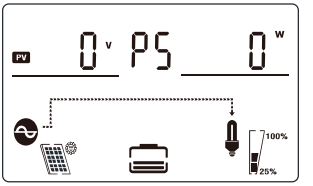
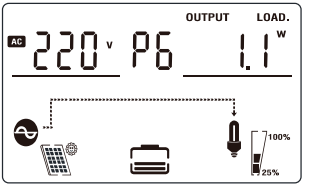
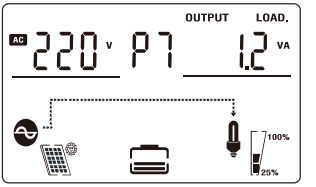
71	Prohibited charging battery from utility grid during BGP ON	
		The default setting is ON. When the Program 70 (Battery power load in PBG mode) function is ON, utility grid is not permitted to charge battery in PBG mode if battery is not sufficient. If set to OFF, utility grid is permitted to charge the battery in PBG mode when battery energy is not sufficient.
72	Anti-reflux control	
		The default setting is ON. If the value of program 73 is INT, the inverter can only supply power to load from inverter's AC OUT port. If the value of program 73 is CT or MET, the inverter can supply power to on-grid load and the supplied power will not exceed the load power consumption. If set to OFF, the inverter can feed the power to grid as program 37 defined power value.
73	Grid-side energy statistics device	
		The default setting is INT. It means the inverter will calculate the grid power by internal sample circuit.
		
		If set to CT, the inverter will calculate the grid power by the CT.
		
		If set to MET, the inverter will calculate the grid power by the meter.

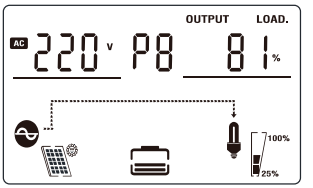
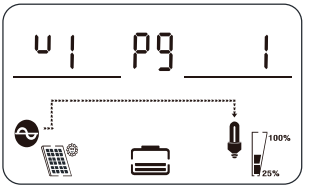
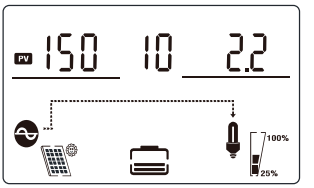
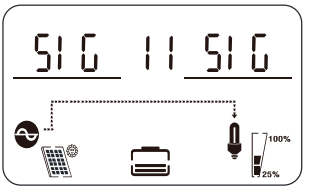
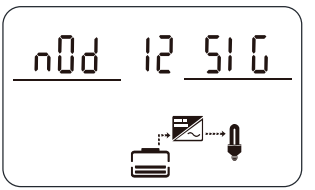
5.2 Display Information

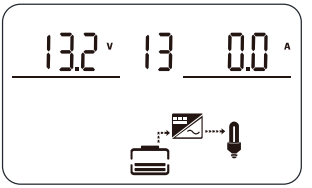
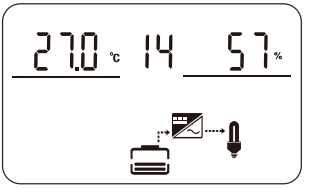
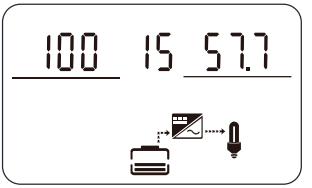
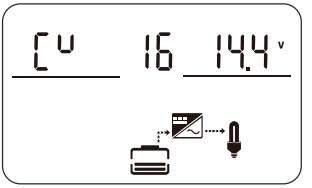
The LCD display information will be switched in turns by pressing 'UP' or 'DOWN' key. The selectable information is switched as below order: voltage, frequency, current, power, firmware version.

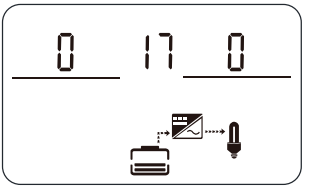


Information	LCD display
Ⓐ AC Input voltage Ⓑ Display page number Ⓒ Output voltage Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ AC Input frequency Ⓑ Display page number Ⓒ Output frequency Ⓓ Battery capacity Ⓔ Load percentage	

Ⓐ Battery voltage Ⓑ Display page number Ⓒ Charge current Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ PV voltage Ⓑ Display page number Ⓒ PV charging current Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ PV voltage Ⓑ Display page number Ⓒ PV power Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Active power output Ⓓ Battery capacity Ⓔ Load percentage	
Ⓐ Output voltage Ⓑ Display page number Ⓒ Apparent power output Ⓓ Battery capacity Ⓔ Load percentage	

