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File Name	Portable Power Station Technical Specification	Pages	16
Model	S2400	Valid Date	2023-02-25

S2400 Technical Specification



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Versions Upgrade Record

No.	Content	Edit	Version	Date
1	Initial version	王建国	V1.0	2022/02/25
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Introduction

This document mainly describes the detailed technical specifications and parameters of the S2400 (110V/230V) portable lithium-ion outdoor energy storage power supply, and clarifies the definitions of various interfaces, as well as parameter ranges and operating instructions.

1. Electrical Specification

This product is a portable energy storage power PCBA kit, including a bidirectional inverter board, a DC main control board, a BMS protection board, an MPPT charging board, a DC PV input port, and an AC charging port; 4 USB-A QC3.0 output ports, 2 Type-C output ports, 2 DC5521 output ports, 1 cigarette lighter output port, 1 DC5525 output port, 4 AC output ports

1.1 XT60 DC Input Parameter

Item	Min	Standard	Max	Remark
Input port				XT60 female shell male end
Input voltage range	11.5V	60V	100V	Charge stably during this voltage range
Input under-voltage protection	---	---	12V	The battery cannot be charged in an under-voltage state
Input over-voltage protection	---	---	100V	Stop charging when the input voltage is higher than this value, if the input voltage exceeds the hardware withstand voltage (120V), the charging module will be permanently damaged
Charging current	---	20A	20A	Intelligently identify MPPT
Charging power	---	---	1200W	Limit charging power $\leq 1200W$
Input reverse polarity protection	---	Yes	---	When the input is reversed, the system cannot be used, and start output protection
Input short circuit protection	---	Yes	---	When the input is short-circuited, the system cannot be used, and start output protection
Reverse protection	---	Yes	---	When not charging, the interface has no external voltage output
Charging temperature	---	---	---	When the battery temperature is higher than 55 degrees or lower than 0 degrees, stop charging
Conversion efficiency	---	93%	---	Tested by 60V input voltage

1.2.1 110V AC Input Parameter

Item	Min	Standard	Max	Remark
Input voltage range	90V	110V	130V	Charge stably during this voltage range
Input under-voltage protection	90V	---	---	The battery stop being charged under 90V input voltage
Charging current	---	---	15A	
Charging power	500W	1500W	1500W	Support simultaneous charging of mains power and PV, priority is given to photovoltaic charging, and the total power of simultaneous charging of mains power and PV is $\leq 2700W$
Input total power limit	---	1650W	---	Under 110V voltage input, when the power exceeds this power in UPS mode, the machine will start protection
Slow charge mode	---	500W	---	Press the button to switch to slow charging mode, slow charging is beneficial to battery lifespan

Input reverse polarity protection	---	Yes	---	
Input short circuit protection	---	Yes	---	
Conversion efficiency	---	90%	---	Tested by 110V input voltage
UPS	---	Yes	---	Switching time 20ms (AC output must be turned on when charging) When in UPS mode, charging power = total input power - output power, the minimum charging power is 300W

1.2.2 230V AC Input Parameter

Item	Min	Standard	Max	Remark
Input voltage range	180V	230V	260V	Charge stably during this voltage range
Input under-voltage protection	180V	---	---	The battery stop being charged under 180V input voltage
Charging current	---	---	10A	
Slow charge mode	---	500W	---	Press the button to switch to slow charging mode, slow charging is beneficial to battery lifespan
Charging power	500W	2000W	2000W	Support simultaneous charging of mains power and PV, priority is given to photovoltaic charging, and the total power of simultaneous charging of mains power and PV is $\leq 3300W$
Input total power limit	---	2300W	---	Under 230V voltage input, when the power exceeds this power in UPS mode, the machine will start protection
Input reverse polarity protection	---	Yes	---	
Input short circuit protection	---	Yes	---	
Conversion efficiency	---	90%	---	Tested by 230V input voltage
UPS	---	Yes	---	Switching time 20ms (AC output must be turned on when charging) When in UPS mode, charging power = total input power - output power, the minimum charging power is 300W

1.3 QC3.0 USB-A Output Parameter

Item	Min	Standard	Max	Remark
Port type	---	USB-A	---	Port quantity is 4PCS with individual output for each
Protocol	---	QC3.0	---	Support QC3.0/2.0 protocol, discharge 18W Max
Output voltage range	4.75V	5V	5.25V	The product automatically recognizes the QC protocol and outputs the corresponding voltage to meet the current requirements: 5V/3A; 9V/2A; 12V/1.5A
	8.55V	9V	9.45V	
	11.65V	12.0V	12.65V	
D+ Voltage	2.60V	2.70V	2.75V	Product port voltage under no-load output condition
D- Voltage	2.60V	2.70V	2.75V	Product port voltage under no-load output condition
Automatic	---	Yes	---	Load output current according to different protocols

