Single Phase AIO ESS & Gateway2

User Manual

Contents

1. Notes On This Manual

1.1. Validity

This manual describes the assembly, installation, commissioning and maintenance of PolarESS all-in-one machine.
This specification does not address any details of the equipment (e.g., product components) connected to the unit. Information about connected devices can be obtained from the manufacturer's instructions.

1.2. Personnel Requirement

 Caution	This manual is for qualified personnel that have received training and have demonstrated skills and knowledge in construction and operation of this device. Qualified personnel are trained to deal with the dangers and hazards involved in installing electric devices.

1.3. Manual Storage

Instructions and other documents must be kept in a convenient place for easy access. We shall not be liable for any damage caused by failure to comply with the instructions in the instructions.

1.4. Symbol Description

- The following types of safety instructions and general information appear in this document as described below:

 Manual	Manual – Read the manual.
 Danger	Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 Warning	Warning indicates a hazardous situation which, if not avoided, will result in death or serious injury.

 Caution	Caution indicates a hazardous situation which, if not avoided, could result in a minor or moderate injury.
 Note	Note Failure to observe this warning may lead to damage to property.

- Markings on this product：

	Warning regarding dangerous voltage. The product works with high voltage. All work on the product must only be performed as described in its documentation and by qualified trades people.
	Beware of hot surface. The product can become hot during operation. Do not touch the product during operation.
	Observe the operating instructions. Read the product's documentation before working on it. Follow all safety precautions and instructions as described in the documentation.
	Point of connection for grounding protection.
	Direct Current (DC)
	Alternating Current (AC)
	Signals danger due to electrical shock and indicates the times (5 minutes) to allow after the inverter has been turned off and disconnected to ensure safety in any installation operation.
	The inverter complies with the requirements of the applicable CE guidelines.
	The Hybrid inverter must not be disposed of with the household waste.

1.5. Additional Information

Due to product version upgrades or other reasons, the document content will be updated from time to time, unless there is a special agreement, the document content cannot replace the security precautions in the product label. All descriptions in the documentation are intended as a guide for use only.
Please get the latest version information and product information from the official website.

2. Safety Instruction

2.1. General Safety

The terms "note", "caution", "warning" and "danger" in the manual do not represent all safety precautions to be observed, but only supplement all safety precautions. We do not accept any liability for violations of general safe operating requirements or violations of safety standards for design, production and use of equipment.

- Please read this document carefully to understand the products and precautions before installing the device.
- All equipment operations must be carried out by professional and qualified electrical technicians, who are familiar with the relevant standards and safety specifications of the project location.
- When the inverter is operated, it is necessary to use insulating tools and wear personal protective equipment to ensure personal safety. Contact electronic devices need to wear electrostatic gloves, electrostatic bracelets, anti-static clothing, etc. to protect the inverter from electrostatic damage.
- Equipment damage or personal injury caused by failure to install, use and configure the inverter in accordance with the requirements of the documentation is not within the scope of responsibility of the equipment manufacturer.
- It is strictly forbidden to install, use and operate outdoor equipment and cables (including but not limited to handling equipment, operating equipment and cables, plugging and unplugging signal interfaces connected to outdoors, working at height, outdoor installation, etc.) in bad weather such as lightning, rain, snow, and level 6 winds.
- Please follow the requirements of this manual, use the correct tools, and master the correct use of the tools, please follow the warning signs, warnings and protective measures on the equipment.
- It is forbidden to carry out installation, wiring, maintenance and replacement operations with electricity, and the voltage at the contact point should be measured before touching any conductor surface or terminal to confirm that there is no risk of electric shock.
- When transporting, turnover, installation, wiring and maintenance, etc., it must meet the laws and regulations and relevant standards of the country and region where it is located. The materials provided by the user and the tools required during operation must meet the requirements of the laws, regulations and relevant standards of the country and region where they are located.
- Do not disassemble the system equipment at will.

For more information about product safety and warranty, please visit the official website.

2.2. Electrical Safety

2.2.1. Grounding Requirements

- Equipment to be grounded, when installing, must first install a protective ground wire; When removing equipment, the protective ground wire must be removed last
- The grounding of the energy storage inverter meets the local requirements for the grounding of photovoltaic modules and energy storage inverters. To ensure continuous conduction with the ground in order to optimally protect the system and personnel.

 Caution	It is strictly forbidden to operate the equipment on the equipment that is not grounded, the live equipment may cause injury to the operator, and it is necessary to check whether the grounding is good in advance when operating the equipment.

2.2.2. PV String Side Operation

- Please use the DC terminal block supplied with the box to connect the inverter DC cable. Using other models of DC terminal blocks can lead to serious consequences
- It is recommended that the panel string be connected to the equipment to add a breaking device, and before the electrical connection of the equipment, if it may encounter a live part, the corresponding breaking device of the front stage of the equipment must be disconnected。
- Use the measuring equipment to confirm the positive and negative poles of the DC cable to ensure that the positive and negative poles are correct and there is no reverse connection; And the voltage is within the permissible range.。
- The unit is a transformerless inverter. It has no galvanic isolation. Do not ground the DC circuit of the PV module to the inverter. Grounding only the mounting frame. If you bond PV modules to the inverter, you will receive an error message "PV ISO is low"
- PV modules with large land capacity, such as thin-film PV modules with cells on metal substrates, can only be used if their coupling capacity does not exceed 470nF. During feed-in operation, leakage current flows from the battery to the earth, the magnitude of which depends on how the PV modules are installed (e.g. foil on a metal roof) and the weather (rain, snow). This "normal" leakage current may not exceed 30mA, as the inverter will automatically disconnect from the grid as a protective measure
- To disassemble, unplug and maintain the inverter DC string terminal wire, it must be confirmed that the equipment switch and the corresponding breaking device of the previous stage are disconnected, and confirm that the equipment and machine are stopped and there is no work。

 Danger	Sparks and arcs may occur in the DC string terminal of the live plugging equipment, and the human body touches the metal part of the terminal to cause electric shock casualties; Sparks and arcs can cause fires.

2.2.3. Inverter Requirements

- Ensure that the voltage and frequency of the grid-connected meet the grid-connected specifications of the inverter.
- It is recommended that AC power grid add a breaking device to the equipment, and the inverter AC side recommends adding protection devices such as circuit breakers or fuses, and the specifications of the protection device should be greater than 1.25 times the maximum current of the inverter AC output.
- Risk of burns due to overheating of housing parts! During operation, the four sides of the cabinet cover and radiator may become hot. Only contact with the front chassis cover during operation.
- Deadly voltage is life-threatening! The lethal voltage is present inside the device and on the power line. Therefore, only authorized electricians can install and open this unit. Even if the device is disconnected, high contact voltages may still exist within the device.

	Beware of hot surface The product can become hot during operation. Do not touch the product during operation.
 Danger	Dangerous voltage There is a high voltage inside the machine, and unauthorized non-professionals opening and touching the internal devices can cause electric shock and cause personal injury.

2.2.4. AC Side Operation

- Please connect the wire L/N/PE on the AC side of the single-phase inverter equipment according to the instructions in this manual. Incorrect connection of the wire sequence may cause damage to the equipment and cause leakage and electric shock.
- The AC wire must be disconnected by the corresponding breaking device of the previous stage before being connected to the equipment, and any two AC wires cannot be short circuited.
- Disassembling, unplugging, and maintaining the AC connection wires of the inverter must confirm that the power grid is disconnected from the equipment switch and the corresponding breaking device of the previous stage and confirm that the equipment and machine are stopped and not working.

 Danger	Sparks and arcs may occur at the AC side terminals of live plug and unplug equipment, causing electric shock accidents when the human body comes into contact with the metal parts of the terminals; Sparks and arcs can cause fires.

3. Introduction

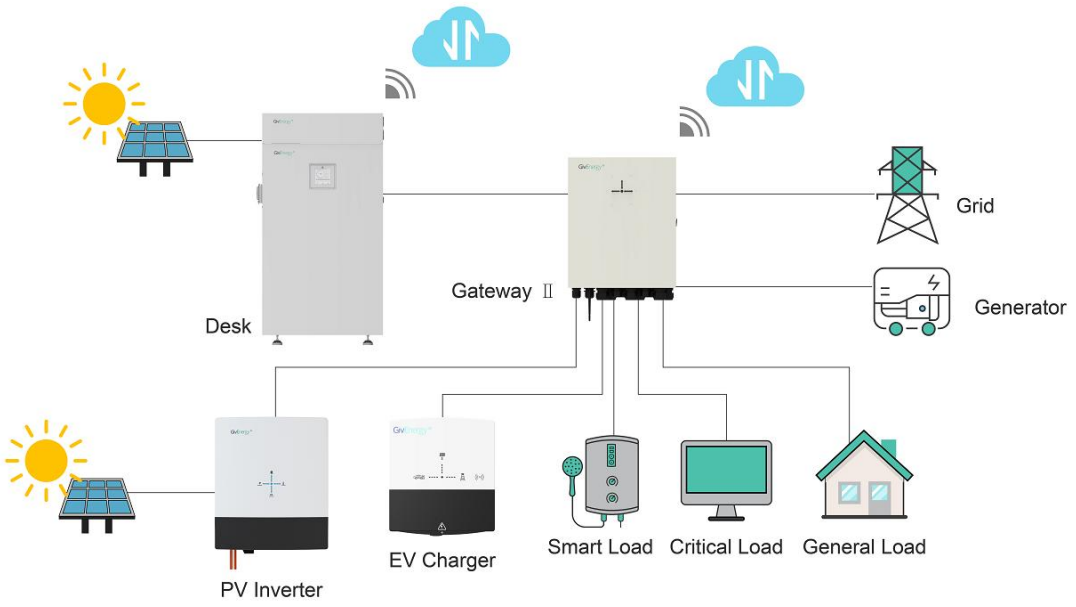
3.1. Product Description

3.1.1. Product Introduction

The All in One II is an integrated system with a bi-directional inverter and 13.5kWh battery, the MPPT Unit contains 6 PV input channels, and the Gateway II contains PV inverters, electric vehicle chargers, generators, general purpose loads, critical loads, smart loads and grid interfaces.

When the grid is online, the All in One II can be charged during low-price periods and discharged during high-price periods to help users save money on electricity bills. The three products can be used in combination, and when used together with Gateway II, the system can be used as a backup power supply for the whole family in the event of a power outage, and multiple interfaces form an integrated smart power system that integrates home solar energy storage and electric vehicle chargers. When used together with MPPT Unit, the system can absorb multi-channel high-power solar energy, reducing the cost of household electricity.

The following multifunctional smart power system can be formed when used with Gateway II:



PV Inverter： The PV inverter can be connected to the system as an additional power generation device to make full use of clean energy, and the excess energy can

be charged to the AIO and even discharged to the grid to obtain maximum benefits. Off-grid, when the AIO power is higher than 90%, AIO will automatically turn off the output of the PV inverter, when the AIO power is lower than 90%, AIO will turn on the output of the PV inverter again. On-grid, the excess energy can either charge the AIO or discharge the grid, at which time the AIO will not shut down the output of the PV inverter to maximize the benefits.

EV Charger： The system can be connected to the household electric vehicle charging pile to monitor the charging status of electric vehicles in real time.

