

SOLAR ENERGY STORAGE SYSTEM

MPSG-E1200

User Manual

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1. Information on this Manual

1.1 Validity

This manual is valid for the following devices:

- Solar inverter

1.2 Scope

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations.

1.3 Target Group

This document 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 in how to deal with the dangers and risks associated with installing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of the compliance with this document and all safety information

1.4 Label Description

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

Labels on Inverter

	CAUTION Do not disconnect under load!
	Danger: High Voltage! Danger: Electrical Hazard!
	Start maintaining the INVERTER at least 5 minutes after the INVERTER disconnected from all external power supplies.
	Read instructions carefully before performing any operation on the INVERTER.
	Grounding: The system must be firmly grounded for operator safety.

Labels in the documentation

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

1.5 Safety Instructions



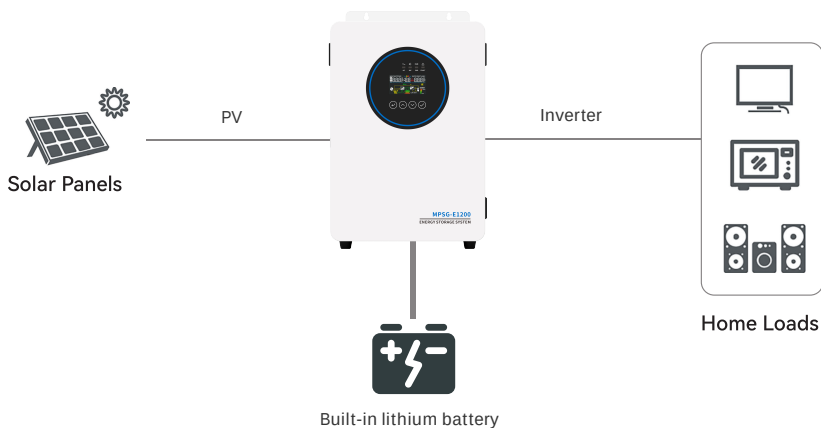
WARNING!

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

01. Please be clear which kind of battery system you want, lithium battery system or lead-acid battery system, if you choose the wrong system, energy storage system can't work normally.
02. Before using the unit, read all instructions and cautionary marking on the unit, the batteries and all appropriate sections of this manual. The company has the right not to quality assurance, if not according to the instructions of this manual for installation and cause equipment damage.
03. All the operation and connection please professional electrical or mechanical engineer.
04. All the electrical installation must comply with the local electrical safety standards.
05. When install PV modules in the daytime, installer should cover the PV modules by opaque materials, otherwise it will be dangerous as high terminal voltage of modules in the sunshine.
06. CAUTION - To reduce risk of injury, charge only deep-cycle lead-acid type rechargeable batteries and lithium batteries. Other types of batteries may burst, causing personal injury and damage.
07. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
08. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
09. NEVER charge a frozen battery.
10. For optimum operation of this inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.

11. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
12. 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.
13. GROUNDING INSTRUCTIONS -This inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
14. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
15. Make sure the inverter is completely assembled, before the operation.

