

USER MANUAL



Model

FLH48100UG2

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Revision History

Revision No.	Revision Date	Revision Reason
1.0	2025.8	First Published

About This Manual

The manual mainly describes the introduction, installation, operation, and maintenance. Please read this manual carefully before installation and operation. Keep this manual for future reference.

How to Use This Manual

Please read this manual and all relevant documents thoroughly before carrying out any operations on the battery. Ensure that the documents are stored securely and remain accessible at all times. The content may be periodically revised or updated to reflect product improvements.

1. Safety Introductions



1.1 Warning

1.1.1 Before Connecting

- After unpacking, inspect the product and packing list carefully. If any damage is found or parts are missing, please reach out to your local retailer for assistance.
- Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode.
- Ensure proper wiring by connecting the positive and negative cables correctly and avoiding any short circuits with external devices.
- Directly connecting the battery to AC power is strictly prohibited.
- The battery system must be properly grounded, with a grounding resistance of less than 1Ω .
- Verify that the electrical parameters of the battery system are fully compatible with the connected equipment.

1.1.2 In Using

- If the battery system needs to be moved or serviced, ensure that the power is disconnected and the battery is fully powered down.
- Keep the battery away from water and fire.
- Connecting the battery with a different type of battery is strictly prohibited.
- Do not operate the batteries with a faulty or incompatible inverter.
- Disassembling the battery is not allowed.
- In the event of a fire, only dry powder fire extinguishers should be used; liquid fire extinguishers must not be used.
- Please refrain from opening, repairing, or disassembling the battery unless performed by FelicitySolar staff or personnel authorized by FelicitySolar. Any consequences or responsibilities arising from improper operation or violations of design, manufacturing, or equipment safety standards will not be assumed by us.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

- A battery can present a risk of electric shock and burns by high short-circuit current.
- Failed batteries can reach temperatures that exceed the burn thresholds for touchable surfaces



1.2 Caution

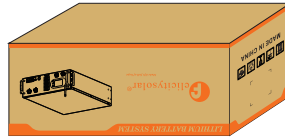
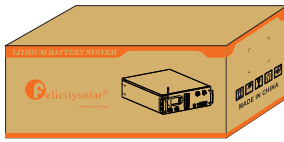
- Our products undergo rigorous inspection before shipment. If you notice any unusual signs, such as the device casing bulging, please contact us promptly.
- **The product must be properly grounded prior to use to ensure safety. This battery pack must be grounded strictly in accordance with the requirements of the product technical manual. Incorrect grounding or poor grounding may lead to safety risks such as electric shock and equipment failure. All losses arising therefrom shall be borne by the party that violates the operation rules.**
- To ensure correct usage, verify that the parameters of the connected devices are compatible and matched. Avoid mixing batteries from different manufacturers, types, or models, as well as using old and new batteries together.
- The ambient environment and storage methods can affect the product's lifespan. Please adhere to the operating environment guidelines to ensure the device functions optimally.
- For long-term storage, recharge the battery every six months, ensuring the charge exceeds 80% of its rated capacity.
- Recharge the battery within 18 hours after it has fully discharged or when over-discharge protection mode is triggered.
- The formula for calculating theoretical standby time is: $T = C/I$ (where T represents standby time, C is the battery capacity, and I is the total current of all loads).
- Disconnect the charging source prior to connecting or disconnecting battery terminals;
- Do not wear any metal objects including watches and rings;
- Do not lay tools or metal parts on top of batteries; and in addition,
- when the battery maintenance cannot be performed by an ordinary person, the following applies:
 - Use tools with insulated handles;
 - Wear rubber gloves and boots;
 - Determine if battery is either intentionally or inadvertently grounded. Contact with any part of a grounded battery can result in electric shock and burns by high short-circuit current.
- The risk of such hazards can be reduced if grounds are removed during installation and maintenance by a skilled person.

1.3 Requirements for installation personnel

- All work shall comply with local applicable laws, regulations and standards. The installation of FLH48100UG2 can only be carried out by electricians with the following qualifications:
- **Qualifications and Training:** Hold a valid electrician vocational qualification certificate, receive training in the installation, commissioning of electrical equipment and batteries, as well as risk handling, and keep abreast of industry regulation updates.
- **Standard Compliance:** Strictly abide by technical connection conditions, standards, regulations and the requirements of this document, and promptly report any discrepancies between the documents and the actual situation.
- **Professional Knowledge:** Be familiar with the full - process operation of lithium - ion batteries, charging and discharging characteristics, abnormal situation judgment, and understand potential hazard sources.
- **Safety and Emergency Response:** Have a strong sense of safety, use protective equipment correctly, and master first - aid and emergency response skills for electrical accidents and battery leakage.

2. Transportation

The battery module can only be transported in an upright position.



- Smoking is prohibited in the vehicle during transportation or in the vicinity during loading and unloading



- The dangerous goods transport vehicles shall meet relevant regulations concerning road transportation and shall be equipped with two tested CO2 fire extinguishers.



- If possible, do not remove the transport packaging before arrival at the installation site. Before removing the transport protector, check if the transport packaging is damaged.



- Improper transport of battery modules may cause injury. It could cause injury if it falls or slips. Use only suitable transport and lifting equipment to ensure safe transport.



- Wear safety shoes to avoid the danger of injury. When transporting the battery module, their parts may be crushed due to their heavy weight. Therefore, all persons involved in transportation must wear safety shoes with toe caps. Please observe the safety regulations for transportation at the end customer's site, especially during loading and unloading.



- During transportation and installation of unpacked battery storage cabinets, the risk of injury increases, especially on sharp metal panels. Therefore, all personnel involved in transportation and installation must wear protective gloves.



















- Improper vehicle transportation can cause injury. Improper transportation or improper transportation locks may cause the load to slip or overturn, resulting in injury.



- The transportation of Li-Ion batteries is classified under hazard category UN3480, Class 9. For transport via sea, air, or land, the batteries are categorized under Packaging Group PI965 Section I. Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium-ion batteries which are assigned Class 9. Please refer to the relevant transportation documentation for details.

3. Introductions

3.1 Symbol Definition

	Danger! Serious physical injury or even death may occur if not follow the relative requirements.		Install the product out of reach of children
	Caution, risk of electric shock.		Do not place nor install near flammable or explosive materials
	In case of electrolyte leakage, keep leaked electrolyte away from eyes or skin.		Disconnect the equipment before carrying out maintenance or repair
	Do not connect the Pack's positive(+) and negative(-)terminal reversely.		EU WEEE mark: Product should not be disposed as household waste.
	Observe precautions for handling electrostatic discharge sensitive devices.		Instruction manual: Read the instruction manual before starting installation and operation.
	Caution, risk of electric shock, energy storage timed discharge		CE mark: The battery system complies with CE certification
	Recyclable.	NOTE	Note:The procedures taken for ensuring proper operation.
	Do not use the Pack beyond specified conditions		Earth terminal: The battery system needs to be reliably grounded to the inverter.
	Take care! This Pack is heavy enough to cause serious injury.		

3.2 Brief Introduction

FLH48100UG2 is equipped with a lithium iron phosphate battery designed for household use. Developed based on customer needs and market demands, this advanced battery storage solution provides high-quality, reliable power for various devices. The product features a long lifetime, suitability for high-temperature environments, and a compact design that requires minimal installation space.

FLH48100UG2 features a battery management system independently developed by our team. When connected to a grid or photovoltaic system as the power source, the product can store energy by charging the battery. In the event of a power outage from the grid or photovoltaic system, the product independently supplies electricity to household loads. Additionally, multiple units can be connected in parallel to form a high-capacity, multi-module system, meeting long-term energy storage requirements.

3.3 Description of FLH48100UG2

1. FLH48100UMG2 is a battery module, it needs to be used with FLH48100UCG2 controller;
2. FLH48100UCG2 is the controller of the entire system, so each system has at least five FLH48100UMG2.
3. Our system consists of at least 1 FLH48100UCG2+5 FLH48100UMG2 and up to 17 FLH48100UMG2.

Mode	System energy(kWh)	Discharge depth	Composition
FLH48100UG2M5	25.6	90%	FLH48100UCG2*1 + FLH48100UMG2*5
FLH48100UG2M6	30.72	90%	FLH48100UCG2*1 + FLH48100UMG2*6
FLH48100UG2M7	35.84	90%	FLH48100UCG2*1 + FLH48100UMG2*7
FLH48100UG2M8	40.96	90%	FLH48100UCG2*1 + FLH48100UMG2*8
FLH48100UG2M9	46.08	90%	FLH48100UCG2*1 + FLH48100UMG2*9
FLH48100UG2M10	51.2	90%	FLH48100UCG2*1 + FLH48100UMG2*10
FLH48100UG2M11	56.32	90%	FLH48100UCG2*1 + FLH48100UMG2*11
FLH48100UG2M12	61.44	90%	FLH48100UCG2*1 + FLH48100UMG2*12
FLH48100UG2M13	66.56	90%	FLH48100UCG2*1 + FLH48100UMG2*13
FLH48100UG2M14	71.68	90%	FLH48100UCG2*1 + FLH48100UMG2*14
FLH48100UG2M15	76.8	90%	FLH48100UCG2*1 + FLH48100UMG2*15
FLH48100UG2M16	81.92	90%	FLH48100UCG2*1 + FLH48100UMG2*16
FLH48100UG2M17*	87.04	90%	FLH48100UCG2*1 + FLH48100UMG2*17

*Note: The latest software supporting 17 BMUs in series is currently under development.