Generator：The generator can be connected to the system as an additional power generation device. When the power grid is powered off and the AIO is in a low power state, the Gateway II will remotely start the generator. The generator supplies power to the system and charges the AIO at a low power. The Gateway II server can set the generator start SOC and stop SOC. When the generator is enabled and the AIO power is lower than the starting SOC, the Gateway II controls the DO signal to make the generator work. When the AIO power reaches the cut-off SOC, the Gateway II controls the DO signal to stop the generator. The grid takes precedence over the generator, and when the grid comes back on, Gateway II shuts down the generator. When the power grid is disconnected and the AIO battery is in an extremely scarce state, the generator can be manually started to activate the AIO battery. It should be noted that when the generator is working, the PV Inverter will be prohibited from working until the generator stops working.

Smart load：Smart load is one of the household loads, it is recommended to access the power consumption is relatively large and do not need to use continuous electrical equipment, such as water heaters. When the AIO is sufficient and the battery and PV power are greater than the load power, the Gateway II automatically starts the smart load. If the preceding conditions are not met, the Gateway II automatically disconnects the smart load. The Gateway II server can set the SOC for the smart load to start working. When the AIO battery SOC is higher than the set value and the power required by other loads is low, the smart load starts working. When the smart load is required in an emergency, the Gateway II server provides the button to forcibly enable or disable the smart load, ensuring that the load can be met at any time.

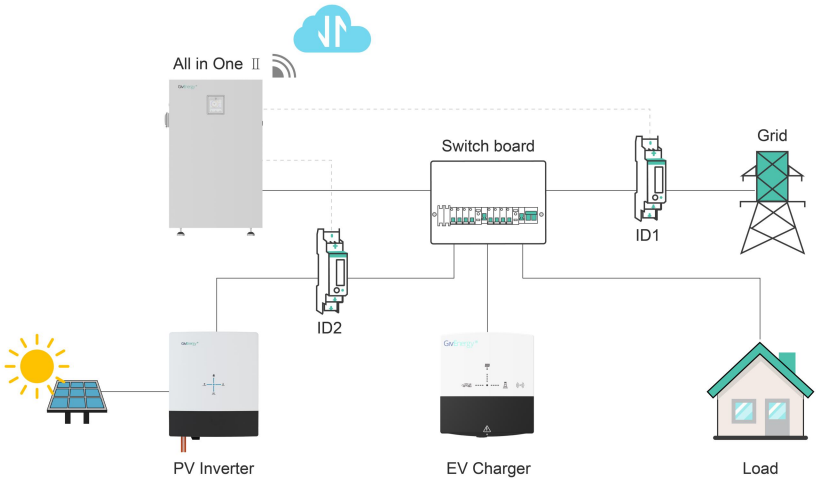
Critical load：Critical load is one of the household loads, and it is recommended to access the important and continuous use of electrical equipment, such as network routers, computers, indoor lights, telephones, etc. When the system has any power

supply, the critical load will always be on, and the continuous and stable work of the important load will be guaranteed at all times.

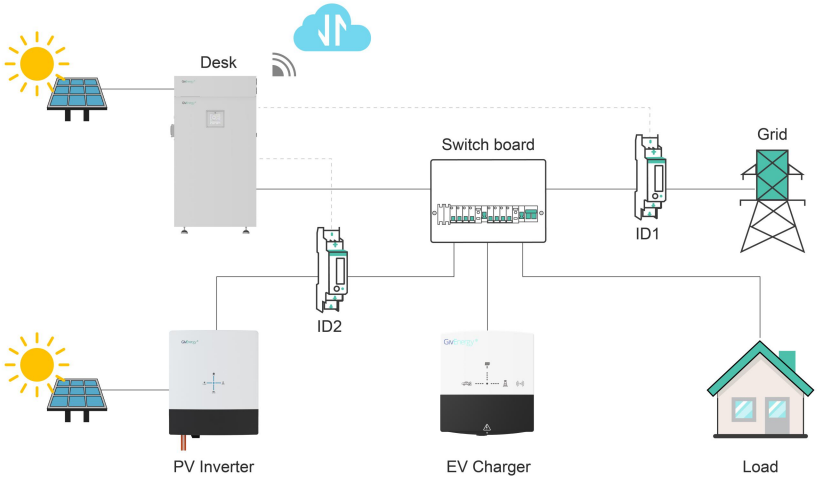
General load： General load is one of the household loads, it is recommended to access the power consumption is relatively large and frequently used electrical equipment, such as air conditioning, heating equipment, etc. When the AIO battery is sufficient, the Gateway Ⅱ automatically starts the general load. Otherwise, the general load is disconnected. The Gateway Ⅱ server can set the general load stop SOC. Off-grid, when the AIO battery SOC is lower than the set value, the general load stops working until the SOC is higher than the set value. When the general load is required in an emergency, the Gateway Ⅱ server provides the button to forcibly enable or disable the general load, ensuring that the load can be met at any time.

3.1.2. System Diagram

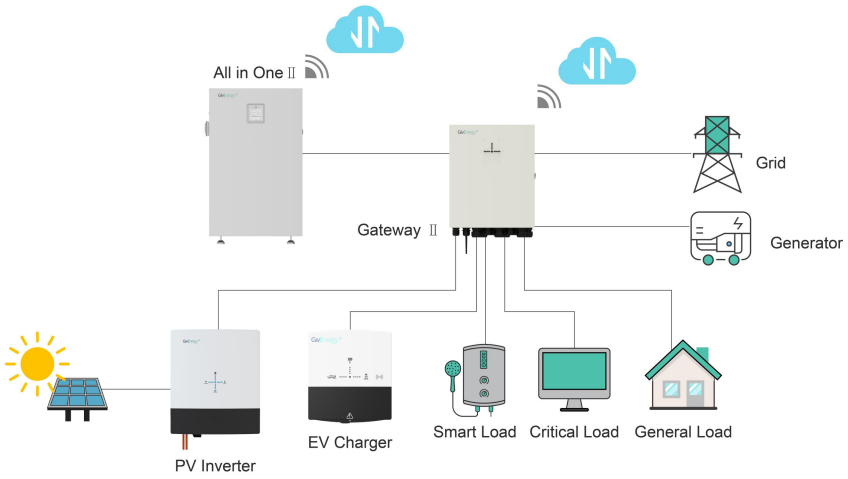
- Single All in One II system block diagram



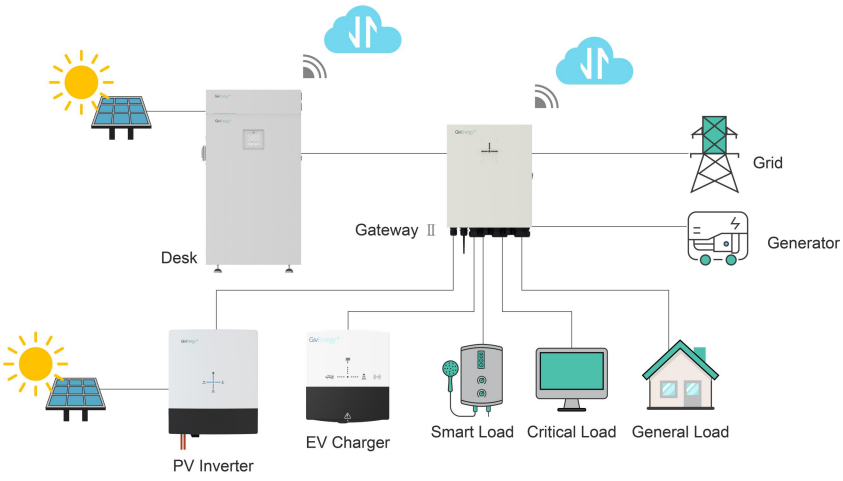
- Single All in One II and MPPT Unit system block diagram



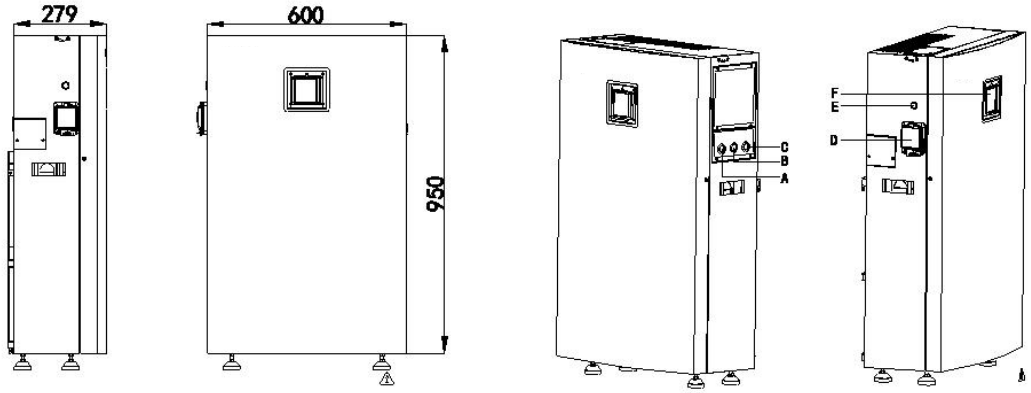
➢ All in One II and Gateway II system block diagram



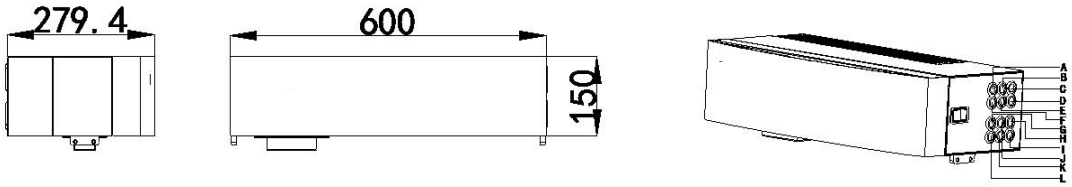
➢ Desk and Gateway II system block diagram



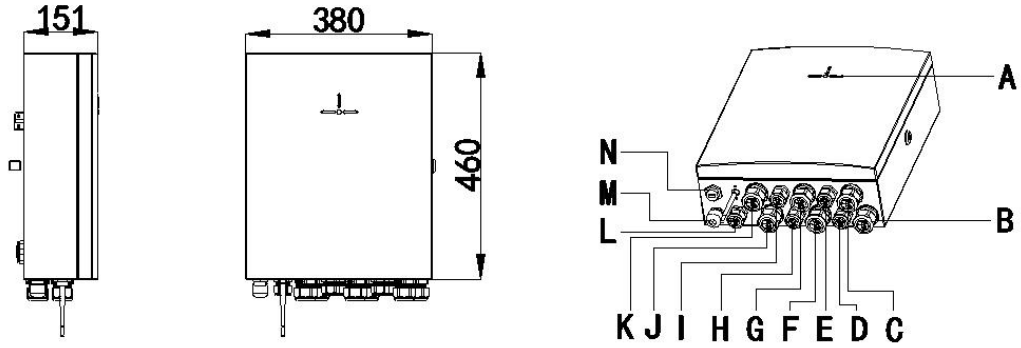
3.1.3. Interface Description



A	Communication Port
B	Reserved Port
C	All in One Ⅱ Output Port
D	Battery Break Port
E	All in One Ⅱ Power Button
F	LCD

