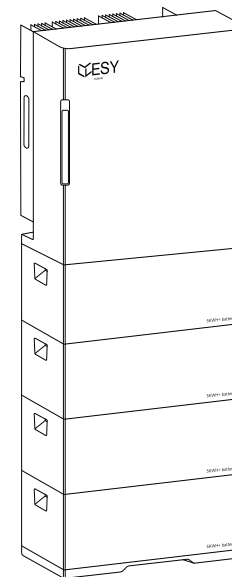




HM5-MAX/HM10/HM12 Inverter User Manual (V-C01)



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Made in China

CE RoHS

ESYsunhome CO.,LTD

With over two decades of experience, ESYSUNHOME has swiftly gained prominence as a leading player in the energy storage industry, specializing in lithium battery technology and Battery Management Systems (BMS). Trusted by global giants such as Huawei, Dell, and Toshiba, ESYSUNHOME is renowned for its innovative solutions. Supported by advanced AI functionalities, protection systems and a highly skilled R&D team, the company's development of the HM series All-in-One residential energy storage systems marks a significant milestone in its pursuit of excellence.

With offices strategically located in Sydney, Australia, and Munich, Germany, ESYSUNHOME is well-positioned for global expansion, aiming to establish a significant international footprint. The company's unwavering commitment to making clean energy accessible drives its mission to empower communities worldwide in embracing sustainable solutions for a brighter future.

Mission:

To provide safe and high-quality new energy products (batteries and power supplies) for every family.

Vision:

Make clean energy available to every family.

Core Values:

Unity and hard work;
Pragmatic and far-reaching;
Innovative research and development;
Scientific and intelligent manufacturing;
Creating value for customers;
Creating opportunities;
Contributing to society.

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1 Precautions

1.1 General statement

This manual is applicable for the installation, maintenance and repair of HM5-MAX ENERGY STORAGE SYSTEM/HM10 ENERGY STORAGE SYSTEM/HM12 ENERGY STORAGE SYSTEM. Please retain this manual properly, and strictly follow all safety instructions and operational instructions contained herein.

- ESYUNHOME bears no responsibility for any consequences arising from failure to comply with the general safety requirements or safety standards for design, production, and use.
- It is crucial to use this product under specified design conditions. Any damage to components, personal injury, or property loss resulting from improper use will not be covered under warranty.
- During installation, use, and maintenance, adherence to all local laws and regulations is mandatory. The safety instructions provided in this manual are supplementary to local laws and regulations.
- The content in this manual will undergo periodic review and updates as needed. ESYUNHOME reserves the right to make improvements or changes to the products and procedures described in this manual at any time without prior notice.
- The product diagram in this manual are used for illustrative purpose only. The product models depicted in the illustrations may differ from the actual product.
- The circuit diagrams in this manual are used for illustrative purpose only. Actual installation may be adjusted according to the local requirements and application scenarios.
- Some products, accessories, functions, and services mentioned in this manual are optional items and may not be within your use scope.
- For further details, please consult authorized personnel or organizations of ESYUNHOME.
- ESYUNHOME reserves all rights to the final interpretation in this document.

1.2 Safe Transportation and Storage

- During transportation of the inverter, it is essential to utilize the original packaging to ensure the safety of the equipment throughout the shipping process.
- Upon receiving the shipments, please thoroughly inspect the external packaging of the inverter before opening the box for a comprehensive inspection.
- If any damage to the inverter occurs during transportation, please notify the shipping company immediately. The shipping company is responsible for any equipment damage incurred during transit. If necessary, seek assistance from the installation personnel or manufacturer.
- When handling inverters weighing 35 kg or more, please use appropriate equipment or collaborate with multiple individuals for safe handling.
- When storing the equipment, please use the original packaging and store it in a cool, dry, and well-ventilated area to prevent damage from moisture.

