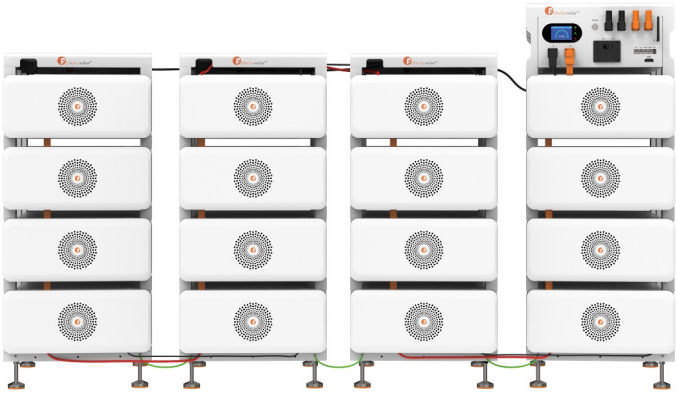
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USER MANUAL



Model

FLH48314UG1

www.felicitysolar.com

Revision History

Revision No.	Revision Date
V00	2025.10
V01	2026.09.04

NOTE: Due to the inherent update cycle of printed manuals, please refer to the latest electronic version available through official channels for the most up-to-date information.

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1. Important Information in the Manual

1.1 Scope

This manual provides instructions for the installation, commissioning, operation, and maintenance of the modular Battery Energy Storage System (BESS).
All procedures described in this manual must be performed only by qualified and authorized personnel.
Before installing, operating, or servicing the product, read this manual carefully and follow all instructions and safety precautions. Failure to do so may result in equipment damage, personal injury, or other hazards.
Keep this manual and all related documentation in an accessible location for future reference during installation, operation, and maintenance.
This manual applies only to products that comply with the certification requirements of the intended market. Users are responsible for complying with all applicable local laws, regulations, codes, and standards. Requirements may vary depending on the country or region of installation.
For technical assistance, please contact Felicity Solar After-sales Support:
Email: felicitysupport@felicitysolar.com

1.2 Product Description

The FLH48314UG1 is a modular lithium iron phosphate ($LiFePO_4$) Battery Energy Storage System (BESS) designed for commercial and industrial (C&I) energy storage applications. It stores electrical energy for later use, helping to improve energy independence and provide backup power when required.
The system consists of the following main components:

- $LiFePO_4$ battery modules.
- An integrated Battery Management System (BMS) for real-time monitoring, protection, and system management.
- Internal power distribution and safety protection circuits.

Mode	System energy(kWh)	Discharge depth	Composition
FLH48314UG1M5	80.35	90%	FLH48314UCG1*1+ FLH48314UMG1*5
FLH48314UG1M6	96.42	90%	FLH48314UCG1*1+ FLH48314UMG1*6
FLH48314UG1M7	112.49	90%	FLH48314UCG1*1+ FLH48314UMG1*7
FLH48314UG1M8	128.56	90%	FLH48314UCG1*1+ FLH48314UMG1*8
FLH48314UG1M9	144.63	90%	FLH48314UCG1*1+ FLH48314UMG1*9
FLH48314UG1M10	160.70	90%	FLH48314UCG1*1+ FLH48314UMG1*10
FLH48314UG1M11	176.77	90%	FLH48314UCG1*1+ FLH48314UMG1*11
FLH48314UG1M12	192.84	90%	FLH48314UCG1*1+ FLH48314UMG1*12
FLH48314UG1M13	208.91	90%	FLH48314UCG1*1+ FLH48314UMG1*13
FLH48314UG1M14	224.98	90%	FLH48314UCG1*1+ FLH48314UMG1*14
FLH48314UG1M15	241.05	90%	FLH48314UCG1*1+ FLH48314UMG1*15
FLH48314UG1M16	257.12	90%	FLH48314UCG1*1+ FLH48314UMG1*16

Notes:

1.The system supports a maximum of **16 battery modules** per battery system.
2.The allowable number of battery modules depends on the inverter's supported operating voltage range.
3.Ensure the inverter is compatible with the battery system before installation and configuration.

1.3 Meaning of Symbols

	Danger! Serious physical injury or death may occur if not following relevant requirements.		Keep the product out of reach of children.
	Caution: Risk of electric shock.		Do not place or install near flammable or explosive materials.
	In case of electrolyte leakage, avoid contact with eyes or skin.		Disconnect the equipment before carrying out maintenance or repair.
	Do not reverse-connect the Pack's positive (+) and negative (-) terminals.		EU WEEE mark: Product should not be disposed of as household waste.
	Observe precautions when handling electrostatic discharge - sensitive devices.		Instruction manual: Read it before starting installation and operation.
	Caution: Risk of electric shock due to timed energy storage discharge.		CE mark: The battery system is CE certified.
	This product is recyclable.	NOTE	NOTE: Procedures to ensure proper operation.
	Do not use the Pack outside of specified conditions.		Earth terminal: The battery system must be reliably grounded to the inverter.
	Caution: This Pack is heavy and may cause serious injury if mishandled.		

1.4 General Safety Information

1.4.1 Warning 

Before Connecting

- Inspect the product and all package contents upon receipt. If any damage or missing components are found, stop the installation and contact your supplier immediately.
- Ensure that all power sources are disconnected and the battery system is powered off before installation, wiring, or maintenance.
- Connect the positive (+) and negative (−) terminals with correct polarity. Incorrect wiring may result in equipment damage, fire, or electric shock.
- Do not connect the battery system directly to an AC power source.
- Ensure the battery system is properly grounded. The grounding resistance shall be less than 1 Ω.
- Before making any electrical connections, verify that the battery system and inverter are electrically compatible and that all operating parameters are within the specified limits.

During Operation

- Disconnect all power sources and ensure the battery system is completely powered off before moving, servicing, or inspecting the equipment.
- Keep the battery system away from water, moisture, corrosive substances, and other conductive liquids.
- Use only compatible battery modules and inverters approved by the manufacturer.
- Do not operate the battery system if the inverter is damaged, malfunctioning, or incompatible.
- Do not open, modify, repair, or disassemble any part of the battery system unless instructed by Felicity Solar or performed by authorized service personnel.
- Do not dispose of the battery in a fire. Doing so may cause fire, explosion, or the release of hazardous substances.
- Do not puncture, crush, or damage the battery enclosure. Electrolyte released from damaged batteries may be toxic and can cause skin or eye irritation.
- The battery system contains hazardous DC voltage and high short-circuit current. Improper operation may result in electric shock, burns, or serious injury.
- Faulty batteries may reach hazardous surface temperatures. Avoid direct contact until the battery has cooled.

Fire Safety

- In the event of a fire, use only a dry powder fire extinguisher suitable for electrical equipment. Never use water or other liquid fire extinguishers.

1.4.2 Caution

- All products are inspected before shipment. If any abnormal condition, such as deformation, cracks, or swelling, is observed, do not install or operate the product. Contact your supplier immediately.

- Ensure the battery system is properly grounded before commissioning. Improper grounding may result in equipment malfunction or electric shock.
- **Before operation, verify that all connected equipment is compatible with the battery system.**
- Do not mix batteries of different manufacturers, models, capacities, ages, or states of charge within the same system.
- Operate and store the battery system only within the environmental conditions specified in this manual. Failure to do so may reduce product performance and service life.
- For long-term storage, recharge the battery at least once every six months and maintain the state of charge (SOC) above 80%.
- Recharge the battery within 18 hours after a full discharge or after over-discharge protection has been activated.
- Disconnect the charging source before connecting or disconnecting battery cables.
- Remove all metallic personal items, such as watches, rings, necklaces, and bracelets, before working on the battery system.
- Do not place tools, cables, or other conductive objects on the battery system.

Maintenance Requirements:

- Maintenance shall be performed only by qualified service personnel.
- Use insulated tools designed for electrical work.
- Wear appropriate personal protective equipment (PPE), including insulated gloves and safety footwear.
- Before performing maintenance, verify that the battery system has been completely isolated from all power sources and is not unintentionally grounded.

1.5 Installation Personnel Requirements

- All installation, commissioning, maintenance, and servicing must comply with all applicable local laws, regulations, codes, and standards. Installation of this Battery Energy Storage System shall be performed only by qualified personnel.
- Qualified personnel are individuals who have received appropriate technical training, possess valid electrical qualifications as required by local regulations, and are authorized to install, commission, and maintain battery energy storage systems.
- Qualified personnel shall be familiar with the installation, operation, maintenance, and troubleshooting of lithium-ion battery systems, as well as the associated electrical hazards and safety procedures.
- Installation shall be carried out in accordance with this manual and all applicable technical specifications. If any discrepancy exists between the installation conditions and the requirements specified in this manual, stop the installation and contact Felicity Solar Technical Support before proceeding.

- Personnel shall wear appropriate personal protective equipment (PPE) and follow all required electrical safety procedures throughout installation and maintenance.
- Personnel shall be trained in emergency response procedures, including electrical shock, fire, and battery electrolyte leakage.
- **Failure to comply with the requirements described in this manual may result in equipment damage, serious personal injury, or death. Felicity Solar shall not be liable for any damage resulting from installation or servicing performed by unqualified personnel.**

1.6 Storage Prior to Installation

Storage Requirements:

- Store the battery system in a cool, dry, clean, and well-ventilated indoor environment.
- Do not expose the battery system to direct sunlight, rain, moisture, or corrosive substances.
- Keep the battery system away from open flames, heat sources, and flammable or explosive materials.
- Store the battery system on a stable, level surface capable of supporting its weight.
- Keep the battery system out of the reach of children and unauthorized persons.
- Do not stack objects on top of the battery system unless otherwise specified.

Handling Precautions:

- Do not drop, strike, puncture, crush, or otherwise damage the battery system. Physical damage may result in electrolyte leakage, fire, or explosion.
- If electrolyte leakage is observed, do not touch the leaked material. Avoid direct contact with skin and eyes, and follow the applicable emergency procedures.
- Always wear appropriate personal protective equipment (PPE), including insulated gloves, when handling the battery system.
- Do not stand on the battery system or place tools or other conductive objects on its surface.
- Do not charge, discharge, install, or operate a damaged battery system.

1.7 Disclaimer

Felicity Solar shall not be liable for any personal injury, property damage, product damage, or consequential damages arising from, including but not limited to, any of the following circumstances:

- Failure to comply with the instructions, warnings, or safety precautions provided in this manual.
- Improper installation, operation, maintenance, storage, transportation, or use of the battery system.
- Installation, commissioning, maintenance, repair, modification, or disassembly performed by unauthorized or unqualified personnel.
- Use of components, accessories, or spare parts not approved by Felicity Solar.
- Unauthorized modification, alteration, or misuse of the battery system.
- Operation of the battery system outside the specified operating conditions or technical specifications.

- Failure to comply with applicable local laws, regulations, codes, and standards.
- **Improper grounding of the battery system, including but not limited to failure to install the required protective earth (PE) conductor between each battery cluster and between the battery system and the PCS, or failure to maintain a grounding resistance of less than 0.6 Ω.**

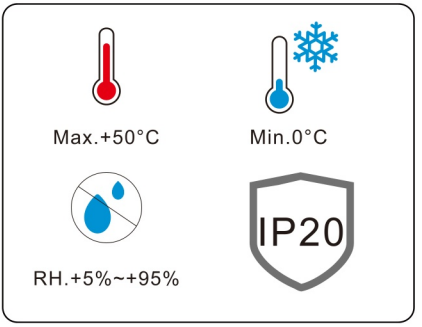
1.8 Installation Environment

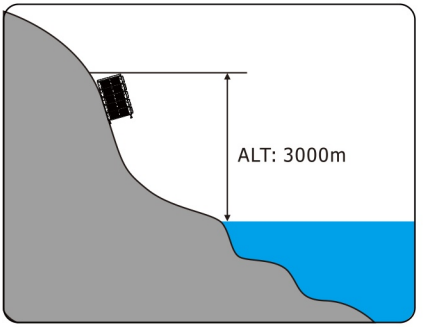
Environmental Requirements:

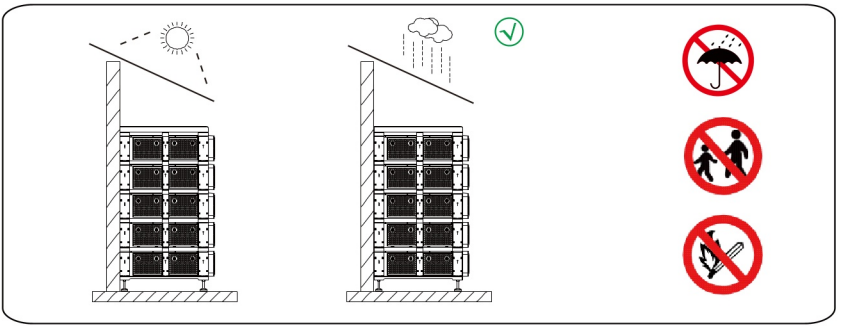
- This battery system is intended for **indoor installation only**.
- Install the battery system in a clean, dry, and well-ventilated environment.
- Protect the battery system from direct sunlight, rain, water, conductive dust, corrosive gases, and excessive humidity.
- The installation environment shall comply with **Pollution Degree 2** and **Overvoltage Category II.**

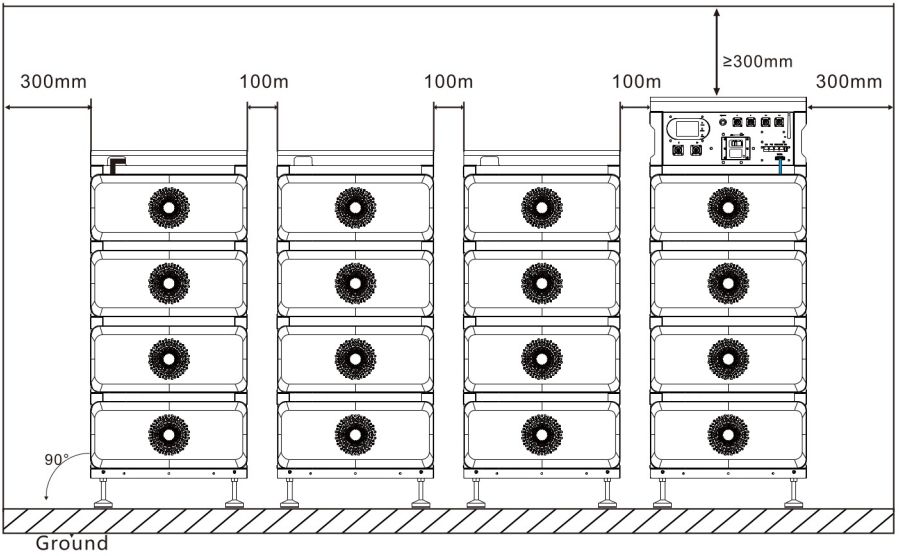
Installation Site Requirements:

- Install the battery system on a stable, level, and non-combustible surface capable of supporting its weight.
- Do not install the battery system in locations containing flammable, explosive, or corrosive substances.
- Avoid installation in environments exposed to salt spray or other corrosive contaminants. Where installation in coastal or high-salinity areas is unavoidable, additional anti-corrosion measures shall be implemented.
- Ensure sufficient space is available around the battery system for ventilation, operation, inspection, and maintenance.





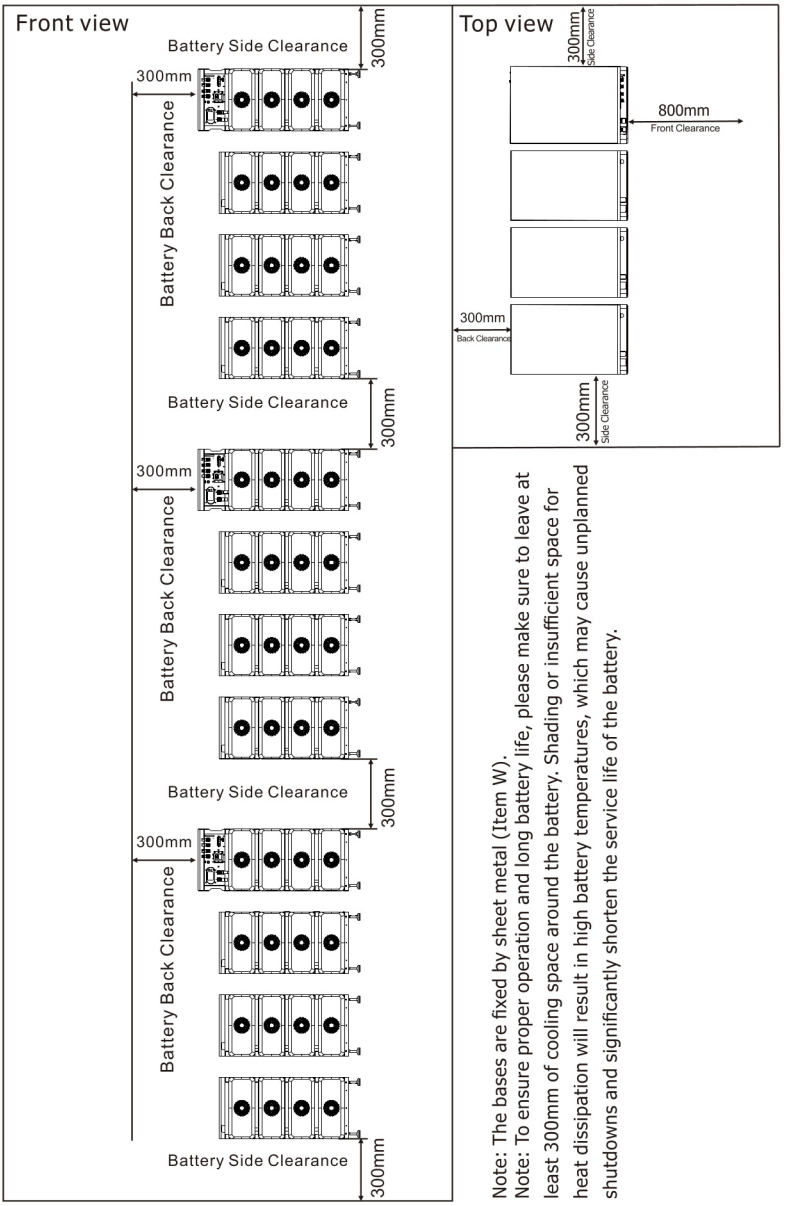




Minimum Installation Clearance

- The following minimum clearances are required to ensure adequate ventilation and maintenance access.
- Maintain a minimum clearance of **300 mm** between the battery system and any surrounding wall or structure.
- Maintain a minimum clearance of **100 mm** between adjacent battery clusters.

