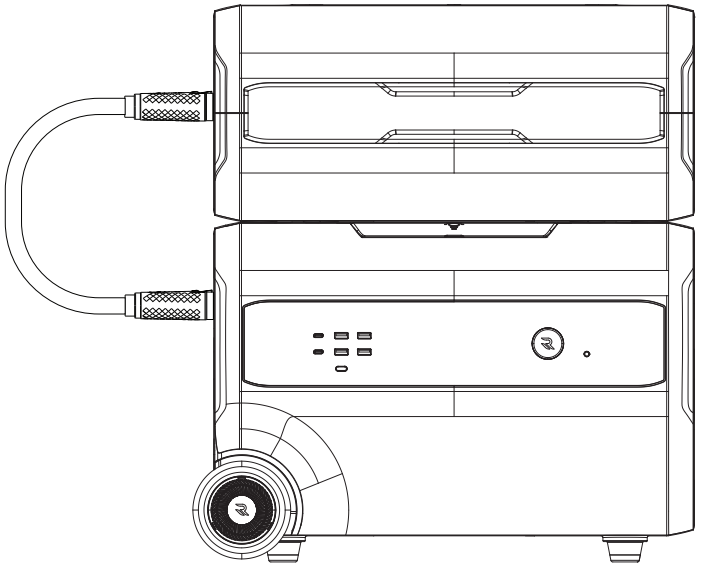
English

RUNHOOD

RESIDENTIAL ESS & PORTABLE POWER STATION

USER MANUAL

2400-EU



RUNHOOD

IOS Android

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Version: EU_2024_06

IMPORTANT SAFETY INFORMATION

To ensure safe operation and service of the meter, read and be sure to understand all instructions.
Failure to follow all instructions may result in severe injury or property damage.
Any loss caused by incorrect use of product is not covered by our Warranty.

IMPORTANT SAFETY INSTRUCTIONS

The connector plug shall incorporate a fuse or other protective device having a current rating not greater than 16 A.

WARNINGS REGARDING RISK OF FIRE, ELECTRIC SHOCK, AND INJURY TO PERSONS

When using this product, basic precautions should always be followed, including the following:
1) Read all the instructions before using the product.
2) To reduce the risk of injury, close supervision is necessary when the product is used near children.
3) Do not put fingers or hands into the product.
4) Use of an attachment not recommended or sold by power pack manufacturer may result in a risk of fire, electric shock, or injury to persons.
5) To reduce risk of damage to the electric plug and cord, pull the plug rather than the cord when disconnecting the power pack.
6) Do not use a battery pack or appliance that is damaged or modified. Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury.
7) Do not operate the power pack with a damaged cord or plug or a damaged output cable.
8) Battery Maintenance:
a) Do not disassemble the power pack.
b) Take device to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of fire or electric shock.
c) When replacing batteries, replace with the same type and number of batteries or battery packs.
d) CAUTION: Do not dispose of batteries in a fire. The batteries may explode.
e) CAUTION: Do not open or damage batteries. Chemical components inside may be toxic and harmful for contact with skin or eyes.
9) To reduce the risk of electric shock, unplug the power pack from the outlet before attempting any instructed servicing.
10) Warning Risk of Explosive Gases:
To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of the battery. Review cautionary warnings on these products and on device.
11) Personal Precautions:
a) If working on battery, wear protection for eyes and clothing. Avoid touching eyes while working near battery.
b) Never smoke or allow a spark or flame in vicinity of battery.
c) Be extra cautious to reduce risk of dropping a metal tool onto battery. Foreign metal objects introduced to the internal components may cause a spark or short circuit risking combustion.
12) Do not expose device to fire or excessive temperature. Exposure to fire or temperature above 130°C may cause combustion.
13) Have servicing performed by a qualified repair person using only identical replacement parts. This will ensure that the safety of the product is maintained.
14) Do not use the product over its output rating. While the device is equipped with built-in overload protection, overload outputs above rating present a risk of fire or injury.
15) Do not expose the product to moisture, rain, or snow.
16) Do not charge, use, or store the product in a bathroom or an area exposed to rain or moisture.
17) Do not leave children, persons with reduced physical, sensory, or mental capabilities alone with product. Be sure to give proper supervision or instruction to any person using the device to ensure their safety.
18) Do not place the product on its side or upside down while in use or storage. If rust, odor, overheating, or other abnormal circumstances are observed, stop using and contact customer service.
19) The accessories included in the box should only be used with the product.

SAVE THESE INSTRUCTIONS

MAINTENANCE
Recharge as needed. There are no pre-designated intervals at which to recharge as long as the product is being used regularly. Avoid discharging completely on a regular basis, as this can impact overall life. Periodically inspect all ports and wall chargers for any debris, dirt, damage, and corrosion. DO NOT attempt to fix it. DO NOT cover the product with towels, clothing, or other items. Regularly observe if the side vents are collecting dirt or dust and clean following cleaning procedures noted in manual.

CLEANING
Be sure that product is disconnected from all input power sources and output devices. Use a clean, dry, soft, lint-free cloth to wipe device down. Remove any debris, dirt, or other blockage from both side vents. When cleaning debris from the side vents, do not allow the debris, dirt, or other blockages to enter the body of product.
DO NOT use abrasive cleaners or solvents.
DO NOT use compressed air to clean side cooling vents, as this will force foreign particles into the internal circuitry.
To avoid the risk of electrical shock, DO NOT use metal objects to clean ports.

STORAGE

If storing for more than one month, charge completely before storage and recharge approximately every 3 months to avoid full discharge and possible damage. Store indoors, in cool temperatures, low humidity, and away from direct sunlight. Leaving in a vehicle or other confined spaces in extremely hot temperatures can lead to decreased service life, overheating, and fire. Extreme cold conditions below specific storage range can also harm product performance and service life. Keep away from corrosive chemicals and gasses. After taking out of storage, visually inspect to make sure product and all accessories look satisfactory. Be sure to inspect the intake and exhaust vents to ensure they are clear of debris. Allow product to return to ambient conditions before recharging or powering other devices.

	Not permitted on aircrafts.		Avoid dropping.
	To preserve the battery lifespans, please use and recharge at least once every three months.		Do not disassemble.
	Use original or certified charger and cables.		While water resistant, device is not water proof.Avoid exposure to liquids
	Avoid extreme temperature.		Please follow local regulations when disposing of batteries and electronic goods

WARNING SYMBOL DESCRIPTION	
	Risk of combustion
	Keep the battery away from open flame or ignition sources
	High voltage warning. Risk of serious injury due to high voltage inside energy storage system.
	Danger. Risk of electric shock!
	Do not touch the product in 5mins after shutdown.
	CE certification.
	Please read enclosed documentation carefully before using the product.
	Product can not be disposed with common household waste in the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please recycle responsibly to promote sustainable reuse of material resources. Follow all local regulations when disposing of product.
	The battery string must be waterproof and moisture-proof.

Contents

1 PRODUCT DEFINITION

1.1 APPLICATION SCENARIOS

Application Scenario One: Supports input methods such as AC charging, PV charging, and vehicle charging. Supports DC output such as USB, DC 12V/10A and AC output. Can be moved and stacked for use.
Application Scenario Two: Used as a balcony photovoltaic, supporting grid connection function.
Application Scenario Three: As a home energy storage battery pack, it can be matched with hybrid inverters for use.

1.2 F2400

Composed of battery pack, inverter, DC interface, parallel interface, etc.

1.2.1 PRODUCT APPEARANCE

Figure 1-1
Appearance Diagram of F2400 Product

1.2.2 SPECIFICATION PARAMETERS

F2400		
Battery	Cell specifications	LiFePO4(LFP64151，50Ah)
	Cell model	LFP64151/50Ah
	Grouping method	15S1P
	Electricity level	2400Wh
	Rated current	Charging：40A；Discharge：50A
	Maximum current	Charging：40A；Discharge：80A
	Voltage range	40.5-54Vdc
	Temperature range	Charging：-15℃~55℃；Discharge：-25℃~55℃
	Number of cycles	8000 cycles to 70%+ capacity@25℃
Lcd screen	LCD	Support(Broken code screen)
Lamp	LED	Support(Flip)
Key	Key1	Main power switch on/off
	Key2	AC on/off
	Key3	DC on/off
	Key4	Wi-Fi Reset
PV	Input	PV Input Voltage 60Vdc Max.
		PV MPPT Voltage Range 12~58Vdc
		PV Input Current 25A Max.
		PV Input Power 1200W Max.
		ISC PV (Absolute maximum) 29A
	OVC category	DC: OVC II
DC	Input	Rated 12–60Vdc, Supports the Maximum Voltage of 150V, DC 15A, 1200W Max.
	Output	USB-A(*2) 5V/2.4A 12W Max.
		USB-A(*2) QC3.0 5V/3A, 9V/3A, 12V/2.4A, 28W Max.
		USB-C(*2) PD3.0 5V/3A, 9V/3A, 15V/3A, 20V/5A, 100W Max.
		Car Port 12V/10A, 120W Max.
AC	Maximum inverter backfeed current to the array	0 A
	Input	European regulations 230Vac， 50Hz， 10A，1800W Max.
	Output	European regulations 230Vac, 50Hz, total 2400W Max. (Socket*4 & Back-Up*1)
	On-grid	European regulations 230Vac, 50Hz, 2400W Max.
	Current (Nominal or range)	10.4A
	Current (Inrush)	20.8A
	Power (Maximum continuous)	2400W
	Maximum output fault current	26A
	Maximum output overcurrent protection	26A
	Grid frequency range	50Hz
	Power factor range	-0.8(Lagging) ~ 0.8(Leading)
	OVC category	AC: OVC III
	Protection class	I
Wi-Fi /Bluetooth	Support	
Extra battery port(*2)	Power and Communications	
Extra battery packs quantity	8 Max.	
External communication	RJ45 *3 Com1:Hybrid inverter/EMS/ Bidirectional electricity meter /CT Com2: Debugging/Inverter Com3: Dry junction	