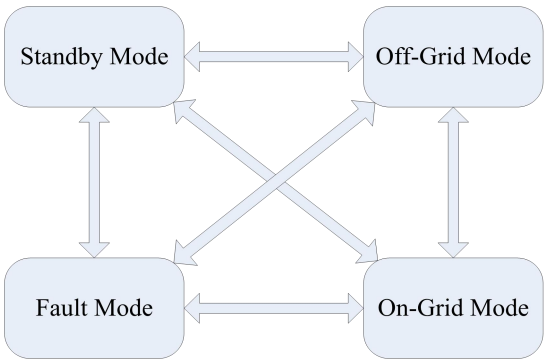


A	PV1+ Port
B	PV2+ Port
C	PV3+ Port
D	PV3- Port
E	PV2- Port
F	PV1- Port
G	PV4+ Port
H	PV6+ Port
I	PV6- Port
J	PV5+ Port
K	PV5- Port
L	PV4- Port



A	Gateway Ⅱ status light
B	Grid Port
C	Bypass Port
D	Smart Load Port
E	Critical Load Port
F	Generator Port
G	Parallel Port
H	General Load Port
I	PV Inverter Port
J	EV Charger Port
K	All in One Ⅱ Port
L	RS485 Port
M	CAN/DRM/LAN Port
N	WIFI/4G Port

3.2. Inverter Operating Modes

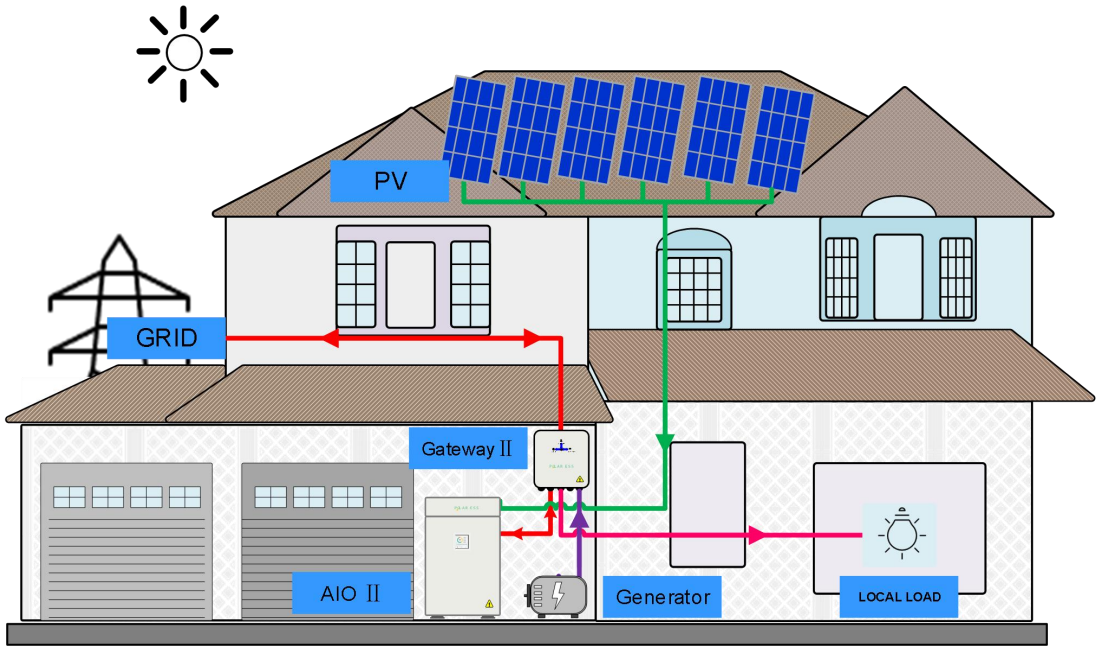


Item	Specification	Description
1	Standby Mode	After the machine is powered on for the first time • Performs various self-tests and enters the mode state

		after normal • Switch between modes in one end of the time to enter the standby state
2	On-Grid Mode	The inverter is normally connected to the grid • When the grid jumps open, it cannot detect that the grid will enter the off-grid mode at any time. • When a machine fault occurs, jump to the fault mode and not run, and report an error corresponding to the fault message. • When the grid does not meet the grid-connected conditions and the off-grid cannot meet the situation, the machine enters standby mode and waits for the conditions to be met;
3	Off-Grid Mode	The machine is disconnected from the grid, and the inverter switches EPS to off-grid mode by default • When a machine fault occurs, jump to the fault mode and not run, and report an error corresponding to the fault message. • When the power grid returns to normal, the machine enters standby mode after detection, confirms that the self-test is OK and enters grid-connected mode operation. • When the power grid does not meet the conditions, the battery has no power or other off-grid conditions are not met, enter the standby mode, and when the conditions are not met, disappear and enter the off-grid mode operation;
4	Fault Mode	If the machine detects a fault, the machine quickly switches to this mode, reports the error corresponding to the fault message, and switches to the standby mode for self-test for fault elimination, and runs the corresponding setting mode.

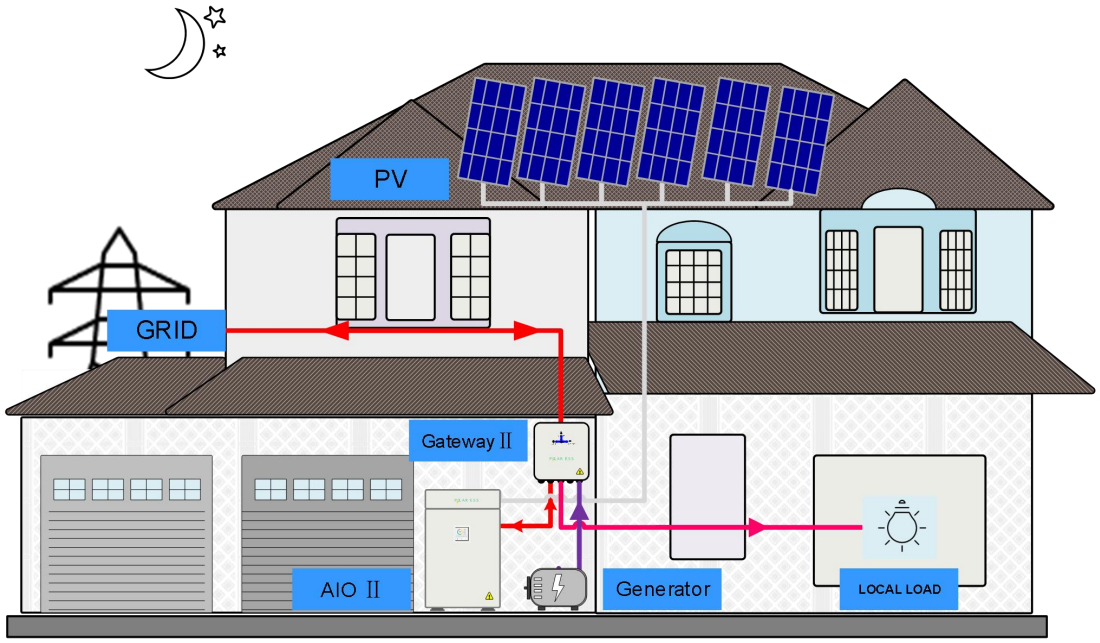
3.3. Main Work Modes

3.3.1. Daytime Mode



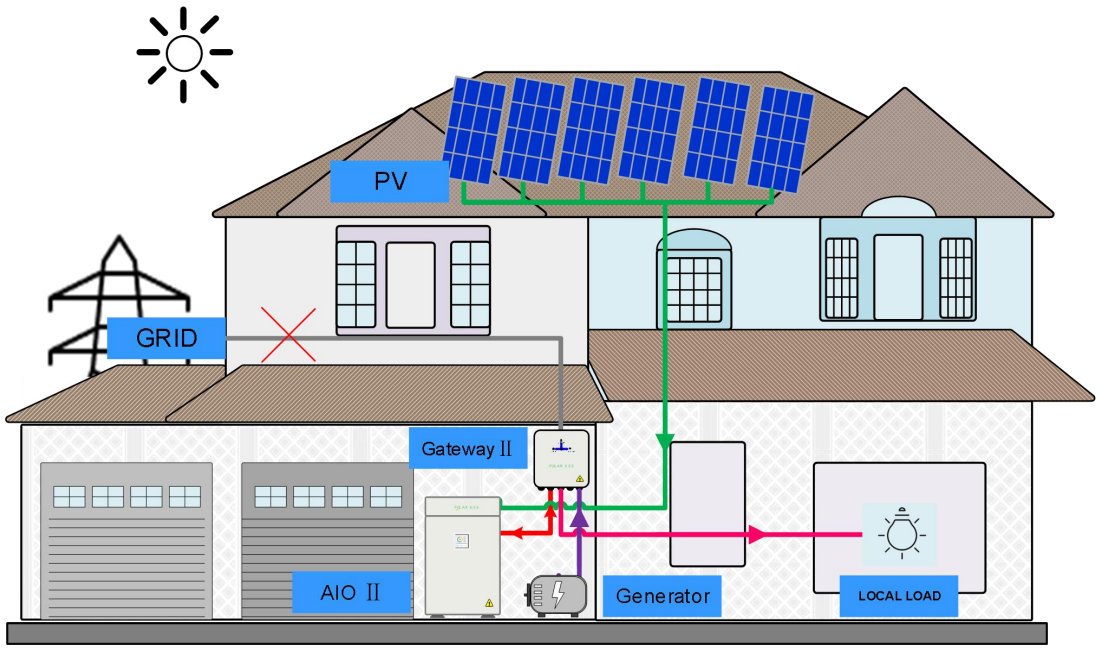
The MPPT Unit of the system can be connected to PV to realize the transmission of photovoltaic power generation. The power supply prioritized the load, followed by the battery charging, and finally the excess power generation was transmitted to the grid. When the power grid is cut off, the generator can be started in an emergency to supply power to the entire system, and the battery can be charged if necessary.

3.3.2. Nighttime Mode



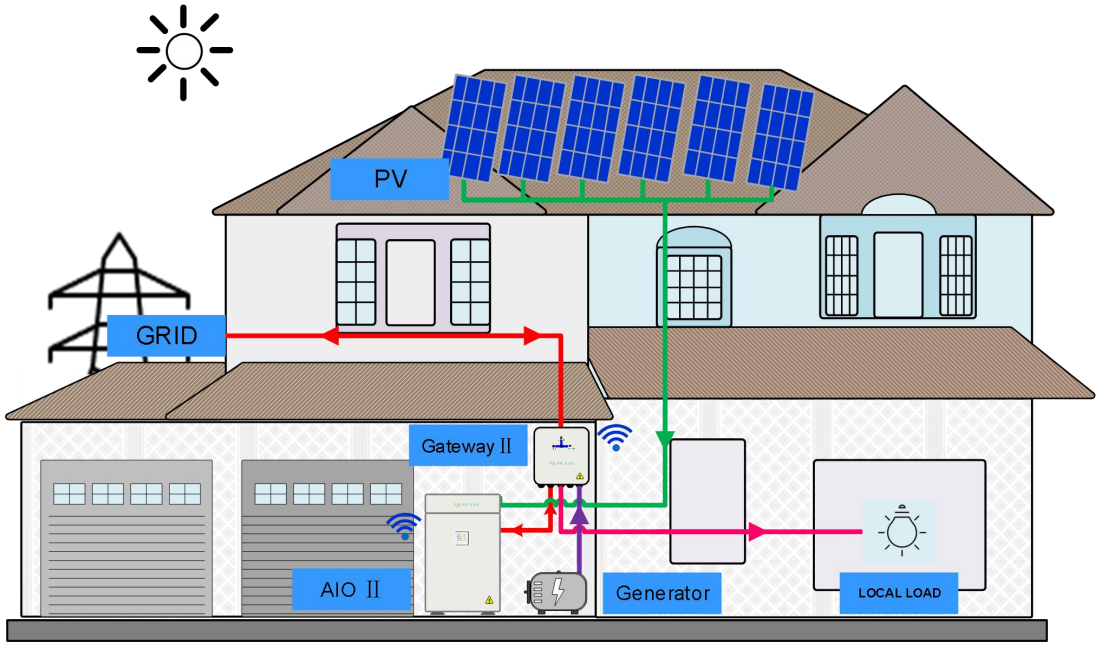
During peak periods of power consumption, the battery is preferently turned off in discharge mode, and if necessary will be recharged at the cheapest electricity price. When the battery is exhausted, it will automatically switch to the grid for charging. When the power grid is cut off, the generator can be started in an emergency to supply power to the entire system, and the battery can be charged if necessary.