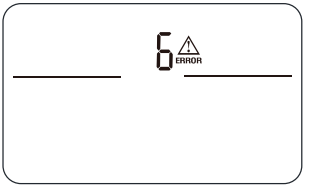
Ⓐ Output voltage Ⓑ Display page number Ⓒ Load percentage Ⓓ Battery capacity Ⓔ Load percentage	
Display software version	
Ⓐ Total power generation Ⓑ Display page number Ⓒ Daily power generation Ⓓ Battery capacity Ⓔ Load percentage	
Parallel operation status	
After enabling BMS, the following pages are available.	
Network status of lithium battery. When the upper right display shows SIG constant, the battery pack is operating as a single group; 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 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 fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR	

6. Fault Reference Code

Fault display:



Function Description: The alarm code ALA flashes and the buzzer sounds once every 1 second, lasting for 1 minute before stopping. The fault indicator code remains steadily lit, and the buzzer sounds continuously for 10 seconds before stopping. After stopping, the fault is cleared. From the first fault occurrence, if the fault is triggered 6 times within 15 minutes, the device will enter a fault lock mode. In this mode, the device will not restart if the fault occurs 6 times within 15 minutes. To restart the device, a complete power off (screen off) or waiting for 15 minutes is required.

Fault: The inverter enters fault mode, with a constant red LED light and LCD displaying a fault code. The following recoverable faults can be restarted 6 times within 15 minutes. After exceeding 6 times, a fault lock will be triggered, and the fault lock will be released after 15 minutes.

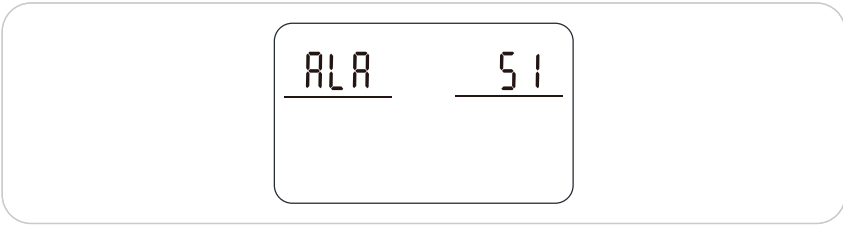
Fault code sheet

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
1	Bus soft boost start failed	Turn fault mode	Bus voltage does not reach set value.	15s can restore.
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	After the bus voltage recovers, restore again after 15 seconds..
3	Bus voltage low	Turn fault mode	Bus voltage is below the under voltage protection point.	Cannot restore.
4	Battery over current	Turn fault mode	Battery current is above the set value.	Cannot restore.
5	Over temperature	Turn fault mode	The temperature exceeds the protection threshold or fan stuck.	The temperature is below the set value and the fan is running; recovery will occur after 15 minutes..
6	Battery high voltage	Turn fault mode	Battery voltage is higher than set value.	15s can restore.
7	Bus soft start fault	Turn fault mode	The soft start process has exceeded but the bus voltage has not reached set value.	15s can restore.

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
8	Bus short circuit	Turn fault mode	Bus voltage below threshold.	Cannot restore.
9	Inverter soft start fault	Turn fault mode	After a period of soft start, the inverter still cannot reach the rated output voltage.	15s can restore.
11	INV under voltage	Turn fault mode	In battery mode, the inverter voltage is lower than the set value.	15s can restore.
12	INV short circuit	Turn fault mode	The inverter voltage is lower than the set value, and the current is higher than the set value.	15s can restore.
13	Negative power protection	Turn fault mode	The inverter power is negative and greater than the set value for a continuous period.	15s can restore.
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	15s can restore.
17	Programming in progress	Turn fault mode	Trigger programming/ OTA.	Restore after completion.
18	PV reverse polarity	Turn fault mode	Photovoltaic panel reverse polarity.	Restore 15s after correcting reverse polarity.
26	BMS fault	Turn fault mode	Battery BMS fault reported.	Restore after battery BMS fault recovery.
29	INV load abnormal	Turn fault mode	Inverter triggered protection 10 times per half-cycle for 3 consecutive half-cycles.	15s can restore.
30	PV over voltage	Turn fault mode	PV voltage exceeds maximum supported voltage.	PV voltage is below the maximum supported voltage.