Grounding point	Grounding identification
DIP switch	Terminal resistance
Grid switch	ON：on-grid ; OFF：off-grid
Topology	Isolated
Operating ambient temperature range	-20℃~40℃
Relative humidity	0~80%Rh
Ingress protection /IP	IP20
Noise emission {Typical}	40dB
Cooling concept	Fan cooling
Pollution degree	PDII
Max operation altitude	2000m
Weight	29kg
Dimensions	503mm*323mm*344mm

1.2.3 BASIC FUNCTION

As shown in the following figure：

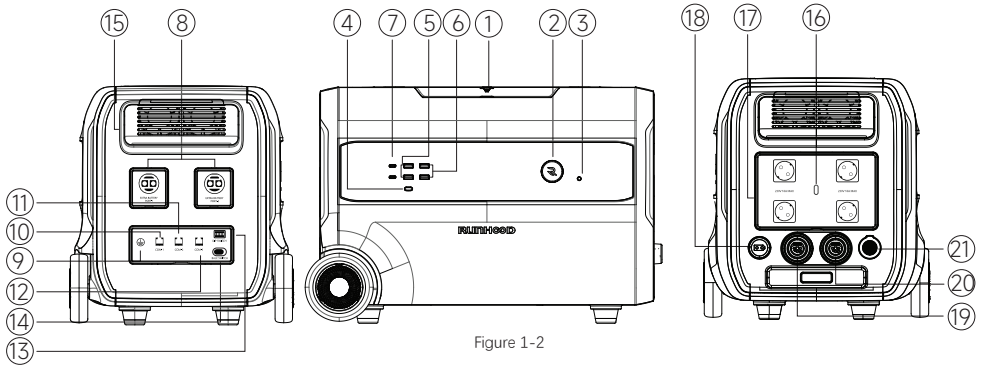


Figure 1-2

1.LED Lighting

Flip up the flap to turn on the LED light. The light intensity can be adjusted through the app.

2.Main Power Switch ON/OFF

To turn on the Runhood F2400 home/mobile energy storage power supply, press the main power button for 1.5 seconds until you hear a beep. To shutdown the device, long press the power button for three seconds, wait for the beep, and release the button. If device is unable to shutdown normally, press and hold the power button for ten seconds until you hear three beeps in succession. This will force the device to power off. When the Runhood F2400 home/mobile energy storage power is turned on, the LCD display screen will light up. If the power supply is idle for 2 minutes, the LCD display screen will decrease in brightness. If the home/mobile energy storage power is idle (All output switches are turned off and the device is not charging) for more than 5 minutes, the Runhood F2400 home/mobile energy storage power will automatically shut down. Users can adjust the idle time before entering power save modes by using the Runhood App.

When connected to B2400, B2400 will remain in the same open or closed state as F2400.

3.Wi-Fi Reset Switch

After clicking, the device's network configuration information can be cleared. F2400 will disconnect from the Wi-Fi connection. If you need to connect to the internet, you need to use the app to reconfigure the network.

4.DC and USB Output Switch ON/OFF

Press the DC&USB output switch button to turn on or off the DC output and USB output of Runhood F2400 home/mobile energy storage power supply, and light up the button indicator light. This button controls the output of the USB output port and cigarette lighter port of the Runhood F2400 home/mobile energy storage power supply.

5.USB-A*2 DC 28W

It can be used to charge various appliances through USB ports, with a maximum output of 28W per port (Appliances that support QC3.0 charging protocol).

6.USB-A*2 DC 12W

It can be used to charge various appliances charged through USB ports, with a maximum output of 12W per port.

7.USB-C*2 DC 100W

It can be used to charge various appliances, such as smartphones, tablets, cameras, speakers, and other appliances that can be charged through USB-C ports. The maximum output power of each USB-C port is 100W (For appliances that support the PD3.0 charging protocol).

NOTE: When adjacent USB-A 28W and USB-C 100W are used simultaneously, they enter the shared state. The USB-A and USB-C ports in shared mode output 5V, with a total maximum output power of 30W (5V, 6A).

8.DC Parallel Connection Port PORT-1、PORT-2

The parallel ports are used to connect to the dedicated parallel connection cable of Runhood during the DC parallel connection of the product, to expand the capacity of the battery pack. PORT-1 is connected to the front product, and PORT-2 is connected to the rear product.

DC parallel connection port (PORT-1), port (Orange) containing wires and communication wires, has different functions in different scenarios:

1)When F2400 is used for home energy storage applications, this port is connected to the battery port of the Hybrid inverter.

2)During DC parallel operation, this port is connected to the lower connection port of the front F2400. The schematic diagram and pin definitions are as follows:

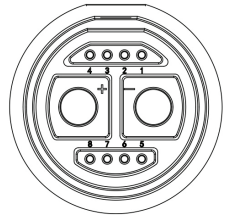


Figure 1-3

Schematic Diagram of DC Parallel Connection Port (PORT-1)

DC Parallel Connection Port (PORT-1) Pins Description

Number	Identification	Description
+	P+	Connect the positive electrode of the battery module in series
-	P-	Connect the negative electrode of the battery module in series
1	CAN0_H	Parallel communication CAN-H
2	CAN0_L	Parallel communication CAN-L
3	M_TX	Signal transmission through uplink communication
4	M_RX	Signal transmission through uplink communication
5	GND	Ground
6	SYN_ON	System start signal
7	M_DET	Signal detection for uplink access
8	GND	Ground

DC parallel connection port (PORT-2), port (Black) containing wires and communication wires, connects to the upper connection port of F2400 or B2400. The schematic diagram and pins definitions are as follows:

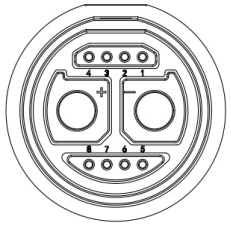


Figure 1-4

Schematic Diagram of DC Parallel Connection Port (PORT-2)

DC Parallel Connection Port (PORT-2) Pins Description

Number	Identification	Description
+	P+	Connect the positive electrode of the battery module in series
-	P-	Connect the negative electrode of the battery module in series
1	CAN0_H	Parallel communication CAN-H
2	CAN0_L	Parallel communication CAN-L
3	S_RX	Signal transmission through downlink communication
4	S_TX	Signal transmission through downlink communication
5	S_DET	Signal detection for downlink access
6	SYN_ON	System start signal
7	GND	Ground
8	GND	Ground

9.Grounding Screw

1) When the device is used for household energy storage applications, a grounding screw should be reserved and grounded if needed.
2) When the device is used in portable energy storage applications and grid connected applications, if the voltage of the solar panel exceeds 60V, it needs to be grounded.

10.Hybrid inverter or EMS Communication Port COM-1

When the device is used in home energy storage application scenarios, this port is connected to the home storage hybrid inverter for communication, and the communication method is CAN.

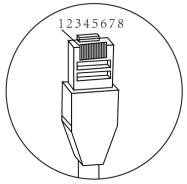


Figure 1-5

Schematic Diagram of Hybrid inverter Communication Port COM-1

Hybrid inverter Communication or EMS Port (COM1) Pins Description

Number	Identification	Description
1	RS485_B_CT	CT module RS485-B
2	RS485_A_CT	CT module RS485-A
3	RS485_B_EMS	EMS module RS485-B
4	CAN_H	Hybrid inverter module CAN-H
5	CAN1_L	Hybrid inverter module CAN-L
6	RS485_A_EMS	EMS module RS485-A
7	RS485_A	Hybrid inverter module RS485 A
8	RS485_B	Hybrid inverter module RS485 B

11.Debugging Communication Port COM-2

This port is for professional technical maintenance personnel to use.

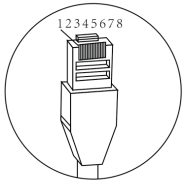


Figure 1-6
Schematic Diagram of Debugging Communication Port COM-2

Debugging Communication Port Pins (COM2) Description

Number	Identification	Description
1	CAN0_H	Debugging communication CAN_H
2	CAN0_L	Debugging communication CAN_L
3	GND	Ground
4	RS485_B	Internal inverter module RS485-B
5	RS485_A	Internal inverter module RS485-A
6	ACT	Start signal
7	GND	Ground
8	RESET	Reset

12.Dry Junction Communication Port COM-3

The device has reserved a dry contact signal.

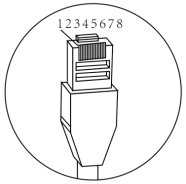


Figure 1-7
Schematic Diagram of Dry Junction Communication Port COM-3

Dry Junction Communication Port Pins (COM3) Description

Number	Identification	Description
1	NO1	Output dry contact signal 1 (In)
2	COM1	Output dry contact signal 1 (Out)
3	NO2	Output dry contact signal 2 (In)
4	COM2	Output dry contact signal 2 (Out)
5	DIN+	Input dry contact signal 1+
6	DIN1	Input dry contact signal 1
7	DIN+	Input dry contact signal 2+
8	DIN2	Input dry contact signal 2

13.DIP Switch

The dial switch has a total of 6 digits. The following are the instructions and usage of the dial switch.