3.3.3. Island Mode



The system has the ability to become an independent power system in island mode. It can also be used as a backup power system in the event of a power outage, and if there is no solar energy at this time, the generator can be started to power the entire household load, and the battery can be charged.

3.3.4. Demand Response



The system has the function of remote data collection/analysis, which can provide users with the working situation of the entire system in real time and can also remotely control the system if necessary to meet daily needs.

3.4. Features

- Support grid-connected, off-grid, pure off-grid multi-scenario, spontaneous self-use, TOU, full Internet access multiple working modes.
- Support users to query the total discharge information of the product life cycle in real time.
- Intelligent operation and simple operation.
- Built-in Wi-Fi and expandable external Wi-Fi and 4G modules for easy connection to server.
- Operates independently of single-phase output to accommodate irregular load changes.

- Real-time adjustment of spontaneous self-consumption, full control of output grid power.
- Easy installation and replacement.
- Modular terminals for system connections facilitate installation and removal of individual components.
- Modular design of supporting battery, can be freely matched with capacity.
- One person can operate.
- Intelligent operation and maintenance.
- The factory settings meet the default settings of the main target market, and the power can be generated by connecting OK.
- The LCD displays the real-time working status, at the same time can use the mobile APP, to achieve all remote and near end operations.

4. Installation Instructions

4.1. Unpacking Inspection

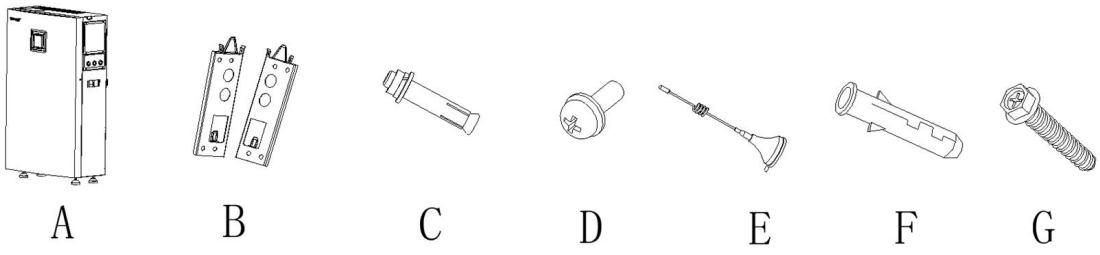
When unpacking, please check the following:

- There are no missing accessories from the packaging list
- The model and specification of the All in One Ⅱ、MPPT Unit and Gateway Ⅱ's nameplate match the order specifications
- Ensure the packaging and product are free from any damage

If any damage to the packaging is visible, or if you find that the unit is damaged after unpacking, please notify the distributor immediately. If there is anything damaged or missing, please contact your supplier. Do not dispose of the original packaging. If you want to transport the unit, it is better stored in the original packaging.

4.2. Packaging List

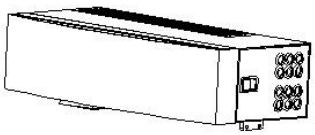
4.2.1. All in One Ⅱ packing list



Item	Name	Quantity
A	All in One Ⅱ	1
B	Wall rack	2
C	Explosion-proof screw	4
D	Safety screw	2
E	WIFI antenna	1

F	Expansion tube	4
G	Tapping screw	4

4.2.2. MPPT Unit packing list

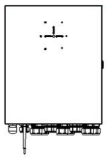


A

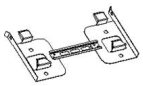
B

Item	Name	Amount
A	MPPT Unit	1
B	Stainless screw	6

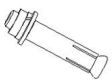
4.2.3. Gateway Ⅱ packing list



A



B



C

D

E

F

G

Item	Name	Quantity
A	Gateway Ⅱ	1
B	Wall rack	1
C	Explosion-proof screw	4
D	Tapping screw	4

E	WIFI antenna	1
F	Expansion tube	4
G	Torx screws	2

4.3. Installation Instruction

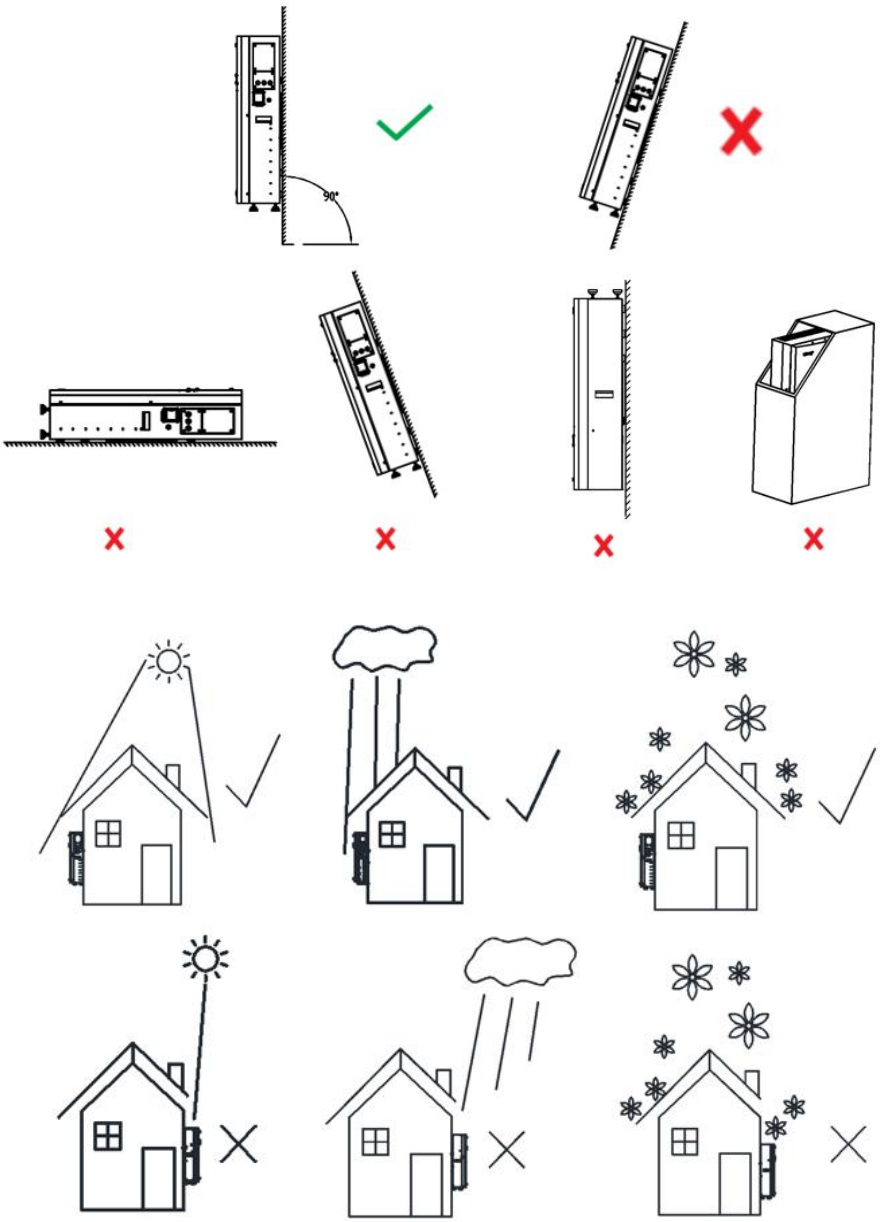
4.3.1. Safety Attention

 Danger	Danger to life due to fire or explosion ● Despite careful construction, electrical devices can cause fires. Do not install the inverter on easily flammable materials and where flammable materials are stored.
 Danger	Risk of burns due to hot enclosure parts ● Mount the inverter in such a way that it cannot be touched inadvertently.
 Danger	● All electrical installations shall be done in accordance with the IEE Wiring Regulations. ● Do not remove the casing. The inverter contains no user serviceable parts. Please refer servicing to qualified service personnel. ● All wiring and electrical installation should only be conducted by a qualified electrician. ● Carefully remove the unit from its packaging and inspect for external damage. If you find any imperfections, please contact your local supplier. ● The inverter must only be operated with PV generation. Do not connect any other source of renewable energy to it. ● Both AC and DC voltage sources are terminated inside the PV Inverter. Please disconnect these circuits before servicing. ● This unit is designed to feed power to the public power grid (utility) only. Do not connect this unit to a generator. Connecting the inverter to external devices could result in serious damage to your equipment. ● When a photo-voltaic panel is exposed to light, it generates a DC voltage. When connected to this

	equipment, a photo-voltaic panel will charge the DC capacitors. ● Energy stored in this equipment's DC capacitors presents a risk of electric shock. Even after the unit is disconnected from the grid and photo-voltaic panels, high voltages may still exist inside the PV-Inverter. ● Although designed to meet all safety requirements, some parts and surfaces of the Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while Inverter is operating.

4.3.2. Recommended installation position

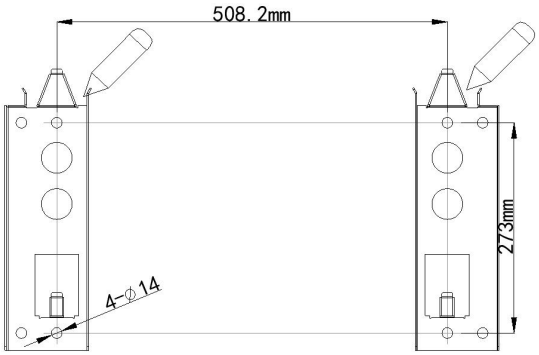
- The product shall not be installed in direct contact with water or direct sunlight.
- The long-term installation position must be suitable for the weight and size of the inverter.
- Select a location where you can easily view the product status display.
- Do not install the product on structures made of flammable and explosive materials.
- The humidity of the installation location should be 0-95%, and no condensation.
- The installation location must be safely accessible at all times.
- Do not put anything on the product to prevent covering the product.
- Do not install the product near the TV antenna or any other antenna or antenna cable.
- The product requires sufficient cooling space to provide optimal ventilation for the product and ensure adequate heat loss. The ambient temperature should be below 40℃ to ensure optimal operation.
- The tilt Angle of the product should be perpendicular to the horizontal ground.