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Identification				
Port output ripple	---	---	150mVp-p	The rated input and rated load oscilloscope bandwidth is set to 20MHz, and the test terminal is connected in parallel with 0.1uF ceramic and 10uF electrolytic capacitors
Rated output current	---	5V3A	---	Work stably for a long time under load current <3A
	---	9V2A	---	Work stably for a long time under load current <2A
	---	12V1.5A	---	Work stably for a long time under load current <1.5A
Single port efficiency	---	≥85%	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Over load protection	3.1A	---	4A	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the USB button after removing the load
	2.1A	---	4A	
	1.6A	---	4A	
Short circuit protection	---	Yes	---	The output is short-circuit protected and turns off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the USB button after removing the load
Plug&play	---	No	---	Need to manually press the USB button to output

1.4 Type-C Output Parameter

Item	Min	Standard	Max	Remark
Port type	-	Type C	-	Port quantity is 2PCS
Protocol	-	PD3.0	-	Discharge 100W Max
Output voltage range	4.75V	5V	5.25V	Products within this voltage range can charge stably. The product automatically recognizes the PD3.0 (100W) protocol and outputs the corresponding voltage
	8.55V	9V	9.45V	
	11.50V	12V	12.50V	
	14.25V	15V	15.75V	
	19.00V	20V	21.00V	
D+ Voltage	---	Automatic	---	Product port voltage under no-load output condition
D- Voltage	---	Automatic	---	Product port voltage under no-load output condition
Port output ripple	---	---	200mVp-p	The rated input and rated load oscilloscope bandwidth is set to 20MHz, and the test terminal is connected in parallel with 0.1uF ceramic and 10uF electrolytic capacitors
Rated output current	---	5V/9V/12V/15V 3A	---	Work stably for a long time under load current <3A
	---	20V5A	---	Work stably for a long time under load current <5A
Single port efficiency	---	≥85%	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Over load protection	3.1A	5V/9V/12V/15V	4A	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the USB button after removing the load
	5.1A	20V	5.5A	
Short circuit protection	---	Yes	---	The output is short-circuit protected and turns off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the USB button after removing the load

Automatic Identification	---	Yes	---	Load output current according to different protocols
--------------------------	-----	-----	-----	--

Plug&play	---	No	---	Need to manually press the USB button to output
-----------	-----	----	-----	---

1.5 DC12V Output Parameter

Item	Min	Standard	Max	Remark
Output voltage range	12.5V	13.5V	14.0V	Full loaded voltage $\geq 12V$
Output ripple voltage	----	----	200mVp-p	The rated input and rated load oscilloscope bandwidth is set to 20MHz, and the test terminal is connected in parallel with 0.1uF ceramic and 10uF electrolytic capacitors
Rated output current	----	10A	---	Work stably for a long time under load current $< 10A$
Rated output efficiency	----	$\geq 85\%$	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Over load protection	10.1A	---	12A	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the DC button after removing the load
Short circuit protection	----	Yes	----	The output is short-circuit protected and turns off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the DC button after removing the load
DC12V+Cigarette Lighter Output	----	15A	----	DC12V+Cigarette Lighter total output 180W

1.6 Cigarette Lighter Output Parameter

Item	Min	Standard	Max	Remark
Output voltage range	12.5V	13.5V	14.0V	Full loaded voltage $\geq 12V$
Output ripple voltage	---	---	200mVp-p	The rated input and rated load oscilloscope bandwidth is set to 20MHz, and the test terminal is connected in parallel with 0.1uF ceramic and 10uF electrolytic capacitors
Rated output current	---	10A	---	Work stably for a long time under load current $< 10A$
Rated output efficiency	---	$\geq 85\%$	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Over load protection	10.1A	---	12A	Full loaded voltage $\geq 12V$
Short circuit protection	---	Yes	---	Output over-current protection status and turn off the output. The triangular warning light on the display screen is always on/the DC indicator icon is flashing. After the load is removed, short press the DC button to exit and then clear