2. Introduction



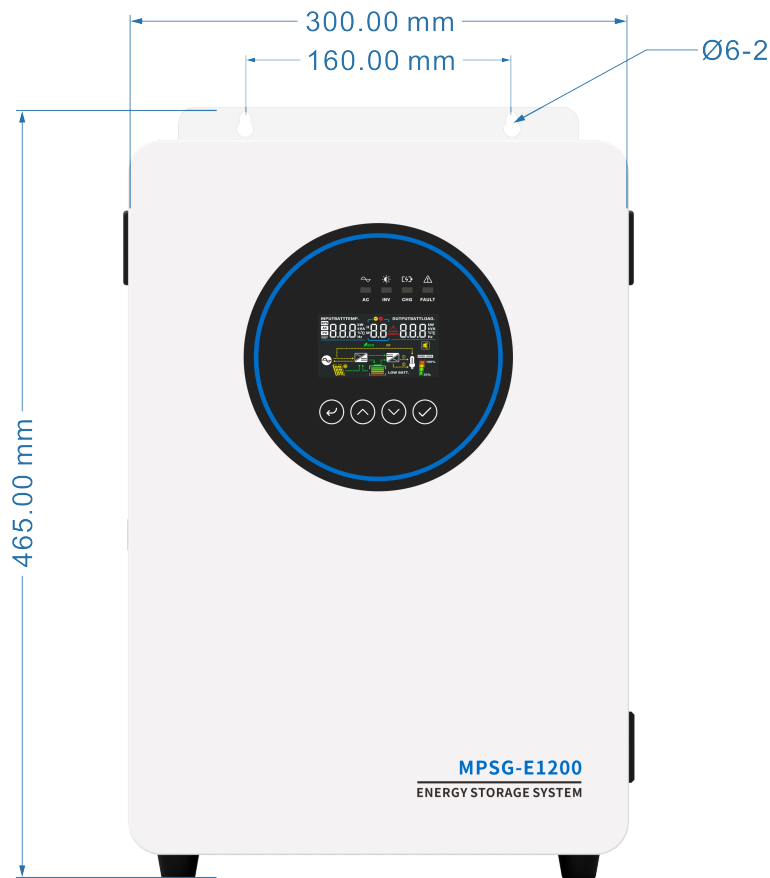
Solar Energy Storage System

This is a multifunctional solar inverter, integrated with a MPPT solar charge controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications.

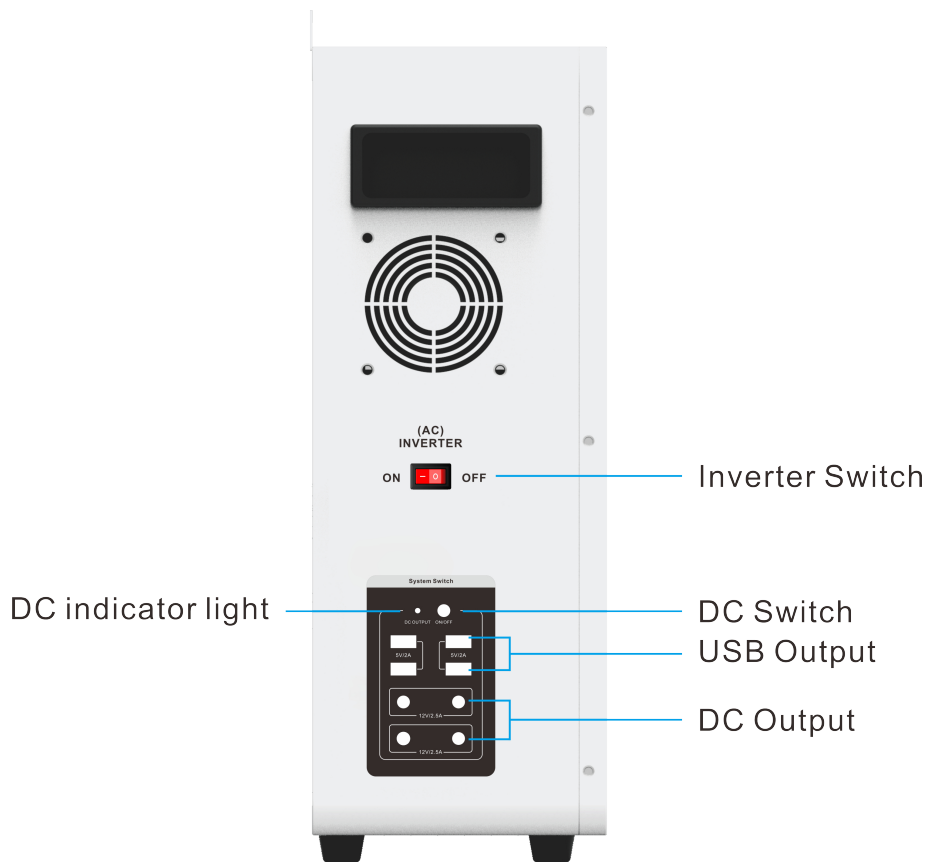
The whole system also need other devices to achieve complete running such as PV modules, generator, or utility grid. Please consult with your system integrator for other possible system architectures depending on your requirements.