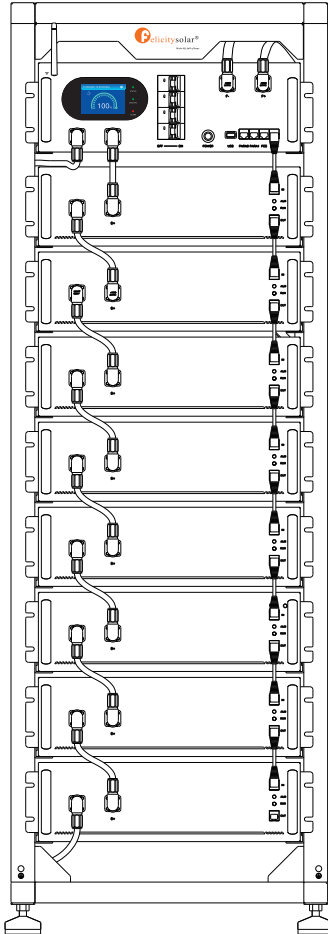
3.4 Features

- **Safe and Robustness:** LiFePO4 battery cell with higher safe performance and longer cycle life. The battery module is equipped with a standard aerosol fire protection system.
- **Multiple Protection:** Built-in smart BMS, Breaker and Fuse.
- **Flexible Installation:** Depending on the number of modules, multiple types of multi-level racks are available for selection. The rack integrates grounding functionality, eliminating the need for additional grounding wire connections.
- **Wide Compatibility:** Compatible with leading inverter brands.
- **High Scalability:** The capacity of a single cluster can reach up to 87.04 kWh, and it can support up to 16 sub-clusters. The system can be expanded to nearly 1.4 MWh at its maximum.
- **Flexible Configuration and upgrade:** Upgrades and parameter configurations can be performed via RS485, WiFi, Bluetooth, and USB.
- **Efficient Balancing :** Supports module-level voltage balancing, and allows the use of both new and old batteries automatically(Please contact the supplier for installation guidance).
- **Wide Operating Temperature:** Working from -20°C to 55°C with great discharge performance and cycle life.

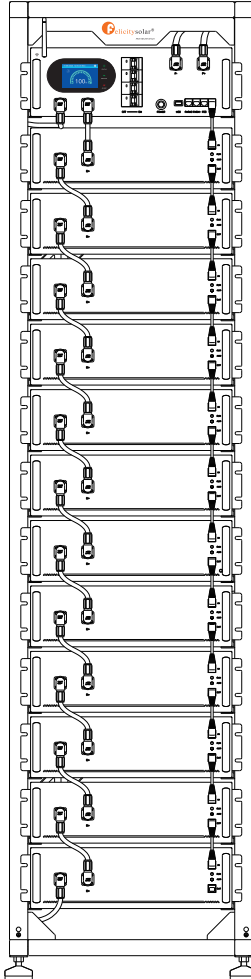
3.5 Product selection

We offer our customers three options:

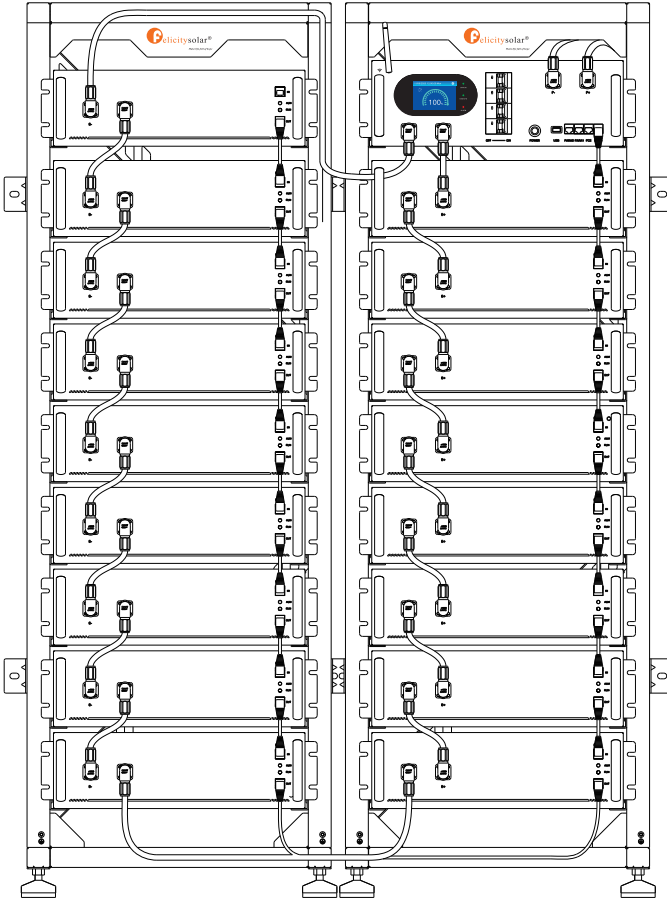
1. First option: 5 to 8 battery modules are required. A 9-layer product can be chosen, as shown in the following figure:



2. Second option: requires 9 to 12 battery modules, can choose 13 layer product solution. As shown in the following figure:

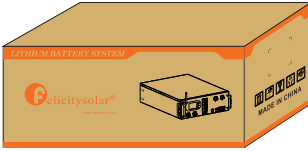


3. Third option: 13~17 battery modules are required, and two 9-layer products can be selected, as shown in the figure below:

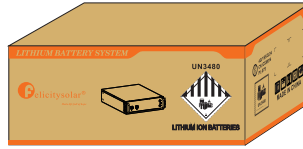


3.6 Product Overview

3.6.1 External Packaging

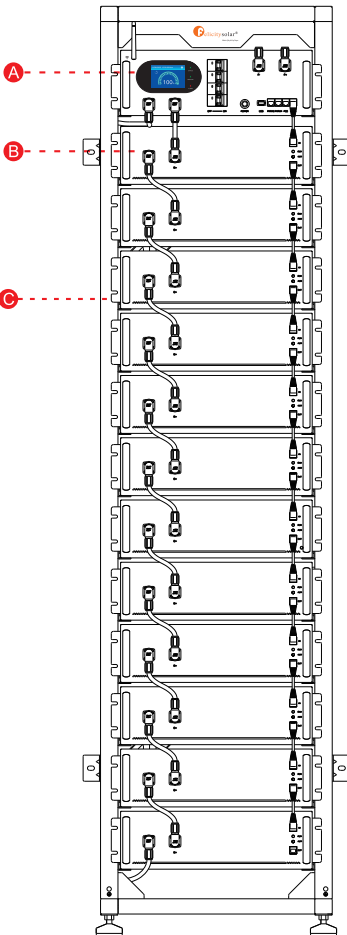


Carton box(FLH48100UCG2)



Carton box(FLH48100UMG2)

3.6.2 Battery system introduction



Code	Name	Product Model
A	High-Voltage Battery Control Unit	FLH48100UCG2(BCU)
B	High-Voltage Battery Module	FLH48100UMG2(BMU)
C	Rack	*FLH48100R13G2 *FLH48100R9G2

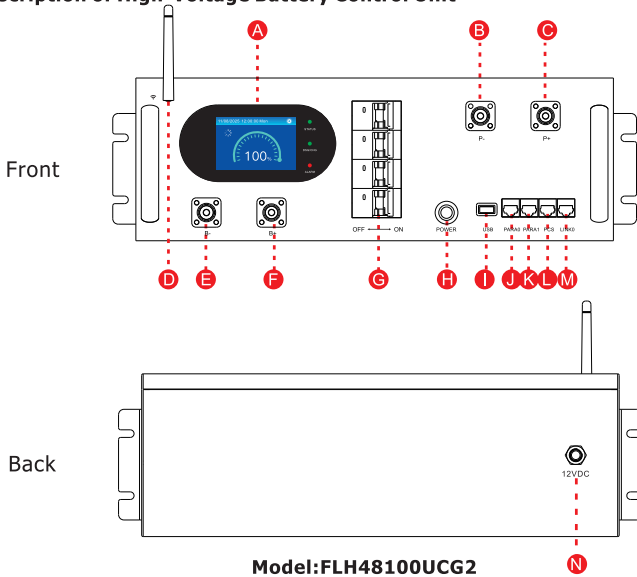
* FLH48100R13G2:

Built in 1 control module and UP to 12 battery modules

* FLH48100R9G21:

Built in 1 control module and UP to 8 battery modules

3.6.3 Description of High-Voltage Battery Control Unit

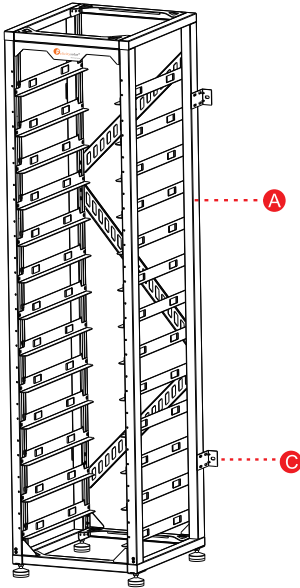


Code	Name	Definition
A	LCD Display	Indicate the important battery information
B	PCS-	Connection terminal of PCS negative pole(black)
C	PCS+	Connection terminal of PCS positive pole(red)
D	Antenna	Increase the WiFi receiving signal
E	BAT-	Connection terminal of the common negative pole of the battery(black)
F	BAT+	Connection terminal of the common positive pole of the battery(red)
G	DC Circuit Breaker	Used to manually control the output situation of battery rack
H	Power Switch	Indicate the power on/off function
I	USB	BMS upgrade interface with USB
J	PARA0	The clustered interface connected to the previous battery system
K	PARA1	The clustered interface connected to the next battery system

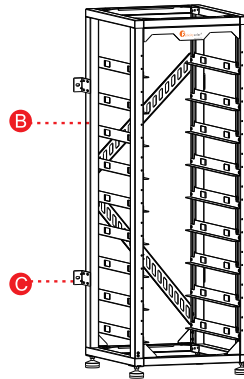
3.6.5 Rack Introduction

- FLH48100R13G2: Built in 1 control module and UP to 12 battery modules;
- FLH48100R9G2: Built in 1 control module and UP to 8 battery modules;

Code	Name
A	Rack(R13)
B	Rack(R9)
C	Fixed trestle



FLH48100R13G2

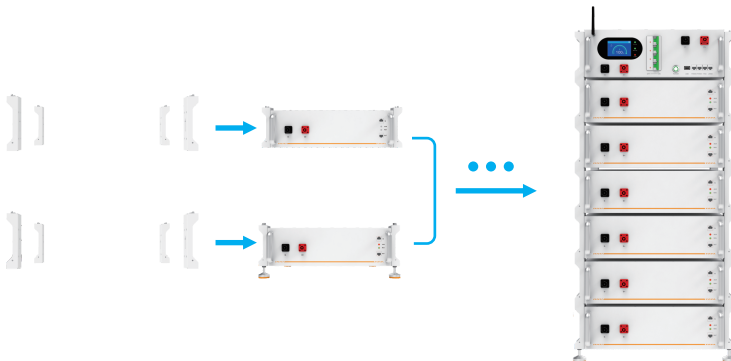


FLH48100R9G2

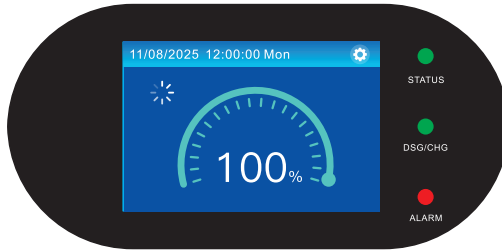
According to customer needs, if the customer needs less than 7 battery packs (5~6 battery packs +1 high voltage box), then the customer can choose a simple rack.

Note: Simple bracket is optional.

The installation Procedure of the simple mounting rack is shown in the figure.



3.7 LCD Display Icons



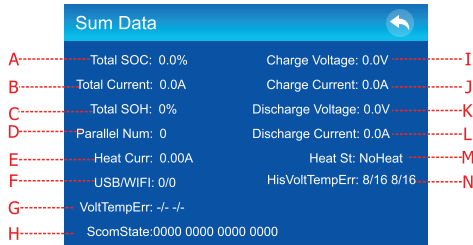
Name	Description
LCD touch screen	Display the information of the battery.
Status LED	Indicates the operating status of the battery, which is always on when running normally.
Charge&Discharge LED	Indicates the charging&discharging status of the battery; A long bright light indicates discharging, and a flashing light indicates charging.
Alarm LED	Indicates the fault status of the battery, which lights up when the fault occurs.

3.7.1 Main Interface

Battery Information	
	Indicate SOC.
	It Indicates the battery level, with each grid representing 5%.
	This icon lights up to indicate that the battery is waiting to be connected, and there is no output at this time. After entering normal working mode, this icon disappears.

Sum Data:

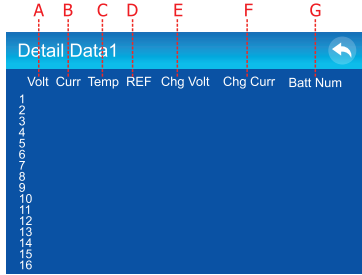
This page displays the summary information of parallel battery system:



Code	Name	Definition
A	Total SOC	SOC of parallel battery system.
B	Total Current	Total Current of parallel battery system.
C	Total SOH	SOH parallel battery system.
D	Pararrel Number	The number of successfully paralleled batteries.
E	Heat Current	Heat Current of parallel battery system. If this battery does not support the heating function, please ignore it.
F	USB/WIFI	USB/WIFI connection state. 1 represents connected, and 0 represents disconnected.
G	Voltage Temperature Error	Current records of BMU cells or temperatures error
H	Slave Com State	BMU communication state. Binary numbers are used to determine which BMUs are online.
I	Charge Voltage	Charge limited voltage of parallel battery system.
J	Charge Current	Charge limited current of parallel battery system.
K	Discharge Voltage	Discharge limited voltage of parallel battery system.
L	Discharge Current	Discharge limited current of parallel battery system.
M	Heat State	Heat state of parallel battery system. If this battery does not support the heating function, please ignore it.
N	History Voltage Temperature Error	Historical records of battery cells or temperatures;

Detail Data1:

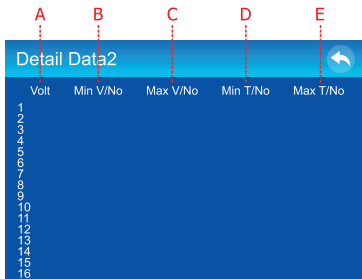
This page displays the detail information of parallel battery system:



Code	Name	Definition
A	Voltage	Every battety voltage of parallel battery system.
B	Current	Every battety current of parallel battery system.
C	Temperature	Every battety temperature of parallel battery system.
D	Reference SOC	Every battety reference SOC of parallel battery system.
E	Charge Voltage	Every battety charge limited voltage of parallel battery system.
F	Charge Current	Every battety charge limited current of parallel battery system.
G	Battety Number	Battery address number.

Detail Data2:

This page displays the detail information of battery system:



Code	Name	Definition
A	Voltage	Every BMU voltage of battery system.
B	Minimum Voltage/No	Minimum cell voltage of BMU and cell number.
C	Maximum Voltage/No	Maximum cell voltage of BMU cell number.
D	Minimum Temperature/No	Minimum cell temperature of BMU cell number.
E	Maximum Temperature/No	Maximum cell temperature of BMU cell number.

4. Installation and Configuration

4.1 Preparations for Installation

4.1.1 Safety Requirement

This system must only be installed by personnel trained in power supply systems and possessing adequate knowledge of such systems. The safety guidelines outlined below, along with applicable local safety standards, must be strictly adhered to during installation.

- All circuits interfacing with this power system and carrying external voltages below 48V must comply with SELV requirements as specified in the IEC60950 standard.
- If working within the power system cabinet, ensure the system is completely powered down, and all battery devices are switched off.
- The distribution cables should be arranged systematically and equipped with protective measures to prevent accidental contact while operating power equipment.

4.1.2 Installation Environment

- Working temperature: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Charging temperature range: $0^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Discharging temperature range: $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Storage temperature: $0^{\circ}\text{C} \sim +35^{\circ}\text{C}$
- Relative humidity: 5% ~ 95%
- Elevation: $\leq 2000\text{m}$
- Heat source: $\geq 50\text{cm}$
- Fire source: $\geq 500\text{cm}$

Operating environment: Suitable for indoor or outdoor installation at locations shielded from direct sunlight, wind, conductive dust, and corrosive gases. Pollution PD2, overvoltage category II. Ensure the following conditions are met:

- The installation site should be distant from the sea to prevent exposure to saltwater and high humidity.
- The ground at the installation location must be flat and level.
- The site should be free of flammable or explosive materials.
- Optimal ambient temperature: 20°C to 30°C .
- Avoid areas with excessive dust or clutter.

4.1.3 Tools



Screw Driver



Crimping Modular



Safety Shoes



Multimeter



Safety Gloves



Safety Goggles



Plier














Ribbon














Electric drill


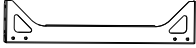












4.2 Unpacking Inspection

- Upon arrival at the installation site, loading and unloading should strictly follow the established rules and procedures to prevent exposure to sunlight and rain.
- Before unpacking, verify the total number of packages against the shipping list attached to each package, and inspect the outer cases for any signs of damage. After unpacking, carefully check for loose or damaged wiring and contacts, cracks, deformations, leaks, or any other form of damage. If any damage is detected, the battery must be replaced immediately. Do not attempt to charge or use a damaged battery, and avoid contact with any liquid from a ruptured battery.
- During unpacking, handle all components with care to protect the surface coating from damage.