1.7 DC24V Output Parameter

Item	Min	Standard	Max	Remark
Output voltage range	23.5V	24V	25.0V	
Output ripple voltage	---	---	200mVp-p	The rated input and rated load oscilloscope bandwidth is set to 20MHz, and the test terminal is connected in parallel with 0.1uF ceramic and 10uF electrolytic capacitors
Rated output current	---	5A	5.5A	Work stably for a long time under load current <5A
Rated output efficiency	---	≥85%	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Over load protection	5.1A	---	5.7A	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the DC button after removing the load
Short circuit protection	---	Yes	---	The output is short-circuit protected and turns off the output. The error code will be displayed on the display screen, and it will be cleared by short pressing the DC button after removing the load
DC24V+PD Output	---	15A	---	DC24V+PD total output 220W

1.8 AC110V Output Parameter

Item	Min	Standard	Max	Remark
Output voltage range	100V	110V	120V	
Frequency	59Hz	60Hz	61Hz	±3Hz
Waveform	---	Pure sine wave	---	No load and rated load
Rated power	---	2400W	---	
Rated output efficiency	---	≥88%	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Power factor	---	0.98	---	
Over load protection	2450W	---	4000W	Load power ≥2450W constant power mode starts, the output voltage starts to drop, and when the output voltage drops to 0.75*rated voltage, the AC output is turned off
Short circuit protection	---	Yes	---	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by restart the AC button after removing the load
Inverter over temperature	90℃	---	100℃	
Standby power consumption	15W	--	25W	No-load output status

1.9 AC230V Output Parameter

Item	Min	Standard	Max	Remark
Output voltage range	200V	230V	240V	
Frequency	49Hz	50Hz	51Hz	±3Hz
Waveform	---	Pure sine wave	---	No load and rated load
Rated power	---	2400W	---	
Rated output efficiency	---	≥88%	---	Rated input, rated load, test requirements: average efficiency at four points of load current 25%, 50%, 75%, and 100%
Power factor	---	0.98	---	
Over load protection	2450W	---	4000W	Load power ≥2350W constant power mode starts, the output voltage starts to drop, and when the output voltage drops to 0.75*rated voltage, the AC output is turned off
Short circuit protection	---	Yes	---	Output over-current protection status and turn off the output. The error code will be displayed on the display screen, and it will be cleared by restart the AC button after removing the load
Inverter over temperature	90℃	---	100℃	
Standby power consumption	15W	--	25W	No-load output status

1.10 Battery Pack Parameter

Item	Min	Standard	Max	Remark
Battery cell type	---	---	---	Lithium manganese iron phosphate (LMFP)
Battery voltage	---	3.75V	---	
PACK type	---	---	---	13 String 2 Parallel
Single cell capacity	20Ah	21Ah	22Ah	Under 20℃, it's 0.5C charging and 1C discharging
Battery capacity	40Ah	42Ah	43Ah	The actual usable capacity is about 95% of the rated capacity, subject to the highest measured discharge efficiency
Power estimation accuracy	---	---	5%	SOC maximum tolerance is 5%
Overcharge voltage protection	4.18V	4.20V	4.21V	Single cell overcharge protection voltage
Overcharge release voltage	4.1V	4.15V	4.15V	Single cell overcharge protection recovery voltage
Over discharge voltage protection	2.7V	2.75V	2.8V	Single cell over-discharge protection voltage
Over discharge release voltage	2.75V	2.80V	2.85V	Output terminal voltage under no-load condition
Discharge overheating	58℃	60℃	65℃	When the battery is discharging, the output will be turned off when the continuous temperature is above 60℃

Charging overheating	50℃	50℃	55℃	When the battery is charging, the input will be turned off when the continuous temperature is above 50℃
Battery full charge voltage	54V	54.60V	54.75V	Battery voltage after standing for 1 hour
Output over-current protection	150A	---	300A	The output terminal of the protection board is over current protected, and the protection board closes the output. Rechargeable activation after over current release
Internal resistance	---	---	100m Ω	String internal resistance after parallel connection (internal resistance between B+ and B-)
Sleep current	---	---	50uA	Current consumption after the system has fully entered shutdown and sleep