Installation spacing of three battery cluster



Note: The bases are fixed by sheet metal (Item W).
Note: To ensure proper operation and long battery life, please make sure to leave at least 300mm of cooling space around the battery. Shading or insufficient space for heat dissipation will result in high battery temperatures, which may cause unplanned shutdowns and significantly shorten the service life of the battery.

1.9 Quality Certificate

The quality certificate can be downloaded from www.felicitysolar.com.

2. Transportation

2.1 Transportation of Battery Modules

Transportation of lithium-ion battery products must comply with all applicable local regulations.



General Safety Requirements

Do not smoke during transportation, loading, or unloading. Transport vehicles must comply with dangerous goods regulations and be equipped with at least two approved CO_2 fire extinguishers.



Handling and Lifting

Battery modules are heavy. Improper handling may result in injury.Use only suitable and approved lifting and transport equipment.Lift the battery system using designated lifting points only.Ensure the sling angle is not less than 60° during lifting.



Personnel Protection (PPE)

All personnel must wear appropriate personal protective equipment during transportation and installation.Safety shoes with toe protection must be worn to prevent crushing injuries.Protective gloves must be worn when handling unpacked battery cabinets, especially due to sharp metal edges.



Transport Stability and Safety

Battery modules must be secured to prevent slipping, falling, or overturning during transport.Always transport the battery system in an upright position. Improper securing may result in injury or equipment damage.



Manual Handling Requirements

Battery modules and racks are heavy. Use team lifting when required.
At least 2–3 persons are recommended for installation of battery racks.
Use lifting devices for heavy components and carts or trolleys for lighter parts.
Handle with care to avoid damage to the enclosure.



Unpacking and Handling Risks

The risk of injury increases when handling unpacked equipment.
Pay special attention to sharp edges and exposed metal surfaces.



Packaging and Inspection

Do not remove transport packaging before arrival at the installation site.
Inspect packaging for damage before unpacking.Check any impact indicators on the packaging.Verify that all items are complete upon delivery.

2.2 Shipment Orientation

The battery control module(BCU module) package must be transported in the upright position shown below. This requirement applies to both the control module(BCU module) and the battery module(BMU module). The package is top-heavy; do not place it on its side or upside down during handling or transport.



√ ×

3. Installation and Configuration

3.1 Installation Precautions

WARNING! Risk of structural damage due to excessive load.

1. Ensure the installation site has sufficient load-bearing capacity to support the total weight of the battery system.
2. When selecting the installation site, consider transportation access and ensure adequate space for installation and maintenance.

3.1.1 Safety Requirements

- Installation must be performed by trained and qualified personnel only.
- All installation activities must comply with applicable local safety regulations and standards.
- All circuits interfacing with this system and carrying external voltages below 48 V must comply with SELV (Safety Extra-Low Voltage) requirements in accordance with IEC 60950.
- Before performing any work inside the system cabinet, ensure that:

  ① The system is completely de-energized

  ② All battery modules are switched off

  ③ Route and secure all cables properly. Protective measures shall be implemented to prevent accidental contact during operation.

3.2 Technical Data

Model	FLH48314UG1MN[1]			
Battery Type	LiFePO4			
Nominal Energy	16.07kWh			
Nominal Voltage	51.2V			
Nominal Capacity	314Ah			
Number of Battery Modules	5(Min)	10	15	16(Max) [2]
System Nominal Voltage(V)	256	512	768	819.2
System Operating Voltage(V)	232 ~ 288	464 ~ 575.6	696 ~ 864	742.4 ~ 921
System Rated Energy(kWh)	80.35	160.7	241.05	257.12
System Usable Energy(kWh)	72.34	144.63	216.95	234.41
Recommend Charge/Discharge current	157A			
Max. Continuous charge/Discharge current[3]	240A			
Depth of discharge(DOD)	90%			
Display type	LED+LCD(Touch)			
IP Rating of Enclosure	IP20			
Working Temperature Range	Charge: 0°C~+55°C; Discharge: -20°C~+55°C			
Storage Temperature Range	0°C~+35°C			
Humidity	5%~95%			
Altitude	≤3000m			
Cycle Life [4]	≥8000			
Installation	Module Stacking			
Protection	Built-in smart BMS, MCCB with shunt trip function, Fuse			
Communication Port	RS485/CAN /Ethernet/WiFi(2.4G)/USB [5]			
Warranty Period [6]	10 Years			
Certification	CE / IEC62619 / IEC62040 / UN38.3			

Control Module FLH48314UCG1 (BCU Module)	Product Dimension	780x525.4x180mm
	Package Dimension	887x622x385mm
	Product Weight Approximate	31.5±3%Kg
	Package Weight Approximate	60±3%Kg

Model	FLH48314UG1MN[1]	
Battery Module FLH48314UMG1 (BMU Module)	Product Dimension	819.5x525.4x260mm
	Package Dimension	925x560x405mm
	Product Weight Approximate	123±3%Kg
	Package Weight Approximate	144.5±3%Kg
	Battery Designation	IFpP74/176/210/[1P16S]E/-20+50/90
FLH48314UG1 Accessory Kit **A**[7]	Package Dimension Approximate	867x612x302mm
	Package Weight Approximate	34.5±3%Kg
FLH48314UG1 Accessory Kit **B**[7]	Package Dimension Approximate	867x612x190mm
	Package Weight Approximate	18.5±3%Kg

[1] N=5,6,7,8,9,10,11,12,13,14,15 or 16. N is the quantity of battery module connected series and should not exceed 16.(5≤N≤16)

[2] Currently, the battery supports a maximum of 16 battery modules. For the entire energy storage system, confirm the inverter's maximum supported voltage range to determine the maximum number of battery modules that can be installed.

[3] Max. continuous charge/discharge current is affected by temperature and SOC.

[4] Test conditions: 0.5C Charging/Discharging@25±2°C,EOL70%.

[5] A 10M/100M Ethernet port (RJ45) is provided for connecting the system to your local network via a router or switch. This connection enables core functions: software upgrades, remote monitoring & diagnostics, and cloud data synchronization. Advanced cloud-based services are in development. Availability and activation will be announced by the supplier. Contact them for future software updates to enable these features.

[6] Conditions apply, refer to Felicitysolar Warranty policy.

[7] When the number of battery modules exceeds five, different module quantities require different accessory kits. Please select the appropriate accessory kit according to your actual requirements and refer to the table below.

Number of Battery Modules	FLH48314UG1 Accessory Kit A Quantity (Sets)	FLH48314UG1 Accessory Kit B Quantity (Sets)
5	/	/
6-10	/	1
11-15	1	/
16(5+6+5)	1	/
16(4*4)	1	1

3.3 Tool Required


Screw Driver


Crimping Modular


Safety Shoes



Multimeter


Safety Gloves


Safety Goggles


Plier


Ribbon


Electric Drill


Measuring Tape


Levelling Instrument


Socket Wrench


Troque Wrench

3.4 Unpacking Inspection

Inspection Upon Delivery

- Upon arrival at the installation site, inspect the packaging for any signs of damage before unloading.
- Handle the product with care during unloading to avoid impact, dropping, or vibration.

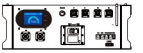
Inspection Requirements

- Verify that the packaging is intact and undamaged.
- Check the impact indicator (if equipped). If triggered, inspect the product carefully for possible transport damage.
- Open the package and inspect the product for any visible damage, such as deformation, cracks, or loose components.
- Verify that all items are complete according to the packing list.

Handling After Unpacking

- Do not remove protective materials until installation begins.
- Keep all packaging materials for potential future transport or storage.
- If any damage or missing parts are found, stop installation immediately and contact the supplier.

Do not install or operate a battery system that has been damaged during transportation. Contact your supplier or Felicity Solar Technical Support for further instructions.

FLH48314UCG1			
No.	**Description**	**Quantity**	**Picture**
1	High-Voltage Battery Control Moduel 1000V/240A(BCU Moduel)	1	
2	User manual	1	
3	Quick Installation Guide	1	
4	Warranty card	1	
5	Master-Slave Communicate Cable: L=200mm, The master-slave communication cable connects between the FLH48314UCG1 and FLH48314UMG1, enabling communication between the BCU module and the first BMU module.	1	
6	Termination Resistor Connector: L=70mm,Used for signal integrity. Must be plugged into the end BMU module's open COM port.	1	
7	B+ Flexible Busbar: L=218.5mm, Connects the B+ terminal of the BCU module to the B+ terminal of the first BMU module, serving as the BCU module's positive input.	1	
8	RJ45 Connector (120Ω Terminated), Must be plugged into the PARA1 port of the final BCU module when multiple culsters are paralleled, to ensure communication integrity.	1	
9	B- Power Cable, L=3000mm,240A maximum current, Connects the BCU module'S B- to the last BMU module's B-	1	
10	Communication cable: 3000mm, It enables communication between the battery and PC through an RS485 adapter. At the same time, it can flexibly match communication cables for different inverters.	1	
11	Multi-Protocol Communication Cable,L=3000mm, Used for inter-cluster parallel communication, CAN communication between masters, and master-to-PCS communication (CAN/RS485).	3	
12	Grounding Wire, L=3000mm,Connects the grounding terminal of the base containing the BMU module to the inverter chassis ground.	1	

13	PCS Positive Power Cable(Orange),L=3000mm, 2AWG,Connects the P+ terminal of the BCU module to the BAT positive terminal of the PCS, SC35-6 Ring Terminal.	2	
14	PCS Negative Power Cable(Black),L=3000mm, 2AWG,Connects the P- terminal of the BCU module to the BAT negative terminal of the PCS, SC35-6 Ring Terminal.	2	
15	BMU Module Top Cover,Installs on top of the BMU module for aesthetic finishing.	1	
16	BMU Module Base: Provides mounting and structural support for the BMU module.	1	
17	M6 Screw, for Battery Fastening	6	
18	BOT Foot Cup: Used for supporting the product	4	
19	Socket Wrench: Used to tighten the series busbar screws. Ensure proper electrical insulation.	1	
20	Bubble Level	1	
21	USB Flash Drive	1	
22	Black Push-Mount Nylon Cable Tie	5	

FLH48314UMG1			
No.	**Description**	**Quantity**	**Picture**
1	16.07 kWh Battery Module(BMU Module)	1	
2	Inter-Slave Communication Cable,L=280mm, Connects between adjacent BMU modules. Attach the "OUT" end to the previous BMU module and the "IN" end to the next BMU module. Refer to the diagram.	1	
3	Series Connection Busbar,L=280mm,Links the power terminals of adjacent BMU module in series.	1	
4	Warranty card	1	
5	BMU module Front Cover,Provides protection for the BMU module, Install only after all connections are made and the system is fully debugged.	1	
6	M6 Screw, for Battery Fastening	6	

FLH48314UG1 Accessory Kit A			
No.	**Description**	**Quantity**	**Picture**
1	Inter-Cluster Series Power Cable, 2/0 AWG,L=1350mm, Connects the power terminals between two battery clusters. Attach the black end to the Negative (-) terminal of the upper cluster and the red end to the Positive (+) terminal of the lower cluster.	2	
2	Chassis Grounding Wire,L=400mm,used to establish a chassis ground connection between two equipment bases.	2	
3	Inter-Cluster Communication Cable,L=1100mm, Connects battery clusters. Match labels: "OUT" to previous cluster, "IN" to next cluster. See diagram for details.	2	
4	Battery Pack Base: Provides mounting and structural support for the battery pack.	2	
5	BMU module Top Cover ,Install after all setup is complete for a finished appearance.	2	
6	BOT Foot Cup: Used for supporting the product	8	
7	Black Push-Mount Nylon Cable Tie, 5x160mm, for Power Cable Securing	5	
8	Bubble Level	1	

FLH48314UG1 Accessory Kit B			
No.	**Description**	**Quantity**	**Picture**
1	Inter-Cluster Series Power Cable, 2/0 AWG,L=1350mm, Connects the power terminals between two battery clusters. Attach the black end to the Negative (-) terminal of the upper cluster and the red end to the Positive (+) terminal of the lower cluster.	1	
2	Chassis Grounding Wire,L=400mm,used to establish a chassis ground connection between two equipment bases.	1	
3	Inter-Cluster Communication Cable,L=1100mm, Connects battery clusters. Match labels: "OUT" to previous cluster, "IN" to next cluster. See diagram for details.	1	
4	Battery Pack Base: Provides mounting and structural support for the battery pack.	1	
5	BMU module Top Cover ,Install after all setup is complete for a finished appearance.	1	
6	BOT Foot Cup: Used for supporting the product	4	
7	Black Push-Mount Nylon Cable Tie, 5x160mm, for Power Cable Securing	5	
8	Bubble Level	1	

3.5 Product Overview

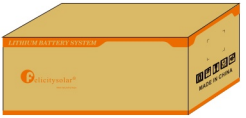
3.5.1 External Packaging



FLH48314UCG1 (Carton box)



FLH48314UMG1 (Wooden box)



FLH48314UG1
Accessory Kit A(Carton box)



FLH48314UG1
Accessory Kit B(Carton box)

NOTE:Different numbers of battery modules require different accessory kits.

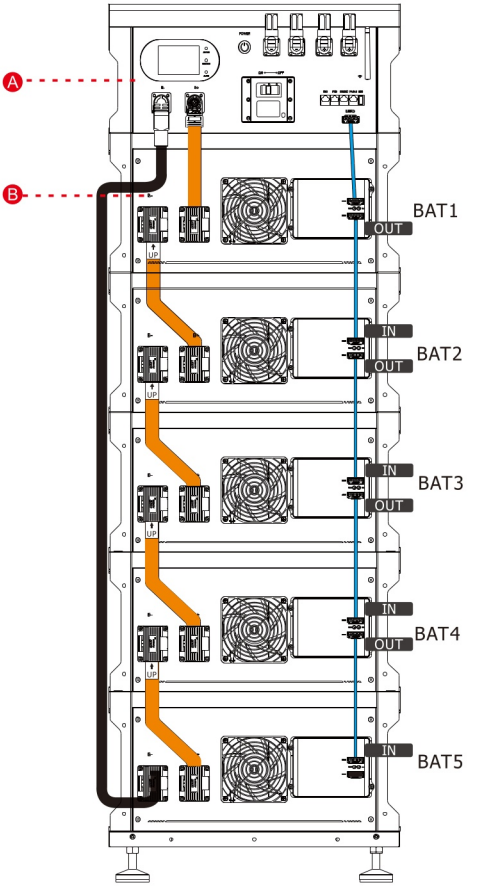
3.5.2 Battery System Introduction

Code	Name	Product Model
A	High-Voltage Battery Control Module	FLH48314UCG1 (BCU Moduel)
B	High-Voltage Battery Module	FLH48314UMG1 (BMU Moduel)

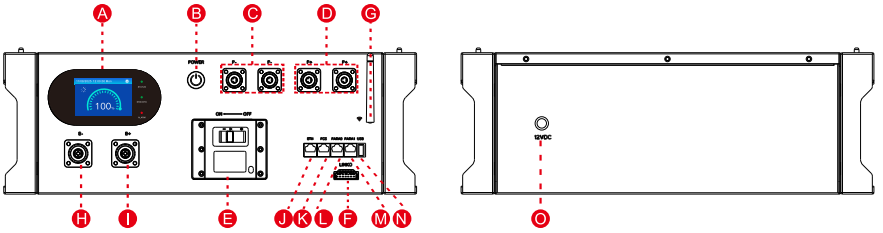
COM cables direction identification labels:

IN

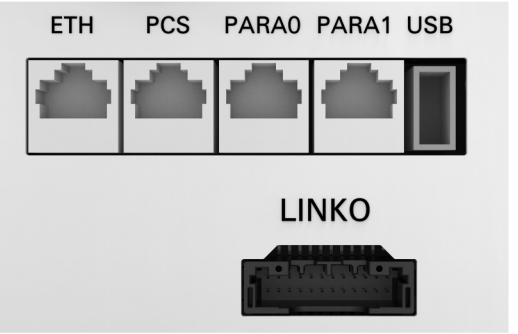
OUT

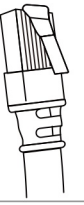


3.5.3 Control Module (BCU Module) Description

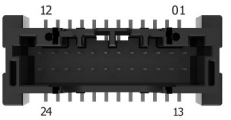


Code	Name	Definition
A	LCD Display	Indicate the important battery information
B	Power Switch	Indicate the power on/off function
C	PCS-	Connection terminal of PCS negative pole(Black)
D	PCS+	Connection terminal of PCS positive pole(Orange)
E	MCCB	Used to manually control the output of the battery
F	LINK0	Connects with the first battery module and communicate with all battery modules
G	Antenna	Increase the WiFi receiving signal
H	BAT-	Connection terminal of the common negative pole of the battery(Black)
I	BAT+	Connection terminal of the common positive pole of the battery(Orange)
J	Ethernet	For cloud monitoring and remote firmware updates
K	PCS	CAN/RS485 port connects to other inverters CAN/RS485 interfaces through communication cable
L	PARA0	The clustered interface connected to the previous battery system
M	PARA1	The clustered interface connected to the next battery system
N	USB	BMS upgrade interface with USB
O	12VDC	Connect to an external 12V DC power supply for debugging the battery control unit

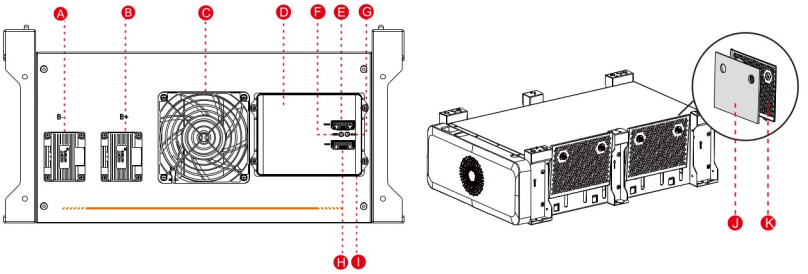


Definition of ETH		Definition of PCS		Definition of PARA0		Definition of PARA1		P1……P8  8…….1 
1	TX+	1	485B_PCS	1	485A_System	1	/	
2	TX-	2	485A_PCS	2	485B_System	2	/	
3	RX+	3	GND	3	/	3	/	
4	CT1	4	CANH_PCS	4	/	4	/	
5	CT2	5	CANL_PCS	5	/	5	/	
6	RX-	6	GND	6	/	6	/	
7	CT3	7	485A_PCS	7	CANL_BCU	7	CANL_BCU	
8	CT4	8	485B_PCS	8	CANH_BCU	8	CANH_BCU	

Definition of Link0

1	12V0_COMISO	13	COM-GND	 
2	12V0_COMISO	14	COM-GND	
3	BMU-ADD-OUT	15	CANL_BMU	
4	/	16	CANH_BMU	
5	DRY1A	17	DRY1B	
6	24V_FANPWR_OUT	18	FAN_GND	
7	24V_FANPWR_OUT	19	FAN_GND	
8	24V_FANPWR_OUT	20	FAN_GND	
9	24V_FANPWR_OUT	21	FAN_GND	
10	24V_FANPWR_OUT	22	FAN_GND	
11	24V_FANPWR_OUT	23	FAN_GND	
12	24V_FANPWR_OUT	24	FAN_GND	

3.5.4 Battery Module (BMU Module) Description



Model:FLH48314UMG1

Code	Name	Definition
A	BAT-	Negative terminal of battery module (Black)
B	BAT+	Positive terminal of battery module (Orange)
C	FAN	Used for assisting in cooling the battery pack
D	BMU Panel	Mounting Panel for BMU
E	COM0	Inter-BMU Connections: Communication, Power Supply, and Addressing
F	RUN	Indicates normal battery operating status (remains on during normal run)
G	ALM	Indicates battery fault status (illuminates when fault occurs)
H	COM1	Inter-BMU Connections: Communication, Power Supply, and Addressing
I	Fan Control	Fan Power, Control, and Status Feedback Connector
J	Dust-proof cotton	Foam installed inside the dust filter to prevent dust accumulation and provide protection. Clean it every six months.
K	Dust Filter	A protective cover installed on the side of the enclosure to prevent dust accumulation. Clean it every six months.

*To ensure proper airflow to the fans and effective heat dissipation, remove and clean both the dust-proof cotton and dust filter every six months. Before removing and cleaning them, make sure the equipment is powered off and has stopped operating. Use a soft-bristled brush or compressed air to remove dust from the surface. After cleaning, place both items in a well-ventilated area and allow them to air-dry naturally. Ensure they are completely dry before reinstalling. If either component cannot be cleaned properly or is damaged, replace it promptly.

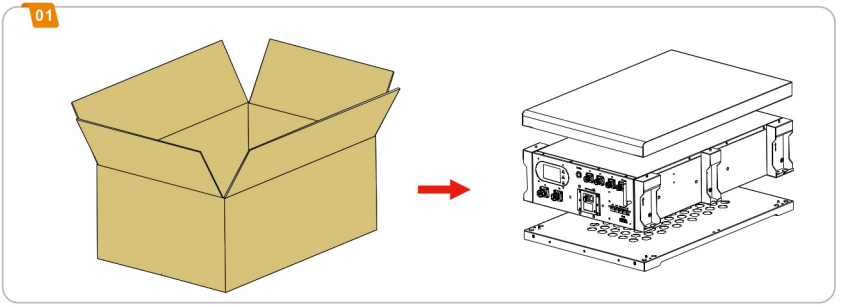
3.6 Installation Procedure

Safety Notice:

Installation must be performed by trained personnel only. Ensure the system is powered off before installation and wear appropriate PPE. Use suitable lifting equipment when handling both BCU module and BMU modules. Do not drop, impact, tilt excessively, or dismantle both BCU module and BMU modules

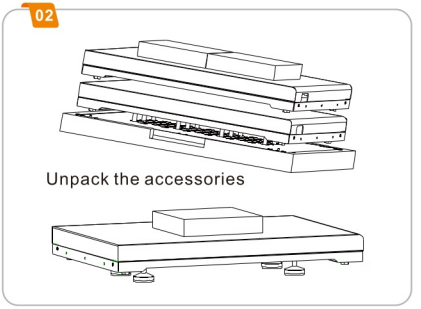
Step 1: Unpack the Equipment

Place the shipping carton on a stable, level surface near the installation location. Open the outer carton and check that both BCU module and BMU modules, base, top cover, fasteners, and accessories are complete and undamaged.



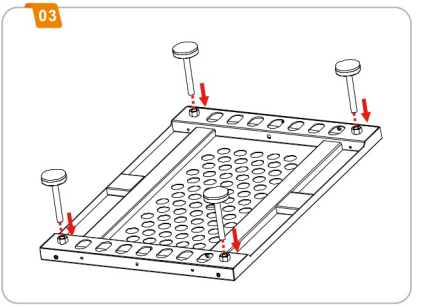
Step 2: Unpack the Accessories

Remove the base, adjustable feet, fasteners, top cover, and other accessories from the packaging. Place them on a clean, level surface and organize them according to the installation sequence.



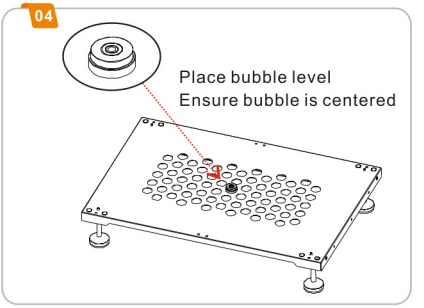
Step 3: Install the Adjustable Feet

Install the four adjustable feet into the mounting holes at the four corners of the base. Adjust them preliminarily so that the base stands securely on the floor.



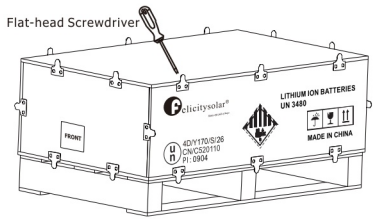
Step 4: Level the Base

Place a bubble level on the designated area of the base. Adjust the four feet until the bubble is centered. Confirm that all four feet are firmly in contact with the floor and that the base does not wobble.



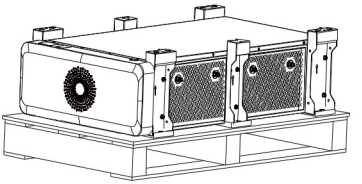
Step 5: Open the BMU Module Shipping Crate
Use a flat-head screwdriver to release the latches securing the crate cover. Open the crate carefully. Do not scratch, puncture, or impact the BMU Module enclosure during this operation.

05



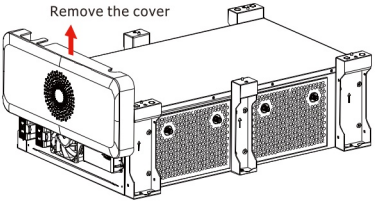
Step 6: Remove the BMU Module from the Crate
Use suitable lifting or handling equipment to remove the BMU Module from the shipping crate. Keep the BMU Module level during handling, and do not pull on connectors, cooling components, or enclosure panels.

06



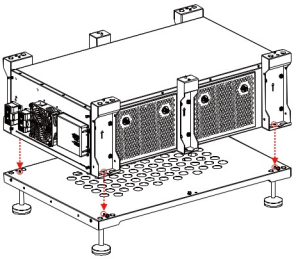
Step 7: Remove the Front Protective Cover
Remove the protective cover from the front of the BMU Module as indicated. Store the removed cover in a clean, safe location to prevent damage or loss. Do not touch or damage the internal connectors or components exposed after removal.

07



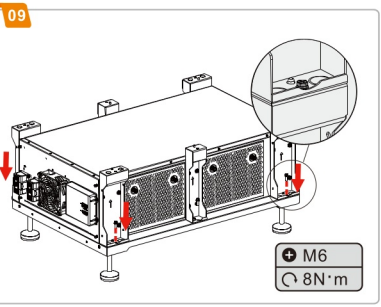
Step 8: Install the First BMU Module on the Base
Lift and position the first BMU Module above the leveled base. Align the locating features and mounting holes, then lower the BMU Module slowly onto the base until it is fully seated and stable.

08

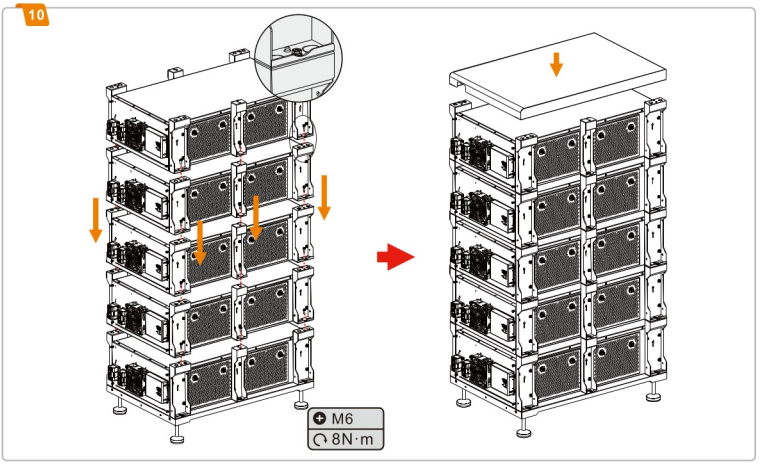


Step 9: Secure the First BMU Module
After confirming correct alignment between the BMU Module and the base, install the M6 fastening screws. Tighten the screws to a torque of 5 N·m. Verify that the BMU Module is firmly secured without movement or tilt.

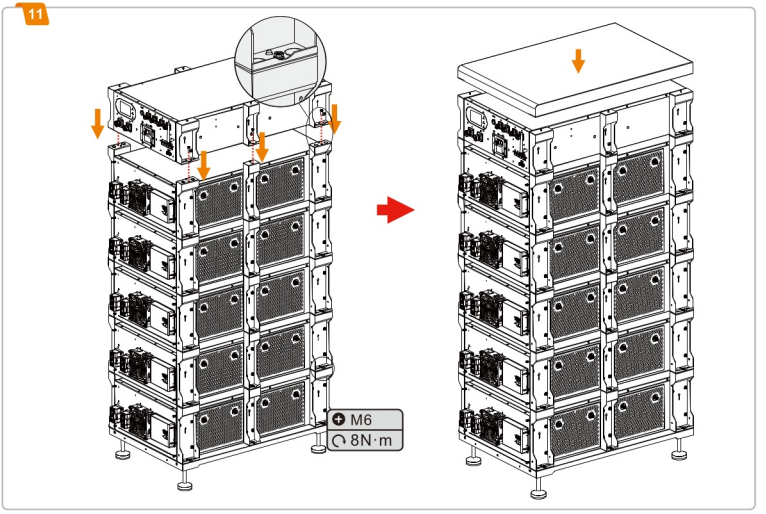
09



Step 10: Stack and Secure the Remaining BMU Module
Install the remaining BMU Module one layer at a time, from bottom to top. Align the locating and connection features between adjacent BMU Module before lowering each unit into position. Secure each layer using M6 screws tightened to 5 N·m. Repeat until the required number of BMU Module has been installed, then install the top cover.



Step 11: Install the Top BCU Module and Top Cover
Place the top BCU Module onto the uppermost BMU Module, ensuring that all locating features and mounting holes are correctly aligned. Secure it with M6 screws tightened to 5 N·m. Finally, install the top cover and verify that all components are properly aligned and firmly secured.



3.7 Multiple-Battery Standard Connection Diagram

3.7.1 Cable Installation Notice

1) Pay attention to the arrow marking on the series connection busbar and keep the arrow pointing upward throughout installation.【See Fig.1】
2) After the cables are properly installed, use the supplied socket wrench to tighten the series connection busbar screws. Ensure proper electrical insulation.【See Fig.2】
3) Pay attention to the arrow marking in the middle of the Master-Slave Communication Cable, and ensure that the arrow points from the BCU module to the FIRST BMU module during installation.【See Fig.3】
4) Pay attention to the arrow marking in the middle of the Inter-Slave Communication Cable and the "IN/OUT" markings at both ends. During installation, ensure that the arrow points from "OUT" to "IN".【See Fig.4】
For the specific connection direction, refer to the detailed connection diagram for the corresponding number of modules in Section【3.7.2】.
5) Pay attention to the "IN/OUT" markings at both ends of the Inter-Cluster Communication Cable.【See Fig.5】

During installation, refer to the detailed connection diagram for the corresponding number of modules in Section【3.7.2】, and ensure that the cable is connected from "OUT" to "IN".

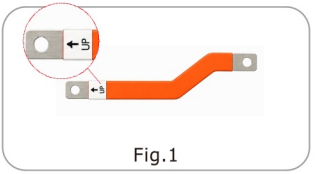
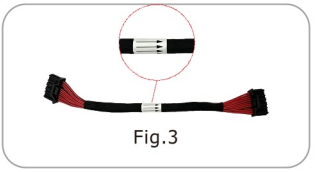

Fig.1


Fig.2


Fig.3

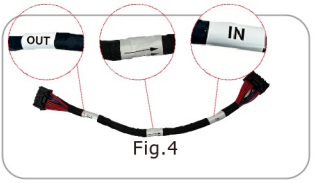


Fig.4

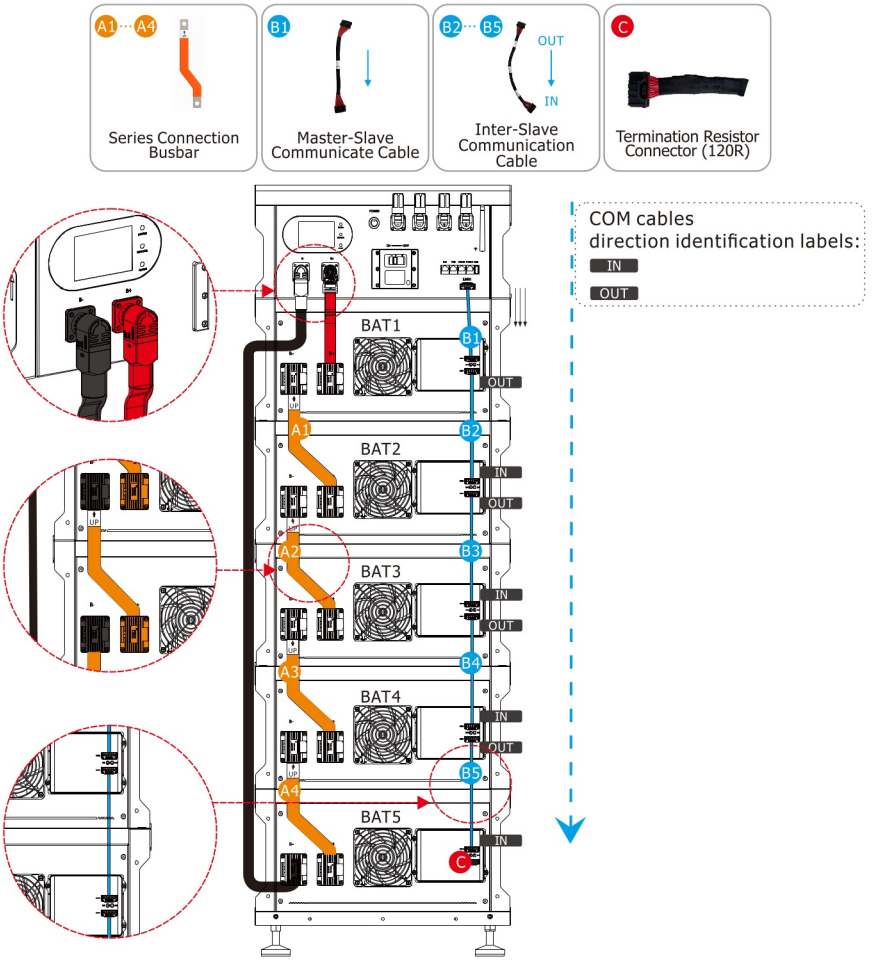

Fig.5

3.7.2 Cable Connection Orientation by Battery BMU Module Configuration

The following figures show the battery installation layouts for 1 to 16 BMU modules. Detailed guidance is provided for five typical configurations: 5 BMU modules, 10 BMU modules, 15 BMU modules, 16 BMU modules (5+6+5), and 16 BMU modules (4×4).