FLH48100UCG2			
No.	Description	Quantity	Picture
1	High-Voltage Battery Control Unit 1000V/100A	1	
2	User manual	1	
3	Warranty card	1	
4	Power Cable 1: 5 meters, 4AWG, allows for charging and discharging up to 100A, used to connect to external PCS+ (red).	1	
5	Power Cable 2: 5 meters, 4AWG, allows for charging and discharging up to 100A, used to connect to external PCS- (black).	1	
6	Power Cable 3: 2 meters, 4AWG, used for serial connection from master control to slave control (black).	1	
7	Power Cable 4: 35 millimeter, 4AWG, used for serial connection from master control to slave control (red).	1	
8	Communication Line 1: The communication between the battery pack and the PCS.	1	
9	Communication Line2: Paralleled communication between the battery clusters.	1	
10	Screw: used for installing control box.	4	
11	Communication Line 4: Used for communication connection between battery control unit and the first battery model	1	

12	Signal Terminal: Used for creating custom communication cables.	2	
13	Ground cable: The 2m ground cable is used to connect the inverter to the battery ground	1	
14	External 12Vdc power supply debug harness	1	
15	120ohm terminal resistor used for BMU communication and paralleled communication	2	
16	Terminal SC25-8: It is used for inverter battery terminals and is connected to the combiner box when bundling	2	
17	Magnetic ring: Used for the communication line between the inverter and the battery pack to improve the signal anti-interference ability	1	


FLH48100UMG2			
No.	Description	Quantity	Picture
1	5.12kWh battery module	1	
2	Warranty card	1	
3	Power Cable: used for series connections between battery pack modules.	1	
4	Communication Cable: used for communication connections between battery control unit and the first battery module	1	
5	Screw: used for installing battery pack modules.	4	

FLH48100R13G2			
No.	Description	Quantity	Picture
1	LOGO board	1	
2	Cross beam	4	
3	Right side beam	1	
4	Left side beam	1	
5	Left diagonal brace	1	
6	Right diagonal brace	2	
7	Rack fastener	4	
8	BOT foot cup	4	
9	Tripod	4	
10	Expansion screw	4	
11	Screw M6×12*66 PCS Screw M5×12*2 PCS	/	
12	Ribbon:Used to fix the power cord	5	
13	Quick installation guide	1	
14	Warranty card	1	

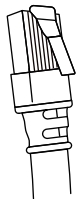


Definition of PARA0		Definition of PARA1		Definition of PCS		Definition of LINK0	
1	BCU-ADD-OUT	1	BCU-ADD-IN	1	485B_PCS	1	BMU-ADD-IN
2	BCU-ADD-IN	2	BCU-ADD-OUT	2	485A_PCS	2	BMU-ADD-OUT
3	/	3	/	3	GND	3	COM-GND
4	DAY1A	4	/	4	CANH_PCS	4	12V0_COMISO
5	DAY1B	5	/	5	CANL_PCS	5	12V0_COMISO
6	/	6	/	6	GND	6	COM-GND
7	CANL_BCU	7	CANL_BCU	7	485A_PCS	7	CANL_BMU
8	CANH_BCU	8	CANH_BCU	8	485B_PCS	8	CANH_BMU

P1.....P8



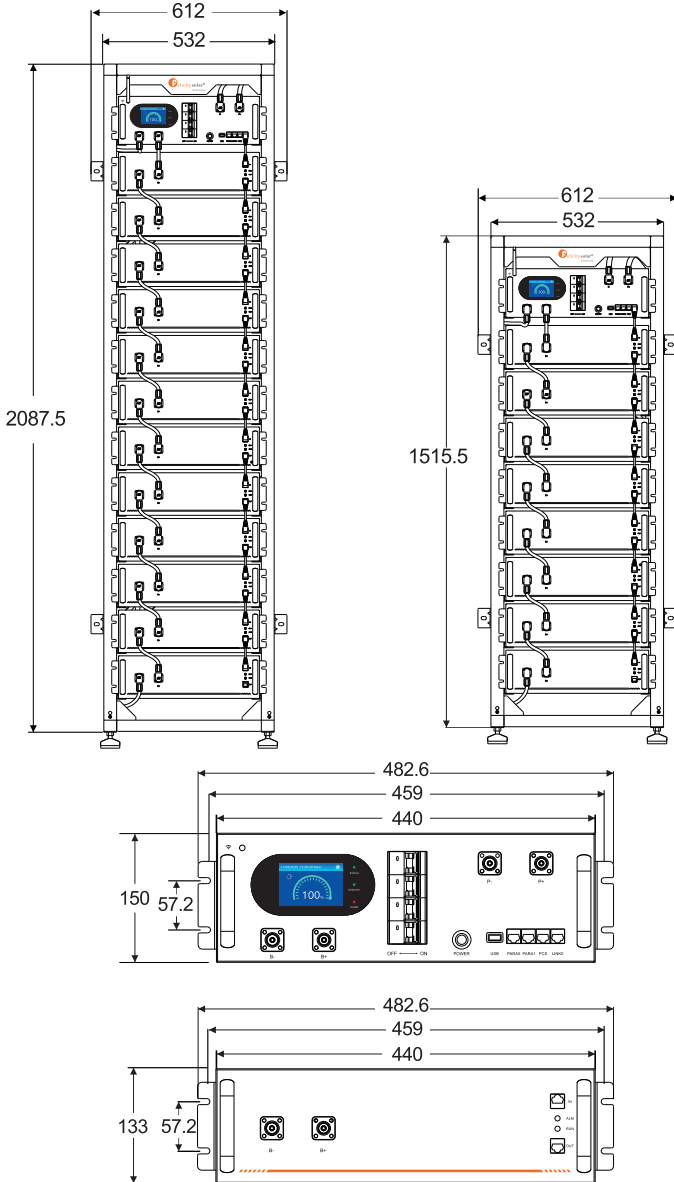
8.....1



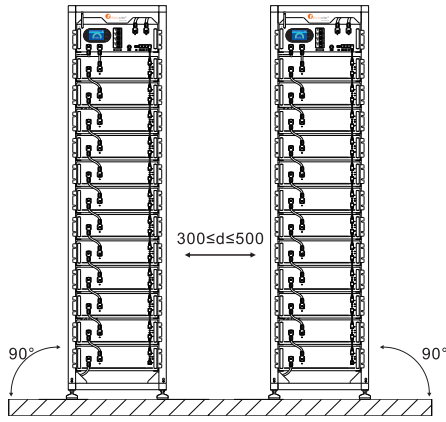
4.3 Installation Procedure

4.3.1 Mounting the Battery

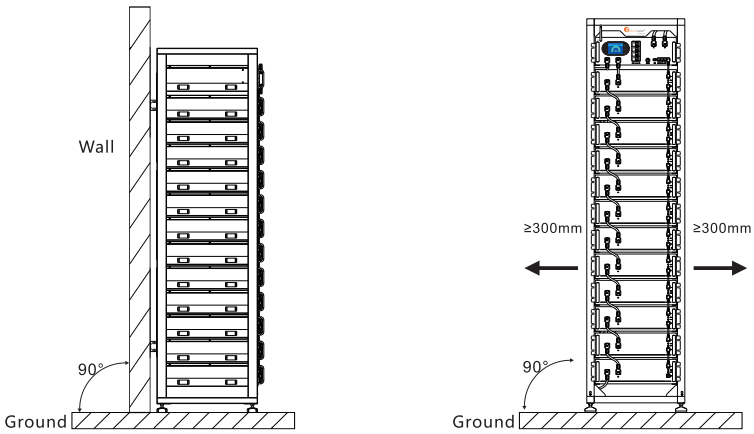
(a) Product size information



(a) Floor-Mounted method



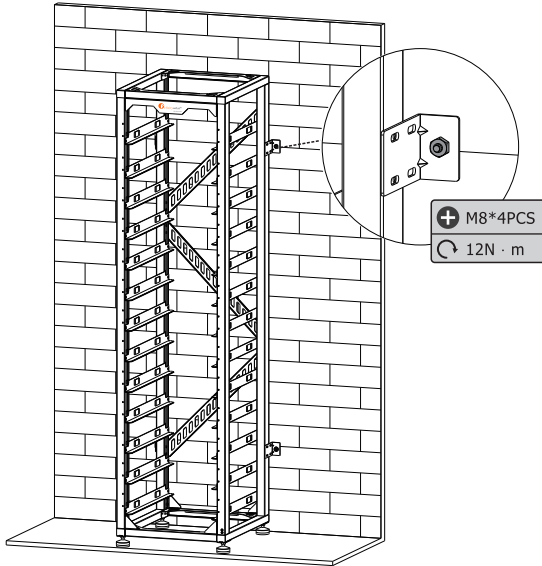
Ground(Two rows installtion)



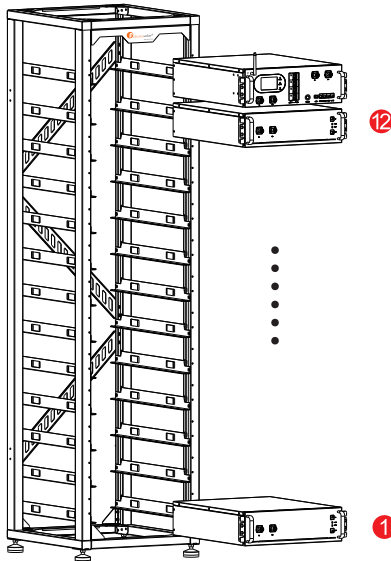
(b) Wall-Mounted Method

Step 1: Remove the battery, control box, and frame from the packing case.