1.11 Temperature Requirements & Others

Item	Min	Standard	Max	Remark
Discharge high temp protection	58℃	60℃	65℃	When the temperature of the battery cell is higher than this value, the output turn off
Discharge high temp release	50℃	55℃	60℃	When high temperature protection, the output be restored after the temperature drops to the recovery value
Storage temp	-20℃	---	60℃	Product does not work, it's the temperature range for storage
Storage humidity	10%	---	90%	Product does not work, it's the humidity range for storage
Working temp	-20℃	---	50℃	Ambient temperature for product normal operation
Working humidity	10%	---	90%	Ambient humidity for product normal operation
LED lighting	---	6W	---	Warm white, 2 levels brightness, SOS mode
Power saving mode	---	Yes	---	When all interfaces are closed, product will sleep and shut down in 3 minutes
Total system standby power consumption	---	---	≤5W	The total power consumption when the system is powered on without any output
Fan noise	---	---	≤75dB	The maximum working noise of the fan
Total output power	≥3000W	---	---	All interfaces in total
Simultaneous charge and discharge function	---	Yes	---	When the mains supply input, the bypass mode is used for simultaneous charging and discharging. When MPPT input, normal inverter output
Power off to charge	---	Yes	---	
Low battery mode	---	Yes	---	Turn off the AC output when the power down to 3%, and turn off all outputs when it is 0%

1.12 Button Functions

Button	Control	Description
POWER	Short press	Short press the POWER button to turn on, and short press the POWER button to turn off the screen when it is on.
	Long press 2S	Press and hold the POWER button for 2s to turn off in the power-on state

AC	Long press 2S	Press and hold the AC button for 2 seconds to turn on/off the AC output
	Press 5 times continuously	When the AC is on, press the AC key 5 times continuously to switch the frequency. The AC will automatically restart after frequency switching.
DC	Short press	Short press DC button to turn on/off DC12V and DC24V output.
USB	Short press	Short press the USB button to turn on and off the USB and PD output
LED	Short press	Press and hold for 2 seconds to turn on the LED (there is a delay of a few seconds to turn on the LED for the first time)
	Short press	When the LED is on, short press to switch 4 modes: high light, low light, SOS, flash
Auxiliary parallel connection	Off status	Parallel connection is only supported when the power is turned off. Does not support parallel operation under power-on or running status
Auxiliary machine turn on/off	Parallel connection status	Turn on the host switch directly to start the auxiliary machine
Auxiliary machine turn on/off	Non parallel connection status	Just turn on the auxiliary machine switch directly. To turn off, you need to press and hold the auxiliary ON/OFF key for 4 seconds
Once hearing the buzzer beeps when press any button, it indicates the operation has been successful		

2. Structural Specification

2.1 Materials & Package

Shell material	Aluminum alloy + Plastic (ABS+PC V0 flame retardant)
Dimension	432MM*296MM*334MM (Handle incl.)
N.W.	28.9kg
G.W.	30.7kg
Carton Size	525*385*455mm
Qty/carton	1pc/carton