1.3 Important Safety Information

	Danger!
	Before installing, operating, and maintaining the equipment, please read this manual carefully.
	Danger!
	Make sure that the product is adequately grounded before operation. The grounding resistance should be less than 0.1Ω.
	Danger!
	Install all terminals of the energy storage system in accordance with the instructions provided in this manual. Follow the corresponding signs and symbols on the equipment during operation.
	Danger!
	During installation, please use the accessories provided in the product packaging.
	Danger!
	During maintenance, the maintenance personnel are prohibited from operating any equipment until all equipment has been shut down and completely discharged.
	Danger!
	Unauthorized removal, improper use, or incorrect installation or operation may result in serious personal injury or equipment damage. Therefore, transportation, installation, startup, dismantling, and maintenance must be carried out by qualified or trained personnel.
	Danger!
	Before undertaking any repair, electrical installation, or accessing any live parts, ensure that the inverter is turned off, and that the port voltage is at a safe level.
	Danger!
	To ensure that the electrical parameters match requirements, relevant measuring equipment is required during system connection and testing. Ensure that the specifications of the equipment match to prevent arcing or impact.
	Danger!
	During instruction, maintenance and repair, warning signs shall be set up in the operational area of the system to prevent accidents caused by unauthorized personnel.
	Danger!
	Before installation, maintenance, or repair, use professional equipment to measure the voltage of the inverter and battery terminals to prevent injury to operators from energized ports.
	Warning!
	Installation must fully comply with national and local laws and regulations.

	Warning!
	Please ensure that a lightning protection device is installed in the combiner box.
	Warning!
	This system is not intended for use with equipment that requires a stable power supply, such as life-supporting medical equipment. It is imperative to ensure that no risk of personal injury arises in the event of a power outage.
	Warning!
	Unauthorized replacement of the internal circuitry of the inverter is prohibited.
	Warning!
	Due to the non-isolated topology is applied on the PV and grid side of the inverter, please use monocrystalline or polycrystalline silicon solar panels (the negative PV pole must not be grounded).
	Warning!
	When exposed to sunlight, the PV array will generate a high DC voltage. For installation safety, please make sure that the entire PV panel is covered with an opaque cover before connection.
	Warning!
	Ensure that the input voltage at the photovoltaic ports of the inverter never exceeds the maximum value. Exceeding the maximum voltage may result in permanent damage to the inverter or other losses. [Please consider the influence of temperature; the voltage of photovoltaic modules at -20°C in winter is about 15% higher than at 30°C in summer.] Do not connect any power source other than the PV module at the PV input port.
	Warning!
	Before connecting to the grid, the product must be securely grounded. Please follow the instructions in this manual. Improper operation may cause serious damage.
	Warning!
	Ensure that the voltage and frequency at the grid connection point comply with the inverter's grid-tie specifications.
	Warning!
	A circuit breaker or fuse protection device must be installed on the AC side of the inverter. The rating of this protective device should be at least 1.25 times the inverter's maximum AC current.
	Warning!
	Only batteries that have been approved by the manufacturer may be used with this inverter.
	Warning!
	If the battery fails to start, please contact the after-sales service center as soon as possible.

	Warning! After installation, maintenance, or repairs, please remember to securely lock the side door of the inverter. Access to this compartment should be restricted to qualified personnel only.
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1.4 Installer Requirements

The operators should be professionally qualified or trained.

The operators should be familiar with the entire storage system, including its components and operating principles.

The operators should be familiar with the user manual.

The grid-connected electricity selling of the energy storage system must be approved by the local power authority, or compliant with the relevant provisions of national and local laws and regulations. It must be conducted by qualified personnel.

1.5 Safety Symbols Description

The symbols that may be found in this product are defined as follows.