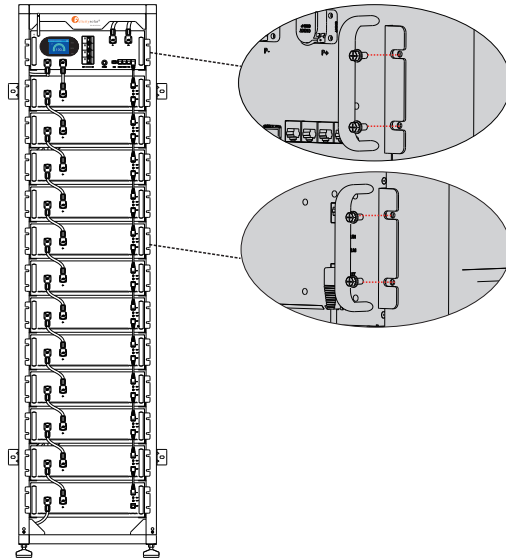
Use a hammer drill to make a frame fixing hole in the wall. (Aperture 10mm, depth 60mm).



Step 2: Attach the rack to the wall, then install the battery from the bottom to the top, and make sure the battery is secured.



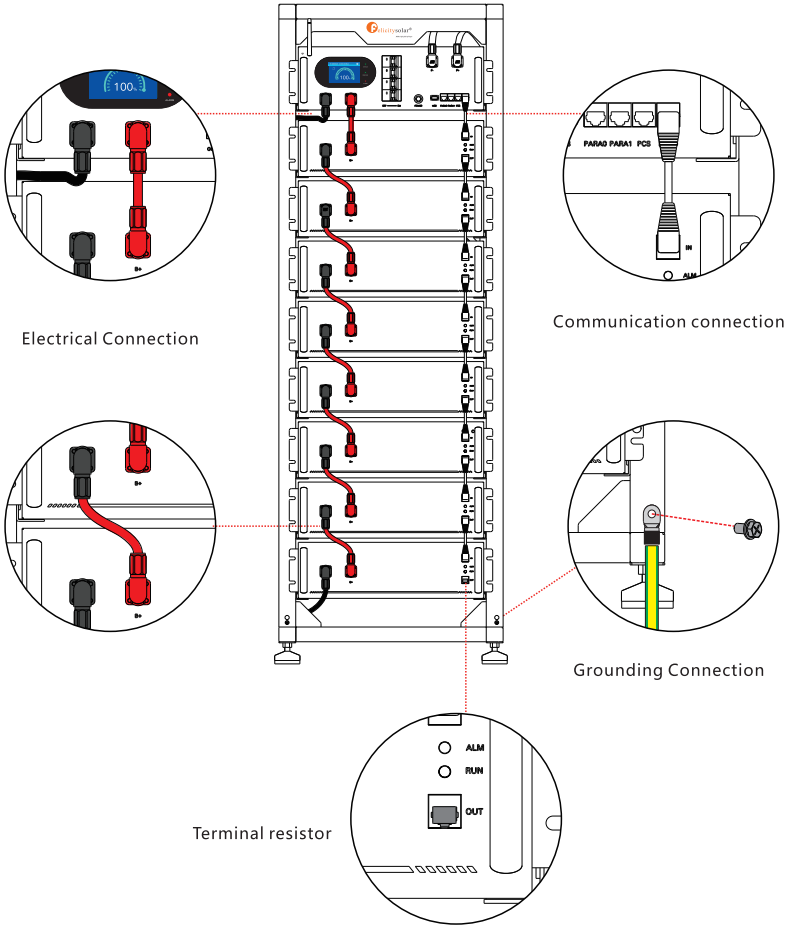
Step 3: Secure the battery, control box to the rack.



Note:

1. Before installation, check that the ground is flat and has no tilt.
2. Ensure that the rack is against a wall and secured.
3. When placed, it should be pushed inward from the bottom up and from the direction of the arrow.
4. When placing the battery, ensure that the battery is pushed to the bottom.
5. Fasten the battery with the accessory screws. Be careful that the battery falls down.
6. After securing the battery, insert the power cable.

4.3.2 Wiring procedure

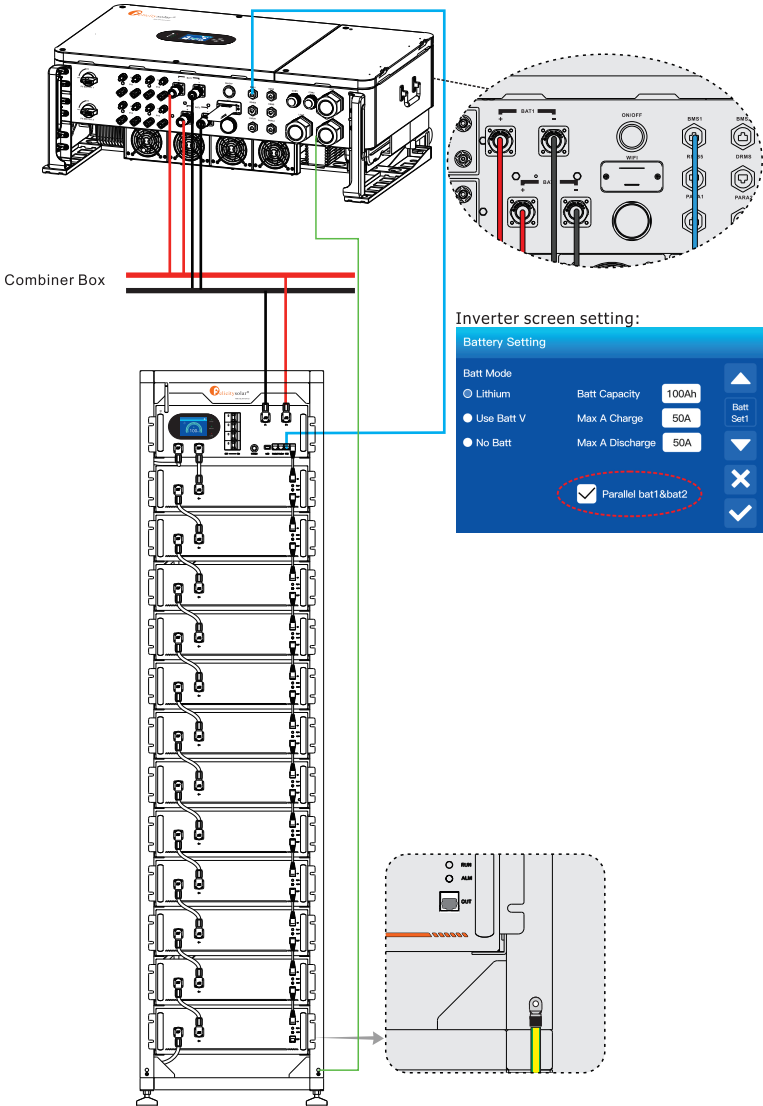


Note:

- When installing the equipment, first make a reliable grounding connection to the inverter through the grounding port at the bottom of the frame, and then make a reliable grounding connection to the battery system and the frame. When disassembling the equipment, first disconnect the power circuit between the battery system and the inverter, then disconnect the grounding connection between the battery system and the frame, and finally disconnect the grounding connection between the frame and the inverter.
- Screw compression torque 5N.
- The control box is connected to the ground wire of the base.

4.3.3 System Connection Diagram

■ Negative Power Line
 ■ Positive Power Line
 ■ RJ45 CAN communication



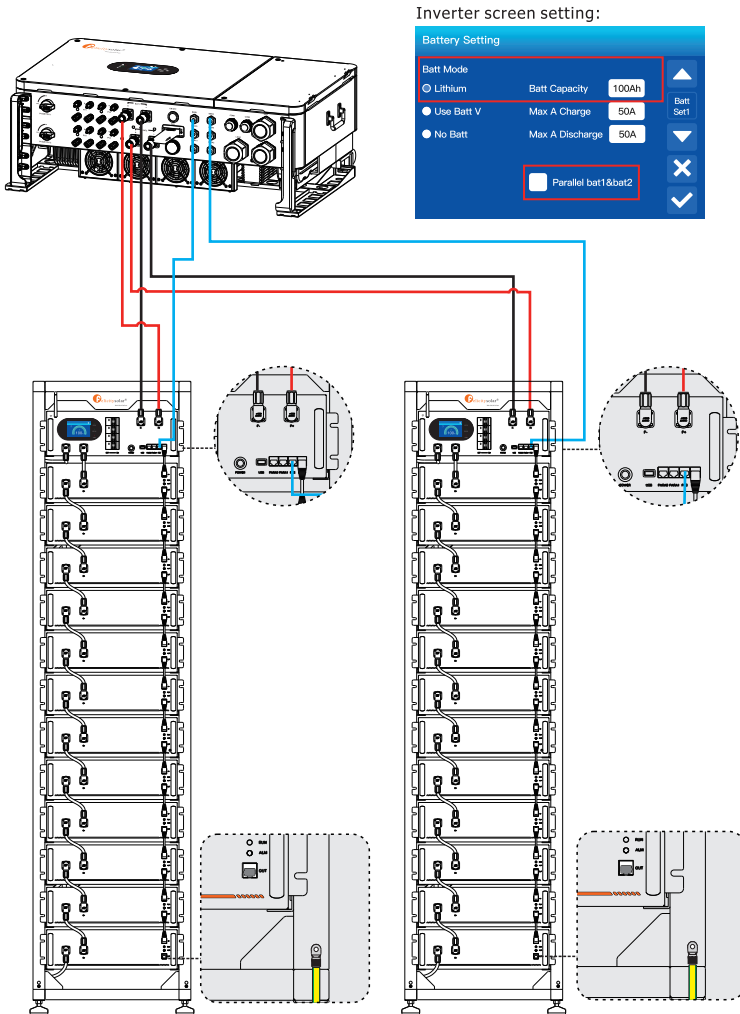
4.3.4 Batteries in parallel

The FLH48100UG2 supports to be connected in parallel for expansion. It can support up to 17 clusters FLH48100UG2 in parallel. Before setting up the parallel system, it is necessary to carefully read this chapter to ensure that the number of each cluster's BMUs is consistent, that the addresses are set correctly, and that the electrical connections are safe and correct.