1)6-digit dial switch, 1-5 is the reserved switch, and 6 is the communication internal resistance 120 Ω access switch.

2)When there are multiple F2400 connected to the grid, it is necessary to select one F2400 as the main device. Set the main device dial 1 to ON and 2-5 to OFF; The remaining F2400 dials 1-5 to OFF. After starting F2400, the main device will be automatically selected based on the dialing status.

3)When the product is locked due to a malfunction (Fault code 68), dial 1-5 to ON and then all to OFF to clear the fault.

14.Grid-Connection Mode Switch On/Off

This switch is used to switch between on-grid and off-grid modes of F2400. In grid-connection application scenarios, this switch needs to be turned on.

15.Vents

During use, the device may generate a large amount of heat due to prolonged charging or discharging. Therefore, a built-in fan is required to actively dissipate heat to maintain the normal operation of the device and extend its service life. Please ensure that the ventilation openings is not obstructed by foreign objects during installation and use.

16.AC Output Socket Switch ON/OFF

The AC power button controls the AC power output of F2400. To enable AC power, click the AC power button. When the AC power supply of F2400 is enabled, the AC indicator light will light up. When overload occurs or the battery level is 0%, the AC output and AC indicator lights will turn off. When the battery level returns to above 2%, the AC output can return to normal.

17.AC Output Socket

Power devices such as laptops, televisions, mini-refrigerators, vacuum cleaners, etc. through sockets support the use of 2400W appliances for power reduction (Not all appliances are supported and may need to be tested to confirm their functionality to avoid affecting performance of the device).

The F2400 supports the UPS backup function. Plug the critical loads to be powered on to the F2400 socket and connect the AC input to the power grid. When the power grid is functioning normally, the grid prioritizes loads while charging the device. When the power grid goes down during an outage, the F2400 switches automatically from charge to discharge mode within 10ms to ensure loads connected to the F2400 stay fully powered.

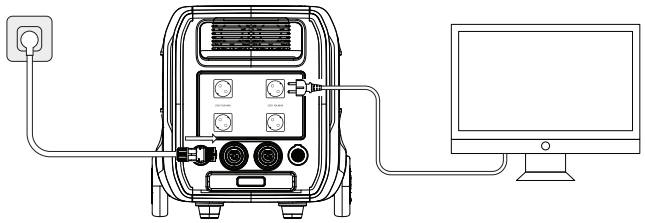


Figure 1-8

18.PV or DC Charging Input Port

Specification XT60EW-M. The F2400 can be charged through the PV or DC charging input port using Runhood’ s built-in car charging port and a dedicated connection cable and through a solar panel.

Supports solar panel series parallel input, rated voltage range: 12-60Vdc, maximum supported voltage: 150V, current: 25A Max, power: 1200W Max.

19.AC Input and AC On_Grid Output Port

1) You can connect to the mains through this port for charging, with a maximum charging power of 1800W.

2) Supports grid connected output, default output of 800W, maximum support of 2400W, can be set through the App.

20.BACK-UP Output Port

Used to connect to distribution boxes or mains sockets, ensuring uninterrupted electricity usage.

There is also a backup power function through the BACK-UP output port. To use this interface, you need to use an AC charging cable/AC on-grid cable to connect to the power distribution box:

Method 1: Turn off the mains and power the load directly from the battery. It's the same way you connect the load to the socket, but the wiring is different. The switching time can be less than 10ms.

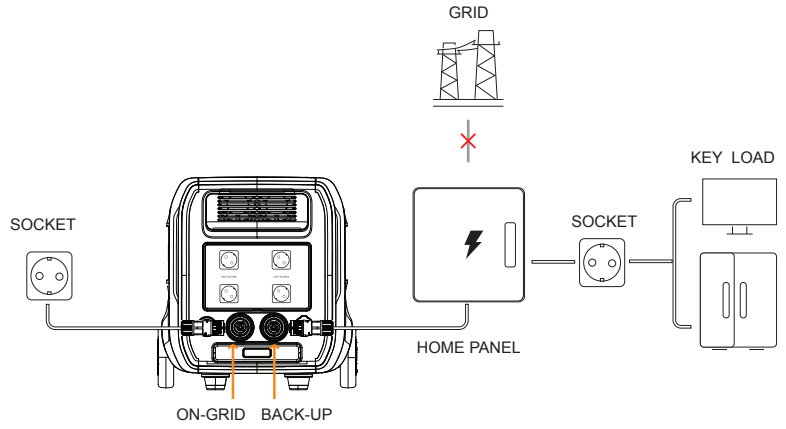


Figure 1-9

Method 2: Add automatic/manual switch mode: Usually, you can obtain power from the mains. When no mains is detected, you can obtain power from the battery. The backup switch time is related to the corresponding time of the automatic switch. The automatic switch or manual switch is purchased by the customer.

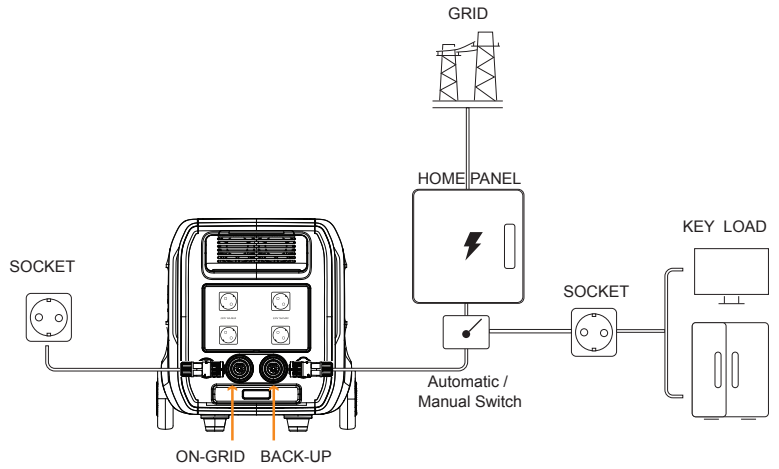


Figure 1-10

Turn on the BACK-UP Output Port and BACK-UP distribution box, turn on the AC output socket switch, and your electrical appliances can be used normally.

21.Cigarette Lighter Output Port

The cigarette lighter output port supports 12V DC output, with a maximum output current of 10A, and can be used for on-car equipment.

1.2.4 LCD FUNCTION

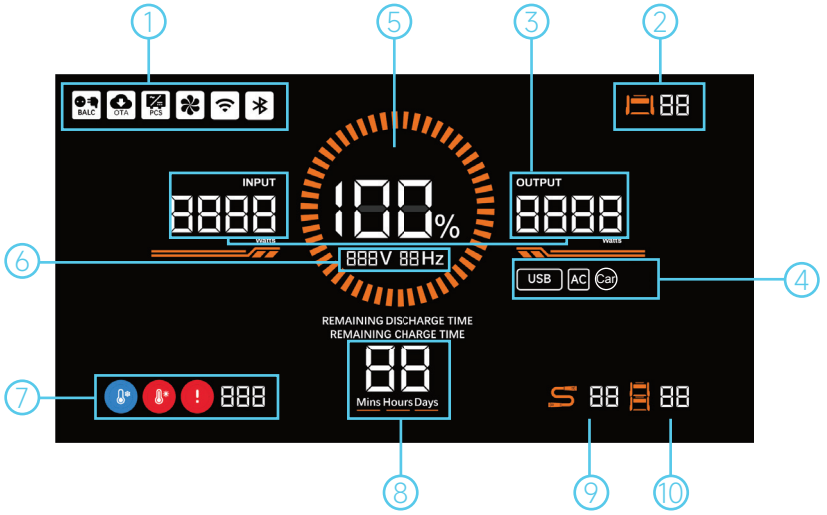


Figure 1-11

Display Information：

①Status Prompt Identification: sequentially Include grid connected switch identification, OTA upgrade identification, Hybrid inverter connection identification, fan operation status identification, Wi-Fi connection identification, Bluetooth connection identification.

②F2400 Parallel Status Identification and F2400 Code: The F2400 parallel status identification lights up when the F2400 is available; The F2400 code represents the number of the F2400 during parallel operation, and when used as the main F2400, the number is 1.

③ Real Time Charging/Discharging Power.

④ Output Switch Status Identification.

⑤ Percentage of Remaining Battery Capacity.

⑥ AC Output Voltage and Frequency.

⑦ High Temperature Alarm Identification, Low Temperature Alarm Identification, and Fault Codes.

⑧ Charge/Discharge Remaining Time: Display the remaining charge/discharge time.

⑨ Parallel Connection Quantity: maximum quantity is 8 units.

⑩ Parallel Available Quantity: The maximum quantity is 8 units.