3.Installation hole position and panel introduction

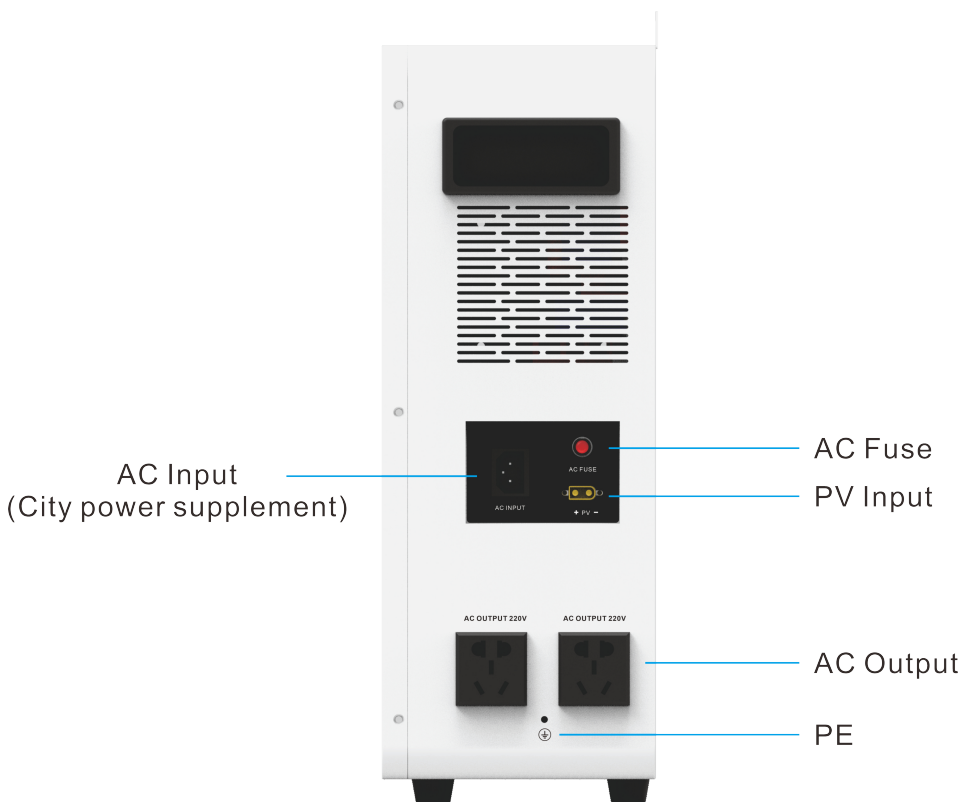
3.1 Installation hole location diagram



3.2 Function introduction



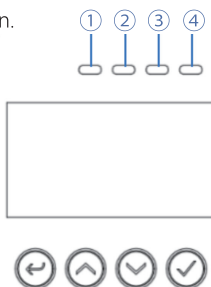
Inverter switch / DC output



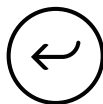
City power supply, photovoltaic input, AC output and ground wire interface

4 Operation and Display Panel

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



LED Indicator			Messages
① AC	Status indicator (Green)	Solid On	The mains power is normal and enters the mains power operation.
		Flashing	The mains power is normal, but it has not entered mains power operation.
		Off	The mains power is abnormal.
② Inverter	Invert indicator (Yellow)	Solid On	Output is powered by battery or PV in battery mode.
		Off	Other states.
③ Charging	Charging indicator (Yellow)	Solid On	The battery is in float charging.
		Flashing	The battery is in constant voltage charging.
		Off	Other states.
④ 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

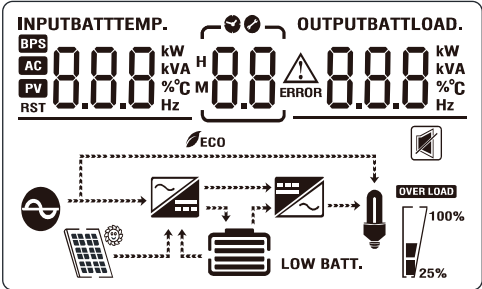


ENTER

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

4.1 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.