* It is recommended to use battery pack combiner box(BTCB0606/BTCB0303) or confluence copper bar confluence.

Two battery clusters connected to the inverter

■ Negative Power Line
 ■ Positive Power Line
 ■ RJ45 CAN communication



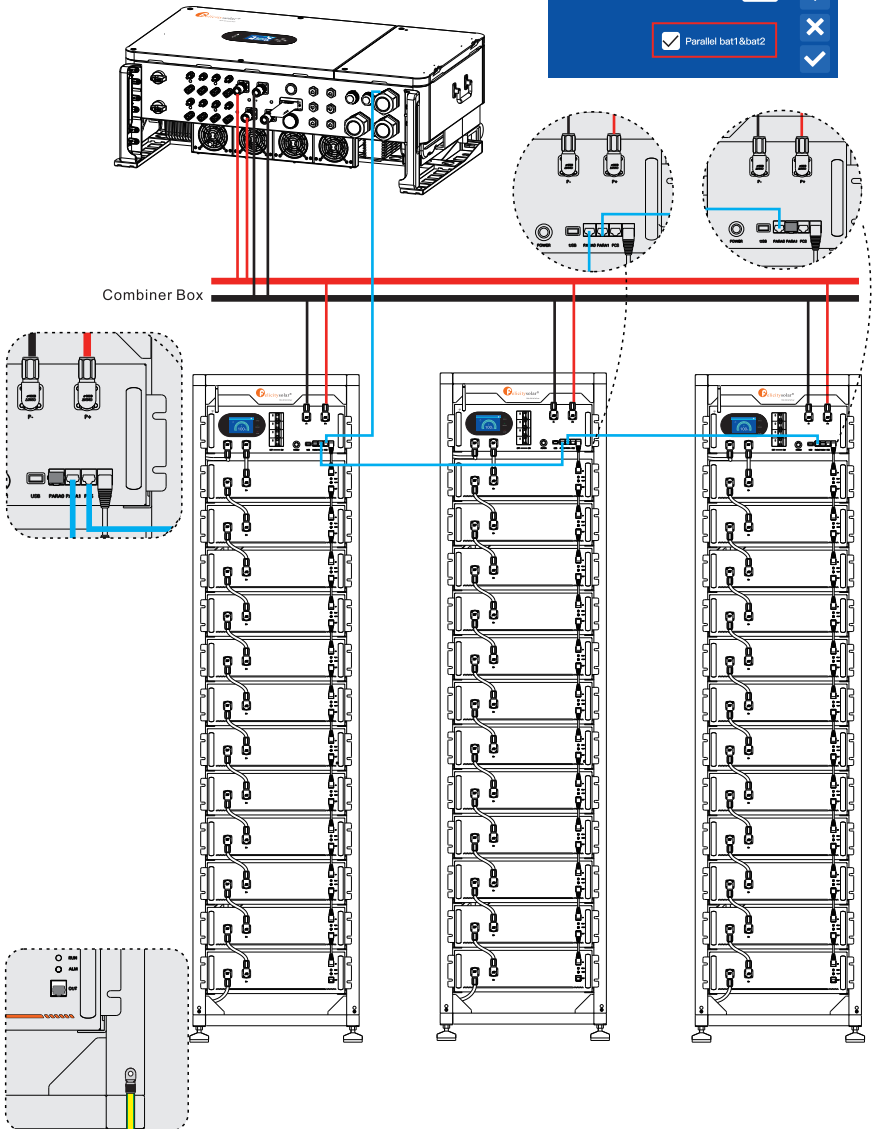
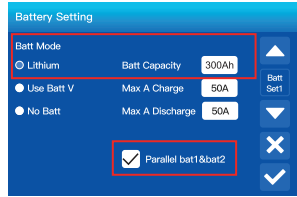
Three battery clusters connected to the inverter

■ Negative Power Line

■ Positive Power Line

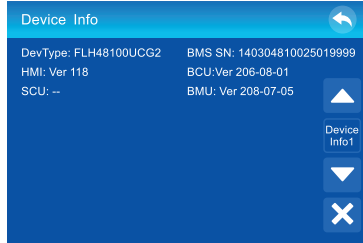
■ RJ45 CAN communication

Inverter screen setting:



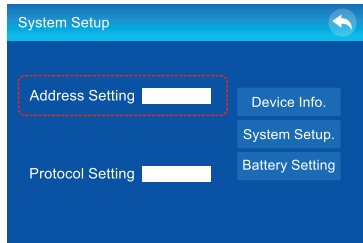
4.3.5 Cluster Setting Instructions

Before the system is set up, upgrade the software version of the main control and LCD screen to be no lower than that indicated in the picture



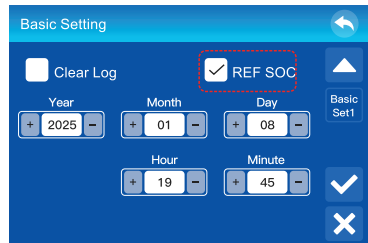
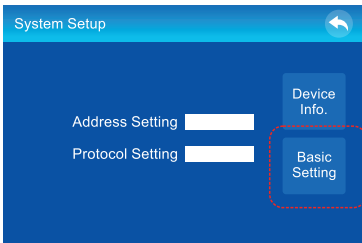
Battery pack parallel operation address setting:

1. After connecting the battery cable, power on the battery pack and set the main control address through the screen. Each main control address cannot be set repeatedly, and the maximum setting is 16.
2. After setting the address, restart the battery.



SOC Averaging Settings for Parallel Connection:


1. After connecting the battery cable, enter the System Setup page and click on Basic Settings.
2. Check the "REF SOC" option



5. Operation


5.1 PCS Port Pin Definition

BATTERY-FelicitySolar

Picture	Pin	Color	Definition
	1	ORG-WH	485A
	2	ORG	485B
	3	GN-WH	NC
	4	BU	CANH
	5	BU-WH	CANL
	6	GN	GND
	7	BN-WH	485A
	8	BN	485B



INVERTER

Pin	Color	Definition	Picture
1	ORG-WH	/	
2	ORG	/	
3	GN-WH	/	
4	BU	CANH	
5	BU-WH	CANL	
6	GN	GND	
7	BN-WH	485A	
8	BN	485B	

5.2 Switch On/Off

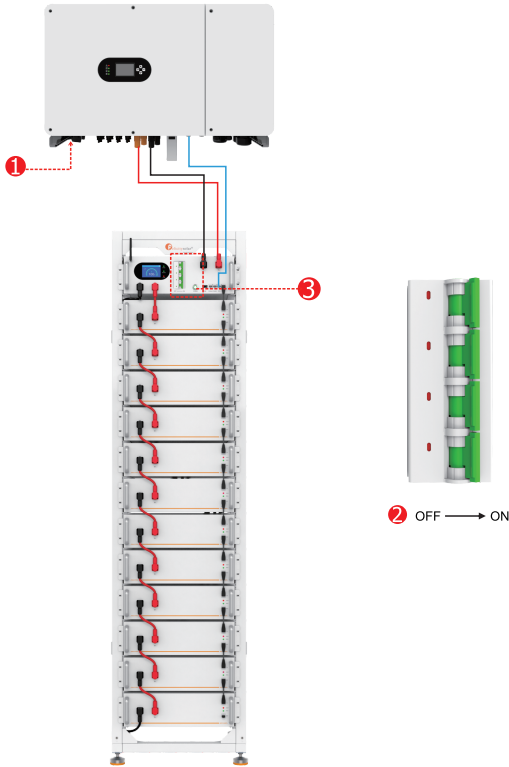
Power on steps:

Step 1: First connect the PV, then connect the mains power, finally connect the battery, and finally start the inverter **1**;

Step 2: Turn on the battery breaker **2** ("OFF" to the "ON");

Step 3: Press and hold the switch **3** for 3s to turn on the battery system.