1.3 B2400

1.3.1 PRODUCT APPEARANCE

Figure 1-12
Appearance Diagram of B2400 Product

1.3.2 SPECIFICATION PARAMETERS

B2400		
Battery	Cell specifications	LiFePO4(LFP64151，50Ah)
	Cell model	LFP64151/50Ah
	Grouping method	15S1P
	Electricity level	2400Wh
	Rated current	Charging：40A；Discharge：50A
	Maximum current	Charging：40A；Discharge：80A
	Voltage range	40.5-54Vdc
	Temperature range	Charging：-15℃~55℃；Discharge：-25℃~55℃
	Number of cycles	8000 cycles to 70%+ capacity@25℃
Battery indicator light	LCD	Support(Broken code screen)
Lamp	Refer to 1.3.4	

Key	Main power switch on/off
Extra battery port(*2)	Power and communications
Extra battery packs quantity	8 Max.
External communication	RJ45 *3 (Com1:Hybrid inverter Com2: Debugging port Com3: Dry junction)
Grounding point	Grounding identification
DIP switch	Terminal resistance
Weight	22kg
Dimensions	481mm*289mm*231mm

1.3.3 BASIC FUNCTION

As shown in the following figure:

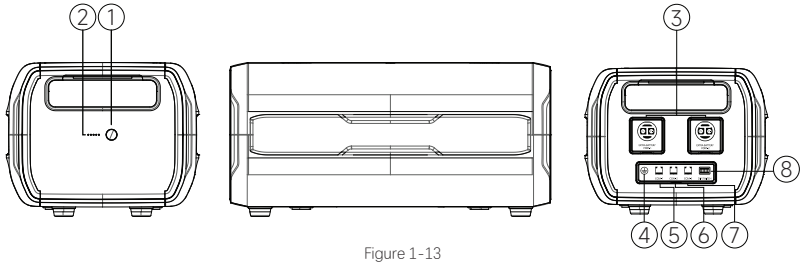


Figure 1-13

1.Main Power Switch ON/OFF

Turn on B2400 after pressing the main power switch for 1.5 seconds. Press and hold for 3 seconds until you hear a beep, then release the button to shut down the device. If unable to shut down normally, press and hold the power button for 10 seconds until you hear three beeps. The system will attempt to forcibly shut down.

If F2400 is idle (All output switches are turned off and the device is not charging) for more than 5 minutes, F2400 will automatically shut down. The period of time until device shuts down in power save mode can be adjusted using the Runhood Power App.

2. Battery Indicator Light

1) Please refer to 1.3.4 for details on the remaining battery capacity of the battery pack.

2) To determine if battery back is in an abnormal state through the indicator light, please refer to 1.3.4 for details.

3.DC Parallel Connection Port PORT-1, PORT-2

The parallel port is used to connect to the extra battery cable during DC parallel connection of the device, which is used to expand the battery pack capacity. PORT-1 is connected to the front-end device, and PORT-2 is connected to the back-end device. In the home energy storage application scenario, the PORT-1 of the top main station can be connected to the front Hybrid inverter or other power sources and appliances, while the PORT-2 can be connected to the rear expansion battery pack B2400.

4. Grounding Screw

When the device is used for household energy storage applications, reserve a grounding screw and decide whether to ground as needed.

5.Hybrid inverter Communication Port COM-1

When the device is used for home energy storage application scenarios, this port is used to connect the home storage hybrid inverter device for communication, and the communication method is CAN. Please refer to F2400 Port Definition for details.

6. Debugging Communication Port COM-2

This port is for professional technical maintenance personnel to use. Please refer to F2400 Port Definition for details.

7.Dry Junction Communication Port COM-3

The device has reserved dry contact signals, as detailed in Port Definition F2400.

8. DIP Switch

1) Adjust the internal resistance function of internal CAN communication, as detailed in F2400 Port Definition.

2) Used to clear serious system faults, detailed in F2400 Port Definition.

1.3.4 POWER INDICATOR FUNCTION

1. Power Indicator Function: The B2400 has a total of five indicator lights, LED1-LED5. Each light indicates 20% power. When all indicators are lit, capacity is at 100%. The following table shows the indicator status during charging and discharging:

State of Charge State:

	SOC	LED1	LED2	LED3	LED4	LED5
Charging	100%-80%	Flash	Extinction	Extinction	Extinction	Extinction
	79%-60%	Bright	Flash	Extinction	Extinction	Extinction
	59%-40%	Bright	Bright	Flash	Extinction	Extinction
	39%-20%	Bright	Bright	Bright	Flash	Extinction
	19%-0%	Bright	Bright	Bright	Bright	Flash

State of Discharge or Idle State:

	SOC	LED1	LED2	LED3	LED4	LED5
Discharge or Idle	100%-80%	Bright	Bright	Bright	Bright	Bright
	79%-60%	Bright	Bright	Bright	Bright	Extinction
	59%-40%	Bright	Bright	Bright	Extinction	Extinction
	39%-20%	Bright	Bright	Extinction	Extinction	Extinction
	19%-0%	Bright	Extinction	Extinction	Extinction	Extinction

2. Fault Indicator Function: The B2400 warns the user if the battery pack is in an abnormal state through a serious of blinking indicators through the five LED lights. Check the table below to determine the fault code based on the LED light indicators.

Fault Codes	Fault Content	LED Display Status	Diagram
15	Too high charging process temperature	2,5 Flash	○ ● ○ ○ ●
16	Too low temperature in charging progress	2,4 Flash	○ ● ○ ● ○
17	Too high charging current	2,4,5 Flash	○ ● ○ ● ●
18	Too high individual voltage	2,3 Flash	○ ● ● ○ ○
35	Too high temperature in discharging process	2,3,5 Flash	○ ● ● ○ ●
36	Too low temperature in discharging process	2,3,4 Flash	○ ● ● ● ○
37	Too low individual voltage	2,3,4,5 Flash	○ ● ● ● ●
38	Excessive discharging current	1,5 Flash	● ○ ○ ○ ●
51	Abnormal total voltage sampling	1,4 Flash	● ○ ○ ● ○
52	Too high MOS temperature	1,4,5 Flash	● ○ ○ ● ●
53	Abnormal communication between master and slave devices	1,3 Flash	● ○ ● ○ ○
54	Abnormal communication between the main station BMS and the DC main control	1,3,5 Flash	● ○ ● ○ ●

55	AFE communication abnormality	1,3,4 Flash	● ○ ● ● ○
61	Discharge fault	1,3,4,5 Flash	● ○ ● ● ●
62	Charging fault	1,2,5 Flash	● ● ○ ○ ●
63	Encoding fault	1,2,4 Flash	● ● ○ ● ○
64	Battery short circuit fault	1,2,4,5 Flash	● ● ○ ● ●
65	Voltage sampling disconnection	1,2,3 Flash	● ● ● ○ ○
66	Abnormal temperature sampling	1,2,3,5 Flash	● ● ● ○ ●
67	Abnormal pre discharge	1,2,3,4 Flash	● ● ● ● ○
68	Fault that locks device	1,2,3,4,5 Flash	● ● ● ● ●

2 USE AND INSTALLATION

2.1 GRID CONNECTION FUNCTION

2.1.1 GRID-CONNECTION MODE

The F2400 comes with a 2400W AC grid-connection bidirectional inverter. When using the grid-connection mode, securely connect the grid-connection port of the F2400 to the power grid, and turn on the grid-connection switch. The total power capacity of the F2400 can be extended to a maximum of 8*2.4KWh through parallel operation. The F2400 can control grid-connection power output with a smart plug. In addition, the F2400 is designed with a comprehensive EMS energy management system and a variety of operating modes.
Example:
a) Total loads include PLUG LOAD and OTHER LOAD.
b) Grid output power 800W(Default), maximum support 2400W can be set through the app.

1.Self-generate and Self-consumption Mode

A. Solar energy provides power to the loads as first priority. If solar energy is sufficient to power all connected loads, excess solar energy will be used to charge the battery. If battery is full, excess solar energy will be fed to the grid.

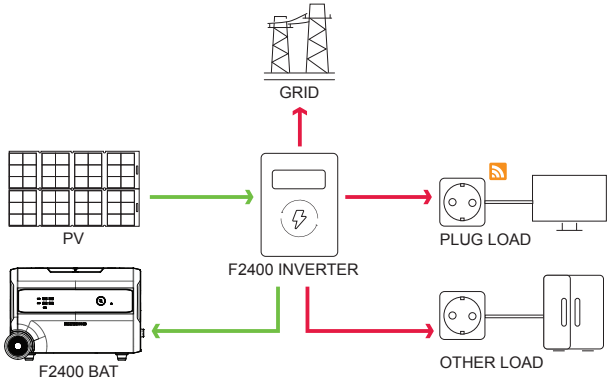


Figure 2-1

B. Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.

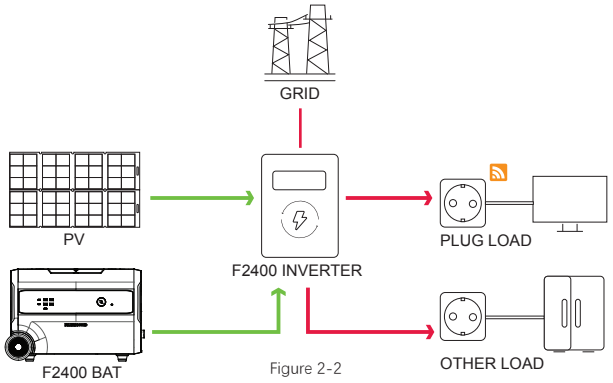


Figure 2-2

C. Solar energy provides power to the loads as first priority. If solar energy and battery are not sufficient to power all connected loads, utility energy (Main grid) will supply power to the loads with solar energy at the same time.