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	

4.2 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.

Program	Description	Setting Option	
01	Output voltage	OPU 01 230 ^v	
		230V (default) Adjustable/settable value: 208V, 220V, 230V, 240V	
02	Output frequency	OPF 02 50 _{Hz}	
		50Hz(default) Adjustable/settable frequency: 50Hz, 60Hz	
03	Output source priority	Grid first (default)	OPP 03 GPb
		(default)Grid is given priority to power the load. If the grid power exit, battery will power the load. Solar only charge the battery in all conditions. If grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	
		/	OPP 03 GPb
		Same as GPb(Grid first).	
		Battery first	OPP 03 PBb
		Battery is given priority to power the load. If the energy of battery is insufficient, the grid will power the load. Solar only charge the battery in all conditions. If grid and battery power is not sufficient to power loads, inverter will go to standby and charge battery.	

03	Output source priority	MKP priority	OPP 03 nLP
		Comprehensive priority When PV exists, the battery takes priority, and when PV does not exist, the grid takes priority.	
04	Output mode	APP: Appliance (default)	nOd 04 APP
		Applied to household appliances	
		UPS	nOd 04 UPS
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	nOd 04 GEN
		Applied to connect generator by using grid input port	
05	Charger source priority	PNG: PV and Grid (default)	[HP 05 PNG
		PV and Grid are charging at the same time.	
		OPV: Only PV	[HP 05 OPV
		The second is OPV (Only PV). Only PV charge.	
		PV: PV first	[HP 05 PVF
		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	FCC 06 30 ^	
		30A(default) Available options: 2/10/20/30/40/50A	

07	Maximum charging current	nCC 07 40 ^	
		Set total charging current for solar and grid chargers. The default setting is 40A. Available options: 2/10/20/30/40/50/60/70/80/90/100A	
08	Menu Default	ndF 08 0N	
		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)	LFS 09 0N
10	Auto restart when over temperature occurs	ON(default)	LFS 10 0N
11	Main input cut warning	n1P 11 0N	
		Enable/Disable Mains 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	PUS 12 OFF	
		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, the system will do the loop stop then resume. If the load is higher than 35W, the system will resume continuous normal output.	
13	Overload transfer to bypass	OLG 13 OFF	
		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	nUE 14 OFF	
		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 mains voltage point	bEtG 15 11.5V	
		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 FEL(Lithium Iron Battery 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 CUS(Customer Set Type mode), the default setting is 11.7V, and it can be adjusted within a range of [10, 12.5V].	
16	Switching back to battery mode voltage points	bEtG 16 13.0V	
		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)	bAtE 17 AGM
		Flooded	bAtE 17 FLD
		Lithium (Ternary Lithium Battery)	bAtE 17 LIB
		User-Defined	bAtE 17 CUS
		Lithium Iron	bAtE 17 FEL

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, FEL, the default setting is 11V. The adjustable range for the voltage is [10.3, 12.5V].
		When the battery type is set to CUS, the default setting is 11V. The adjustable range for the voltage is [10.5, 13.5V].
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 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, FEL or CUS, the default setting is 14.1V, 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 or FEL, 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]. 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	LLV 22 154V
		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	LHV 23 264V
		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	Atb 24 OFF
		The default value is OFF After turn on the function, the backlight will shutdown after 10 minutes of no button operation.
25	Inverter soft start setting	StE 25 OFF
		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	Std 26 OFF
		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 mains and standby modes, but cannot be set in battery mode.

29	Battery Disconnection Alarm	56A 29 OFF
		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	E9V 31 14.6V
		The default setting is 14.6V, with a configurable range of [12, 15V].
32	Equalization Charging Time Setting	E9E 32 OFF
		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	E9O 33 120
		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.