If the battery clusters are connected in parallel, connect the wireharnesses in sequence as indicated and then turn on them one by one.



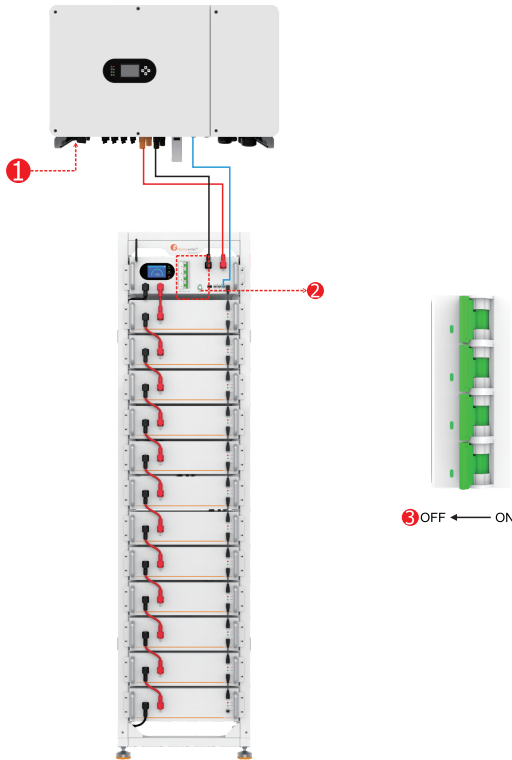
Power down steps:

Step 1: Turn off the inverter **1**;

Step 2: Press and hold the switch **2** for 3s to turn off the battery system;

Step 3: Disconnect the breaker of the battery **3** ("ON" to "OFF").

If the batteries are connected in parallel, turn off them one by one.



6. Manage Devices Via Network

***If the entire system uses FelicitySolar products, the battery information can be monitored through the inverter. If paired with inverters from other brands, please follow the steps below:**

6.1 Configure Network

6.1.1 Download APP

Scan the QR Code on the right side and download the APP.

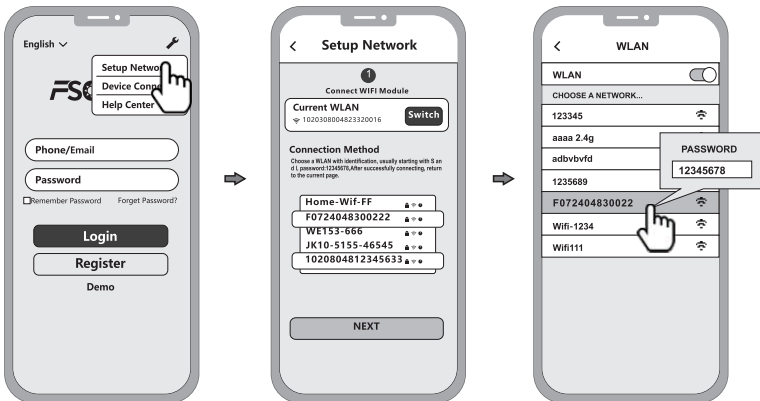


FsolAR APP

6.1.2 Connect to Built-in WIFI wireless network

Configure the mobile phone WLAN to connect to the wireless network of the Built-in WIFI

- 1) Run the APP, enter the login page, click the [Setup network] button to enter the network configuration page.
- 2) On the network configuration page, click the [Switch] button to enter the mobile phone WLAN page.



Configure the mobile phone WLAN to connect to the wireless network of the Built-in WIFI.

- 1) Run the APP, enter the login page, click the [Setup network] button to enter the network configuration page.
- 2) On the network configuration page, click the [Switch] button to enter the mobile phone WLAN page.

3) On the WLAN page of the mobile phone, find the corresponding wireless network name (SSID) of the Smart WiFi module, starting with F (e.g. Fxxxxxxxxxxxxxxxxxx, the xxxxxxxx xxxxxxxx is the same as the device serial number). enter the module wireless network password (default password: 12345678), and connect to the wireless network of the Built-in WIFI.

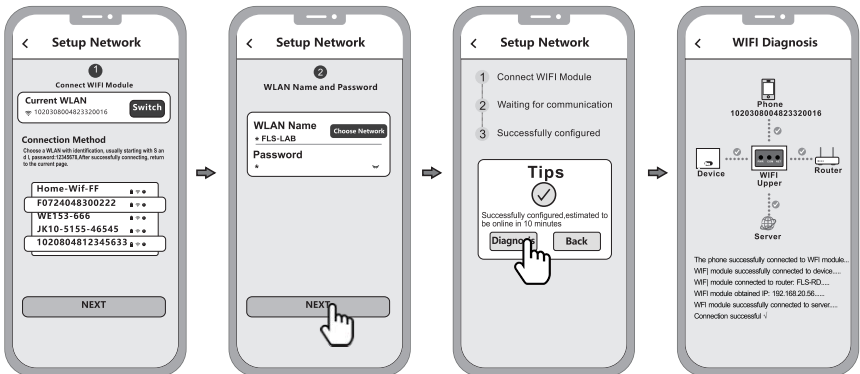
6.1.3 Configure the network

1) After the mobile WLAN is connected to the wireless network of the Built-in WIFI, return to the network configuration page of the APP and click the [NEXT] button to enter the WIFI network page.

2) On the WiFi network page, select the router wireless network to which the Built-in WIFI needs to connect, or directly enter the route name, enter the router wireless network password and click the [NEXT] button.

3) And then wait for the Built-in WIFI to connect to the router's wireless network, which will take some time.

Then you can use the diagnostic function of the APP or according to the fault appendix to troubleshoot the problem.



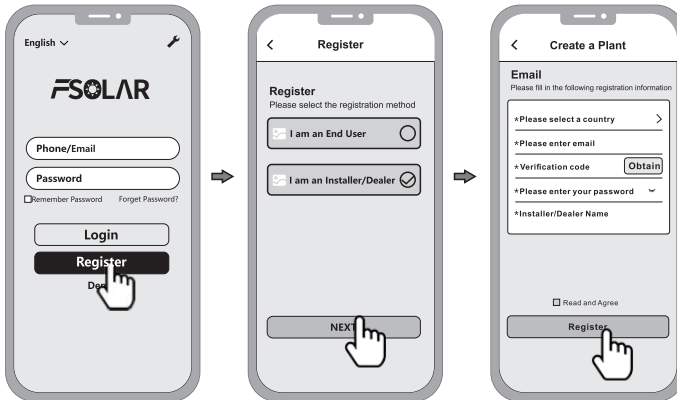
6.2 Create the Plant

After the Built-in WIFI is connected to the server, it will transmit the data of the device to the server. And after the plant is created, users can view and manage the device via the APP or web browser.

6.2.1 Manage devices via APP

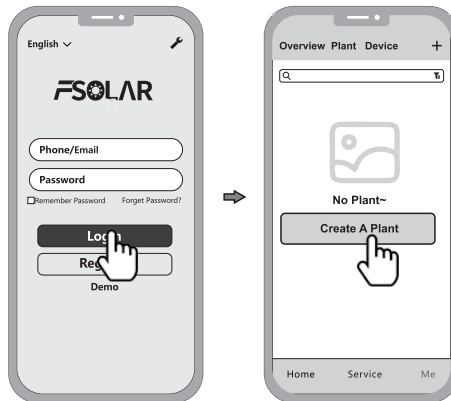
1) Register an account

Run the app, enter the login page, click the [Register] button, select the role you want to register, enter and fill in the relevant information (optional email) to register.

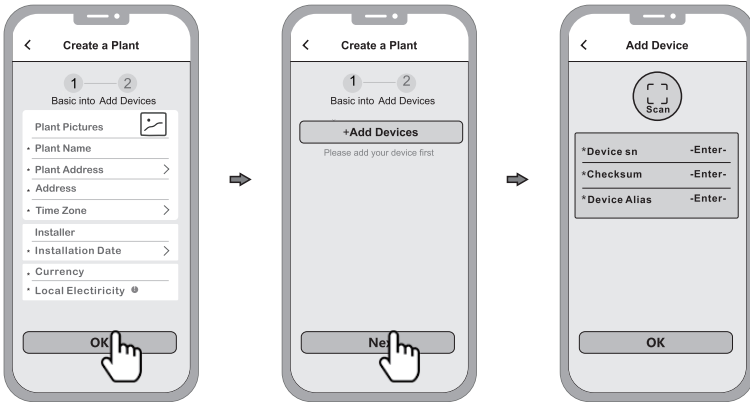


2) New plant construction

- Log in with the newly registered account, enter the homepage, and click on [Create A Plant]



- Fill in the corresponding information and click [OK]
- Click [Add device], click the above icon [scan, align the bar code/two-dimensional code on the side of the inverter or battery pack to scan, or fill in the SN and activation code on the label.



- Manage the device via a web browser, please refer to: <https://shine.felicitysolar.com>

7. Maintenance and Troubleshooting

There are no operator serviceable parts in side this equipment. Service should be provided only by a qualified service technician.