2.2 Certificates

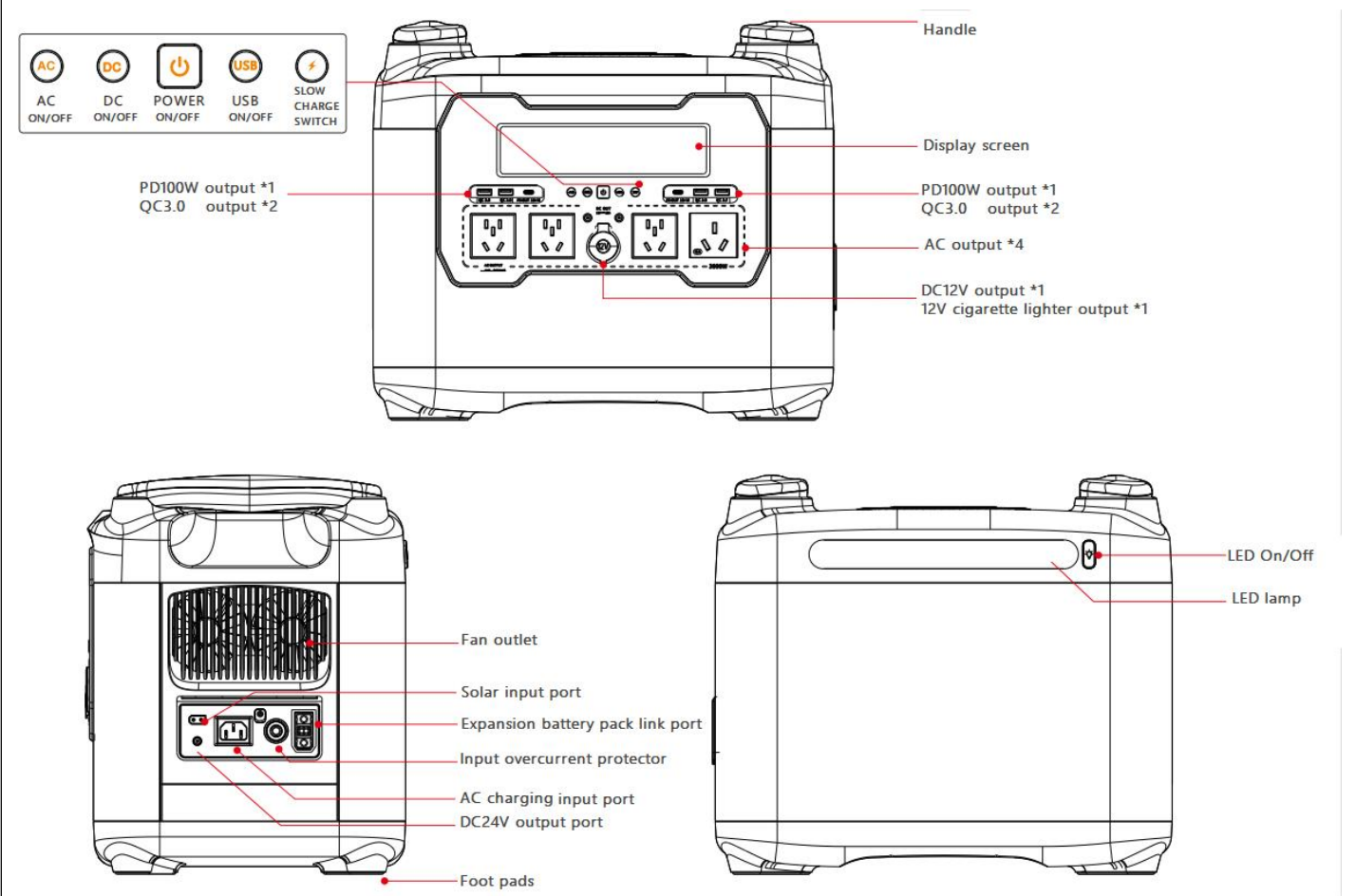
Certificates List	
Shipping Certification	UN38.3, MSDS, Sea/Air/Land/Dangerous Identification & Classification Report
CE	CE-EMC CE-LVD
FCC	FCC FCC-ID
PSE	Round icon PSE, METI back up
IP44	
ROHS	
UL report	UL2743 test report
UKCA	UKCA-EMC UKCA-LVD
Quality inspection report	