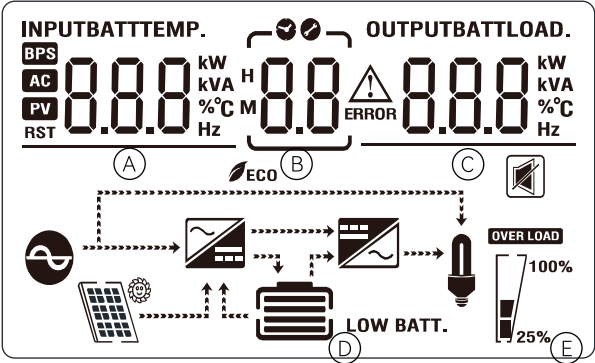
34	Equalization Interval Time Setting	E91 34 30
		When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period) is reached. The default setting is 30 days, the settable range is [1,90], and the increment of each setting is 1 day.
35	Enable Equalization Immediately	E90 35 OFF
		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.
44	BMS Communication Function	b05 44 OFF
		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 protocols: CVT 485 protocol, PYL 485 protocol, GRO 485 protocol, VOL 485 protocol, PAC 485 protocol.
45	BMS ID setting	b01 45 AtO
		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.

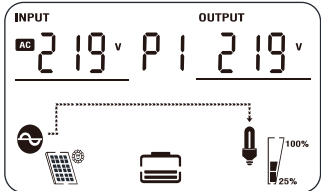
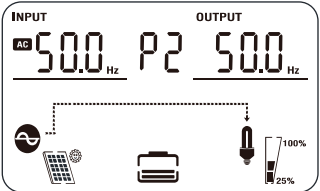
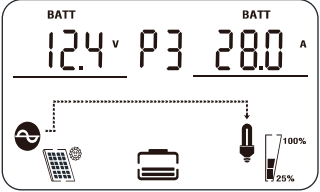
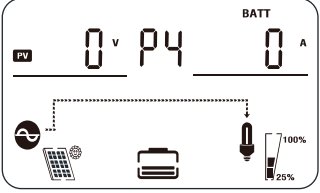
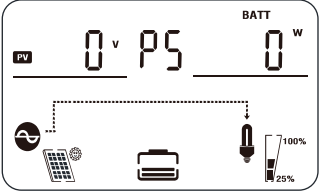
46	Low SOC Shutdown	65U 46 20% Set the inverter to shut down when the State of Charge (SOC) of the battery is low. Default setting is 20, with a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68. The alarm 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	56b 47 90% 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.

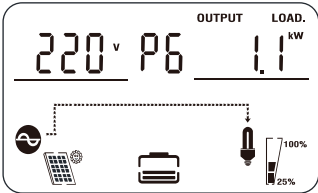
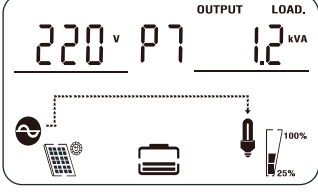
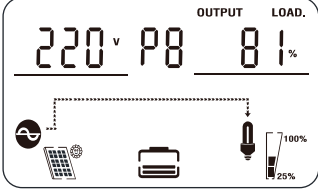
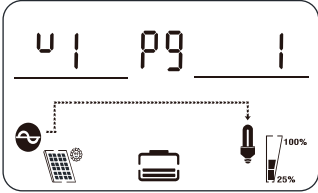
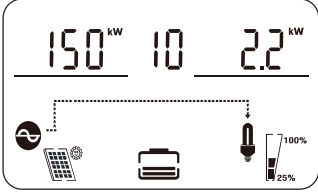
48	Low SOC to Grid	560 48 50% Set the SOC value for the inverter to switch to grid mode. The default setting is 50, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enabled, the inverter 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	Max.discharge current	nDC 61 OFF The default value is OFF. Available options: Off, 10, 15, 20, 25, 30,35,40,45, 50, 55,60, 65, 70,75, 80, 85, 90, 95, 100, 105, 110. When the battery current exceeds the set value in battery mode, an overload alarm 60 is triggered, and after 5 seconds, an overload fault 14 is reported. If the overload to bypass function is enabled in PBG mode, battery overcurrent will also trigger the overload to bypass logic. It can be set to OFF, and the inverter will no longer trigger overload faults or alarms based on battery current.