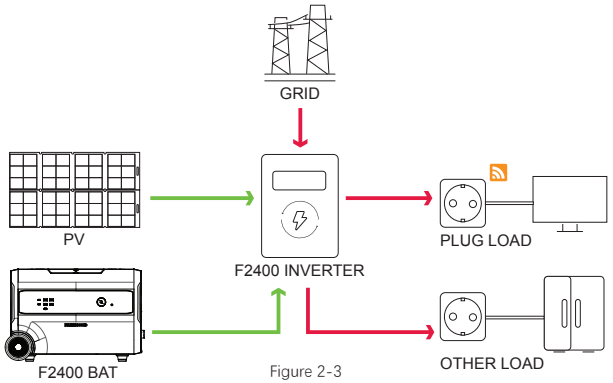


Figure 2-3

NOTE: The SOC discharge limit is set to the default value of 10%. Users can modify the grid-connection output power and SOC limit Settings through the app.

2.Timer Charge/Discharge Mode

1.On Charge Time

A. Solar energy will charge battery as first priority. The excess energy will supply power to the loads.
Power generation to the grid is not supported in this mode. The load on the smart plug draws power directly from the grid.

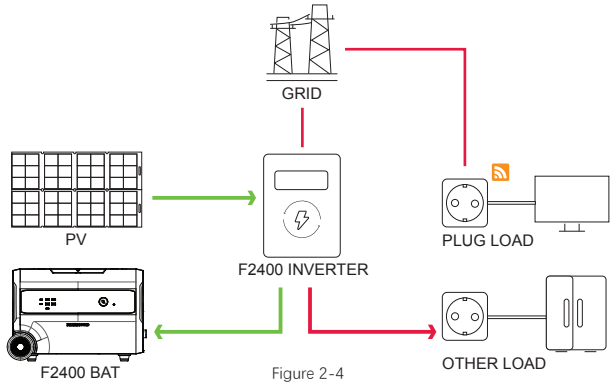


Figure 2-4

B. Solar energy will charge battery as first priority. Then the excess solar energy will supply power to loads. If solar energy is not sufficient to charge battery and supply loads, grid will supply all the connected loads with solar energy together.
The load on the smart plug draws power directly from the grid.

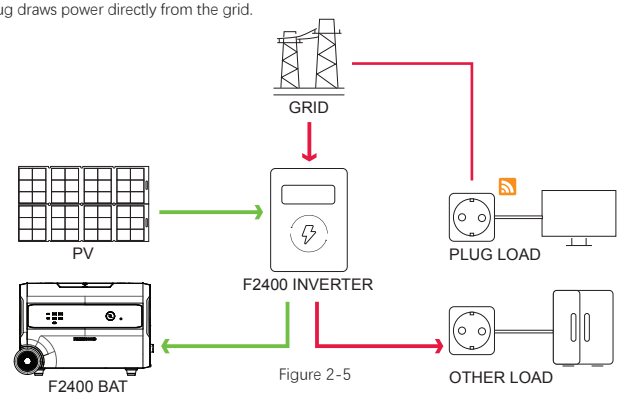


Figure 2-5

2. On Discharge Time

Solar energy provides power to the loads as first priority. If there is extra solar energy, excess power will be delivered to grid.
The load on the smart plug draws power directly from the grid.

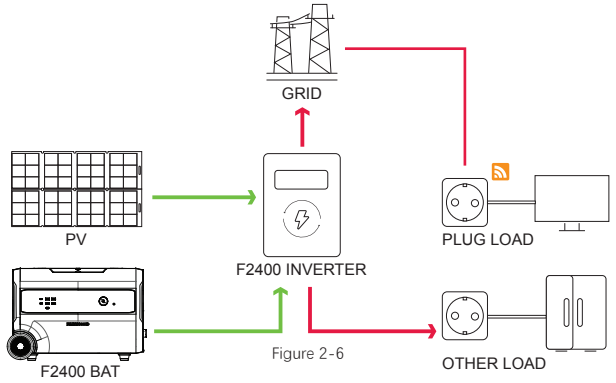


Figure 2-6

3. In the Period of No Charge or Discharge

A . The solar power supplies the loads first with excess power charging the batteries.
The load on the smart plug draws power directly from the grid.

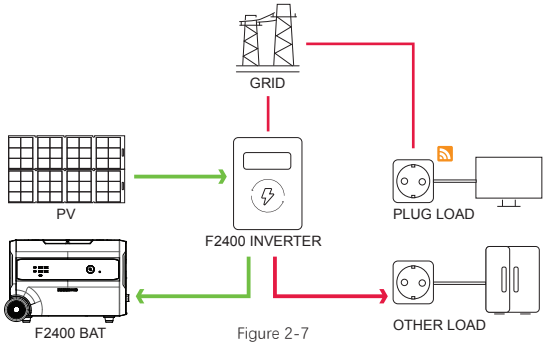


Figure 2-7

B. Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.
Power generation to the grid is not supported in this mode. The load on the smart plug draws power directly from the grid.

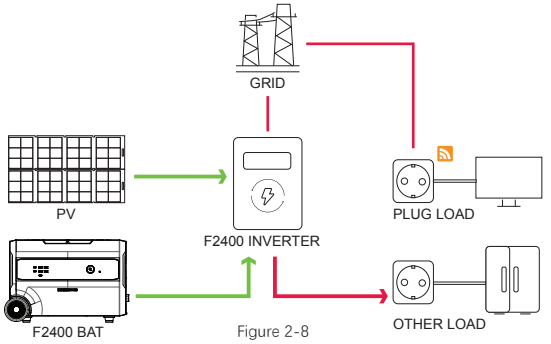


Figure 2-8

NOTE: The SOC discharge limit is set to the default value of 10%. Users can modify the grid-connection output power and SOC lower limit settings through the app.

3. Battery Priority Mode

A. Solar energy will charge battery as first priority. If there is excess solar energy, excess power will supply the loads. If batteries are fully charged and all loads are satisfied, excess power will feed to the power grid.
The load on the smart plug draws power directly from the grid.

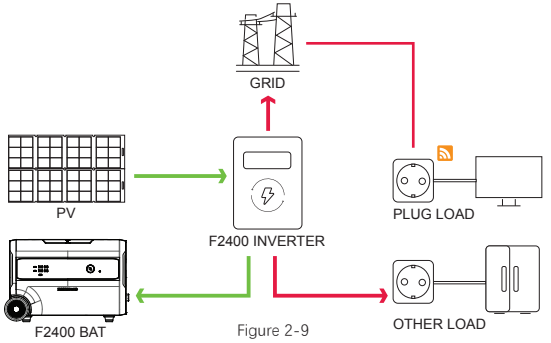


Figure 2-9

B. Solar energy will charge the battery as its first priority. If there is excess solar energy, the excellent power will supply the loads. If solar energy is not sufficient to charge battery and supply loads, grid will supply power to loads.
The load on the smart plug draws power directly from the grid.

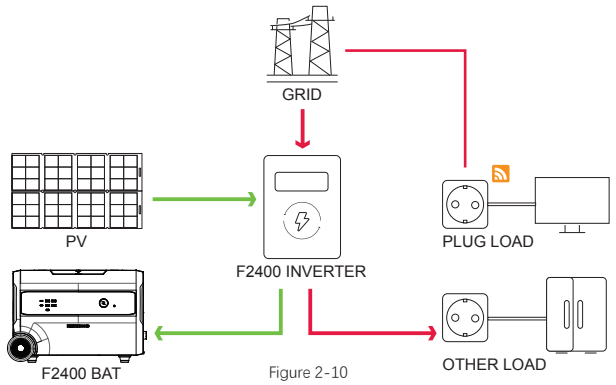


Figure 2-10

NOTE:To prevent repeated charging of the F2400, charge it after the SOC is below SOC upper limit setting. The SOC upper limit setting can be set through the app.

2.1.2 INSTALLATION STEPS

When using F2400 and B2400 for grid connection, the installation method for the connection is as follows:

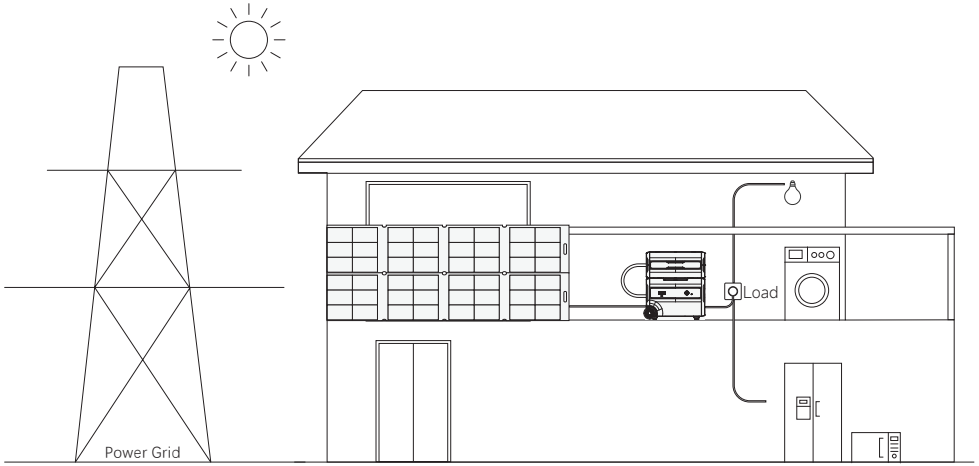


Figure 2-11

Step 1: Please reserve sufficient space before installation. Place the device against the wall. It is recommended to not stack more than two units. If stacking exceeds two units, add additional securing measures to prevent the stacked devices from tilting forward or falling. When installing the equipment, the F2400 needs to be connected to a main socket or distribution box. Please install indoors. If installed on balcony, a waterproof box is recommended.