MODEL: ESYSUNHOME HM5-MAX MODEL: ESYSUNHOME HM10 MODEL: ESYSUNHOME HM12	ESYSUNHOME HM5-MAX: Model, indicating that the inverter specification is 5 kW. ESYSUNHOME HM10: Model, indicating that the inverter specification is 10 kW. ESYSUNHOME HM12: Model, indicating that the inverter specification is 12 kW.
	Stay safe.
	Beware of hot surfaces.
	Caution: Risk of electric shock.
	Prior to attempting any repair, electrical installation, or accessing any live parts, make sure that the inverter is switched off and wait for 10 minutes until internal capacitors are discharged to a safe voltage.

	Professional recycling and reuse are required.
	Please read this manual before using the product.

2 Product Introduction

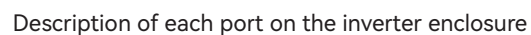
2.1 Inverter Parameters

MODEL	HM5-MAX	HM10	HM12
PV input			
Max. input power	18 kW	18 kW	18 kW
Rated input voltage	360 Vd.c.		
Max.input voltage	550 Vd.c.		
MPPT voltage range	100~540 Vd.c.		
Min. operating voltage	100 Vd.c.		
Starting voltage	150 Vd.c.		
Max. input current	30 A/30 A	30 A/30 A	30 A/30 A
Max. short-circuit current	40 A/40 A	40 A/40 A	40 A/40 A
MPPT Quantity	2		
PV input backfeed short circuit current	0 A		
Battery input/output rating			
Battery type	IFpP/Lithium Iron Phosphate		
Rated voltage	51.2 Vd.c.		
Grid charging	Yes		
Battery voltage range	42~57.6 Vd.c		
Max.charging power	10 kW	10 kW	10 kW
Max. charging current	196 A	196 A	196A
Max. discharging power	10 kW	10 kW	10 kW
Max. discharging current	196 A	196 A	196 A
Battery output short circuit current	300 A		
Battery input backfeed short circuit current	0 A		

Grid rating			
Rated voltage		230 Va.c.	
Rated frequency		50 Hz	
Rated input power	9.9 kW	9.9 kW	12 kW
Rated output power	5 kW	9.9 kW	12 kW
Max. input apparent power	15 kVA	15 kVA	18 kVA
Max. output apparent power	5 kVA	9.9 kVA	12 kVA
Rated input current	43.4 A	43.4 A	52.2 A
Rated output current	21.7 A	43.4 A	52.2 A
Max. input current	65.2 A	65.2 A	78.3 A
Max. output current	21.7 A	43.4 A	52.2 A
Power factor range	0.8 leading~0.8 lagging		
THDI (@Rated power)	≤ 3%		
Max. output overcurrent protection	180 A		
Grid output short circuit current	180 A		
Backup load output rating			
Rated output voltage	230 Va.c. L/N/PE		
Rated output frequency	50 Hz		
Rated output power	10 kW	10 kW	12 kW
Max. apparent output power	10 kVA	10 kVA	12 kVA
Max. output current	43.5 A	43.5 A	52.2 A
THDV	≤ 3% (linear load)		
Overload capacity	110% (≤60 s)		
Switching time	≤ 10 ms		
Load output short circuit current	180 A		
GEN			
Max. input apparent power	10 kVA	10 kVA	12 kVA
Max. input current	43.5 A	43.5 A	52.2 A
Efficiency			
Max. efficiency (PV to Grid)	97.8%		
MPPT efficiency	99.9%		
General parameter			
Dimensions (LxWxH)	600X305X660 mm		
Net weight	56±0.5 kg		
Gross weight	61.5±0.5 kg		
Install method	Floor mounting/Wall mounting		
Ambient temperature range	-25 °C - +60 °C		