For other BMU module quantities, please refer to the simplified installation diagrams provided. Please note that, for installations with the same number of clusters, the routing direction of the communication cables and power cables remains the same. For example, when installing 6 to 9 BMU modules, refer to the wiring method for 10 BMU modules; when installing 11 to 14 BMU modules, refer to the wiring method for 15 BMU modules.

All cables must be installed in the correct orientation. It is recommended to connect the power cables first, followed by the communication cables. Install them in the sequence shown in the figure below: items labeled AX indicate the power-cable installation sequence, while items labeled BX indicate the communication-cable installation sequence.

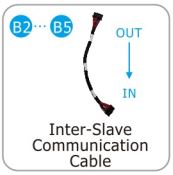


Recommended Installation for 5 BMU Modules
No accessory kit required.

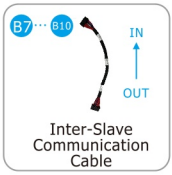






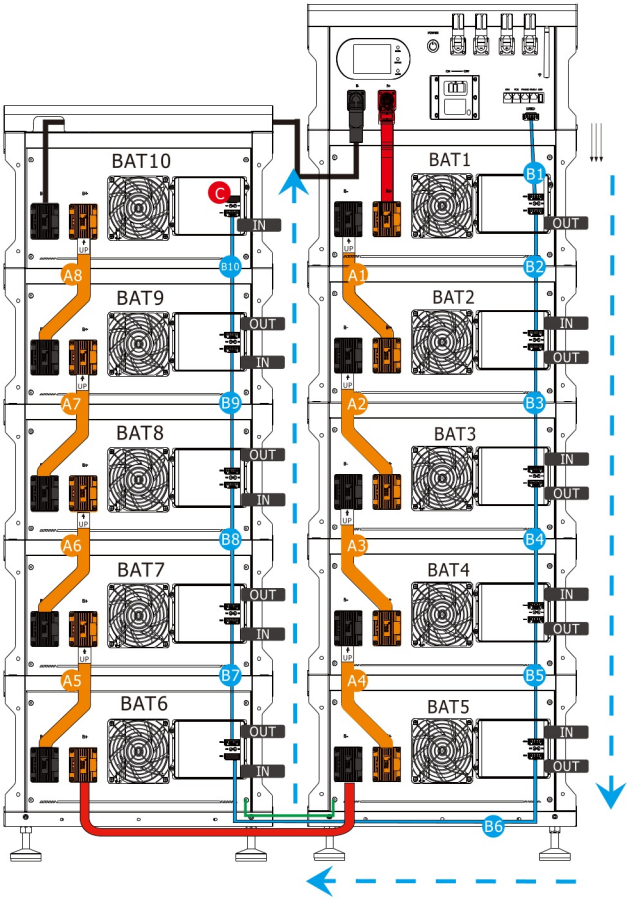






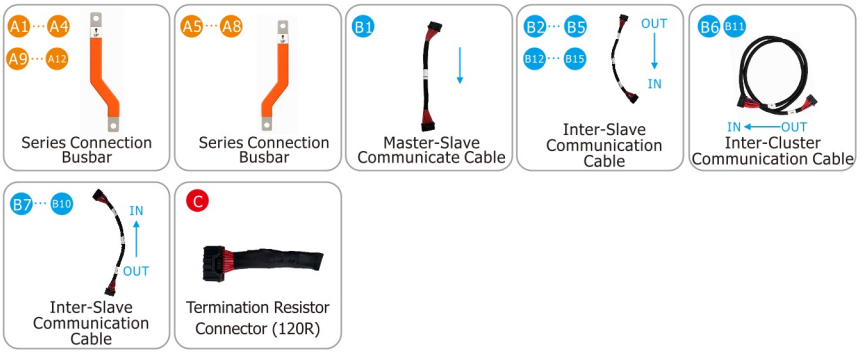


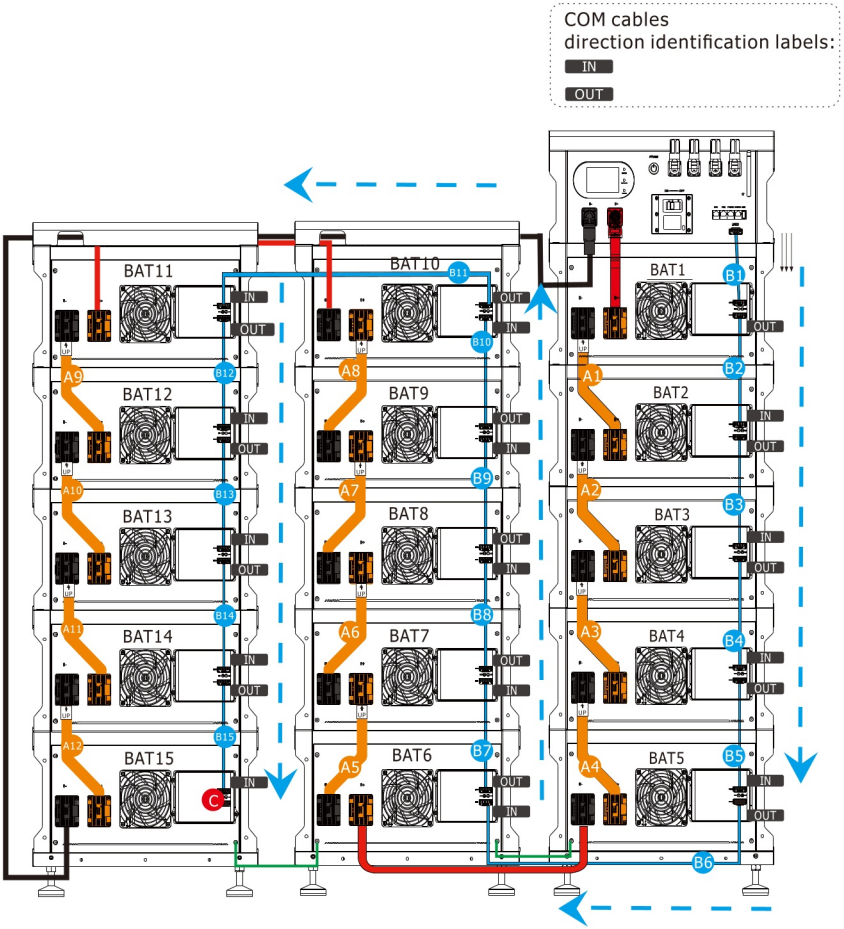
COM cables
direction identification labels:
IN
OUT



Recommended Installation for 10 BMU Modules

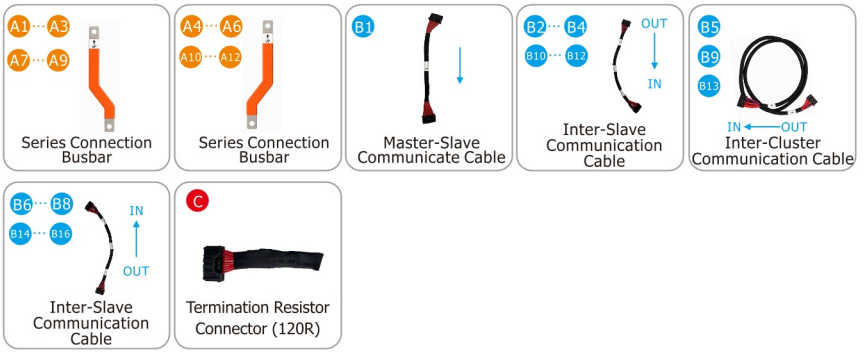
Requires 1 Set of FLH48314UG1 Accessory Kit B

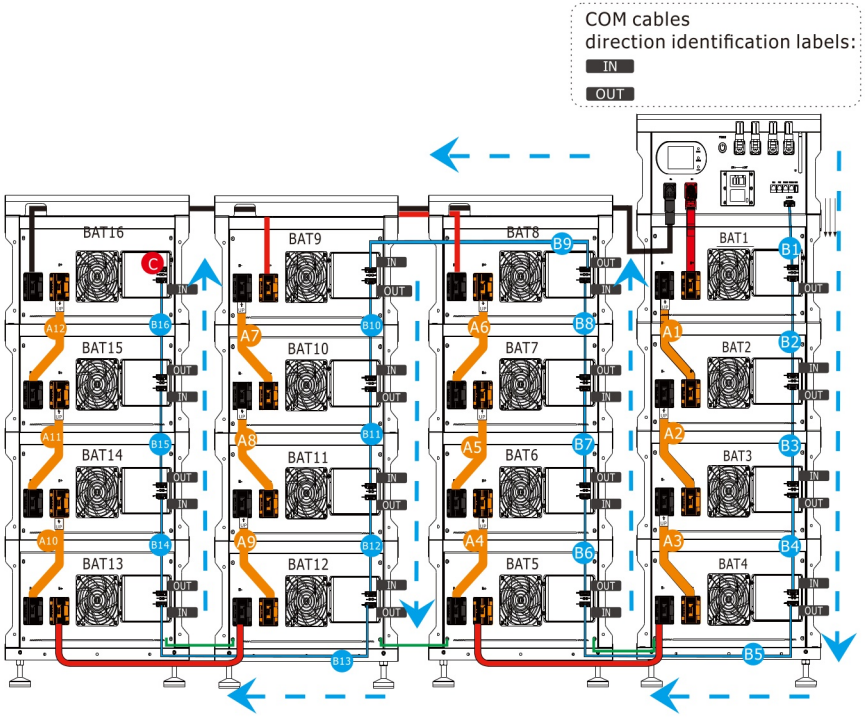




Recommended Installation for 15 BMU Modules

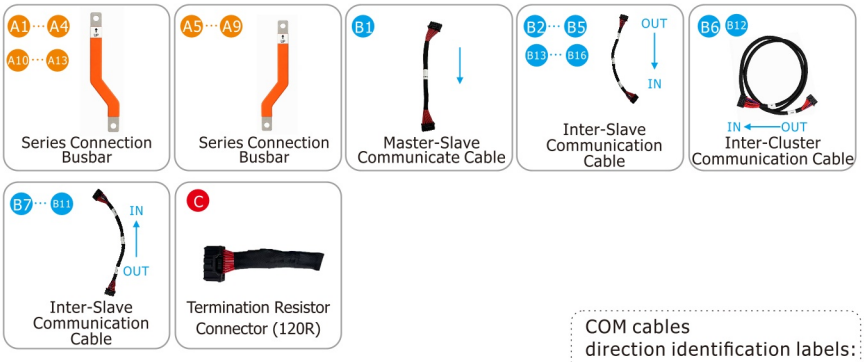
Requires 1 Set of FLH48314UG1 Accessory Kit A

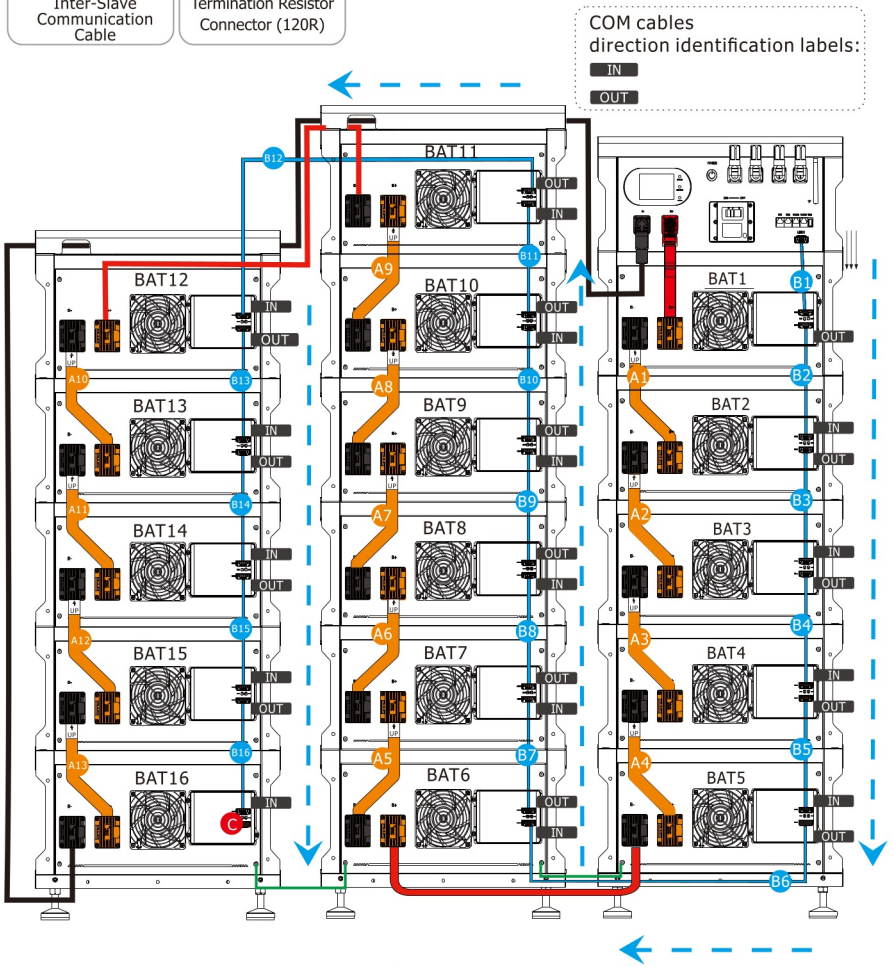




Recommended Installation for 16(4*4) BMU Modules

Requires 1 Set of FLH48314UG1 Accessory Kit A+1 Set of FLH48314UG1 Accessory Kit B

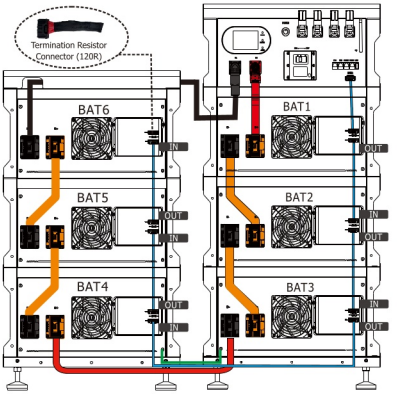




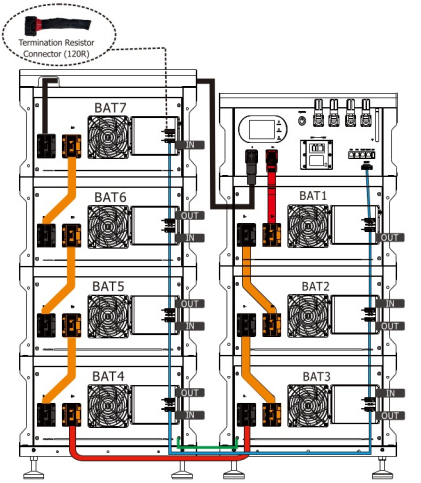
Recommended Installation for 16(5+6+5) BMU Modules

Generally it's not recommended to install more than 5 battery modules in a single cluster