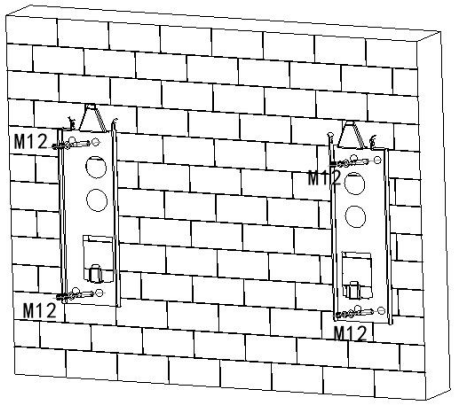
4.3.3. Installation Procedure

4.3.3.1. Desk Installation Procedure

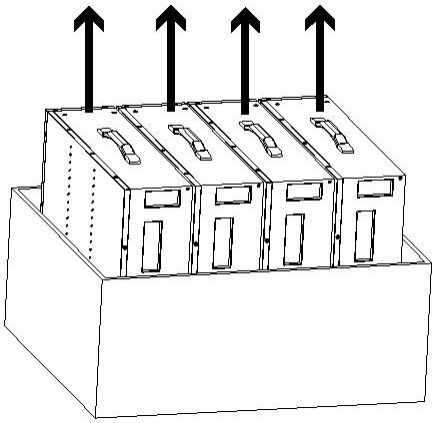
Step1: The depth of the wall is not less than 120mm, and the support is used as a template to mark the drilling hole



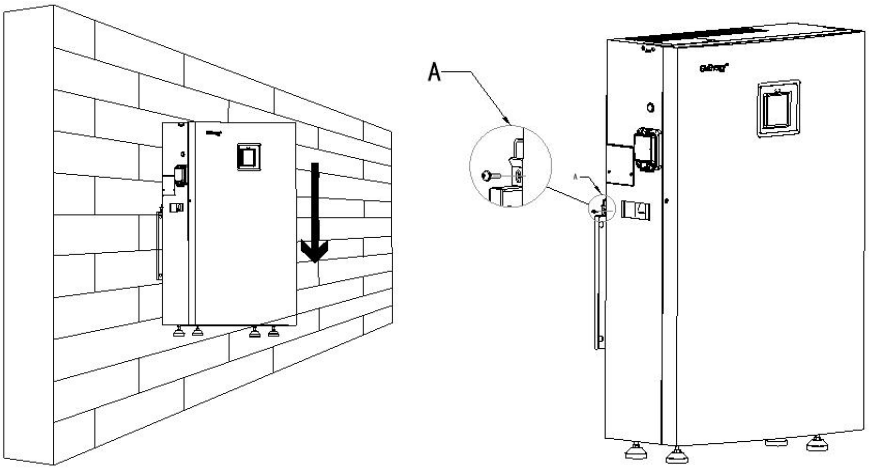
Step2: Drill pipe depth is not less than 75mm, hammer the expansion bolt into the hole, and fix the support with the expansion bolt



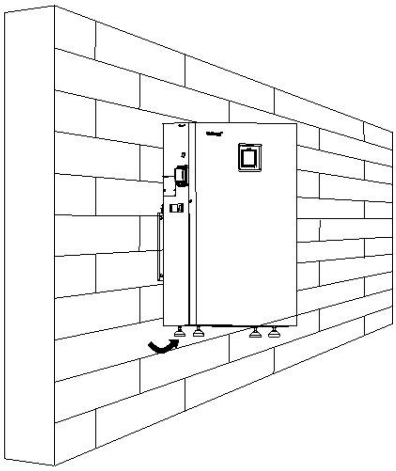
Step3: Open the battery packing case and take out the battery module



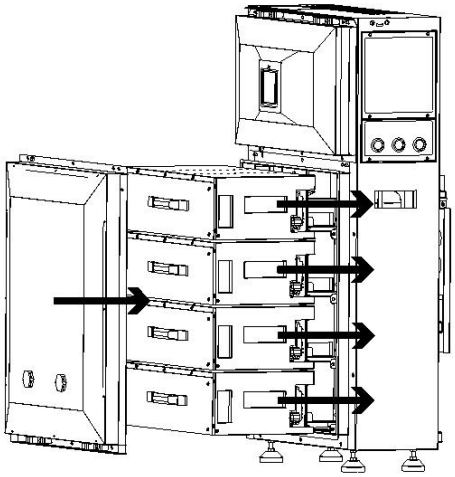
Step4: Mount the All in One Ⅱ to the wall mount



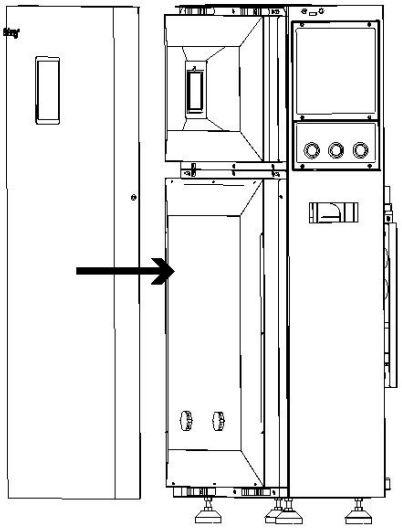
Step5: Adjust the height of the support feet to ensure that the top surface of the All in One Ⅱ is level



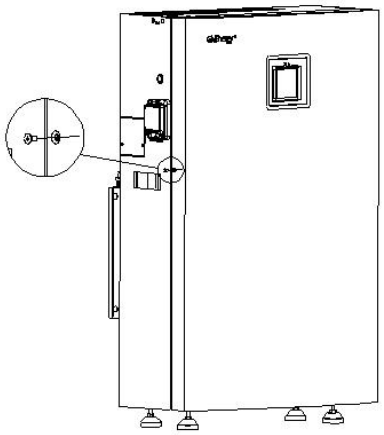
Step6: Insert the battery module into the chassis of the All in One Ⅱ battery compartment



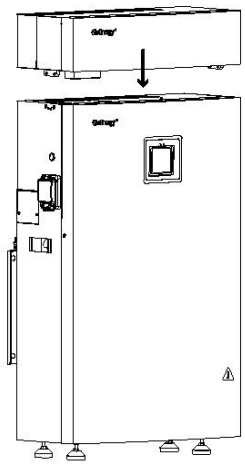
Step7: Install the front cover



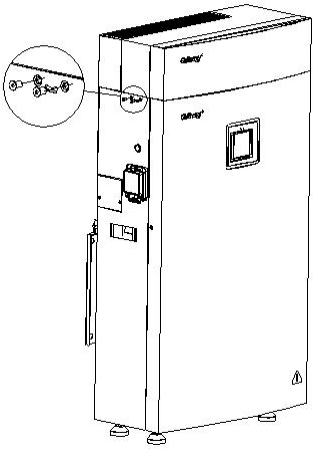
Step8: Screw the front cover



Step9: Place the MPPT Unit on All in One II

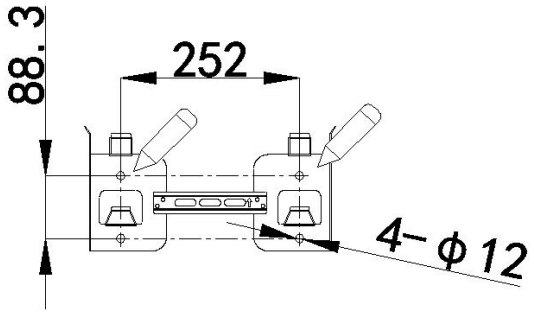


Step10: Connect MPPT Unit to All in One II with screws

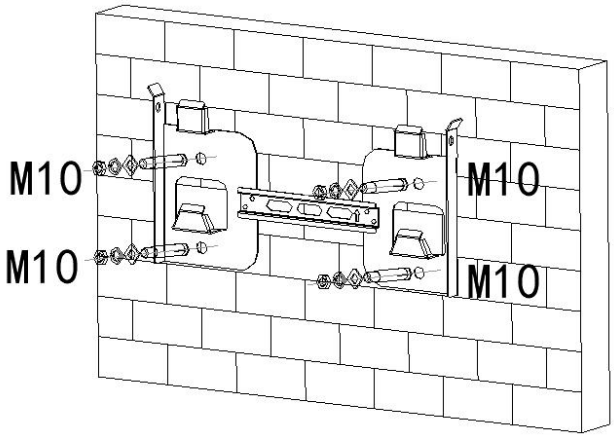


4.3.3.2. Gateway Ⅱ Installation Procedure

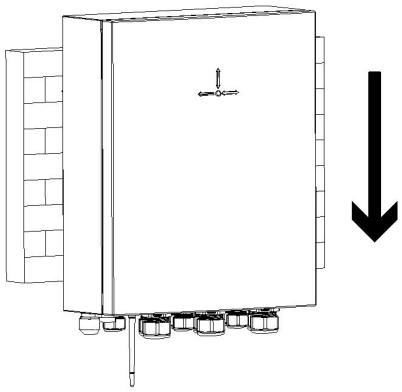
Step1: The depth of the wall is not less than 120mm, and the drilling hole is marked with the bracket as the template



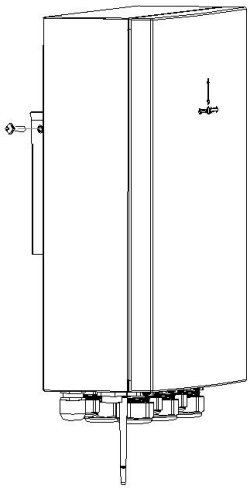
Step2: Drill holes of no less than 75mm, hammer the expansion bolt into the hole, and fix the support with the expansion bolt



Step3: Hang the Gateway II on the support

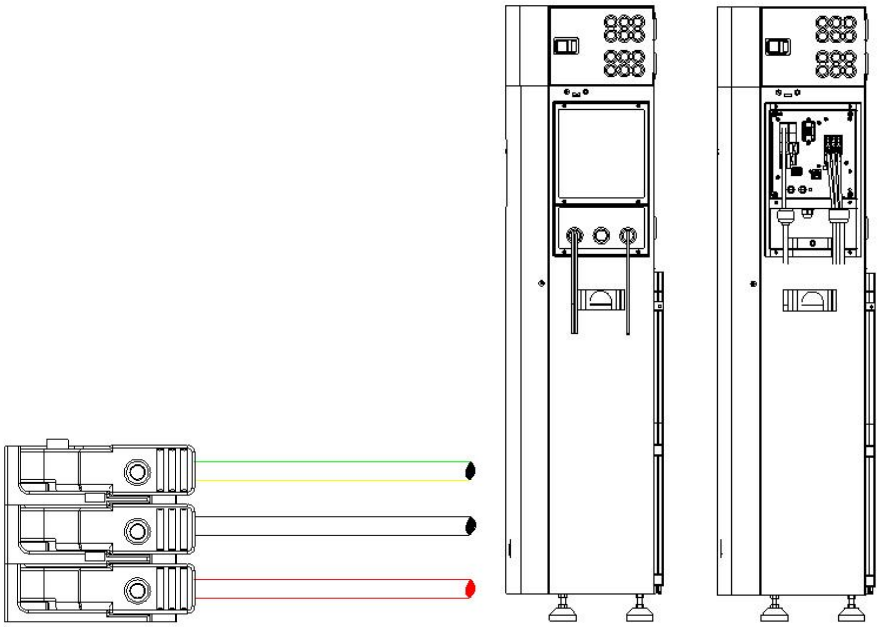


Step4: Fasten the Gateway II to the support with screws and leave enough space around the All in One II for heat dissipation