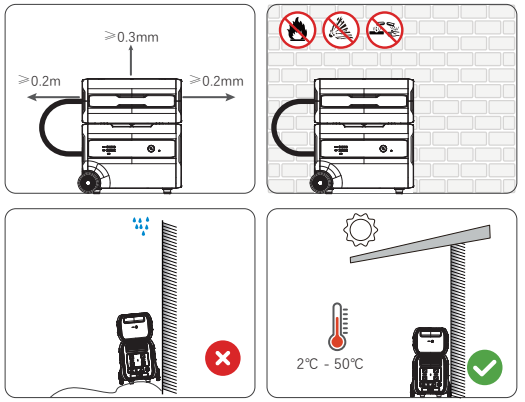


Figure 2-12

Step 2: When connected in parallel, either the F2400 or the B2400 can be used as either the master or slave device without affecting subsequent installation and use.

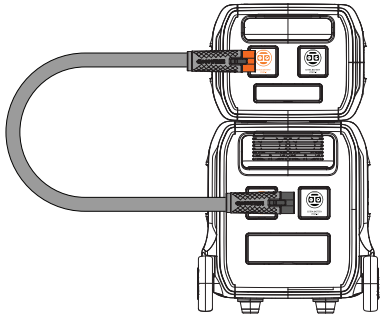


Figure 2-13

Step 3: Insert the smart plug into the mains socket and connect the load to the smart plug. Long press the smart plug button to activate the network distribution function. Open F2400 and use the Runhood app to configure the smart plug and F2400 separately. The configuration method can be found in the app user manual. After successful network distribution, the F2400 will be connected to the smart plug through a local area network, monitor load data based on the smart plug, and automatically adjust the grid-connection output power.

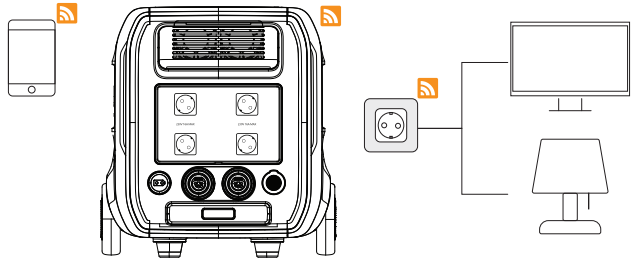


Figure 2-14

NOTE: The F2400 and smart plug must be connected to the same network for local area network connection. Please ensure stable network connection.

Step 4: Install the solar panel and connect it to the DC input port of F2400 using a Solar to XT60F charging cable.

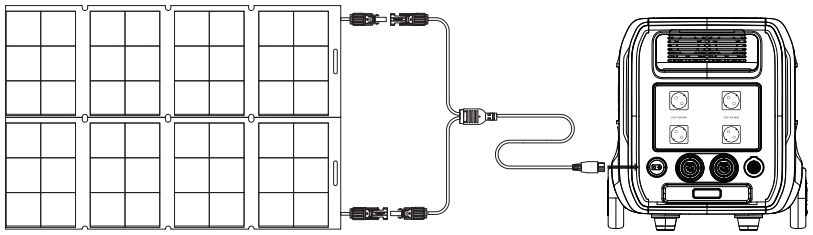


Figure 2-15

NOTE: Before connecting, please pay attention to whether the output voltage of the solar panel meets the charging parameters of F2400. When the voltage of the solar panel exceeds 60V, please connect the grounding screw.

Step 5: Use an AC charging cable\AC On-grid cable to connect the parallel port and the mains socket. Switch the F2400 grid connection switch to Grid-connection mode to see the grid connection identification and input/output power on the F2400 display screen. The default working mode of F2400 is Self-generate and Self-consumption mode, and the working mode of F2400 can be switched through the app settings. For detailed instructions, please refer to the app user manual.

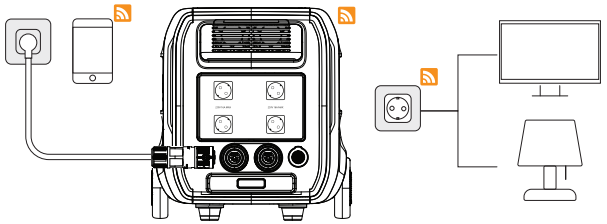


Figure 2-16

Smart Plug
Press and hold the smart Plug for 3 seconds until the indicator light keeps flashing and enters the distribution network state.

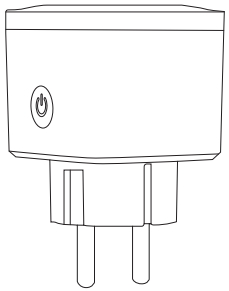


Figure 2-17

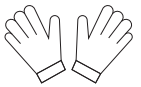
Step 6: Connect the electrical appliances to the AC output socket or use an AC BACK-UP cable to connect to F2400.

NOTE: When multiple F2400s are connected to the grid, please select one F2400 as the master device. The remaining F2400s will receive EMS management from the master F2400 as slaves. F2400 determines the master-slave relationship through the status of the toggle switch, as shown in section 1.2.3-13.

2.2 DC Coupling

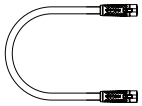
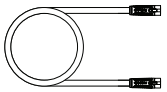
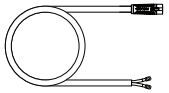
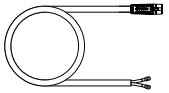
Both the F2400 and B2400 can be connected to hybrid inverters and used as energy storage power sources in home energy storage systems. You can expand the energy storage capacity by "F2400+B2400" or "B2400+B2400" parallel mode. The communication mode between the battery BMS and the inverter is CAN communication, and the SOC notified by the BMS to the inverter is the average SOC. When the power supply is successfully connected to the inverter, the F2400 displays the Hybrid inverter connection identifier and then disables other charging and discharging ports.

2.2.1 Installation and Protective Tools

				
Diagonal plier	Screwdriver	Electric drill	Wrench	Protective gloves

NOTE: Use tools with good insulation performance during installation to avoid electric shock.

2.2.2 Preparation of Accessories

				
Extra battery cable A (0.6m)	Extra battery cable B (1.5m)	Hybrid inverter power cable A	Hybrid inverter power cable B	Cat.6 ethernet cable

2.2.3 Installation Steps

The overall system wiring installation method is shown in the following figure:

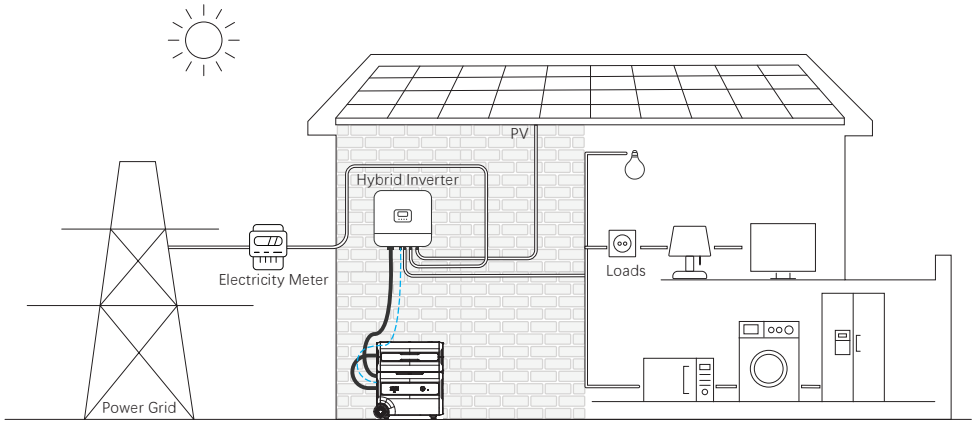


Figure 2-18

NOTE: lease be sure to insulate all wiring during the installation process. It is necessary to install with the grid disconnected to ensure that all devices are powered off.

Step 1: Before beginning installation, be sure to reserve enough space for the F2400 or B2400 and any additional B2400 expansion units. Place the device against the wall ideally in stacks of two. If stacking three or more units, secure tower in place to prevent tilting or falling. Please install indoors. If installed outside, a waterproof and dust-proof box is required to protect the product.

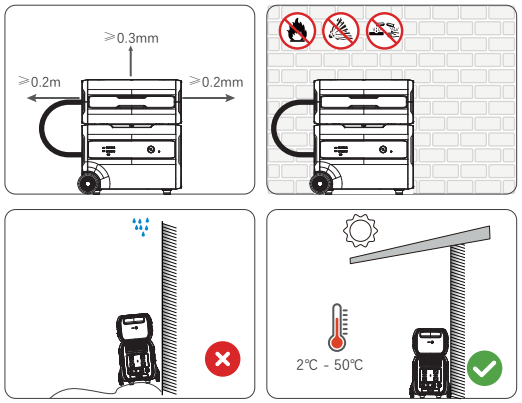


Figure 2-19

Step 2: Connect the extra battery cable to the DC parallel connection ports of two adjacent devices. The harness ports are color-coded for ease of installation. The black plug is connected to the black port, and the orange plug is connected to the orange port. If devices are stacked vertically, the extra battery cable A (0.6m) will be needed for connection. If they are stacked horizontally, connect the devices with the extra battery cable B(1.5m).

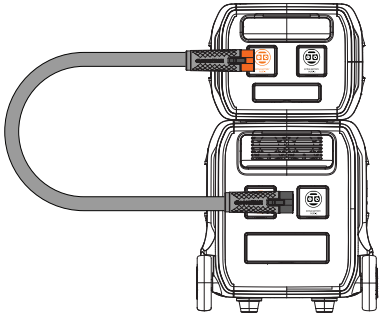


Figure 2-20

Runhood 2400 home/mobile energy storage power supply products support “F2400+B2400” and “B2400+B2400” parallel modes. The F2400 can be used as either a master or a slave device. The total power capacity of the F2400 or B2400 can be extended by parallel operation up to 8*2.4KWh.