Requires 1 Set of FLH48314UG1 Accessory Kit A

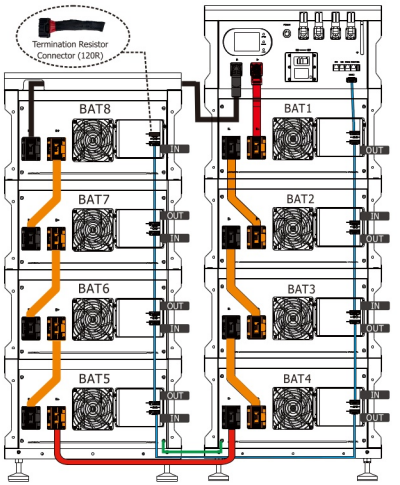


Recommended Installation
for 6 BMU Modules

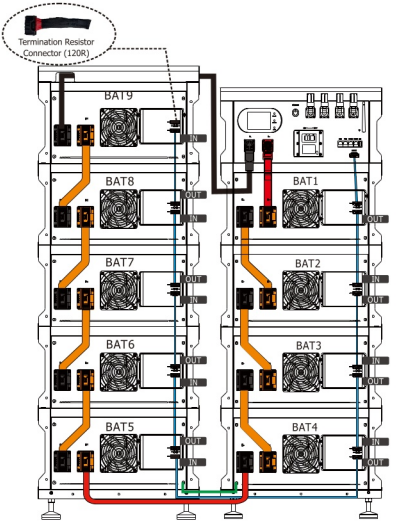


Recommended Installation
for 7 BMU Modules

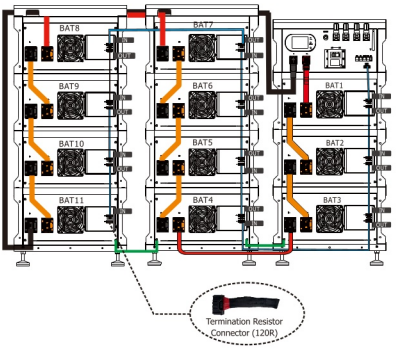
Requires 1 Set of FLH48314UG1 Accessory Kit B



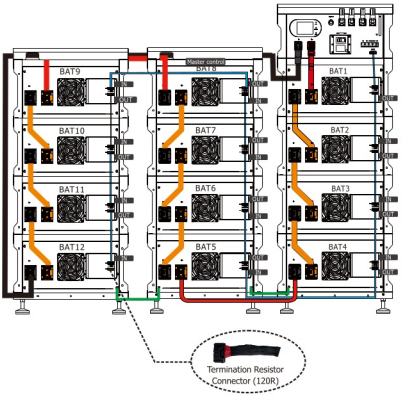
Recommended Installation
for 8 BMU Modules



Recommended Installation
for 9 BMU Modules

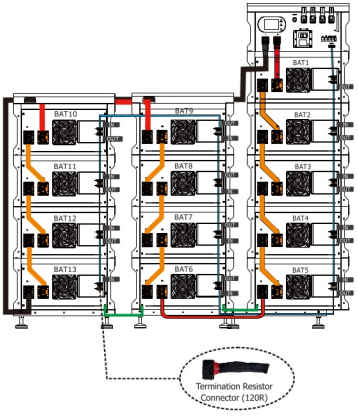


Recommended Installation
for 11 BMU Modules

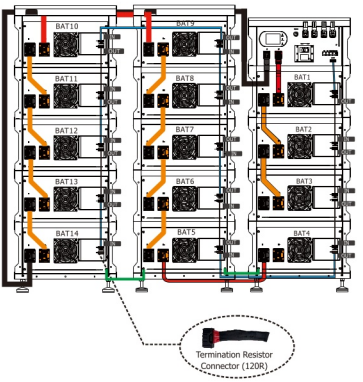


Recommended Installation
for 12 BMU Modules

Requires 1 Set of FLH48314UG1 Accessory Kit A



Recommended Installation
for 13 BMU Modules



Recommended Installation
for 14 BMU Modules

- Grounding: Connect all cluster chassis grounds to ground using the provided cables. (Fig. 8)
- Turn on the MCCB: Turn the MCCB to the ON position. (Fig. 9)
- Power On: Press and hold the Power button for 3-4 seconds.
- Verification: Verify that the Status LED is on and the Alarm LED is off. (see Fig. 10)
- Final Step: Power off the system and install the protective cover. The final installation should match Fig. 11.

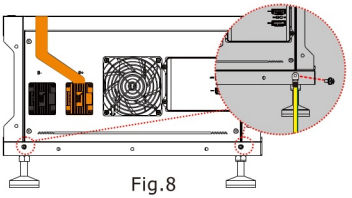


Fig.8

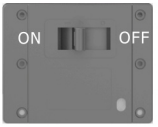


Fig.9

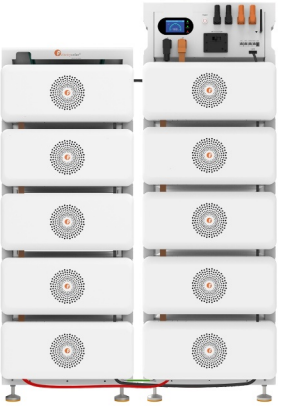


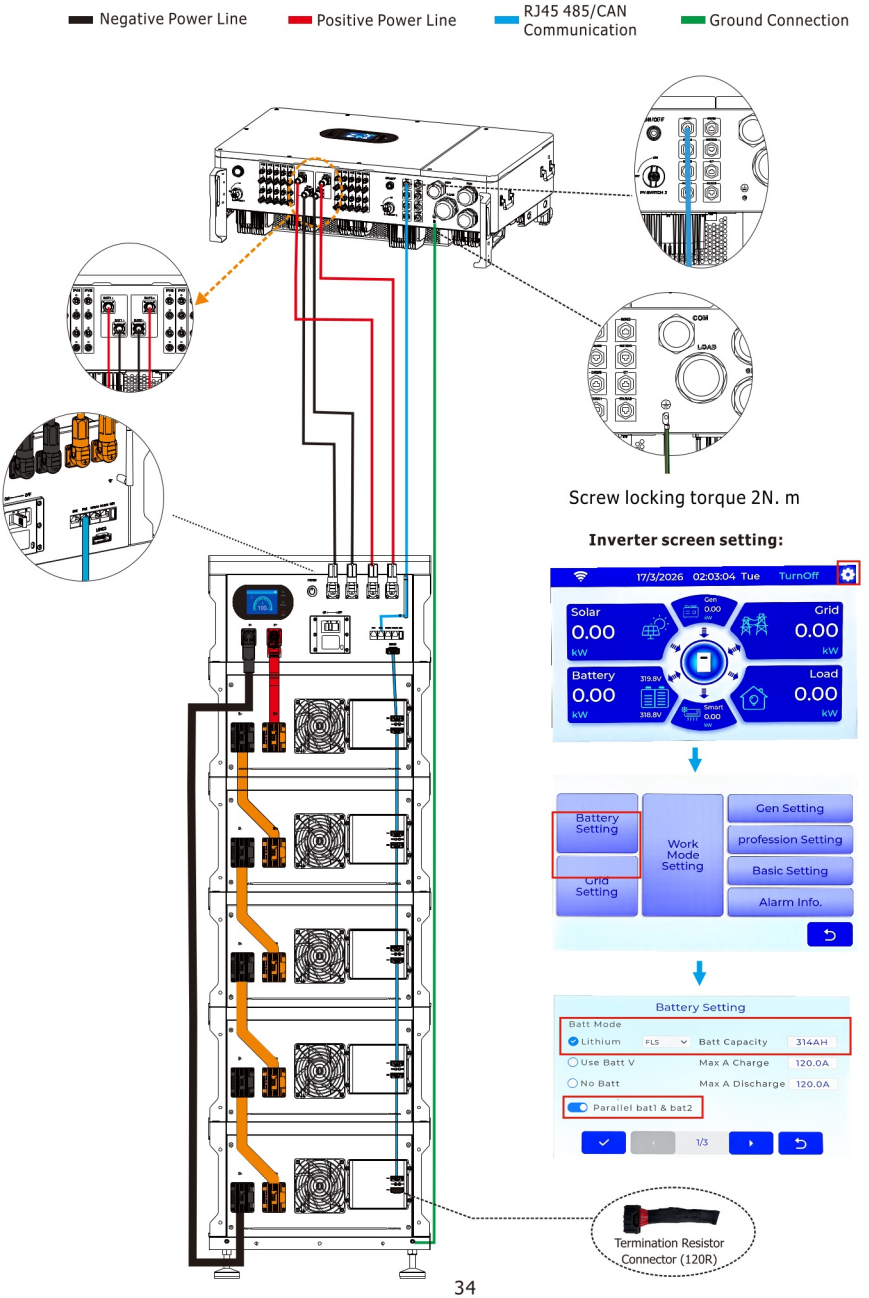
Fig.11



Fig.10

3.8 System Connection Diagram

3.8.1 Connection with IVGM125KHP3GI



3.8.2 Power On/Off with IVGM125KHP3GI

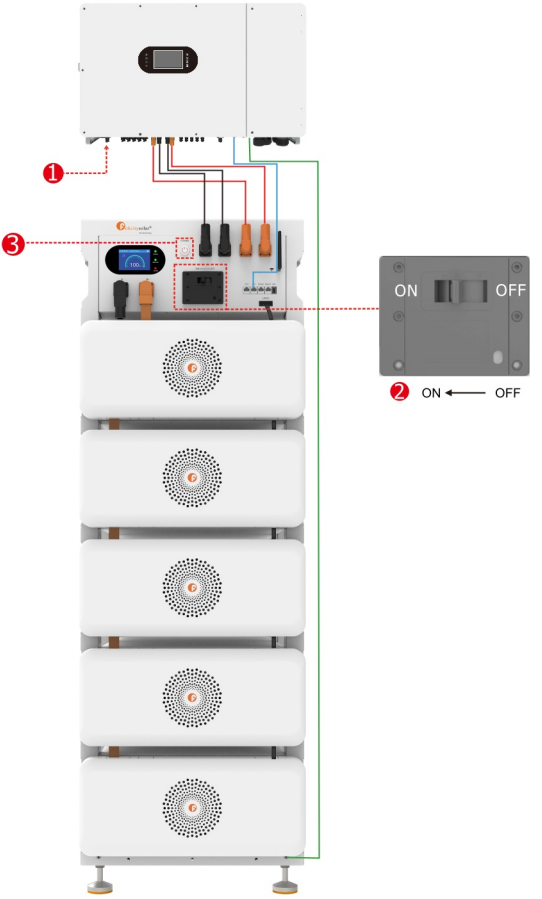
Power on steps:

Step 1: Confirm that the battery and inverter are properly wired, then start the inverter ❶ .

Step 2: Turn on the MCCB by switching it from "OFF" to "ON" ❷ .

Step 3: Press and hold the power button ❸ for 3 seconds to activate the battery system.

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



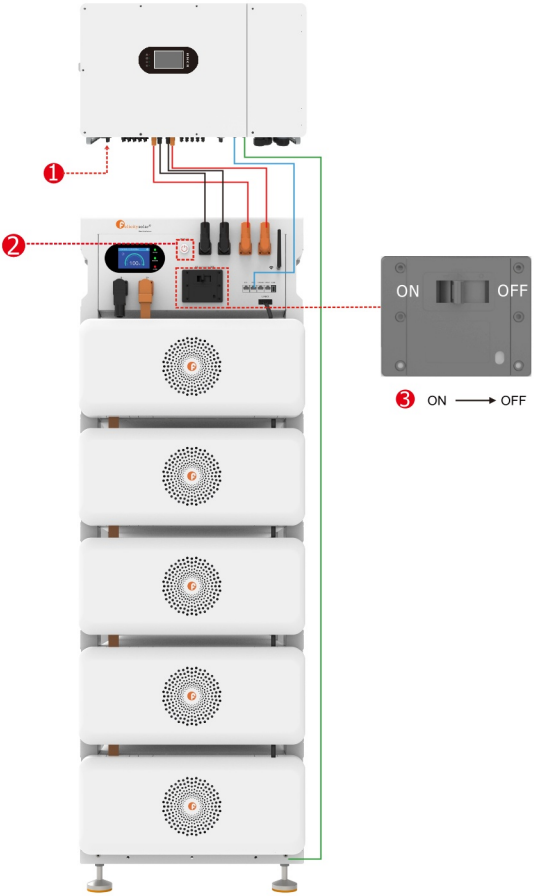
Power down steps:

Step 1: Shut down the inverter❶;

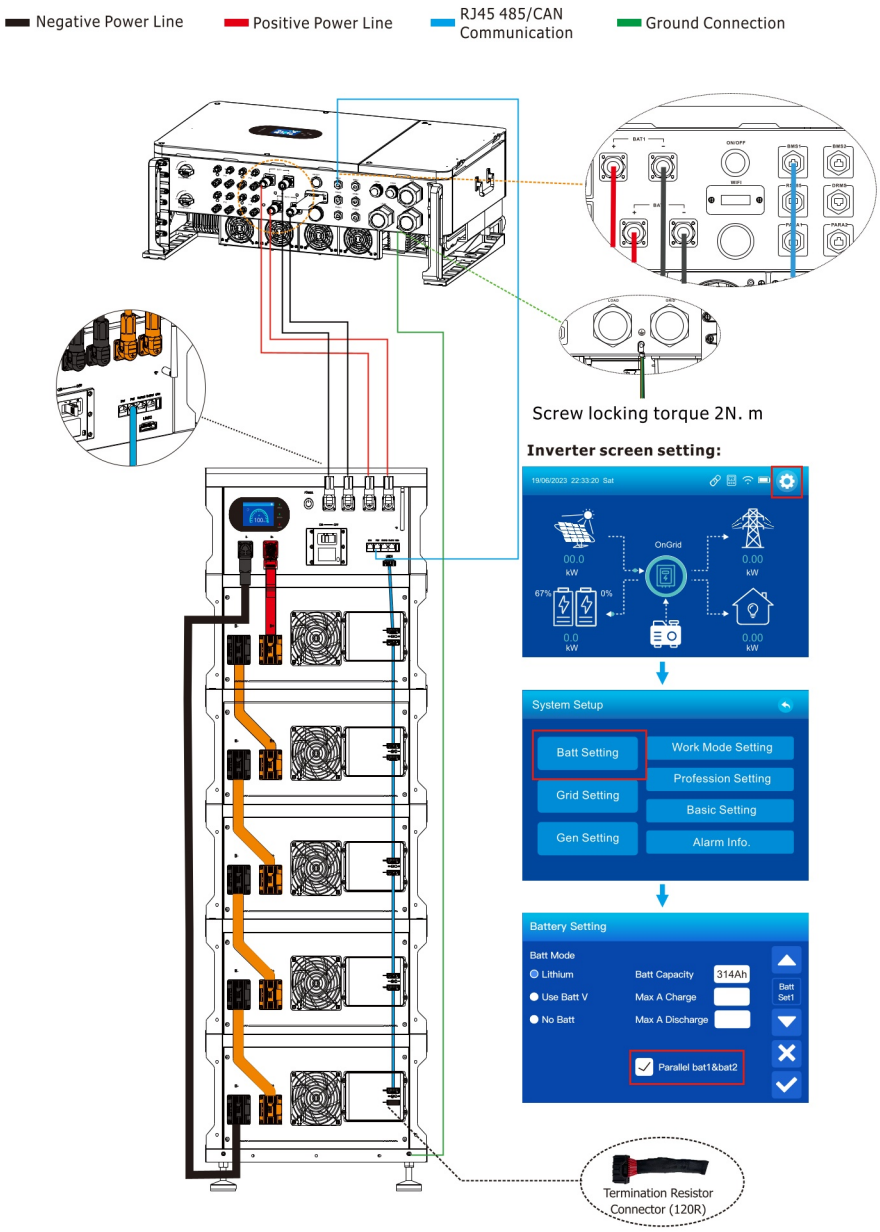
Step 2: Press and hold the power button ❷ for 3 seconds to turn off the battery system;

Step 3: Turn off the battery breaker by switching it from "ON" to "OFF" ❸.

Note: If batteries are connected in parallel, shut them down one by one. Both the positive and negative poles of the battery system are connected through the DC circuit breaker. Opening the breaker isolates all live conductors in the battery system.



3.8.3 Connection with IVGM50KHP3G1



3.8.4 Power On/Off with IVGM50KHP3G1

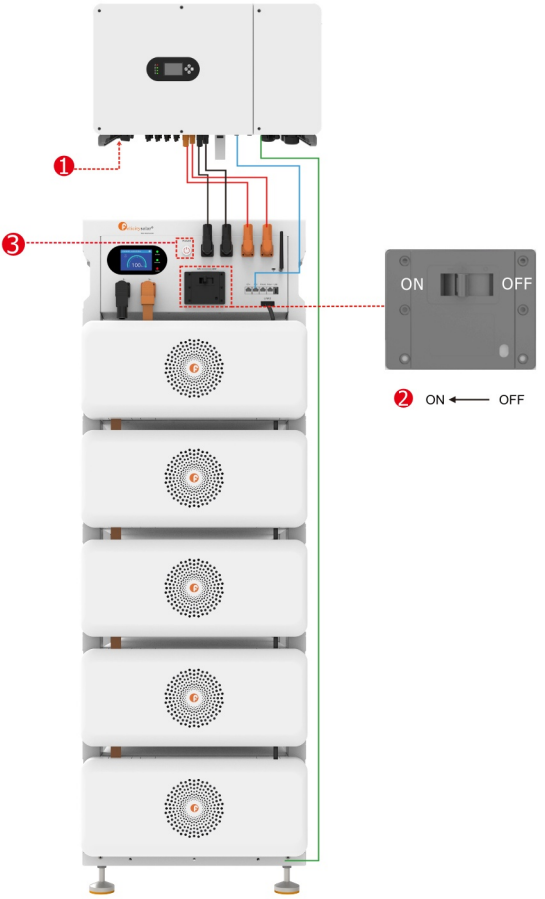
Power on steps:

Step 1: Confirm that the battery and inverter are properly wired, then start the inverter ❶ .