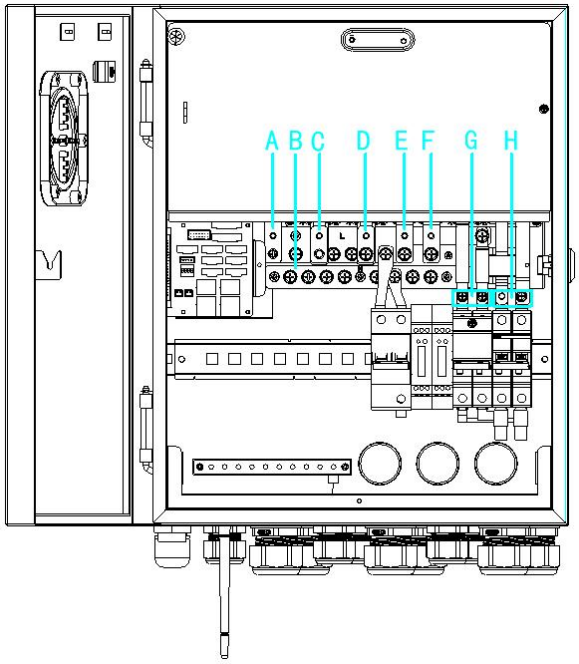
4.4. Electrical Connection

4.4.1. Desk AC Connection



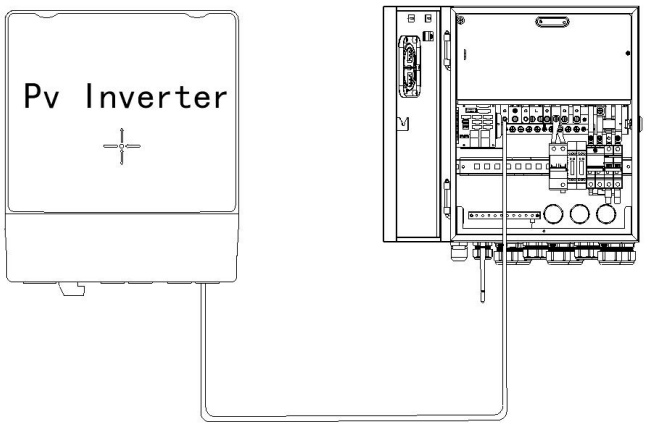
- The output power cable of the All in One Ⅱ should be at least 8mm², the insulation layer of the cable should be stripped by 12mm, and the power cable should be routed through the waterproof gland, and then connected to the power terminal block jack.
- The MPPT Unit input power cable should be at least 5mm².
- The cable length should not exceed 50m, as the resistance of the cable will consume power and reduce the efficiency of the product.

4.4.2. Gateway Ⅱ AC Connection



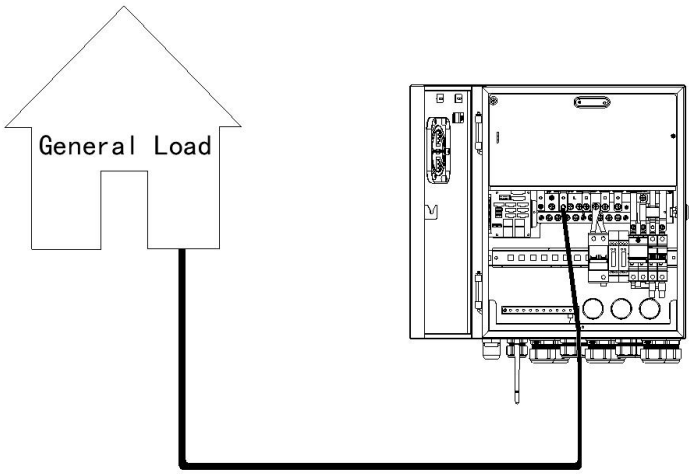
4.4.2.1. PV Inverter Connection

- Channel A is used for PV inverter connection.
- The power cable specifications of the PV inverter are determined by the output power of the PV inverter.
- The live wire of the PV inverter is fixed on the A copper bar with screws, and the zero wire is fixed on the B copper bar.



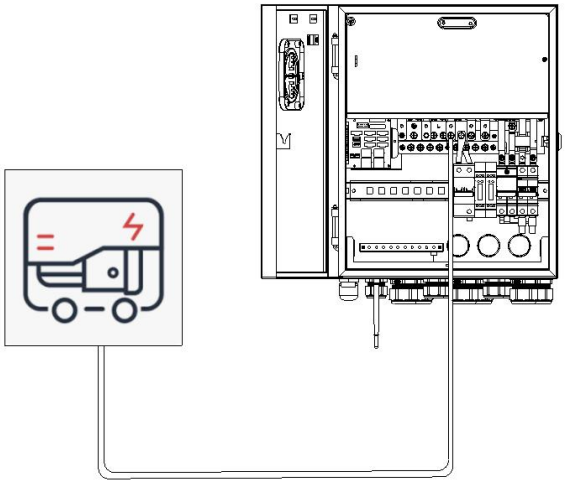
4.4.2.2. General Load Connection

- Channel C is used for general load connection.
- The general load power cable should be at least 35mm².
- The live wire of the general load is fixed on the C copper bar with screws, and the zero wire is fixed on the B copper bar.



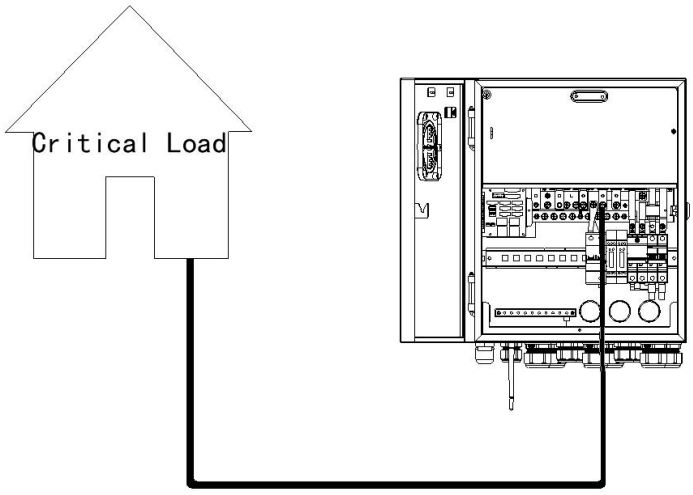
4.4.2.3. Generator Connection

- Channel D is used for generator connection.
- The power cable specifications of the generator are determined by the output power of the generator.
- The live wire of the generator is fixed on the D copper bar with screws, and the zero wire is fixed on the B copper bar.



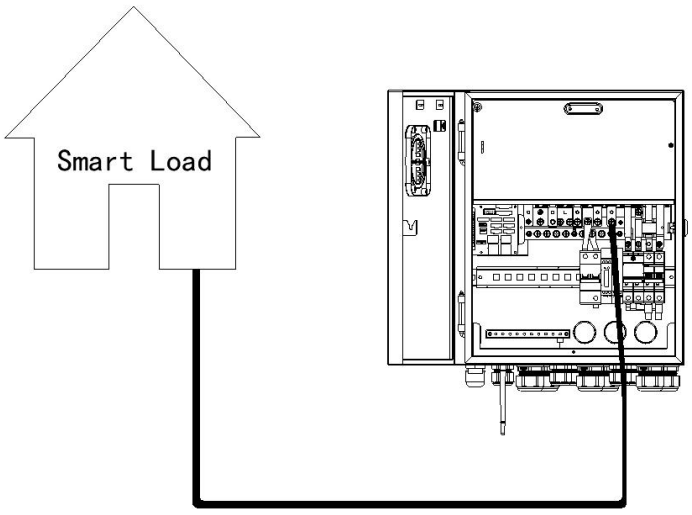
4.4.2.4. Critical Load Connection

- Channel E is used for critical load connection.
- The critical load power cable should be at least 8mm².
- The live wire of the critical load is fixed on the E copper bar with screws, and the zero wire is fixed on the B copper bar.



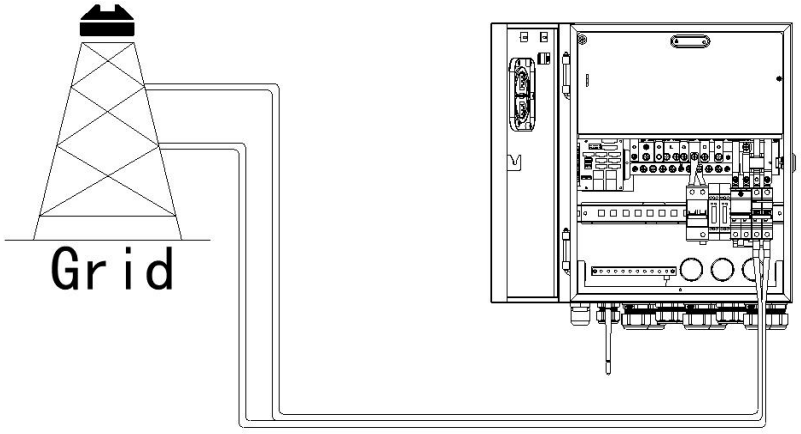
4.4.2.5. Smart Load Connection

- Channel F is used for smart load connection.
- The smart load power cable should be at least 8mm².
- The live wire of the smart load is fixed on the F copper bar with screws, and the zero wire is fixed on the B copper bar.



4.4.2.6. Grid Connection

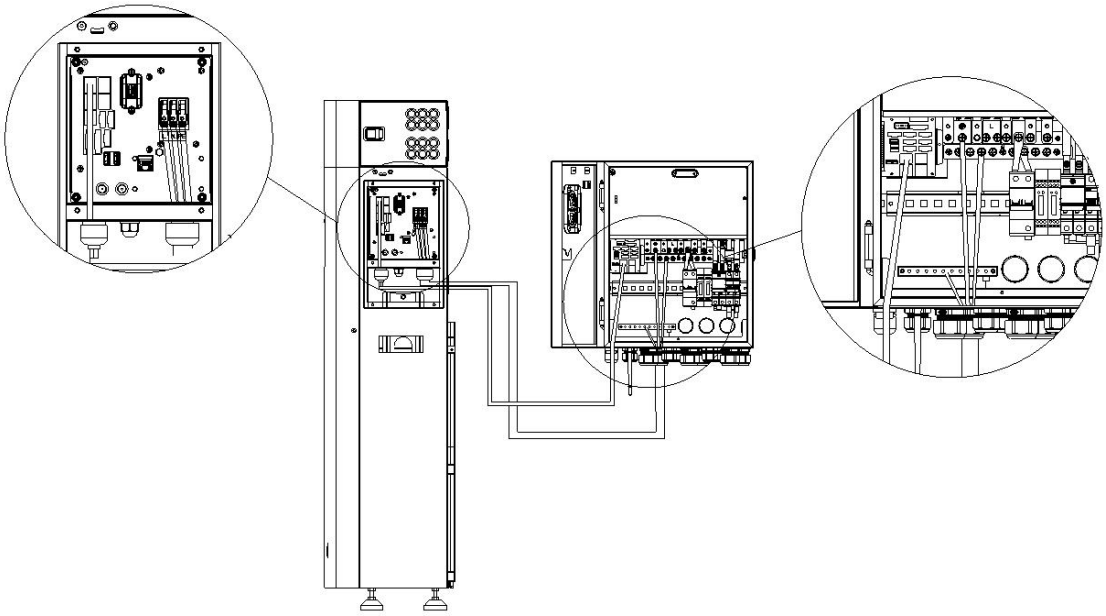
- Channel H is used for grid connection.
- The grid power cable should be at least 35mm².
- The live wire of the grid is fixed on the H copper bar with screws, and the zero wire is fixed on the B copper bar.