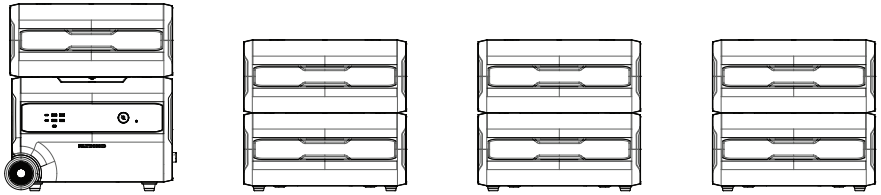


Figure 2-21

Taking one F2400 and two B2400 parallel as an example, the parallel mode is as follows:
1). Select one F2400 or B2400 as the master device (Parallel number 1). The remaining two will serve as slave device 1 (Parallel number 2) and slave device 2 (Parallel number 3).
2). Shut down the three devices and connect the lower port (Port-2) of the master device and the upper port(Port-1) of the slave device, and the lower port(Port-2) of the slave device and the upper port(Port-1) of the slave device respectively using two extra battery cables. Devices can be stacked or placed side-by-side when connected. When connecting two stacked devices, use extra battery cable A (0.6m). When connecting two devices placed side-by-side, use extra battery cable B (1.5m). The cable harness port is designed to prevent retarding. The black plug is connected to the black port and the orange plug is connected to the orange port.
3). Long press the power switch of the main device, release it when the device emits a prompt tone, and the device starts to parallel. If there are a large number of parallel devices, it takes 1 to 5 seconds to perform the parallel.
4). After the devices are synced in parallel, you can use appliances connected to AC output of the F2400 normally.

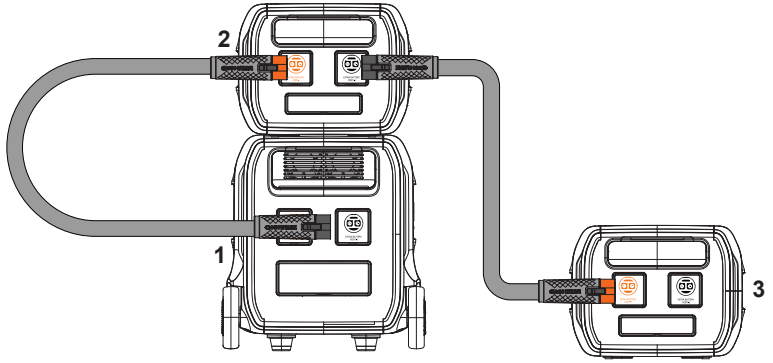


Figure 2-22

NOTE:
1. “F2400+F2400” parallel mode is not supported.
2. You can also apply the parallel equipment to the grid-connection work scene and home energy storage scene.
3. Do not connect or disconnect the extra battery cable when the device is turned on to avoid equipment damage or shock.
4. Avoid stacking more than two units. The recommended stack height is demonstrated in the figure.
5. If several devices are run in parallel and communication between devices fails, the internal resistance of communication between 1 or 2 devices needs to be connected. Determine the number of resistors to be connected based on the actual situation. For details about how to connect resistors, see 1.2.3-13 DIP Switch.

Step 3: Connect the battery power port of the inverter using the Runhood dedicated hybrid inverter power cable. For hybrid inverter power of 5KW and below, use hybrid inverter power cable A (2AWG). For hybrid inverter power above 5Kkw, use hybrid inverter power cable B(1/0AWG).

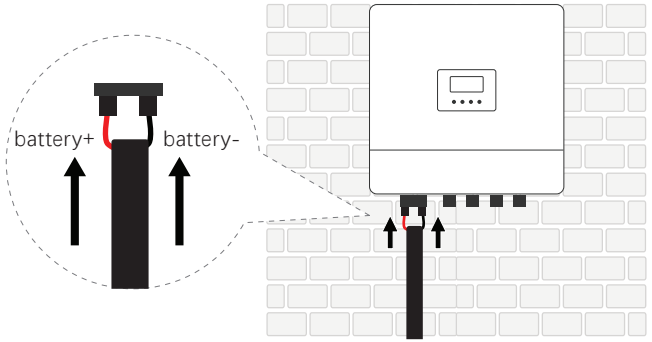


Figure 2-23

Step 4: Connect the other end to the upper connection port of the battery.

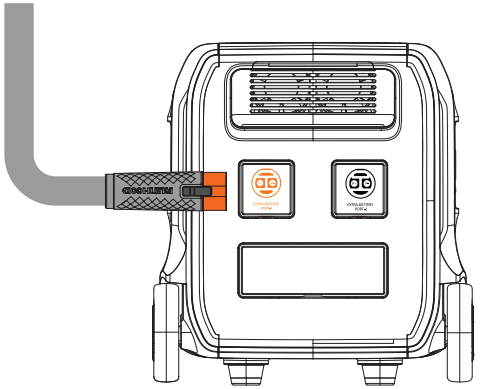


Figure 2-24

Step 5: Connect the BMS communication port of the inverter using an ethernet cable.

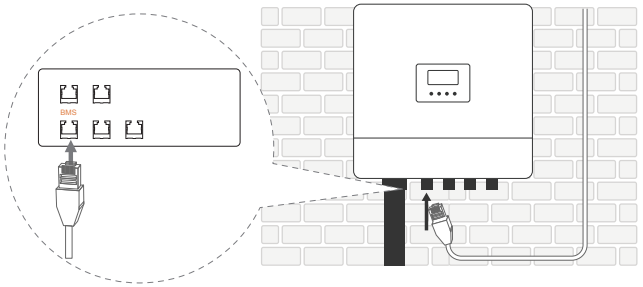


Figure 2-25

Step 6: Use an Ethernet cable to connect the hybrid inverter communication port of F2400 or B2400 with port identification: COM-1.

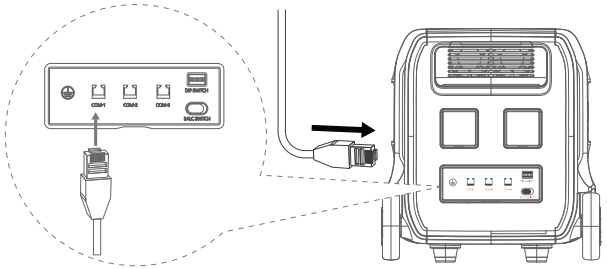


Figure 2-26

NOTE: The sixth steps and the fourth step must be the same device.

Step 7: Turn on the Runhood 2400 home/mobile energy storage power supply and confirm that the inverter is successfully connected. At this time, the Runhood 2400 home/mobile energy storage power supply enters ESS mode and the F2400 LCD displays the PCS identifier indicating that the communication with the inverter is successful.

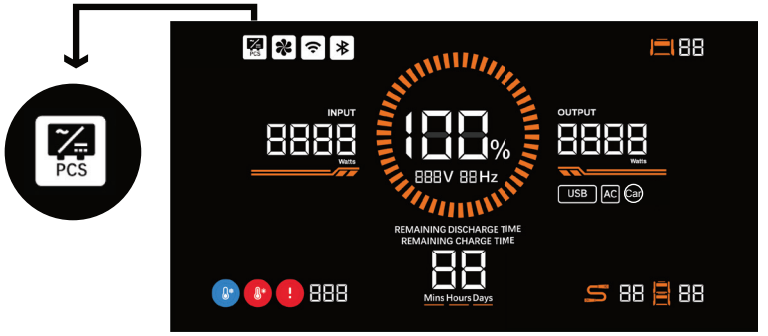


Figure 2-27

NOTE: The PCS connection identification refers specifically to applications where hybrid inverters are connected.

Step 8: Shutdown: If you need to turn off the battery, stop the inverter first, and then disconnect the Cat.6 ethernet cable connection with the inverter and the hybrid inverter power cable connection. After the Runhood 2400 home/mobile energy storage power supply exits the Hybrid inverter mode, long press the power switch for 3s to shut down the Runhood home/mobile energy storage power supply. If it cannot be shut off normally, long press the 2400 home/mobile energy storage power switch for 10s and the power system will forcibly shut down.

NOTE: Please ensure that the device is powered off during the connection process. Please charge the battery in a timely manner when the battery level is depleted to extend its life cycle.

2.3 AC COUPLING

2.3.1 INSTALLATION STEPS

1. The original solar inverter or micro inverter scheme:

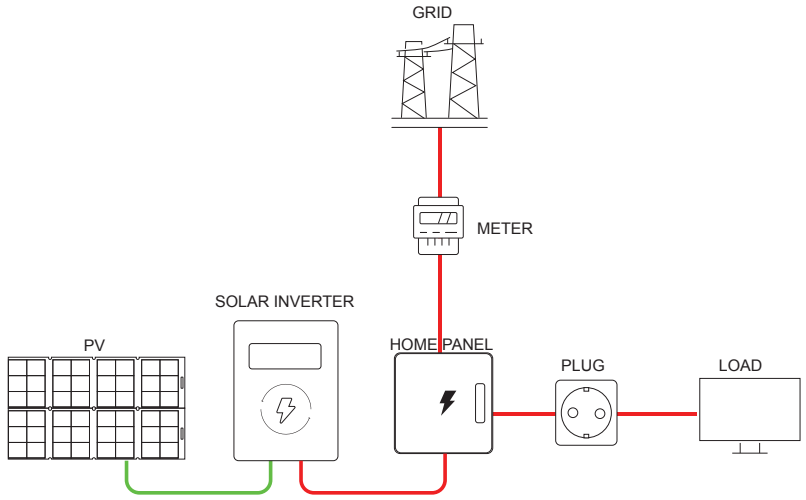


Figure 2-28

2. Based on the original solar inverter or micro-inverse scheme, F2400 and AC coupling are connected to the distribution box: Runhood smart meter is added to the household side and the F2400 works together through the wireless distribution network.