Step 2: Turn on the MCCB by switching it from "OFF" to "ON" ❷

Step 3: Press and hold the power button ❸ for 3 seconds to activate the battery system.

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



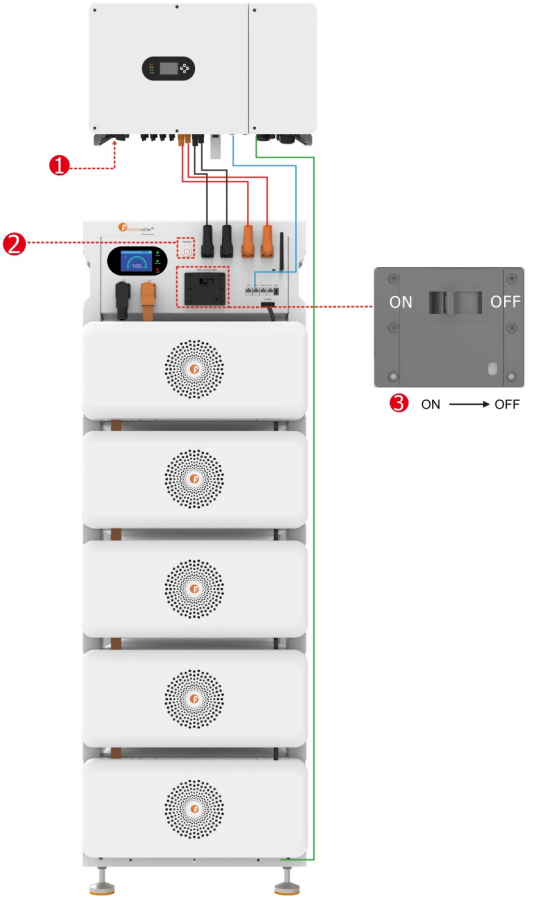
Power down steps:

Step 1: Shut down the inverter ❶;

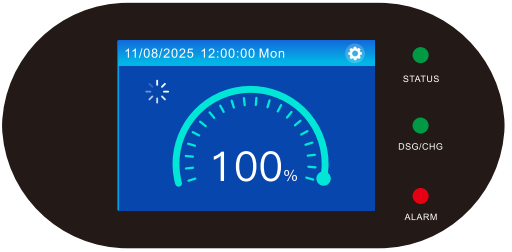
Step 2: Press and hold the power button ❷ for 3 seconds to turn off the battery system;

Step 3: Turn off the MCCB by switching it from "ON" to "OFF" ❸.

Note: If batteries are connected in parallel, shut them down one by one. Both the positive and negative poles of the battery system are connected through the DC circuit breaker. Opening the breaker isolates all live conductors in the battery system.

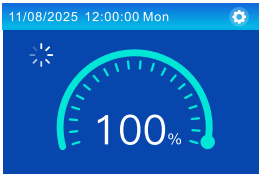


3.9 LCD Display Icons



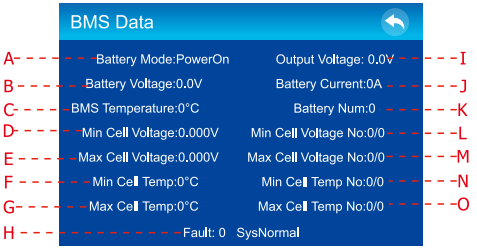
Name	Description
LCD touch screen	Display the information of the battery.
Status LED	Indicates the operating status of the battery, which is always on when running normally.
Charge & Dischage LED	Indicates the charging&discharging status of the battery; A steady light indicates discharging, and a flashing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

3.9.1 Main Interface



Battery Information	
	Indicates SOC.
	Indicates the battery level, with each grid representing 5%.
	This icon will briefly appear after the battery is powered on, indicating the battery is initializing. If the icon remains, it indicates a battery malfunction. Contact Felicity Solar Technical Support immediately.

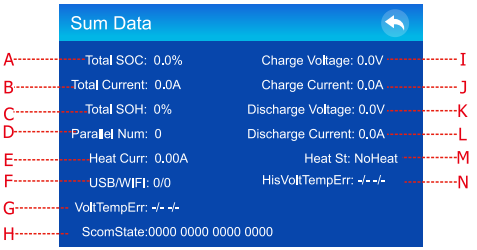
3.9.2 BMS Data



Code	Name	Definition
A	Battery Mode	Current operating status of the battery system.
B	Battery Voltage	Total voltage of the battery system.
C	BMS Temperature	BCU board temperature of the battery system.
D	Minimum Cell Voltage	Minimum cell voltage of the battery system.
E	Maximum Cell Voltage	Maximum cell voltage of the battery system.
F	Minimum Cell Temperature	Minimum cell temperature of the battery system.
G	Maximum Cell Temperature	Maximum cell temperature of the battery system.
H	Fault Status	Current fault status of the battery system.
I	Output Voltage	PCS port voltage of the battery system.
J	Battery Current	Charge/Discharge current of the battery system. Positive for charging; negative for discharging.
K	Battery Number	Number of successfully addressed BMUs in the battery system.
L	Minimum Cell Voltage Number	Cell number of the cell with the minimum voltage in the battery system.
M	Maximum Cell Voltage Number	Cell number of the cell with the maximum voltage in the battery system.
N	Minimum Cell Temperature Number	Cell number of the cell with the minimum temperature in the battery system.
O	Maximum Cell Temperature Number	Cell number of the cell with the maximum temperature in the battery system.

3.9.3 Sum Data

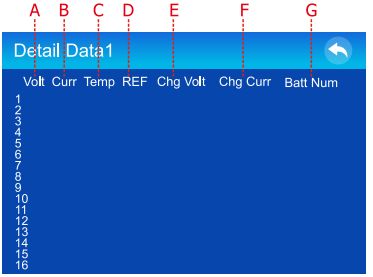
This page displays the summary information of parallel battery system(If it is a single-cluster system, the information displayed is its own):



Code	Name	Definition
A	Total SOC	SOH of the battery system.
B	Total Current	Total Current of battery system.
C	Total SOH	SOH of the battery system.
D	Parallel Number	The number of successfully paralleled batteries.
E	Heater Current	Heater Current of battery system. Ignore if heating function is not supported.
F	USB/WIFI	USB/WIFI connection state. 1 represents connected, and 0 represents disconnected.
G	Cell Voltage / Temp Error	Current record of cell voltage or temperature errors.
H	Slave Com State	BMU Module communication state. Binary numbers are used to determine which BMU Module is online.
I	Charge Voltage	Charge voltage limit of battery system.
J	Charge Current	Charge current limit of battery system.
K	Discharge Voltage	Discharge voltage limit of battery system.
L	Discharge Current	Discharge current limit of battery system.
M	Heat State	Heat state of 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;

3.9.4 Detail Data1

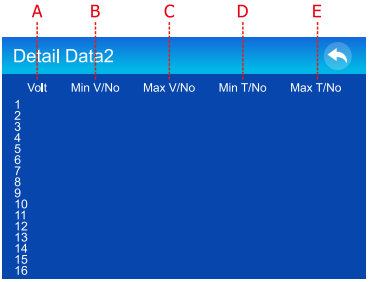
This page displays the detail information of parallel battery system:



Code	Name	Definition
A	Voltage	Voltage of each battery of parallel battery system.
B	Current	Current of each battery of parallel battery system.
C	Temperature	Temperature of each battery of parallel battery system.
D	Reference SOC	Reference SOC of each battery of parallel battery system.
E	Charge Voltage	Charge voltage limit of each battery of parallel battery system.
F	Charge Current	Charge current limit of each battery of parallel battery system.
G	Battety Number	Battery address number.

3.9.5 Detail Data 2

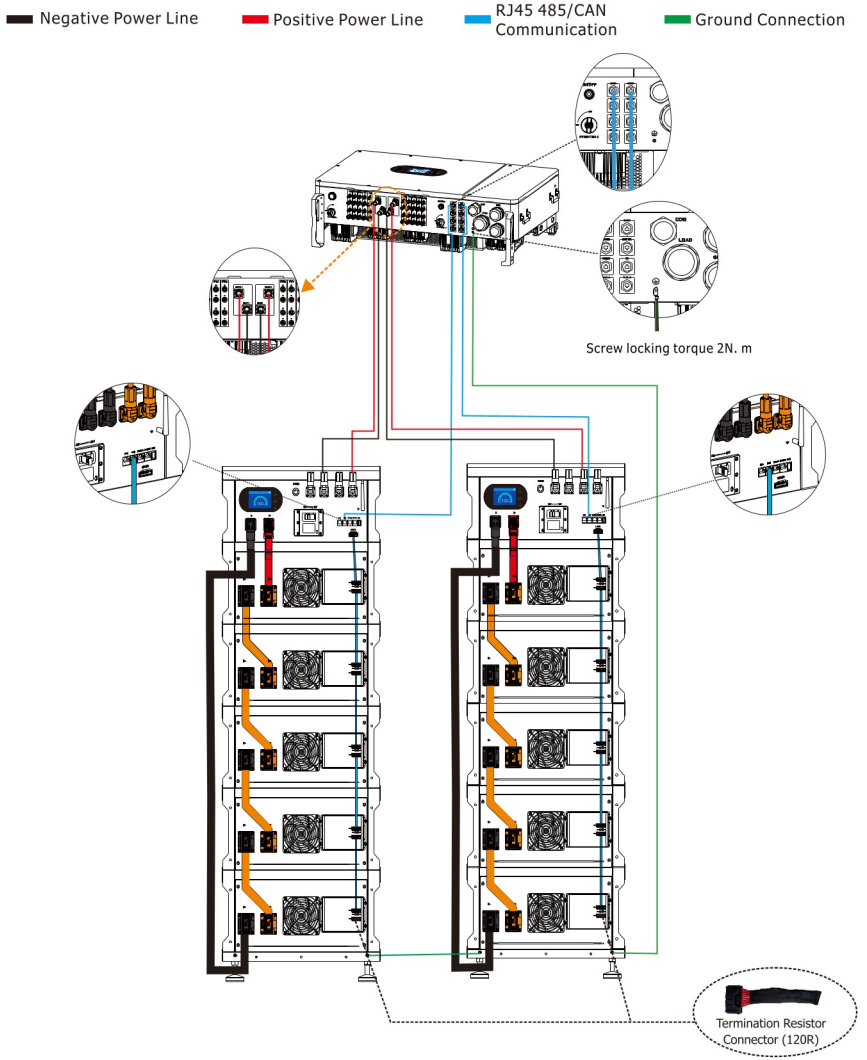
This page displays the detail information of battery system:



Code	Name	Definition
A	Voltage	Every BMU Module 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.

3.10 Multi-cluster Battery System Connection

3.10.1 Two-Cluster Connection to IVGM125KHP3G1

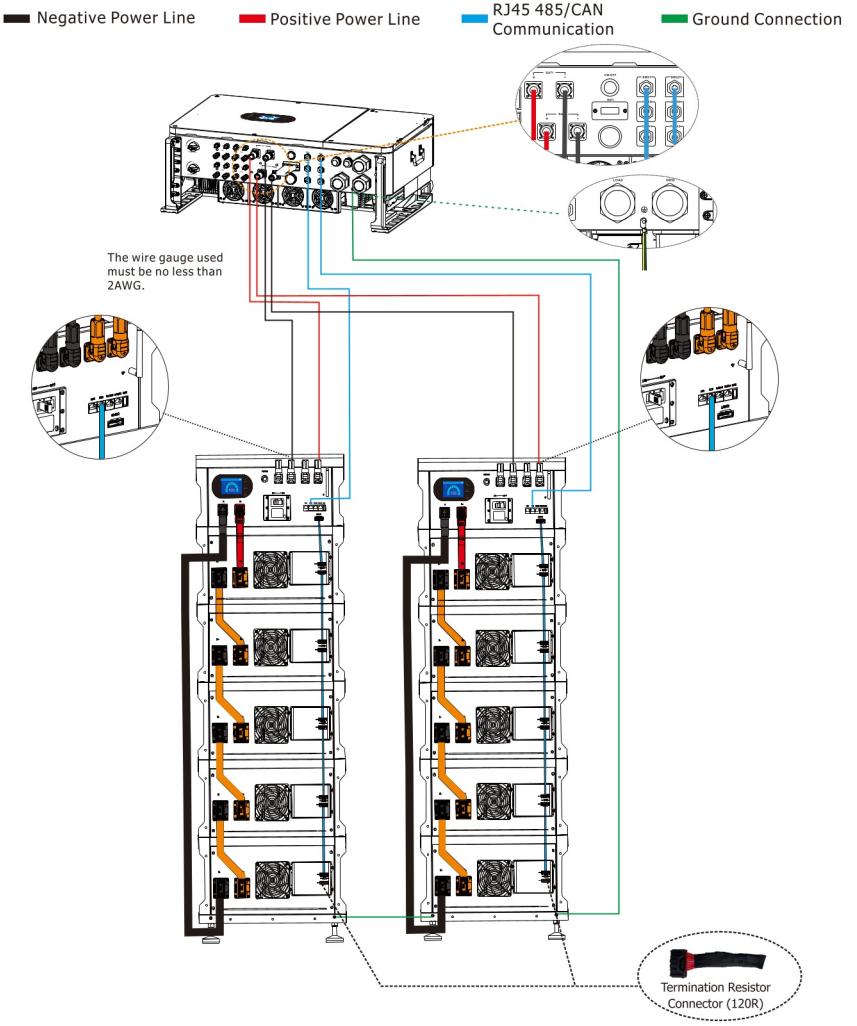




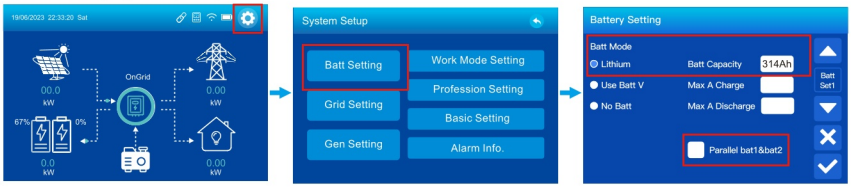




3.10.2 Two-Cluster Connection to IVGM50KHP3G1



Inverter Display Setup Steps:



3.10.3 Three-Cluster Connection to IVGM125KHP3G1

This battery system supports parallel operation to increase system capacity. A maximum of 16 battery clusters can be connected in parallel.

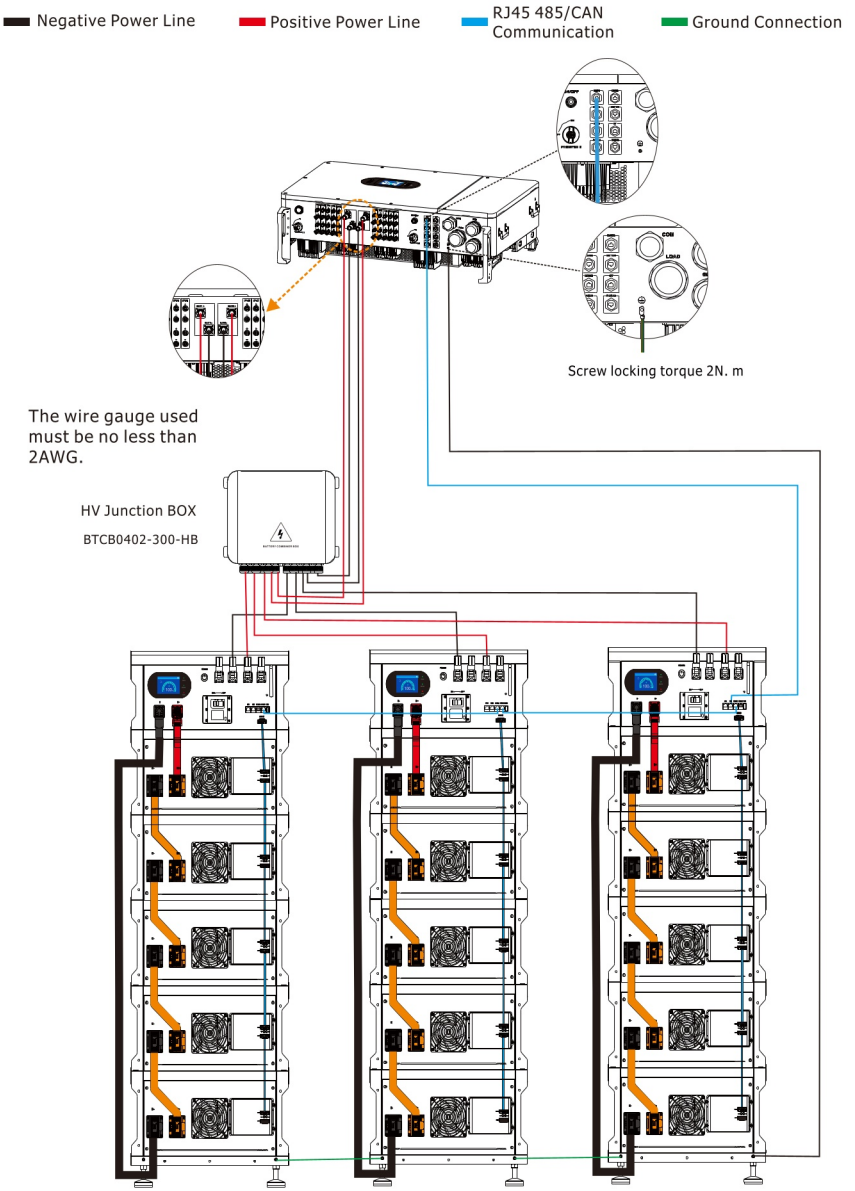
Before configuring a parallel system, ensure that:

- Each battery cluster is configured with the same number of battery modules.
- Each battery cluster is assigned a unique address.
- All power cables and communication cables are connected correctly and securely.
- All electrical safety requirements specified in this manual have been met.