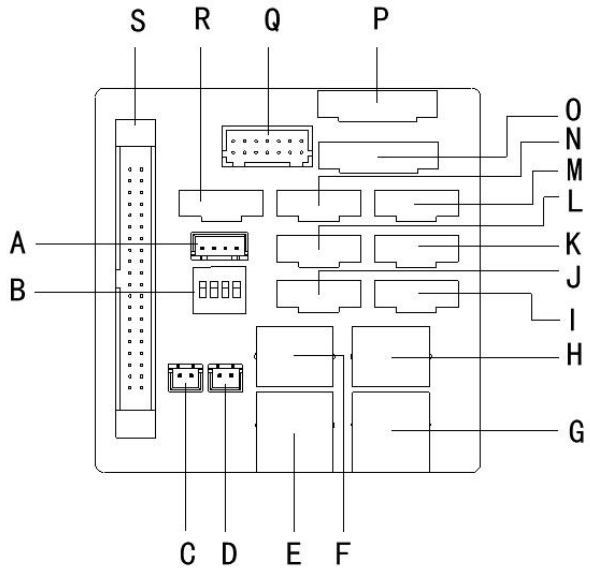
4.4.3. Communication Connection

4.4.3.1. System Communication Connection

Connect the Desk communication cable to the Gateway II communication port.

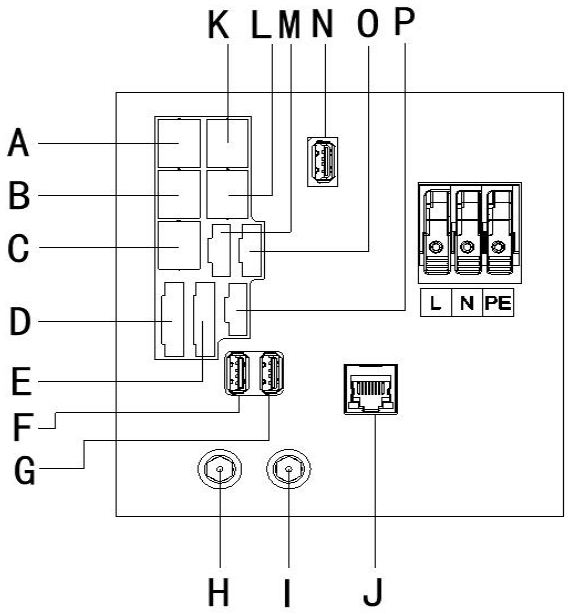


4.4.3.2. Gateway Ⅱ Communication Port



Item	Function	Foot position	Note
B	Mode switch	Built-in WIFI: 1111 External WIFI/USB update: 0000 LAN mode: 0111	
F	AIO network cable port		AIO communication interface
G	LAN port		Wired network interface
H	DRM		Details below
O	DO1 and DO2 output port	1: DO1+ 2: DO1- 3: DO2+ 4: DO2-	
P	DI1 and DI2 input port	1: DI1+ 2: DI1- 3: DI2+ 4: DI2-	

4.4.3.3. All in One Ⅱ Communication Port



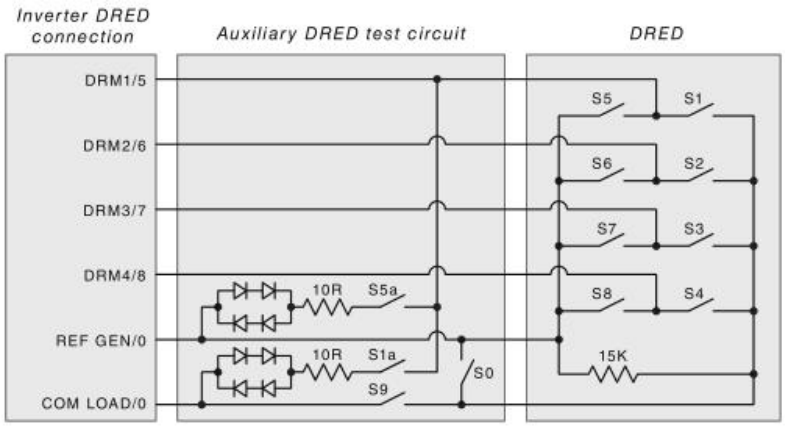
Item	Function	Foot position	Note
A	Gateway network cable port		Gateway communication interface
B	Parallel IN port		Single AIO is not used
C	DRM port		
D	DO1 and DO2 output port	1: DO1+ 2: DO1- 3: DO2+ 4: DO2-	
E	DI1 and DI2 output port	1: DI1+ 2: DI1- 3: DI2+ 4: DI2-	
F	LCD update port		
G	BCU update port		
H	Reserved antenna port		
I	Reserved antenna port		
J	LAN port		
K	Gateway out port		Single AIO is not used
L	Parallel out port		Single AIO is not used
N	U disk update port/External WIFI port		Inverter/MPPT update
P	Meter communication port		The connection Gateway is not used

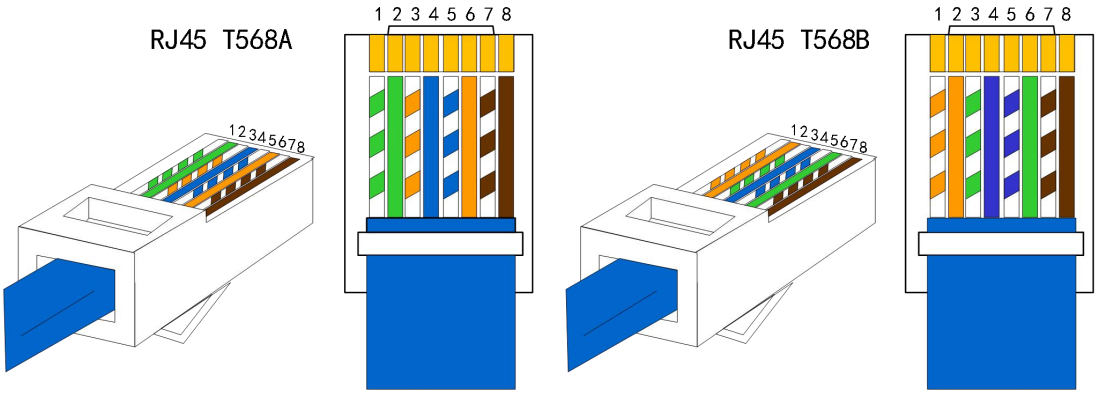
Wi-Fi/4G

All in One Ⅱ uses Wi-Fi/4G as standard wireless communication. The machine comes with internal WiFi wireless communication, and the corresponding communication connection can be connected to the monitoring server for real-time data monitoring and control inverter, specifically refer to the WiFi configuration instructions or consult the installation supplier.

DRM

when the inverter is used in Australia, it needs to connect the DRMS device and DRMS terminal of the inverter to run, the RJ45 terminal is defined as follows:





1. White&Green
2. Green
3. White&Orange
4. Blue
5. White&Blue
6. Orange
7. White&Brown
8. Brown

1. White&Orange
2. Orange
3. White&Green
4. Blue
5. White&Blue
6. Green
7. White&Brown
8. Brown

Pin	DRMS	Pin	DRMS
Pin1	DRM1/5	Pin5	Ref/Gen

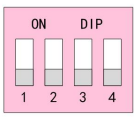
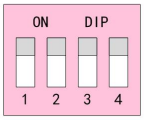
Pin2	DRM2/6	Pin6	GND
Pin3	DRM3/7	Pin7	/
Pin4	DRM4/8	Pin8	/

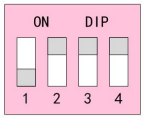
Inverter demand response modes：

Mode	RJ45 pins to be connected	Demand
DRM0	Connect Pin5 and Pin6	Stop
DRM1	Connect Pin1 and Pin5	Disallow charge
DRM2	Connect Pin2 and Pin5	Charge power should be less than 50% of the rated power
DRM3	Connect Pin3 and Pin5	Charge power should be less than 75% of the rated power
DRM4	Connect Pin4 and Pin5	Charge power should be less than 100% of the rated power
DRM5	Connect Pin1 and Pin5	Disallow discharge
DRM6	Connect Pin2 and Pin5	Discharge power should be less than 50% of the rated power
DRM7	Connect Pin3 and Pin5	Discharge power should be less than 75% of the rated power
DRM8	Connect Pin4 and Pin5	Discharge power should be less than 100% of the rated power

DIP Switch

Select the network connection and battery communication method through DIP switch as follows:

Tag Number	Sketch Map	Description
SW		Upgrade Program Through USB Drive or External WIFI/4G: 0000
		Built-in WIFI: 1111

		LAN Mode: 0111

5. System Commissioning

 Notice	Without setting the parameters, the inverter will not be commissioned.

Connect to the inverter via the Engineers software to set the battery parameter, grid charger time, inverter discharge time and various other functions.

5.1. Inspection Before Power On

 Warning	Check that all the wires are securely connected before the battery breaker and the AC breaker is switched on. The PV should be switched on first to start the inverter, and you must set the parameter of battery according to your battery system.

5.2. System Startup and Shutdown

 Warning	The inverter will generate high voltage inside after opening, please do not touch the internal wiring position of the machine after power-on to prevent electric shock from damaging personal safety.

5.2.1. Start-Up the Inverter

(1) Connect the AC circuit breaker.
(2) Turn on the DC switch.
(3) Turn on the battery breaker.
(4) The inverter will start automatically when the PV voltage is higher than 80V, the battery voltage is higher than 254.4V and Hybrid Inverter setting is correct.

5.2.2. Disconnect the Inverter

(1) Disconnect the AC circuit breaker to prevent it from being reactivated.
(2) Disconnect the Battery breaker to prevent it from being reactivated.
(3) Turn off the PV switch.
(4) Check the inverter operating status.
(5) Wait until LCD display has gone out, the inverter is shut down.

5.3. Equipment Parameter Setting and Monitoring

The following methods can perform the following operation contents of the inverter:

(1) View the running data, software version, alarm information, etc. of the device.

(2) Set the power grid parameters, communication parameters, safety areas, anti-reverse current, etc. of the equipment.

(3) Maintain the equipment.

(4) Upgrade the device software version.

6. System Maintenance

6.1. System Power-Off

(1) Disconnect the AC circuit breaker to prevent it from reactivating.
(2) Disconnect the battery circuit breaker to prevent it from reactivating.
(3) Turn off the photovoltaic switch.
(4) Check the operating status of the inverter.
(5) Wait until the LCD display goes out and the inverter turns off.
(6) It is necessary to wait for more than 20min to confirm that the machine is completely powered off and the surface temperature is cooled, and other actions of the machine are performed.