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2.3 Six-sided View

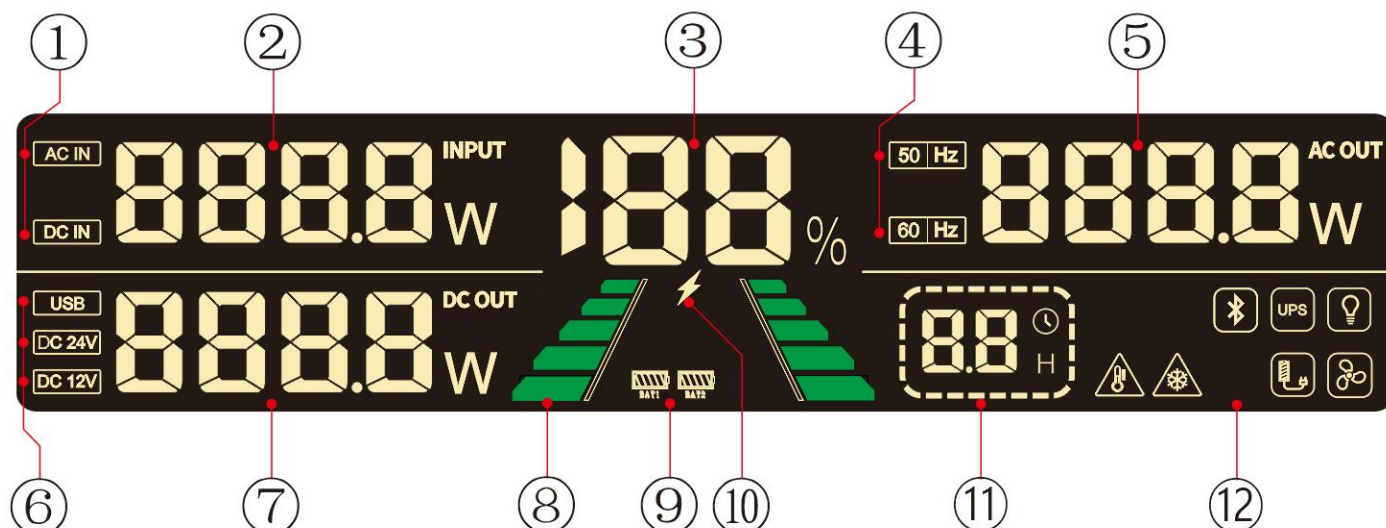


2.4 Interface Diagram



3. Display & Operation

3.1 Display Screen



Display instruction

①	AC/DC(solar) input icon is always on when charging
②	Display charging input power. When AC+DC is charging at the same time, the total power is displayed
③	Display battery remaining percentage
④	Display AC output frequency
⑤	Display AC output power
⑥	USB/DC12V/DC24V output icon. When the corresponding output interface is turned on, the icon is always on
⑦	Display DC output power. When USD+DC12V+DC24V is charging at the same time, the total power is displayed
⑧	5 levels battery power display
⑨	Expansion pack battery. Steady light on indicates that the corresponding expansion package has been linked
⑩	Fast charging icon. It means fast charging mode if it is displayed; if not, it means slow charging mode
⑪	Display estimated remaining usage time
⑫	The icon is displayed once the Bluetooth successfully connected
	The icon is displayed when UPS function work
	The icon is displayed when turn on the LED light
	High temp warning icon is displayed when reaching the set high temp protection value
	Low temp warning icon is displayed when reaching the set low temp protection value
	Expansion pack battery icon is displayed when expansion pack battery successfully connected
	Fan icon is displayed when fan work

3.2 Error Code

Error code instruction

Code	Error	Error Code Removal
E01	DC output overload	After the load is removed, short press the DC button to resume output
E02	DC output short-circuit	After the load is removed, short press the DC button to resume output
E03	AC output overload or short-circuit	After the load is removed, long press and hold the AC button for 2S to resume output
E04	AC output over temperature	Clear the error code after detecting that the AC temperature returning to a normal value
E05	AC output over voltage	
E06	AC output low voltage	
E07	PD output overload or short-circuit	After the load is removed, short press the USB button to resume output
E08	USB-A output overload or short-circuit	After the load is removed, short press the USB button to resume output
E09	DC input over voltage, stop DC charging	Clear the error code after detecting that the DC charging voltage working in normal voltage range
E010	DC input low voltage, stop DC charging	Clear the error code after detecting that the DC charging voltage working in normal voltage range
E011	AC input over voltage, stop AC charging	After the AC input voltage returns to the normal voltage range, reinsert the charging port
E012	AC input low voltage, stop AC charging	After the AC input voltage returns to the normal voltage range, reinsert the charging port
E013	Battery over temperature	Clear the error code after detecting that the battery temperature has returned to the normal charging/discharging temperature range
E014	Battery low temperature	Clear the error code after detecting that the battery temperature has returned to the normal charging/discharging temperature range
E015	Battery over temperature during charging/discharging	After detecting that the battery temperature has returned to the normal temperature range for charging and discharging, unplug and plug the charging cable again to clear the error code
E183	Expansion pack battery connection failure	Turn off the product, unplug and plug the expansion pack battery connection cable again then restart

3.3 Charging Time

Charging time

AC fast charging mode	About 1.2 hours (10-40℃ ambient temperature), reduce charging power in low and high temperature environments
MPPT charging	About 2 hours (Sufficient sunlight and sufficient power of solar panels)
AC+MPPT simultaneous charging	About 1 hour (10-40℃ ambient temperature)
AC slow charging mode	About 4 hours
12V DC charging	About 25 hours
24V DC charging	About 13 hours

3.4 Fan Logic & Temperature

Temperature protection

Invert board	95-100℃
MPPT board	85-90℃
BMS board	85-90℃
Battery cell discharging	-20-60℃
Battery cell charging	0-55℃

Fan logic

AC slow charging mode	2 nd speed
AC fast charging mode	4 th speed
MPPT charging	2 nd speed
DC output	Total power output over 120W, it turns on 1 st speed fan. Once down to 100W, the fan turns off
AC output	Power control: turns on 1 st -3 rd speed over 600W, forcibly turns on 4 th speed over 2100W
	Fan speed adjustment control ways: Turn off below 45℃; 1 st speed at 45-55℃; 2 nd speed at 55-65℃; 3 rd speed at 65-70℃; 4 th speed over 70℃