7. Alarm Reference Code

Alarm: the inverter 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
50	Battery open	Alarm.	The battery is not connected for no more than 10 minutes continuously.	Charging after battery connection does not exceed 2 minutes.
51	Battery Under Voltage	Alarm, battery low voltage shutdown or cannot power on.	Battery voltage is below the BAU set value.	Battery voltage above 13V per cell.
52	Battery low voltage	Alarm.	Battery voltage is below the BAL set value.	Battery voltage is 0.5V above the BAL set value.
53	Charger short circuit	Warning, Battery not charging, Battery not discharging.	Single cell voltage is less than 6V while there is charging current	After excluding short circuit, recovery occurs within a maximum of 1 minute.
56	BMS Loss	Alarm.	After BMS communication function is enabled, communication fails.	BMS communication function is disabled, or communication is established.
58	Fan Lock	Alarm, Fan running at full speed.	No fan speed signal detected.	Fan speed signal detected.
59	EEPROM Error	Alarm.	EEPROM read/ write error detected; abnormal data found. Restore to factory settings.	Cannot restore.

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
60	Over load	Alarm.	AC input current / battery discharge current / load power exceeds the rated value.	AC input current / battery discharge current / load power is below the rated value.
62	PV energy weak	Alarm, PV output disabled, PV charging retained.	When the battery is not connected, bus voltage is below the set value.	Cleared when the battery or AC input is properly connected, or after 10 minutes.
68	Low SOC shutdown	Alarm, switching to standby mode.	BMS reports SOC below BSU set value.	Recovery occurs when the low SOC shutdown function is disabled, or BMS communication is disabled, or SOC rises to the set value plus 5%.
69	Low SOC Alarm	Alarm, if in standby mode, remain in standby without powering on.	Lithium battery SOC is below the set value + 5% (in AC mode or battery mode), or below the set value + 10% (in standby mode).	Recovery occurs when the low SOC shutdown function is disabled, or BMS communication is disabled, or SOC recovers to the set value + 10%.
72	Battery Below Start-up Voltage	Alarm.	After power-on, the battery voltage is below the allowed start-up voltage.	Battery voltage is above the allowed start-up voltage.
76	CT/Electricity Meter Com-munication Anomaly	Alarm,Cease supplying power to the grid supply side.	When the grid power load function is enabled, grid power is connected, the CT/meter direction is selected as ATO, and the grid-side power statistics device is not selected as INT, and communication with these devices is abnormal.	When the alarm conditions are not met.
77	Grid Power Unstable	Alarm.	Utility power lost 3 times within 5 minutes.	Recovery occurs 5 minutes after the first utility power loss.

8. Battery Equalization

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

Note:*Don't activate this mode when using lithium batteries.

How to Apply Equalization Function

You must enable battery equalization function by set charging time from 'off' to another setting first. Then, you may apply this function in device by either one of following methods:

1.Set equalization voltage point on Program 31.

2.Set equalization delay time on Program 33.

3.Set equalization interval time on Program 34.

4.Set immediate equalization mode activation on Program 35.

9. Trouble Shooting

Problem	Fault Event	Trigger conditions	What to do
LED screen display fault code 5	Over temperature	Fan lock exceeds 10 seconds.	Please check if the fan is not connected or if there are loose wiring issues. If the fan is not connected for more than 10 seconds, 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 80V and the inverter current is greater than 5A, it should respond within 80-100ms.	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). 2.Verify if the inverter voltage and inverter current meet the triggering conditions.
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 .	Send command: TIDA1911000000000000
LED screen display fault code 58	Fan malfunction	Any of the fans rotating less than 10 times within 5 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.

Problem	Fault Event	Trigger conditions	What to do
Unable to start	Battery	Due to the need for a voltage of ≥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 multimeter 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. 3. Check whether BSU configuration in page 46 is accessible. Connecting the wrong battery voltage can cause capacitor explosion.
	Utility power	/	1.Check for any short circuits at the grid 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 grid input to the output terminals.
	PV	/	Check if the PV input voltage is too close to the critical threshold.
PV not charging	/	/	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.

Notes: Updates to the content and version of this manual will not be notified separately.

10. Product Specifications

Model	LE1800-A
AC Output	
Rated output power	1800W
Surge power	3600VA/2s
Rated output voltage	230V±10%
Output frequency	50Hz (Optional 60Hz)
DC Output	
USB-A output	5V/2.4A
TYPE-C output	5V/3A,9V/2.25A,12V/2A
LFP Battery	
Nominal energy	2624Wh
Nominal voltage	12.8V
Operation ambient temperature(Charge)	0°C-40°C (32°F-104°F)
Operation ambient temperature(Discharge)	-10°C-40°C (14°F-104°F)
PV Input	
Max.PV input power	3000W
Max. input voltage(Voc)	450V
MPPT operating voltage range	85-400Vdc
Max. input current per MPPT	18A
AC Input	
AC input voltage	200~240V
Acceptable input voltage range	150~265V
Nominal input frequency	50Hz/60Hz
General Parameters	
Noise level	⩽50dB
G.W.	30kg
Dimension	399*295*266.3mm
IP rating	IP21
Safety & Certification	UN38.3/MSDS