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
(A) AC Input voltage (B) Display page number (C) Output voltage (D) Battery capacity (E) Load percentage	 The LCD display shows the following information: INPUT AC 219 V, OUTPUT P1 219 V. Below the display, there are icons for a solar panel, a battery, and a light bulb. A dashed line connects the solar panel and battery icons to the light bulb icon, indicating a power flow. A battery capacity indicator shows 100% and a load percentage indicator shows 25%.
(A) AC Input frequency (B) Display page number (C) Output frequency (D) Battery capacity (E) Load percentage	 The LCD display shows the following information: INPUT AC 500 Hz, OUTPUT P2 500 Hz. Below the display, there are icons for a solar panel, a battery, and a light bulb. A dashed line connects the solar panel and battery icons to the light bulb icon, indicating a power flow. A battery capacity indicator shows 100% and a load percentage indicator shows 25%.
(A) Battery voltage (B) Display page number (C) Charge current (D) Battery capacity (E) Load percentage	 The LCD display shows the following information: BATT 12.4 V, P3 28.0 A. Below the display, there are icons for a solar panel, a battery, and a light bulb. A dashed line connects the solar panel and battery icons to the light bulb icon, indicating a power flow. A battery capacity indicator shows 100% and a load percentage indicator shows 25%.
(A) PV voltage (B) Display page number (C) PV charging current (D) Battery capacity (E) Load percentage	 The LCD display shows the following information: PV 0 V, P4 0 A. Below the display, there are icons for a solar panel, a battery, and a light bulb. A dashed line connects the solar panel and battery icons to the light bulb icon, indicating a power flow. A battery capacity indicator shows 100% and a load percentage indicator shows 25%.
(A) PV voltage (B) Display page number (C) PV power (D) Battery capacity (E) Load percentage	 The LCD display shows the following information: PV 0 V, P5 0 W. Below the display, there are icons for a solar panel, a battery, and a light bulb. A dashed line connects the solar panel and battery icons to the light bulb icon, indicating a power flow. A battery capacity indicator shows 100% and a load percentage indicator shows 25%.

(A) Output voltage (B) Display page number (C) Active power output (D) Battery capacity (E) Load percentage	
(A) Output voltage (B) Display page number (C) Apparent power output (D) Battery capacity (E) Load percentage	
(A) Output voltage (B) Display page number (C) Load percentage (D) Battery capacity (E) Load percentage	
Display software version	
(A) Total power generation (B) Display page number (C) Daily power generation (D) Battery capacity (E) Load percentage	
Parallel operation status	

After enabling BMS, the following pages are available.

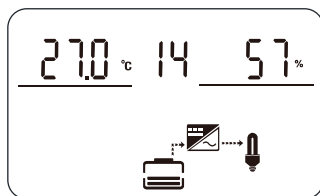
Network status of lithium battery.
When the upper right display shows SIG constant, the battery pack is operating as a single group; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple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



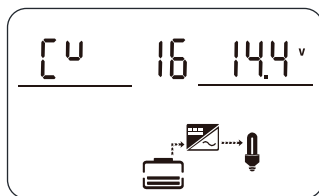
Lithium battery temperature and SOC; The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR



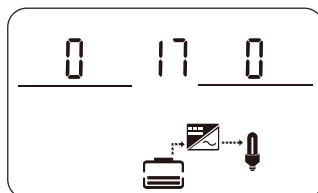
Lithium battery capacity; The upper left displays rated capacity; The upper right displays current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR



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

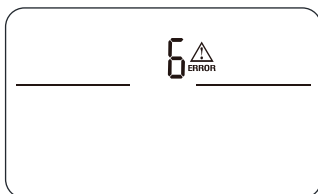


Lithium battery fault alarm information;
The upper left displays BMS alarm information;
The upper right displays BMS fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR



5. 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 restart automatically. If the machine does not work after six times restart, the machine and LCD display will always be 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 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.