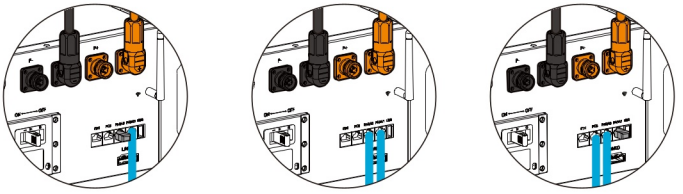
For the recommended combiner box model, please contact Felicity Solar Technical Support:
Email: felicitysupport@felicitysolar.com

The following example illustrates the connection of three battery clusters to an IVGM125KHP3G1 inverter. The same configuration principles apply to systems with up to 16 battery clusters connected in parallel.

①.Wiring Diagram



Schematic Diagram of Communication Port Connections



BAT1 BAT2 BAT3

The first and last clusters of batteries need to be connected to the parallel clustering terminal of FLH48314UCG1 accessory 8.

②. Inverter Display Setup Steps

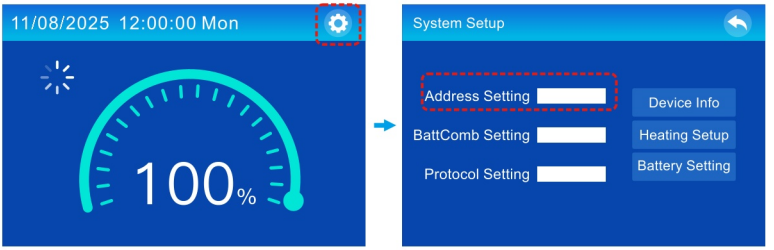


③. Battery Cluster Configuration Steps

Battery cluster parallel operation address setting:

1.After connecting the battery cables, power on the battery and configure the BCU module address via the display. BCU module addresses must be unique (no duplicates), with a maximum configurable address of 16.

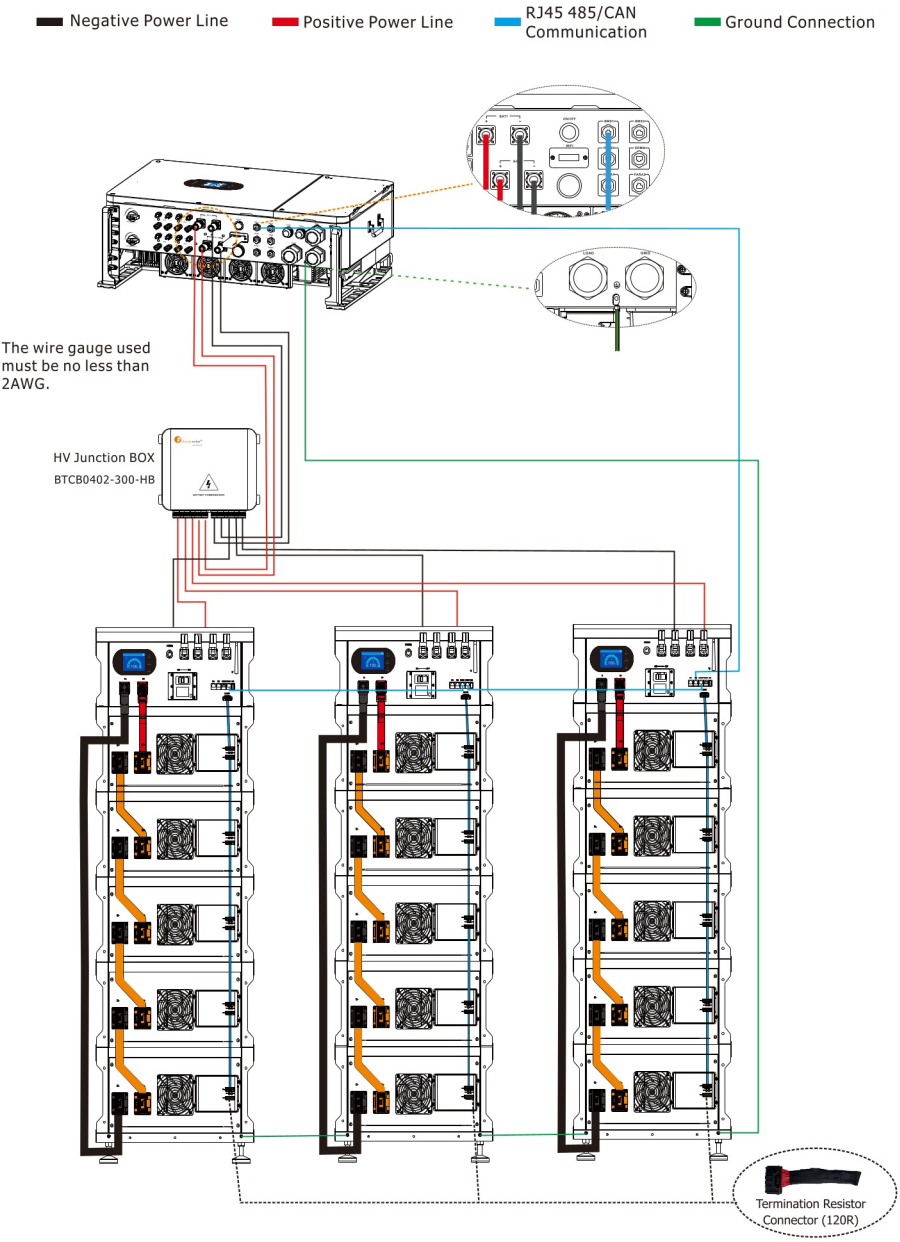
2.Once the address is configured, restart the battery .



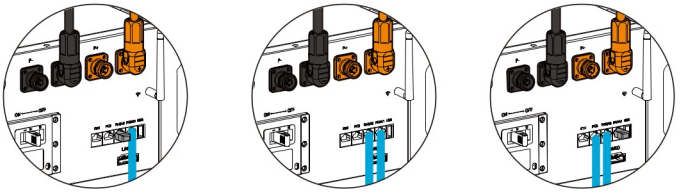
″Protocol Setting": This feature is not yet active and does not require configuration.

3.10.4 Three-Cluster Connection to IVGM50KHP3G1

①.Wiring Diagram



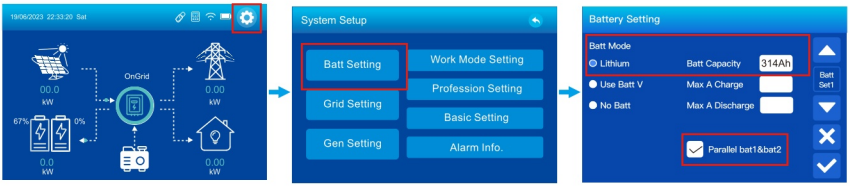
Schematic Diagram of Communication Port Connections



BAT1 BAT2 BAT3

The first and last clusters of batteries need to be connected to the parallel clustering terminal of FLH48314UCG1 accessory 8.

②. Inverter Display Setup Steps

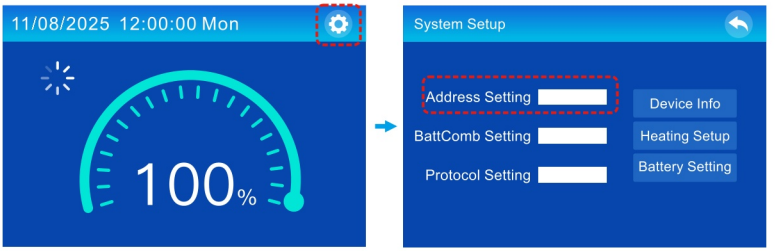


③. Battery Cluster Configuration Steps

Battery cluster parallel operation address setting:

1.After connecting the battery cables, power on the battery and configure the BCU module address via the display. BCU module addresses must be unique (no duplicates), with a maximum configurable address of 16.

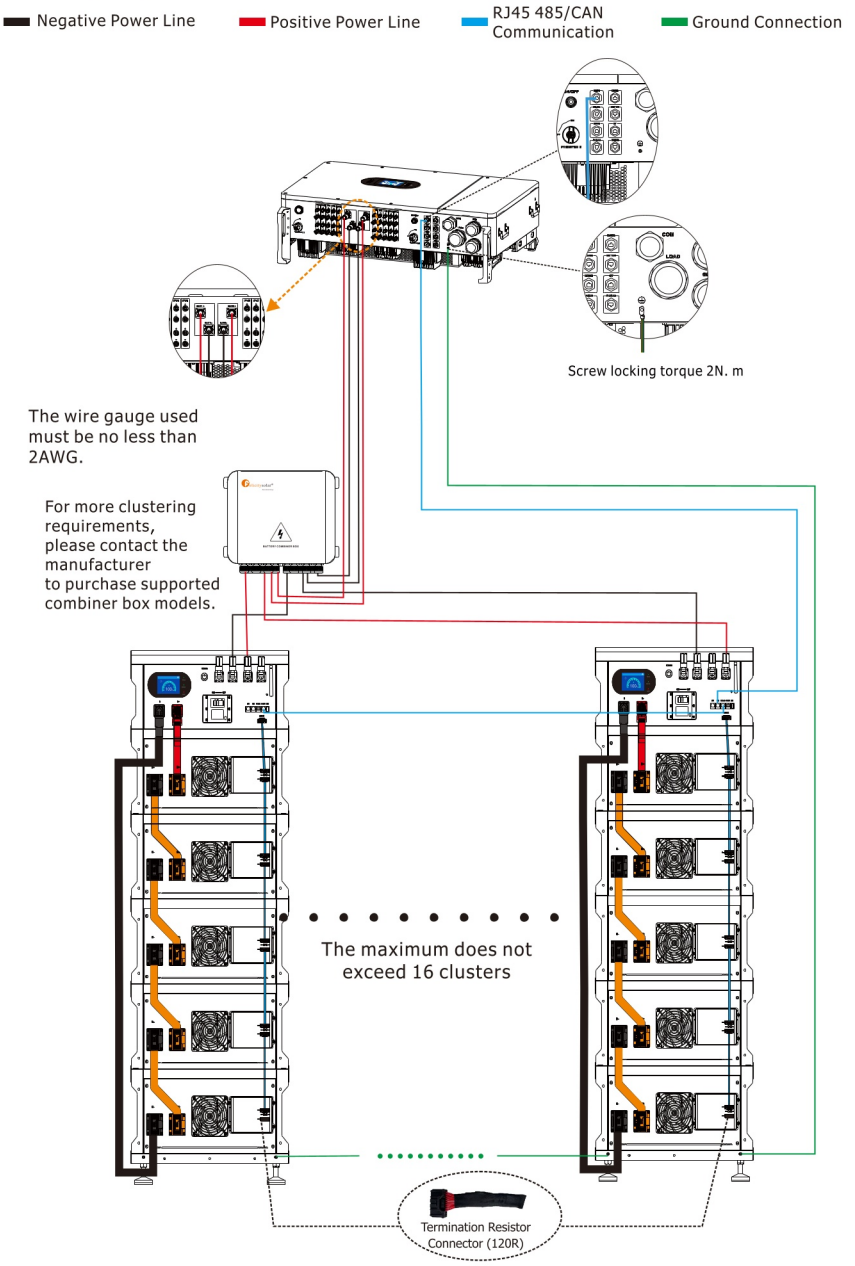
2.Once the address is configured, restart the battery .



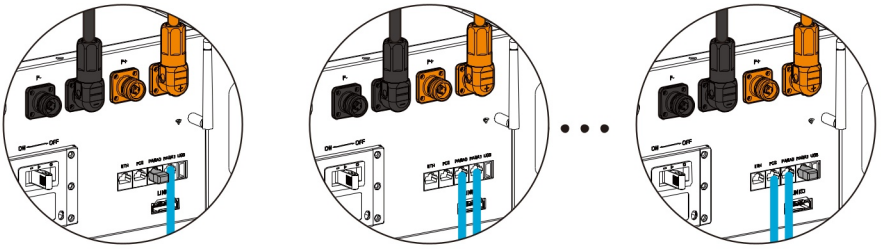
"Protocol Setting": This feature is not yet active and does not require configuration.

3.10.5 Multi-Cluster Connection to IVGM125KHP3G1

①.Wiring Diagram



Schematic Diagram of Communication Port Connections



The first and last clusters of batteries need to be connected to the parallel clustering terminal of FLH48314UCG1 accessory 8.

②. Inverter Display Setup Steps

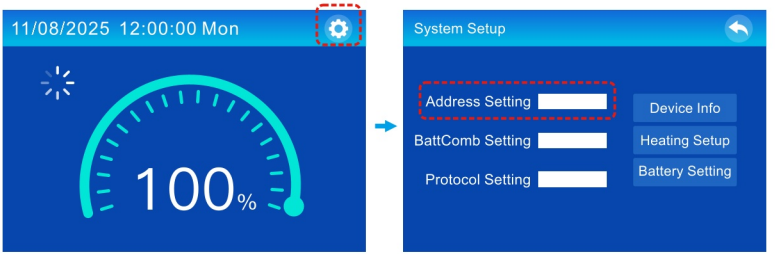


③. Battery Cluster Configuration Steps

Battery Cluster parallel operation address setting:

1.After connecting the battery cables, power on the battery and configure the BMU module address via the display. BMU module addresses must be unique (no duplicates), with a maximum configurable address of 16.

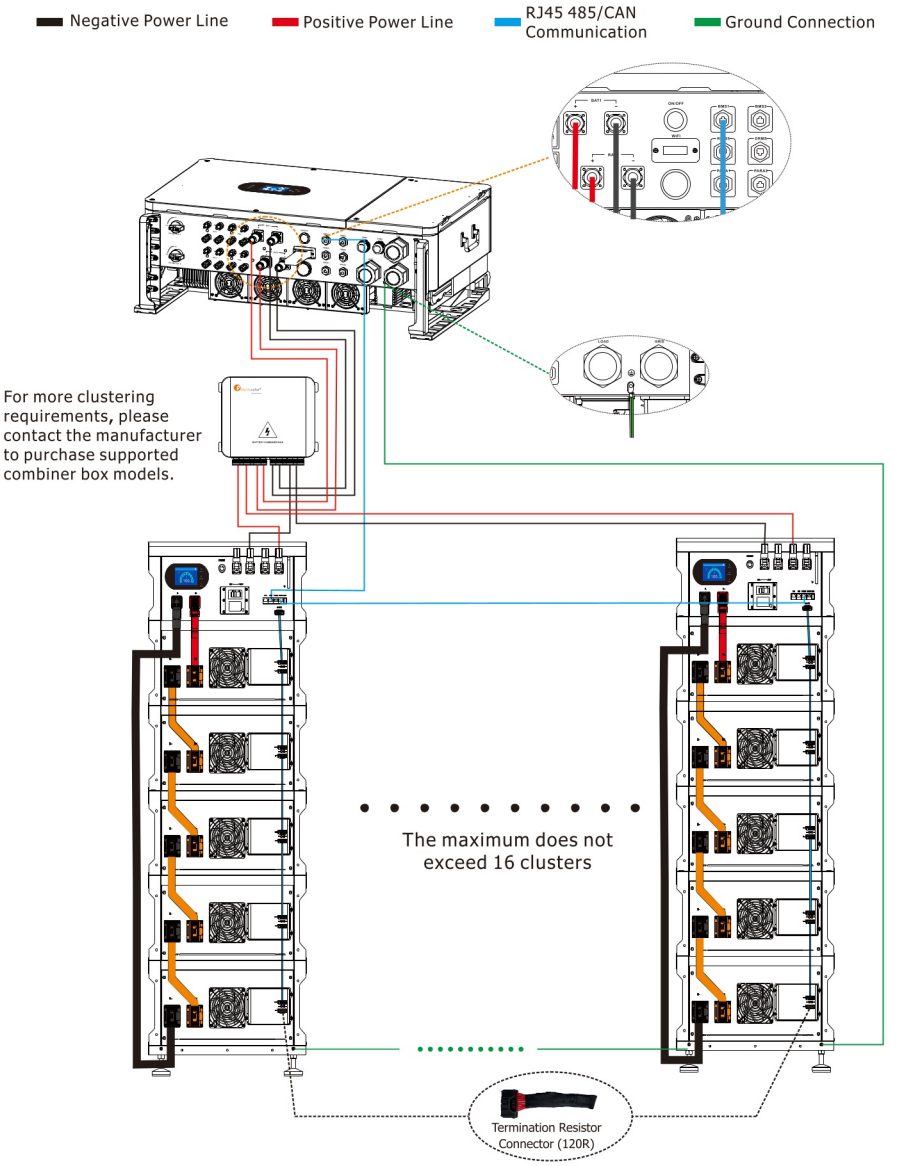
2.Once the address is configured, restart the battery.