6.2. Regular Maintenance

(1) Checking Heat Dissipation.
If the inverter regularly reduces its output power due to high temperatures, please improve the heat dissipation conditions. You need to clean the heat sink or look for other obstructions.
(2) Cleaning the Inverter.
If the inverter is dirty, please shut down the inverter and clean the enclosure lid.
(3) Checking the DC switch.
Check for externally visible damage and discoloration of the breaker, and the cables at regular intervals. If there are any signs of visible damage to the breaker, or visible discoloration or damage to the cables, contact the installer.

 Warning	Once a year, turn the rotary switch of the DC switch from the on position to the Off position 5 times in succession. This cleans the contacts of the rotary switch and prolongs the electrical endurance of the DC Disconnect.

6.3. Troubleshooting

(No.)	Fault name	Reason of fault	Handling suggestions
1	Inverter NTC Fault	The working environment temperature of the inverter is too high or too low.	1. If the temperature is too high, please lower the ambient temperature as much as possible or try to turn off the inverter for 15 minutes, then restart it; make sure to follow the installation instructions in the user manual. 2. If the temperature is too low, please do not try to start, please contact the after-sales service immediately.
2	Grid Frequency Fault	The inverter detects that the grid frequency is outside the normal range required by safety regulations.	1. Make sure the safety country setting of the inverter is correct. 2. If the safety country is set correctly, please check whether the AC frequency (Freq) of the inverter is within the normal range. 3. If Freq faults are rare and resolved quickly, it may be caused by occasional grid frequency instability.
3	Grid Voltage Fault	The inverter detects that the AC voltage is outside the normal range required by safety regulations.	1. Make sure the safety country setting of the inverter is correct. 2. Use a multi meter to check whether the AC voltage between the L line and the N line on the AC wiring side is within the normal range. If the AC voltage is high, make sure that the AC cable is not too long, and the specifications meet the requirements in the user manual. If the AC voltage is low, make sure the AC cable is well wired and the

			jacket is not pressed into the AC terminal. 3. Make sure the grid voltage in your area is stable and within the normal range.
4	PV Voltage Fault	The inverter has detected that the PV voltage is outside the normal range of the rated requirements.	Turn off the PV switch of the machine and use a multi meter to check whether the open circuit voltage of the panel is less than 600V. If it is greater than the number of panels that need to be reconfigured, reduce the input voltage.
5	DCI High	The inverter has detected a high DC component in the AC output.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
6	Current Leak High	The ground fault may be caused by various reasons such as the AC side N line is not connected properly or the surrounding humidity is high.	Check with a multi meter for voltage between the inverter and the grounded frame. In general, the voltage should be close to 0V. If there is voltage, it means that the N wire and the ground wire on the AC side are not well connected. It should be normal if this failure occurs in the early morning/dawn/rainy day with high air humidity and recovers quickly.
7	PV Isolation Fault	If the impedance is too low, the grounding of the photovoltaic panel may be poor, the photovoltaic panel may be aged, or the direct current The cable is broken or the surrounding humidity is high.	1. Use a multi meter to check that the resistance between the inverter and the grounded frame is close to zero. If not, make sure the wiring is good. 2. Isolation failure may occur if humidity is too high. 3.Check the resistance of PV1+/PV2+/PV1-/PV2- to ground. If the resistance is below 50K, check the system wiring. 4. Try restarting the inverter and

			check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
8	No Utility	The inverter does not detect grid information.	1. Use a multi meter to check whether there is voltage on the AC side and ensure that the grid voltage is normal. 2. Make sure that the AC cable is firmly connected and not loose. 3. If everything is OK, try disconnecting the AC circuit breaker and reconnecting it after 5 minutes.
9	Bus Over Voltage	The internal BUS voltage is out of range.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
10	DSP Communication Fault	Caused by the interference of external strong magnetic field.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
11	Hall Sensor Fault	Abnormal HCT detection in the system.	There is a fault in the leakage current detection circuit inside the machine, please contact the after-sales service for processing.
12	GFCI Fault	Abnormal GFCI detection in the system.	There is a fault in the leakage current detection circuit inside the machine, please contact the after-sales service for processing.
13	Relay Fault	The neutral and ground wires are not properly connected on the AC side or are only accidentally faulty.	When the machine is connected to the grid, use a multi meter to check whether there is a high voltage between the N wire and the ground wire on the AC side. In general, the voltage should be lower than 10V. If the voltage is higher than 10V, it means that the

			AC side N wire and ground wire are not well connected, or the inverter needs to be restarted. When the machine is disconnected from the grid, check whether the load of the machine connected to the backup exceeds the rated load of the machine, and the inverter needs to be restarted.
14	EEPROM Fault	Caused by the interference of external strong magnetic field.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
15	Consistent Fault	The internal programs of the system do not match each other.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
16	ARM Communication Fault	Caused by the interference of external strong magnetic field.	Try restarting the inverter and check if the fault still exists. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
17	Back-up Overload Fault	The total backup load power is higher than the backup rated output power.	Reduce off-grid loads to ensure total load power is below off-grid rated output power. If the fault does not exist, it means that it is only caused by interference. Otherwise, please contact after-sales immediately.
18	BMS Comm Fault	The communication between the inverter and the lithium-ion battery is abnormal	Power off to check whether the BMS cable connection is normal. Contact the dealer or after-sales customer service to solve the problem
19	Bat Volt Low	Lithium battery: battery voltage is less than 280V.	Confirm that the battery is not currently over discharged, if it occurs, please set the inverter for

		Lead acid: Battery voltage less than (LV-cell*1V);	strong charging to eliminate the error after the power replenishment is completed. Otherwise, Contact the dealer or after-sales customer service to solve the problem.
21	Meter Comm Loss	The inverter communicates abnormally with the meter	Check whether the meter and the inverter are connected normally. Check whether the communication line RX/TX is reversed, and confirm that the uploaded data is normal through the APP. Contact the dealer or after-sales customer service for consultation and solution.
22	Battery Need Charge	The battery voltage is too low to be discharged, and it is necessary to replenish power	Set the inverter through the app to force charging the battery SOC to more than 4% to clear the error.

6.4. Remove Machine

Dismantling The Inverter

(1) Disconnect the inverter as described.
(2) Remove all connection cables from the inverter.
(3) Screw off all projecting cable glands.
(4) Lift the inverter off the bracket and unscrew the bracket screws.

 Danger	Danger of burn injuries due to hot enclosure parts! Wait 20 minutes before disassembling until the housing has cooled down.

6.5. Scrap Machine

When the inverter cannot continue to be used and needs to be scrapped, please dispose of the inverter according to the electrical waste disposal requirements of the country/region where the inverter is located, you can contact the dealer or customer service center for consultation and treatment, and the inverter cannot be disposed of

as household waste.

	The hybrid inverter must not be disposed of with the household waste.

6.6. Manufacturer Warranty

This inverter is covered by a 5 years warranty. Completion of the online registration certificate validates a standard factory warranty of 5 years from the date of commission.

7. Product Specification

Model	GIV-MPP-13.0-G1	GIV-MPP-16.5-G1	GIV-MPP-20.0-G1
Input Data(PV)			
Max. DC input power	13,000W	16,500W	20,000W
Max. DC input power of single MPP tracker	4,500W		
Start-up voltage	60V		
Max. PV open-circuit voltage	600V		
MPPT voltage range	80V-550V		
Rated MPPT voltage	360V		
Max. input current	6*17A		
Max. PV short-circuit current	6*23A		
MPP tracker/No. of strings per MPP tracker	6/1		
Dimensions (WxHxD)	600W*145H*280D(mm)		

Model	GIV-AIO-AC-13.5-8.0	GIV-AIO-AC-13.5-10.0	GIV-AIO-AC-13.5-12.0
Battery			
Battery type	Li-ion		
Battery voltage range	260-346V		
Nominal voltage	307V		
Max. charging/discharging current	25A /41A	25A/41A	25A /41A
Max. battery charging/discharging power	6,000W/8,600W	6,000W/10,600W	6,000W/12,600W
Battery communication	CAN		
Battery capacity	13.5kWh		
Output Data (AC, On-grid)			
Rated AC output power	8,000W	10,000W	12,000W

Max. apparent power	8,000VA	10,000VA	12,000VA
Nominal off-grid power	12000VA	12000VA	12000VA
Peak power (10s, off-grid)	14400VA	14400VA	14400VA
Rated/Max. output current	34.8A	43.5A	52A
Nominal grid voltage/range	230 V.a.c (180 to 270V.a.c)		
Nominal frequency/range	50 /60Hz; ±5Hz		
Power factor (@full load)	>0.99		
Power factor range	0.8lagging-0.8leading		
THDI (@rated power)	<3%		
AC output type	Single phase		
General data			
Battery Max. charging/discharging efficiency	96.5%		
PV max. efficiency	97.1%	97.3%	97.5%
Euro efficiency	96.6%	96.8%	97%
MPPT efficiency	99.90%		
Protection Degree	IP65		
Protection Class	I		
Overvoltage category	PV: II, Battery: II, AC: III		
Inverter topology	PV: Transformer-less; Battery: Transformer-less		
Cooling	Smart Fan Cooling		
Noise emission (typical)	50dB Typical		
Operation temperature	-20~+50℃		
Relative humidity	0~100%, non-condensing		
Altitude	4000m (Derating above 2000 m)		
Dimensions (WxHxD)	600W*1100H*280D(mm)		
Weight	213Kg		
Self-consumption	<15W		
Number of parallel operations	3		
Display	LCD &&APP		

Communication	RS485/WIFI/4G inside
Warranty	5

Model	**GIV-AIO-GW1-2**
Grid output AC	
Nominal AC power	23000W
Nominal AC current	100A
Max. AC current	100A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated grid Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	100A
General Load output AC	
Nominal AC power	23000W
Nominal AC current	100A
Max. AC current	100A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated grid Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	100A
Critical Load output AC	
Nominal AC power	9200W
Nominal AC current	40A
Max. AC current	40A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated grid Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	40A
Smart Load output AC	
Nominal AC power	9200W
Nominal AC current	40A
Max. AC current	40A
Rated voltage	230V.a.c (180 to 270V.a.c)

Rated grid Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	40A
Generator output AC	
Nominal AC power	9200W
Nominal AC current	90A
Max. AC current	90A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated grid Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	90A
EV charger output AC	
Nominal AC power	7200W
Nominal AC current	32A
Max. AC current	32A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated Frequency	50/60±5Hz
Maximum output fault current	6000A
Maximum output overcurrent protection	32A
AIO input AC	
Nominal AC current	52A
Max. AC current	52A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated Frequency	50/60±5Hz
PV input AC	
Nominal AC current	43A
Max. AC current	43A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated Frequency	50/60±5Hz
AIO parallel input AC	
Nominal AC current	52A
Max. AC current	52A
Rated voltage	230V.a.c (180 to 270V.a.c)
Rated Frequency	50/60±5Hz
General data	
Dimensions	365Wx438Hx160D(mm)

Weight	18Kg
Protective Class	Class I
Operating temperature range	-20 ~ +50°C
Ingress protection	IP65

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