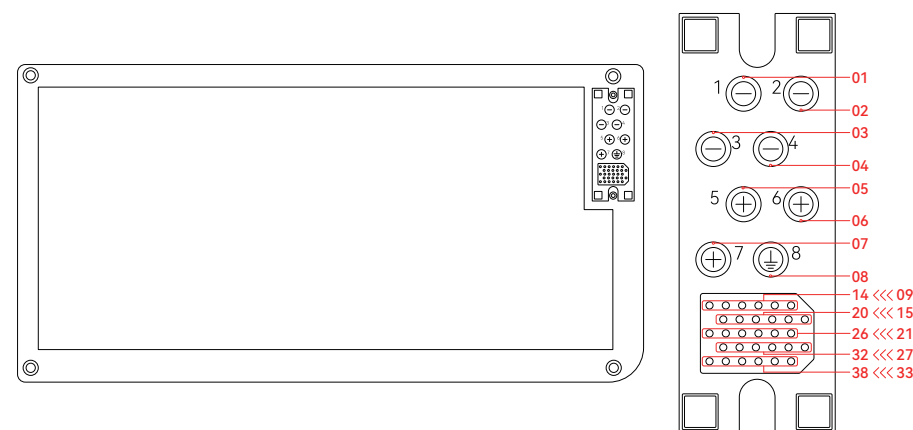
General parameter	
Storage temperature	-25 °C - +70 °C
Altitude	≤3000 m
Noise level at 1 m	≤55 dB
Relative humidity	0 - 100%
Cooling method	Intelligent air cooling
Environmental category	Outdoor (shaded environment)
Environment pollution degree	External: PD 3, Internal: PD 2
Communication method	WiFi/Ethernet/GPRS (optional), USB/RS485/CAN
Ingress protection rating	IP 66
Protection rating	Class I
Anti-islanding method	Active anti-islanding: Power Variation (method c)
Topology	Non isolated
Over voltage category	OVC II (for PV/Battery); OVC III (for AC Grid)
Protection	Over/under-voltage; Over/under-frequency; Over-current; Overload; Short circuit; Over-temperature; Leakage current; Insulation resistance; Anti-island protection
Country of Manufacture	China

Dimensions of the battery and base compatible with the HM5-MAX/HM10/HM12 inverter:



S/N	Mark	Description
1	PV Switch	PV OFF/ON switch
2	PV1-	PV1 (1) Negative Input
3	PV1+	PV1 (1) Positive Input
4	PV1-	PV1 (2) Negative Input
5	PV1+	PV1 (2) Positive Input
6	PV2-	PV2 (1) Negative Input
7	PV2+	PV2 (1) Positive Input
8	PV2-	PV2 (2) Negative Input
9	PV2+	PV2 (2) Positive Input
10	GEN	Generator terminal connection
11	LOAD	Load connection
12	GRID	Grid connection
13	COM	Communication port connection
14	DRM	DRM port (for Australia)
15	PARALLEL IN	Parallel in port (optional)
16	WIFI	WiFi-IoT Max port (optional)
17	USB	USB port
18	PARALLEL OUT	Parallel out port (optional)
19	Battery Switch	Battery OFF/ON switch

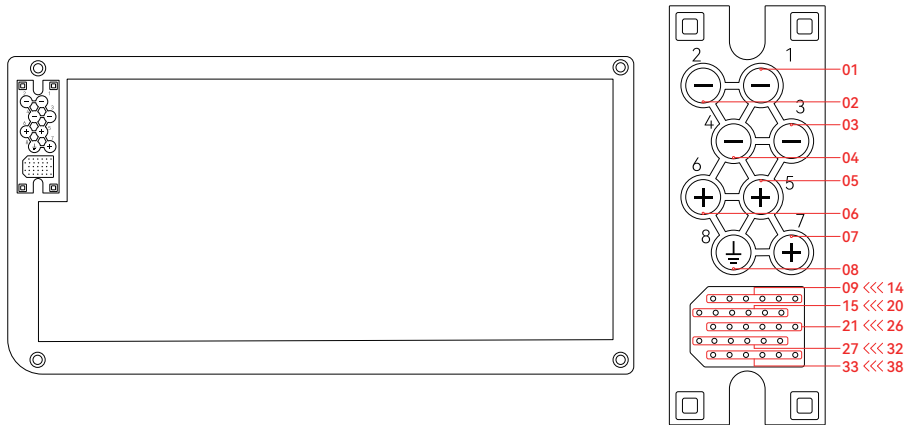
Schematic diagram of top port arrangement for
5KWH+ Residential energy storage battery