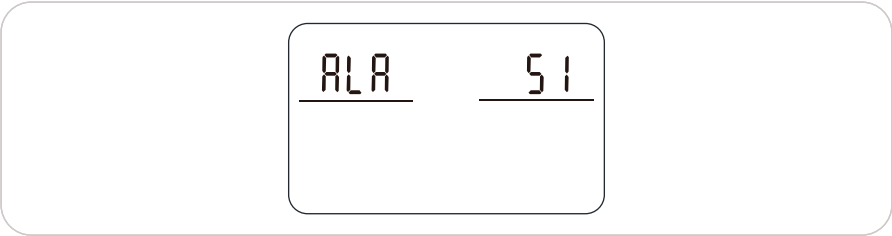
Fault code sheet

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.	Can restore.
2	Bus voltage high	Turn fault mode	The bus voltage is higher than protection point.	Can restore.
3	Bus voltage low	Turn fault mode	Bus voltage is below the under voltage protection point.	Can restore.
4	Battery over current	Turn fault mode	TZ interrupt triggered more than 2 times within 2ms.	Cannot restore.
5	Over temperature	Turn fault mode	The temperature exceeds the protection threshold or fan stuck.	Can restore.
6	Battery high voltage	Turn fault mode	Battery voltage is higher than set value.	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.	Can restore.

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
8	Bus short circuit	Turn fault mode	Inverter on or PFC on, bus voltage below threshold.	Can restore.
9	Inverter soft start fault	Turn fault mode	After a period of soft start, the inverter still cannot reach the rated output voltage.	Can restore.
10	INV over voltage	Turn fault mode	The inverter voltage is higher than the set value.	Can restore.
11	INV under voltage	Turn fault mode	In battery mode, the inverter voltage is lower than the set value.	Can restore.
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.	Can restore.
13	Negative power protection	Turn fault mode	In battery mode, the load power is lower than set value(negative power, such as -1200W).	Can restore.
14	Over load	Turn fault mode	Overload exceeds limit (list in specification).	Can restore.
26	BMS fault	Turn fault mode	Error code in BMS message.	Turn off BMS communication function or BMS fault recovery.
27	MCU fault	Turn fault mode	MCU error.	Cannot restore
29	INV TZ fault	Turn fault mode	In four consecutive half waves, with each half wave triggering more than 10 rapid overcurrent events.	Can restore

6. 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, battery does not charge.	Battery voltage is below 8V.	Restore after battery voltage >10V.
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.
52	Battery low voltage	Alarm	Battery voltage is below set point.	Restore after battery voltage recover.
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.
55	Battery over charge	Alarm, battery does not charge.	Battery voltage is higher than the set value.	Restore after battery voltage is < the set value - 0.5V
56	BMS disconnect	Alarm, lock standby mode.	No correct BMS communication response.	Restore after communication recover.

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
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.
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%.	Restore after load back to normal
68	SOC Under	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%.
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%.
71	Battery short circuit	Alarm	Battery short circuit is detected.	Cannot restore.
72	Battery start up lock	Alarm	Battery voltage do not reach 11.5V/piece(cell).	Can restore.

7. 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.

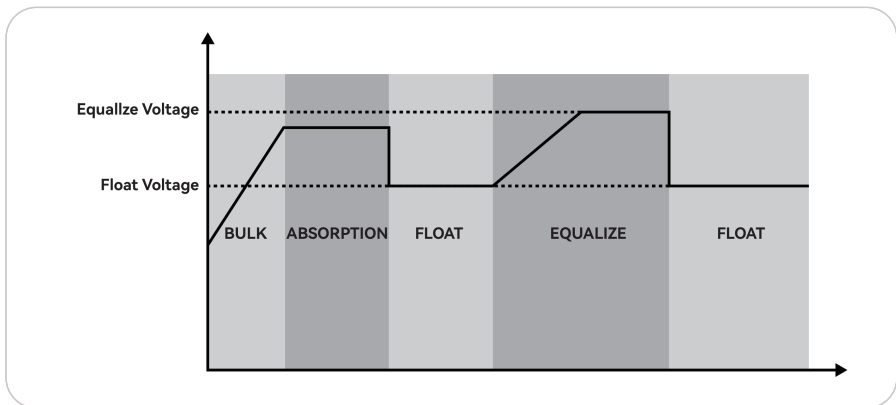
- How to Apply Equalization Function

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.