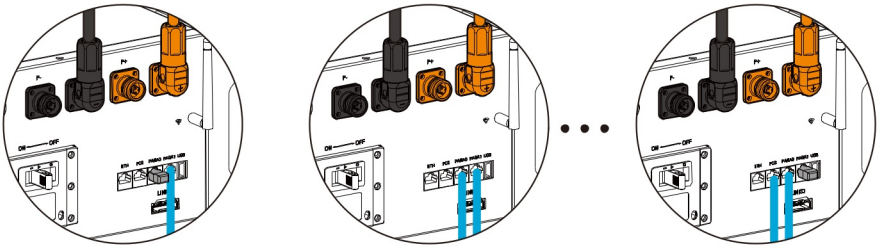
"Protocol Setting": This feature is not yet active and does not require configuration.

3.10.6 Multi-Cluster Connection to IVGM50KHP3G1

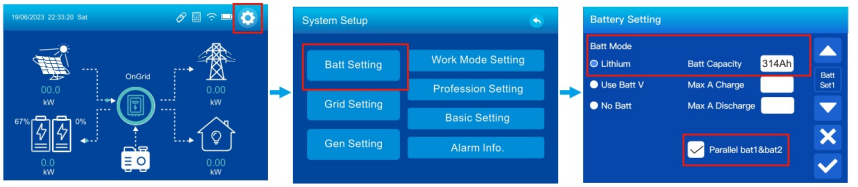
①.Wiring Diagram



Schematic Diagram of Communication Port Connections



②. Inverter Display Setup Steps

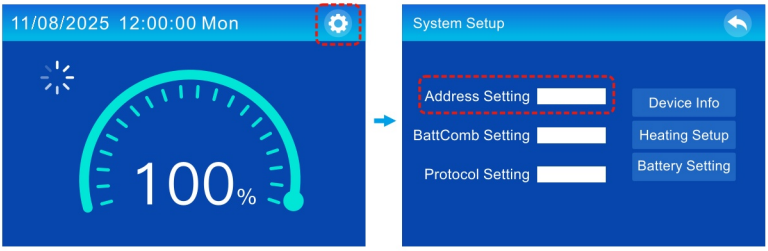


③. Battery Cluster Configuration Steps

Battery Cluster parallel operation address setting:

1.After connecting the battery cables, power on the battery and configure the BMU module address via the display. BMU module addresses must be unique (no duplicates), with a maximum configurable address of 16.

2.Once the address is configured, restart the battery.



"Protocol Setting": This feature is not yet active and does not require configuration.

4. Smart Energy Management & Quick Network Setup Guide

For the best user experience, we recommend installing the app to connect and configure the device. The app lets you monitor real-time system data and view total energy generation, daily output energy,power-generation revenue, and carbon-emission reductions. It also sends instant alerts for system anomalies, providing a clear overview of plant operation. Once the device is online, remote operation and one-click repair requests are available, enabling intelligent management, maximizing power-generation revenue, and extending equipment service life.

4.1 Download the APP

Please use your mobile phone to scan the QR code below to download and install the "Fsolar" APP.

Fsolar APP

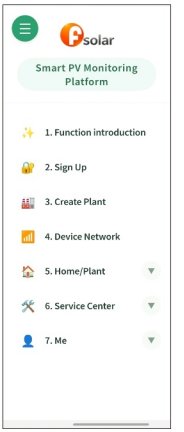
4.2 APP User Guide

Scan the QR code to view the full tutorial, or visit the URL below on your computer browser to quickly learn the following functions:

①Sign Up; ②Create Plant; ③Device Network;

④Home/Plant; ⑤Service Center.

Web access:
https://shine.felicitysolar.com/app_operation_manualen.html



After entering the page, use the menu on the left to quickly navigate to the SOP content you need.

4.3 Web Access

You can also access the web management platform via a computer browser to experience large-screen monitoring and more management features.
Web access: https://shine.felicitysolar.com

5. Fault Code Table

Code	Fault Description	Recommended Action
F01	Battery Voltage High	Battery overvoltage fault & Battery undervoltage fault. Please check whether the power cables and communication cables of the battery system are connected correctly. After checking the wiring harness connections and restarting the system, if the fault is not eliminated, please contact the battery supplier.
F02	Battery Voltage Low	
F03	Cell Voltage High	Battery cell overvoltage fault & Battery cell undervoltage fault. If the same fault is reported multiple times, please contact the battery supplier.
F04	Cell Voltage Low	
F05	Battery Charge Current High	Battery charge overcurrent & Battery discharge overcurrent. If the same fault is reported multiple times, please contact the battery and converter supplier.
F06	Battery Discharge Current High	
F07	BCU Module Temperature High	BCU module over temperature. The battery system may have been exposed to extremely high ambient temperatures for an extended period while operating at high power continuously. Please let it stand idle for a while before continuing to use it. If the same fault is reported multiple times, please contact the battery supplier.
F08	TBD	The F08 code has not been assigned a specific fault yet. Reserved. (not assigned)
F09	Cell Temperature High	Cell over temperature. The battery system may have been exposed to extremely high ambient temperatures for an extended period while operating at high power continuously. Please let it standidle for a while before continuing to use 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. Check for a short circuit on the P+ / P- terminals. After checking it and restarting the system, if the fault is not eliminated, please contact the battery supplier.

F13	BMU Device Communication Fault	BCU module communication fault. Please confirm whether the BMUs communication harness are well connected. After checking it and restarting the system, if the fault is not eliminated, please contact the battery supplier.
F15	TBD	The F15 code has not been assigned a specific fault yet. Reserved. (not assigned)
F16	TBD	The F16 code has not been assigned a specific fault yet. Reserved. (not assigned)
F17	Parallel Fault	Batteries in parallel fault. Please confirm whether the parallel battery system has been set up correctly in accordance with the requirements, such as the 120R terminal resistor, parallel cluster network cable, the parallel cluster addresses on the LCD must be unique, and the number BCU modules in each cluster's battery system, etc. After checking them and restarting the system, if the fault is not eliminated, please contact the battery supplier.
F18	Relay Self-diagnosis 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. Please turn off the battery system and check the fuse status.
F21	Insulation Function Fault	BCU module 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	BCU module Address Fault Please try to restart the battery and check the blinking status of the BMU's status indicator lights. 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 BCU module 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 BCU module 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	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.
F30	cAds Com Fault	High-voltage analog acquisition chip communication fault. Power off and contact battery supplier.
F31	Parallel Communication Fault	Communication between the paralleled units is abnormal or interrupted.
F32	Parallel Power Line Fault	The power connection between the paralleled units is abnormal or disconnected.
F33	Display Communication Fault	Communication between the display panel and the main control board is abnormal or interrupted.

NOTE: For more information, please contact us.
Email: felicitysupport@felicitysolar.com

6. Battery Recycling and Disposal

Lithium iron phosphate ($LiFePO_4$) batteries contain recyclable materials such as aluminum, copper, lithium, iron, and other valuable metals.
At the end of service life, the battery system shall be disposed of in accordance with local environmental regulations and recycling requirements.

6.1 Environmental Compliance

Do not dispose of the battery system in household waste.
Do not incinerate the battery system.
Dispose of the battery system through authorized recycling or battery collection centers in compliance with local regulations (such as WEEE or equivalent directives).

6.2 Recycling Process

Recycling of $LiFePO_4$ batteries shall be carried out only by certified recycling facilities using approved industrial processes.
Recovered materials may include aluminum, copper, lithium, iron, and other recyclable components.

6.3 Anode and Cathode Materials

The battery contains recyclable electrode materials, including aluminum and copper current collectors. These materials can be recovered through industrial recycling processes.

6.4 Diaphragm Material

The separator (diaphragm) is non-recoverable and shall be treated as industrial waste in accordance with local regulations.

6.5 Recycling Equipment

Recycling shall be performed using professional industrial equipment, including dismantling systems, shredding systems, and hydrometallurgical or equivalent recovery processes.

7.Maintenance and Firmware Update

WARNING: Risk of electric shock, fire, or equipment damage.
The battery system contains hazardous voltages. Do not open the enclosure, disconnect cables or connectors, or touch electrical terminals.Any work involving electrical connections, internal components, repair, or replacement must be performed only by qualified personnel authorized by FelicitySolar.Before performing service work, shut down the battery system and isolate all power sources

NOTE: All maintenance and service activities must comply with applicable local laws, regulations, codes, and standards. The USB service port, if provided, is intended only for authorized firmware updates, commissioning, and diagnostic data collection. It is not intended for general user operation.

7.1 Maintenance

The battery system does not require scheduled internal maintenance during normal operation. The owner or operator is responsible only for routine visual inspection and external cleaning.

7.1.1 Routine Inspection

Inspect the battery system periodically and after severe weather, accidental impact, water exposure, or a persistent system alarm.Without touching or opening the equipment, check the following:

- The system operating status is normal and no active alarm is displayed.
- The enclosure and mounting structure show no signs of deformation, cracks, corrosion, discoloration, or other damage.
- There are no signs of water ingress, liquid leakage, unusual odor, abnormal noise, smoke, or excessive heat.
- External cables, conduits, and connectors are securely positioned and show no visible signs of damage, looseness, or overheating.
- The area around the battery system is clean and free from dust, leaves, stored items, or other objects that may obstruct heat dissipation.
- All safety labels remain present, legible, and undamaged.

If any abnormal condition is found, do not attempt to repair the system yourself. If it is safe to do so, shut down the system, keep unauthorized persons away from the equipment, and contact FelicitySolar Technical Support or an authorized service provider.

NOTE: Routine shutdown and restart are not required as part of regular maintenance. Do not repeatedly restart the system to clear a recurring alarm.

7.1.2 Cleaning

Clean the exterior of the battery system when necessary.

- Use a soft, dry, lint-free cloth or a soft brush to remove dust and debris.
- Every 6 months, power off the equipment and remove the dust-proof cotton and dust filter. Clean them with a soft-bristled brush or compressed air, then air-dry them thoroughly in a well-ventilated area before reinstalling. Replace them if they are damaged or cannot be cleaned properly.
- Do not spray water directly onto the equipment.
- Do not use a pressure washer, compressed air, solvents, alcohol, abrasive cleaners, or corrosive cleaning agents.
- Prevent moisture and foreign objects from entering connectors, cable entries, or other openings.
- Do not remove the enclosure cover for cleaning.

In dusty, humid, saline, or otherwise harsh environments, inspect and clean the system more frequently according to actual site conditions.

7.1.3 Electrical Connections

Under normal circumstances, the tightness of plug-in connectors and electrical terminals should be inspected every 6 months.

The connections and tightening torque must also be checked during installation, after component replacement, or whenever loose connections or overheating are suspected. Such work must be carried out by qualified and authorized service personnel in accordance with the applicable installation or service instructions.

7.2 Firmware Update

Firmware updates may be released periodically to improve system performance, compatibility, reliability, or functionality.
Firmware updates must be performed only by qualified personnel using update tools, firmware files, and instructions provided or approved by FelicitySolar Technical Support.

Before starting an update:

- Confirm that the firmware is compatible with the exact product model and current system configuration.
- Ensure that the battery system has a stable power supply and communication connection.
- Read and follow the update instructions supplied with the firmware package.

During an update:

- Do not shut down or restart the battery system.
- Do not disconnect the USB device, communication cable, or power supply.
- Do not operate the system unless instructed to do so by the update procedure.

After the update, verify that the firmware version is correct, the system returns to normal operation, and no active alarm is displayed. If the update fails, do not repeatedly restart the system or reinstall the firmware without guidance. Record the displayed error information and contact FelicitySolar Technical Support.

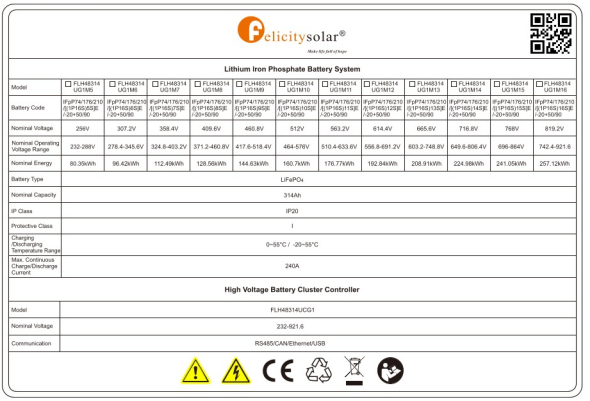
Email: felicitysupport@felicitysolar.com

NOTICE:

Installing incompatible, modified, or unauthorized firmware, or interrupting an update, may cause system malfunction, loss of operating data, or equipment damage

8.Appendices

Labels

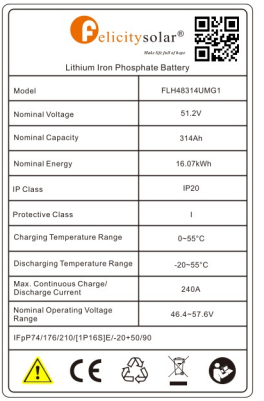


Lithium Iron Phosphate Battery System

Model	☐ FLH48314 UG1M5	☐ FLH48314 UG1M6	☐ FLH48314 UG1M7	☐ FLH48314 UG1M8	☐ FLH48314 UG1M9	☐ FLH48314 UG1M10	☐ FLH48314 UG1M11	☐ FLH48314 UG1M12	☐ FLH48314 UG1M13	☐ FLH48314 UG1M14	☐ FLH48314 UG1M15	☐ FLH48314 UG1M16
Battery Code	(1P16S/65Ah) -20~50/90	(1P16S/48Ah) -20~50/90	(1P16S/75Ah) -20~50/90	(1P16S/48Ah) -20~50/90	(1P16S/48Ah) -20~50/90	(1P16S/100Ah) -20~50/90	(1P16S/115Ah) -20~50/90	(1P16S/125Ah) -20~50/90	(1P16S/135Ah) -20~50/90	(1P16S/143Ah) -20~50/90	(1P16S/150Ah) -20~50/90	(1P16S/165Ah) -20~50/90
Nominal Voltage	256V	307.2V	358.4V	409.6V	460.8V	512V	563.2V	614.4V	665.6V	716.8V	768V	819.2V
Nominal Operating Voltage Range	232-288V	278.4-345.6V	324.8-403.2V	371.2-460.8V	417.6-518.4V	464-576V	510.4-633.6V	556.8-691.2V	603.2-748.8V	649.6-806.4V	696-864V	742.4-921.6
Nominal Energy	80.35kWh	96.42kWh	112.49kWh	128.56kWh	144.63kWh	160.7kWh	176.77kWh	192.84kWh	208.91kWh	224.98kWh	241.05kWh	257.12kWh
Battery Type	LiFePO4											
Nominal Capacity	314Ah											
IP Class	IP20											
Protective Class	I											
Charging /Discharging Temperature Range	0~55°C / -20~55°C											
Max. Continuous Charge/Discharge Current	240A											

High Voltage Battery Cluster Controller

Model	FLH48314UCG1
Nominal Voltage	232-921.6
Communication	RS485/CAN/Ethernet/USB



Lithium Iron Phosphate Battery

Model	FLH48314UMG1
Nominal Voltage	51.2V
Nominal Capacity	314Ah
Nominal Energy	16.07kWh
IP Class	IP20
Protective Class	I
Charging Temperature Range	0~55°C
Discharging Temperature Range	-20~55°C
Max. Continuous Charge/ Discharge Current	240A
Nominal Operating Voltage Range	46.4~57.6V

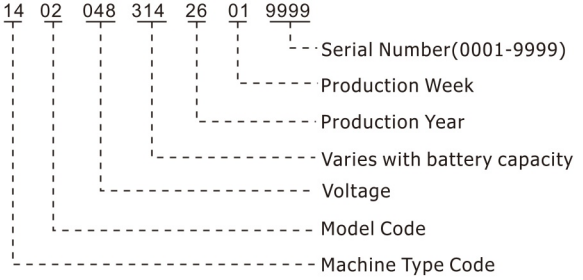
IFpP74/176/210/[1P16S]E/-20+50/90

SN Description

1.High-Voltage Battery Control Module (BCU Module) SN Description

For example

FLH48314UCG1 SN: 140204831426019999

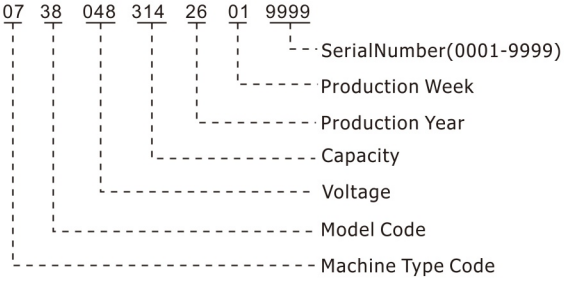


Note: The SN code of the main controller is the SN code of the entire system.

2.High-Voltage Battery Module (BCU Module) SN Description

For example

FLH48314UMG1 SN: 073804831426019999



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358-010647-01