S/N	Mark	Purpose
1	PACK-	Battery cathode
02	PACK-	Battery cathode
03	PACK-	Battery cathode
04	PACK-	Battery cathode
05	PACK+	Battery anode
06	PACK+	Battery anode
07	PACK+	Battery anode
08	Ground wire	Ground wire of the chassis
09	RS485-B2	Battery and inverter communication port
10	RS485-A2	Battery and inverter communication port
11	GND	Ground wire
12	GND	Ground wire
13	SW-air switch	Signal cable for enabling battery discharge
14	SW-air switch	Signal cable for enabling battery discharge
15	RS485-A2	Battery and inverter communication port
16	RS485-B2	Battery and inverter communication port

S/N	Mark	Purpose
17	NC	Reserved interface
18	GND	Ground wire
19	CAN-H2	Communication Interface
20	CAN-H2	Communication Interface
21	CAN-L2	Communication Interface
22	CAN-L2	Communication Interface
23	NC	Reserved interface
24	NC	Reserved interface
25	NC	Reserved interface
26	GND	Ground wire
27	CAN-H1	Communication Interface
28	CAN-H1	Communication Interface
29	CAN-L1	Communication Interface
30	CAN-L1	Communication Interface
31	NC	Reserved interface
32	NC	Reserved interface
33	12V+	12V+
34	12V+	12V+
35	NC	Reserved interface
36	NC	Reserved interface
37	GND	Ground wire
38	GND	Ground wire

Schematic diagram of bottom port arrangement for
5KWH+ household energy storage battery



S/N	Mark	Purpose
01	PACK-	Battery cathode
02	PACK-	Battery cathode
03	PACK-	Battery cathode
04	PACK-	Battery cathode
05	PACK+	Battery anode
06	PACK+	Battery anode
07	PACK+	Battery anode
08	Ground wire	Ground wire of the chassis
09	RS485-B2	Battery and inverter communication port
10	RS485-A2	Battery and inverter communication port
11	GND	Ground wire
12	GND	Ground wire
13	SW-air switch	Signal cable for enabling battery discharge
14	SW-air switch	Signal cable for enabling battery discharge
15	NC	Reserved interface
16	NC	Reserved interface
17	NC	Reserved interface

S/N	Mark	Purpose
18	NC	Reserved interface
19	NC	Reserved interface
20	NC	Reserved interface
21	NC	Reserved interface
22	NC	Reserved interface
23	NC	Reserved interface
24	NC	Reserved interface
25	NC	Reserved interface
26	NC	Reserved interface
27	NC	Reserved interface
28	NC	Reserved interface
29	NC	Reserved interface
30	NC	Reserved interface
31	NC	Reserved interface
32	NC	Reserved interface
33	NC	Reserved interface
34	NC	Reserved interface
35	NC	Reserved interface
36	NC	Reserved interface
37	NC	Reserved interface
38	NC	Reserved interface