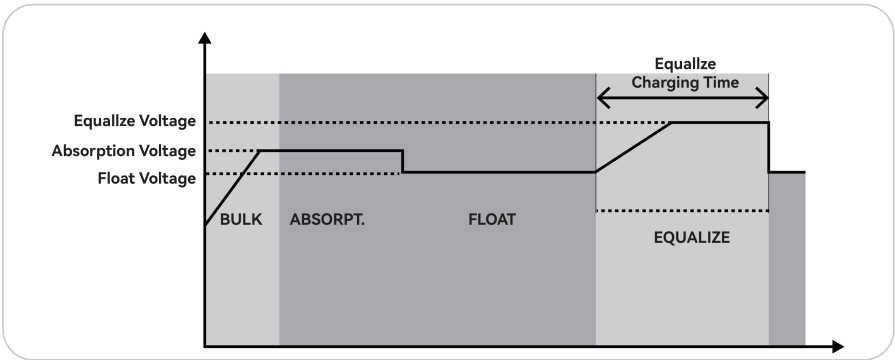
- When to Equalize

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

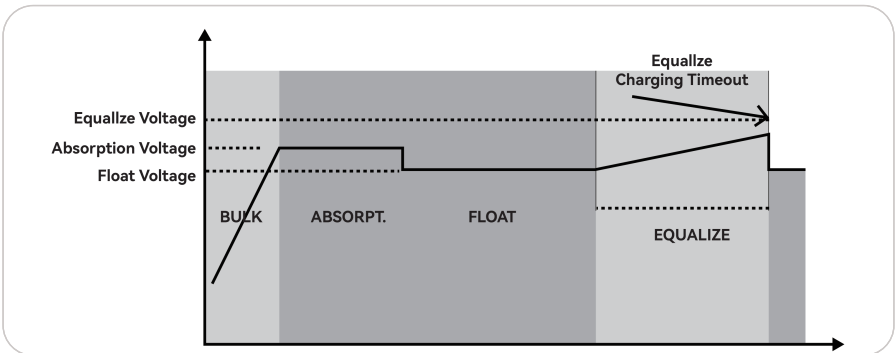


- Equalize charging time and timeout

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



8. 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 1.	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 $\geq 11.5V/N$ 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 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 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.
	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.

9.AC parameters

AC Input	
Rated Input Voltage (VAC)	208/220/230/240; L+N+PE
Voltage Range (VAC)	90~280 (APP mode); 170~280 (UPS mode)
Frequency (Hz)	50/60 (Auto Adaptive)
AC Output	
Rated Capacity (kW)	1.2 (Output Power rating will be reduced to 90%, when setting the Output Voltage to 208V)
Surge Power (kVA)	2.4
Voltage (VAC)	208/220/230/240
Power Factor (PF)	1
Frequency (Hz)	50/60±0.1%
Switch Time (ms)	10 (APP/UPS/GEN mode)
WaveForm	Pure SineWave
Overload Capacity (Battery Mode)	60s@102%~110%load; 10s@120%~200%load
Max. Efficiency (Battery Mode)	90%@12VDC
Charger(PV/AC)	
Solar Charger Type	MPPT
Max PV Input Current/Power	18A/800W
MPPT Range@Operating Voltage (VDC)	17~115
PV Start-up Voltage	20Vdc
Max PV Open Circuit Voltage (VDC)	115
Max PV Charge Current (A)	50
Max AC Charge Current (A)	50
Max. Charge Current (PV+AC) (A)	100
Battery	
Normal Voltage (VDC)	12
Battery Type	LiFePO4
General Data	
HMI	LCD
Interface	RS232
Monitoring	NA

10.DC parameters

Battery parameters	
Battery type	LiFePO4 12.8V
Battery voltage	12V
Capacity	100Ah
Charging current	≤50A
Discharging current	≤100A
Charging temperature	0~55°C
Discharging temperature	-20~60°C
Storage temperature	-30~60°C
DC Output	
USB Output	5V/2A x4
DC Output	12V/2.5A x4

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