7.1 Storage

- Do not expose battery to open flame.
- Do not place the product under direct sunlight.
- Do not place the product near flammable materials. It may lead to fire or explosion in case of accident.
- Store in a cool and dry place with ample ventilation.
- Store the product on a flat surface.
- Store the product out of reach of children and animals.
- Do not damage the unit by dropping, deforming, impacting, cutting or penetrating with a sharp object.
- It may cause leakage of electrolyte or fire.
- Do not touch any liquid spilled from the product. There is a risk of electric shock or damage to skin.
- Always handle the battery wearing the insulated gloves.
- Do not step on the product or place any foreign objects on it. This can result in damage
- Do not charge or discharge damaged battery.

7.2 Fault Code Table

Fault Code	Explain	Tretment Measure
F01	Battery Voltage High	Battery overvoltage fault. Please check the BCU high voltage measurement circuit.
F02	Battery Voltage Low	Battery undervoltage fault. Please check the BCU high voltage measurement circuit.
F03	Cell Voltage High	Battery cell overvoltage fault. If the same fault is reported multiple times, please contact the supplier to upgrade the software.
F04	Cell Voltage Low	Battery cell undervoltage fault. If the same fault is reported multiple times, please contact the supplier to upgrade the software.
F05	Battery Charge Current High	Battery charge overcurrent. If the same fault is reported multiple times, please contact the battery and convertor supplier.
F06	Battery Discharge Current High	Battery discharge overcurrent. If the same fault is reported multiple times, please contact the battery and convertor supplier.
F07	BCU Temperature High	BCU over temperature. Please allow the battery to cool down before using it. If the same fault is reported multiple times, please contact the battery supplier.
F08	TBD	TBD
F09	Cell Temperature High	Cell over temperature. Please allow the battery to cool down before using it. If the same fault is reported multiple times, please contact the battery supplier.
F10	Cell Temperature Low	Cell under temperature. Please note the installation and usage environmental temperatures . If the same fault is reported multiple times, please contact the battery supplier.
F11	AFE Communication Fault	The chip operation is stuck. Please try to restart the battery. If the same fault is reported multiple times, please contact the battery supplier.
F12	Soft Start Fault	Battery soft start fault. Please confirm whether there is a short circuit on the P+/P-.
F13	BMU Device Communication Fault	BMU communication fault. Please confirm whether the BMUs communication harness are well connected.
F14	Insulation Resistance Low Fault	Insulation resistance low fault. Please turn off the battery system and contact the battery supplier.

F15	TBD	TBD
F16	TBD	TBD
F17	Parallel Fault	Batteries in parallel fault. Please confirm whether the addresses are the same or paralleled harness disconnection. If the same fault is reported multiple times, please contact the battery supplier.
F18	Relay Self-diagnosis Fault	Relay driver fault. Please turn off the battery system and contact the battery supplier.
F19	PCS Voltage fault	PCS voltage measurement fault. Please try to restart the battery. If the same fault is reported multiple times, please contact the battery supplier.
F20	Fuse Fault	Fuse fault. If the same fault is reported multiple times, please contact the battery supplier and check the fuse state in BCU.
F21	Insulation Function Fault	BCU insulation function fault. Please try to restart the battery. If the same fault is reported multiple times, please contact the battery supplier.
F22	BMU Address Fault	BMU Address Fault Please try to restart the battery. If the same fault is reported multiple times, please contact the battery supplier.
F23	Cell Temperature Harness Shortage Fault	Cell temperature harness shortage fault. If the same fault is reported multiple times, please contact the battery supplier and check the BMU temperature harness state.
F24	Cell Temperature Harness Open Fault	Cell temperature harness open fault. If the same fault is reported multiple times, please contact the battery supplier and check the BMU temperature harness state.
F25	Cell Voltage Harness Open Fault	Cell Voltage Harness Open Fault If the same fault is reported multiple times, please contact the battery supplier and check the cell voltage harness state.
F26	Heating Power Over Fault	Heating power over fault. Please turn off the battery system and contact the battery supplier.
F27	Heating Circuit Fault	Please turn off the battery system and contact the battery supplier.

F28	Module Balance Relay Fault	Module balance relay fault. Please turn off the battery system and contact the battery supplier.
F29	Delta Voltage Fault	Excessive voltage difference fault. If the same fault is reported multiple times, please contact the battery supplier and check the cell voltage harness state.

8. Battery recovery

Aluminum, copper, lithium, iron, and other metal materials are extracted from discarded LiFePO₄ batteries using an advanced hydrometallurgical process, achieving a comprehensive recovery efficiency of up to 80%. The detailed process steps are outlined as follows.

8.1 Recovery process and steps of cathode materials

The aluminum foil used as collector is an amphoteric metal. Initially, it is dissolved in a NaOH alkaline solution, allowing aluminum to enter the solution as NaAlO₂. After filtration, the filtrate is neutralized with a sulfuric acid solution, resulting in the precipitation of Al(OH)₃. When the pH exceeds 9.0, the majority of the aluminum precipitates, and the resulting Al(OH)₃ can achieve chemical-grade purity upon analysis.

The filter residue is treated with sulfuric acid and hydrogen peroxide, allowing lithium iron phosphate to dissolve into the solution as Fe₂(SO₄)₃ and Li₂SO₄, while separating it from carbon black and the carbon coating on lithium iron phosphate. After filtration, the pH of the filtrate is adjusted using NaOH and ammonia solution. Iron is first precipitated as Fe(OH)₃, followed by the precipitation of the remaining solution using a saturated Na₂CO₃ solution at 90°C.

8.2 Recovery of anode materials

The recovery process for anode materials is relatively straightforward. After separating the anode plates, the copper purity exceeds 99%, making it suitable for further refining into electrolytic copper.

8.3 Recovery of diaphragm

The diaphragm material is primarily non-hazardous and holds no recycling value.

8.4 List of recycling equipment

Automatic dismantling machine, pulverizes, wet gold pool, etc.

9. Disposal

Please abide by the regulations for the disposal of used batteries. Damaged batteries must be stopped immediately. Before disposal, please contact the installer or sales partner and ensure that the batteries are kept away from moisture and direct sunlight.

For details on battery module processing, please contact us in a timely manner:

E-mail: technicalsupport@felicitysolar.com

Web: <https://www.felicitysolar.com>



Caution:

1. Do not discard batteries (including rechargeable batteries) as household garbage! According to regulatory requirements, you are obligated to hand over used batteries and rechargeable batteries to the designated recycling channels for disposal.
2. If used batteries are not properly disposed of, they may release pollutants, posing a threat to the environment and health. Improper storage or handling may lead to the leakage of harmful substances.
3. Batteries contain recyclable resources such as iron and lithium, and recycling them can achieve circular value.



Don't regard batteries as household garbage!

Appendix I

Model		FLH48100UG2			
Battery Type		LiFePO4			
Nominal Energy		5.12kWh			
Nominal Voltage		51.2V			
Nominal Capacity		100Ah			
Number of Battery Modules		5(Min)	8	12	17(Max) ^[1]
System Nominal Energy		25.6kWh	40.96kWh	61.44kWh	87.04kWh
System Nominal Voltage		256V	409.6V	614.4V	870.4V
System Operating Voltage		232~288V	371.2~460.8V	556.8~691.2V	788.8~979.2V
System Usable Energy		25.6kWh	40.96kWh	61.44kWh	87.04kWh
Recommend Charge/Discharge current		50A			
Max. continuous charge/Discharge current[2]		100A			
Depth of discharge(DOD)		90%			
Display type		LED+LCD			
IP Rating of Enclosure		IP21			
Working Temperature Range		Charge:0°C~+55°C			
		Discharge:-20°C~+55°C			
Storage Temperature Range		0°C~+35°C			
Humidity		5%~95%			
Altitude		≤2000m			
Cycle Life[3]		≥6000			
Installation		Rack-Mounting			
Protection		Built-in smart BMS, Breaker, Fuse			
Communication Port		RS485/CAN			
Warranty Period[4]		10 Years			
Certification		CE/ IEC62619/ UN38.3			
Control Module FLH48100UCG2	Product Dimension	482.6x565x150mm			
	Package Dimension	687x562x269mm			
	Product Weight Approximate	10.3kg			
	Package Weight Approximate	16.7kg			

Battery Module FLH48100UMG2	Product Dimension	482.6x565x133mm
	Package Dimension	687x562x250mm
	Product Weight Approximate	41.3kg
	Package Weight Approximate	45kg
	Battery Designation[5]	IFpP/54/150/120/[(1P16S)NS]M/-20+50/95
Rack FLH48100R13G2	Product Dimension	590×532×2087.50mm(13th floor)
	Package Dimension	657×138×2167mm
	Product Weight Approximate	49kg
	Package Weight Approximate	57kg
Rack FLH48100R9G2	Product Dimension	590×532×1515.5(9th floor)
	Package Dimension	657×138×1595mm
	Product Weight Approximate	37.7kg
	Package Weight Approximate	43.2kg
[1]The latest software supporting 17 BMUs in series is currently under development.		
[2] Max. continuous charge/discharge current is affected by temperature and SOC.		
[3] Test conditions: 0.5C Charging/Discharging@25±2°C,EOL70%.		
[4] Conditions apply, refer to Felicitysolar Warranty policy.		
[5] "N" means the number of battery packs connected series and should not exceed 17.(N≤17)		