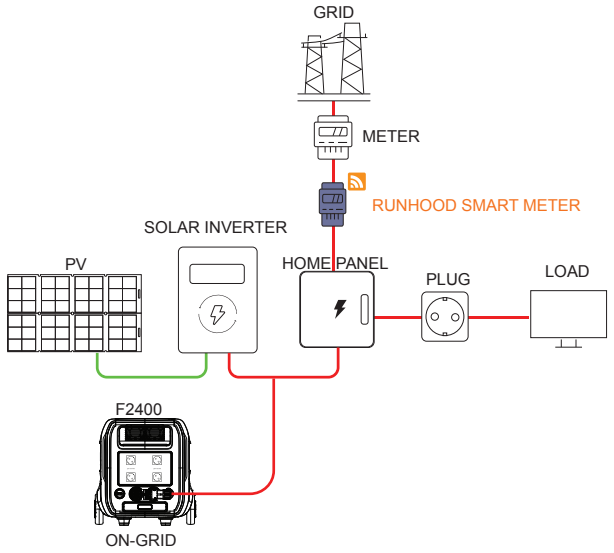


Figure 2-29

2.3.2 RUNHOOD SMART METER

Runhood smart meter introduction: In development, Sample similar the following figure:

Figure 2-30

3 FAULT HANDLING

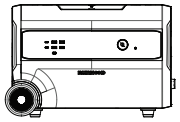
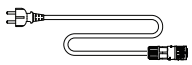
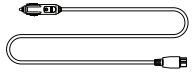
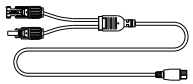
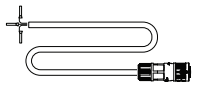
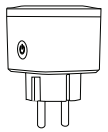
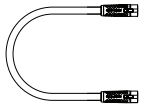
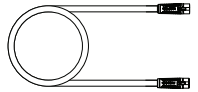
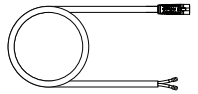
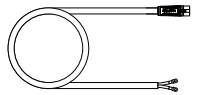
Fault code	Fault content	Can it be automatically restored	Actions
15	Too high charging process temperature	Yes	Stop charging, check if the device temperature is too high, and wait for the device to cool down before use. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
16	Too low temperature in charging progress	Yes	Stop charging, check if the ambient temperature is within the allowable range for product charging, and move the device to the environment with a suitable temperature before charging. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
17	Too high charging current	Yes	Immediately stop charging and check if the charging device meets the specifications of this product. Please use a charging device that meets the product specifications for charging. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
18	Too high individual voltage	Yes	Stop charging and automatically recover after a period of inactivity. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
35	Too high temperature in discharging process	Yes	Stop discharging, check if the device temperature is too high, and let it stand for a period of time before use. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
36	Too low temperature in discharging process	Yes	Stop discharging and check if the ambient temperature is within the normal operating range of the product. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
37	Too low individual voltage	Yes	Stop discharging and charge the device to see if it has been restored. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
38	Excessive discharging current	Yes	Stop discharging and check if the electrical appliance meets the specifications of this product. Please use electrical appliance that meets the product specifications. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
51	Abnormal total voltage sampling	Yes	Stop charging or discharging, let it stand for a period of time and check if it has recovered. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
52	Too high MOS temperature	Yes	Stop discharging, check if the device temperature is too high, and let it stand for a period of time before use. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
53	Abnormal communication between F2400 and other devices	Yes	Check if the DC parallel port and extra battery cable are connected properly, and automatically restore after the connection is correct. If it cannot be restored or cannot be used normally after restoration, please contact a professional.

54	Abnormal communication between the main station BMS and the DC main control	Yes	Check and restart the device for restoration. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
55	AFE communication abnormality	Yes	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
61	Discharging fault	No	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
62	Charging fault	No	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
63	Encoding fault	No	Check if the DC parallel port and extra battery cable are connected properly, and restart the device to restore it after confirming that the connection is correct. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
64	Battery short circuit fault	No	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
65	Voltage sampling disconnection	No	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
66	Abnormal temperature sampling	No	Restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
67	Abnormal pre-discharge	No	Disconnect the electrical appliance and power it off. Ensure that there is no device connected and restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
68	Fault that locks device	No	Use a dial switch to eliminate the fault. Please refer to the instructions for the dial switch in Section 3.3. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
101	USB-A1 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
102	USB-A2 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
103	USB-A3 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
104	USB-A4 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.

105	USB-C1 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
106	USB-C2 port fault	No	Disconnect the electrical appliance, and click the USB output switch to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
107	Cigarette lighter port fault	No	Disconnect the electrical appliance. Click on the DC output switch to clear the fault. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
110	Inverter communication failure	Yes	Check whether the power board can start normally. Wait for communication to resume and automatically clear the fault. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
111	BMS communication failure	Yes	Check whether BMS can start normally. Wait for communication to resume and automatically clear the fault. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
112	MQTT server disconnected	Yes	Check if the network is functioning properly. Wait for recovery and automatically clear the fault. If it cannot be restored or used normally after repair, please contact a professional.
113	Fan communication failure	Yes	Restart the device to restore. Wait for communication to recover and automatically clear the fault. If it cannot be restored or used normally after repair, please contact a professional.
161	Inverter battery overvoltage	Yes	Stop charging and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
162	Inverter battery undervoltage	Yes	Stop discharging and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
163	Inverter over temperature	Yes	Stop discharging and wait for the device to cool down to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
164	Abnormal grid voltage	Yes	Disconnect the grid connection, and re-connect to the grid after restoration. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
165	Abnormal grid frequency	Yes	Disconnect the grid connection, and re-connect to the grid after restoration. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
166	Abnormal output voltage	Yes	Disconnect the electrical appliance and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
167	AC output short circuit	Yes	Disconnect the electrical appliance and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.

168	AC output overload	Yes	Disconnect the electrical appliance and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
169	Inverter malfunction	Yes	Disconnect the electrical appliance and wait for the device to restore or restart the device to restore. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
170	PV charging overvoltage	No	Stop PV charging and check if PV charging meets the specifications. Restart the device to clear the fault. If it cannot be restored or cannot be used normally after restoration, please contact a professional.
171	PV charging overcurrent	No	Stop PV charging and check if PV charging meets the specifications. Restart the device to clear the fault. If it cannot be restored or cannot be used normally after restoration, please contact a professional.

4 PARTS LIST

No.	Article name	Images	Specifications	Instructions for use	Remarks
1	F2400-EU		F2400	Home Mobile Energy Storage Power Supply Host Product	Included in F2400
2	AC charging cable/AC on-grid cable		EU standard/18AWG/black/EU standard three-plug head to PVAC-03SPSA40-07-A/2m	Used as AC charging and AC grid connection	Included in F2400
3	XT60F car charging cable		16AWG/XT60F to 1019 cigarette lighter/PVC black/cable length 1.6m	Applicable for charging with one end inserted into the cigarette lighter port on the car, and the yellow end into the DC input port	Included in F2400
4	Solar to XT60F charging cable		MC4 to XT60F/12AWG/ Line length 3,5m	Connect the MC4 end to the solar panel, and insert the yellow end into the DC input port for charging	Included in F2400
5	AC charging cable \AC on-grid cable (For connecting to the home panel)		EU standard/18AWG/black/L&N&PE head to PVAC-03SPSA40-07-A/2m	Connect one end to on-grid and one end to the home panel	Optional
6	AC BACK-UP cable (For connecting to the home panel)		EU standard/18AW-G/black/L&N&PE head to PVAC-03SPSA40-07-B/2m	Connect one end to BACK-UP and one end to the home panel	Optional
7	Smart Plug		Model：EU02A 230Vac, 50Hz	In the balcony photovoltaic application scenario, it is used with the load.	Optional
8	Extra battery cable A		2 * 2AWG+8 * 20AW/orange+black plug/cable length 0.6m	Used for parallel expansion of battery packs when F2400 or B2400 are up and down Stacks	Optional
9	Extra battery cable B		2 * 2AWG+8 * 20AW/orange+black plug/cable length 1.5m	Used for parallel expansion of battery packs when F2400 or B2400 are placed side-by-side.	Optional
10	Hybrid inverter power cable A		2 * 2AWG/orange plug/cable length 2m	Used as a power cable when connected to a hybrid inverter. Note: Applicable to hybrid inverter power below 5KW	Optional
11	Hybrid inverter power cable B		2 * 1/0AWG/orange plug/shielded/ orange plug/cable length 2m	Used as a power cable when connected to a hybrid inverter. Note: Applicable to hybrid inverter power above 5KW	Optional
12	Cat.6 ethernet cable (Included in the hybrid inverter cable)		24AWG/8-core twisted pair/568B/black/cable length 2m	Used as a communication cable when connected to a hybrid inverter.	Optional