2.5 System Model Overview

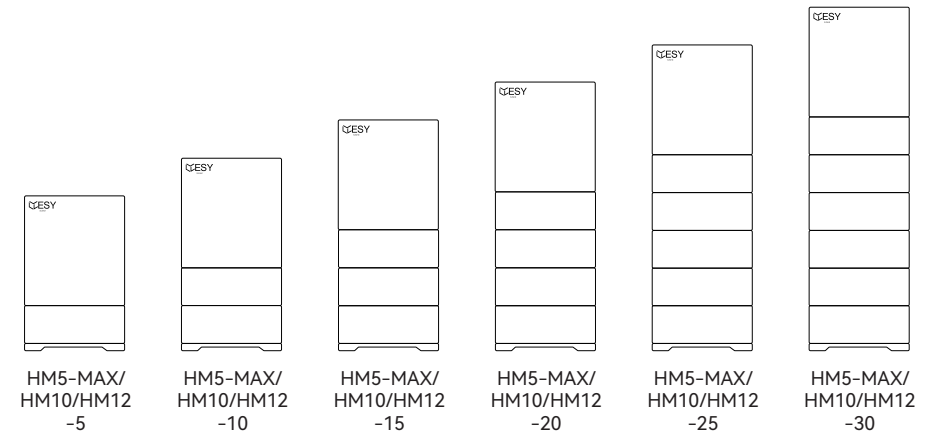


Warning!

When stacking batteries for HM5-MAX/HM10/HM12 inverter, please use the specified models for bases, batteries, and accessories.

Quantity of batteries	Battery capacity (kWh)	Size (LxWxH) (mm)	Weight (kg)
1	5.12	600x305x908	113
2	10.24	600x305x1128	163
3	15.36	600x305x1348	213
4	20.48	600x305x1568	263
5	25.60	600x305x1788	313
6	30.72	600x305x2008	363

Exterior differences between system models:



2.6 Operation Modes



Warning!

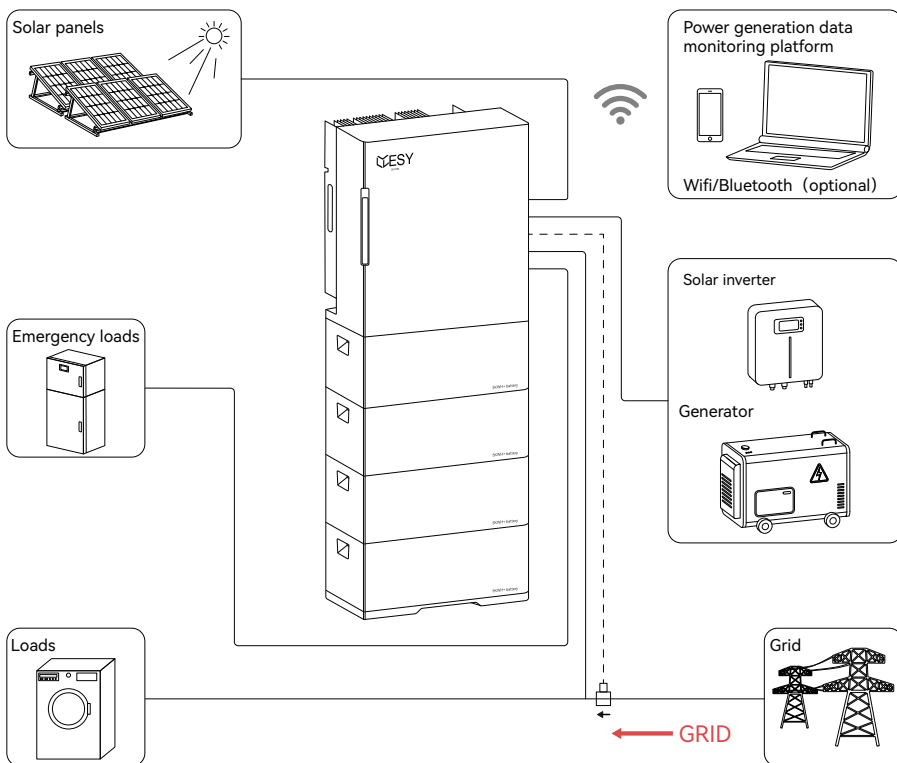
This system is not intended for use with equipment that requires a stable power supply, such as life-support medical devices. Ensure that any power interruptions do not pose a risk to personal safety.



Warning!

Battery current may be influenced by factors such as temperature, humidity, and weather conditions, potentially leading to battery current limits and affecting load-carrying capacity.

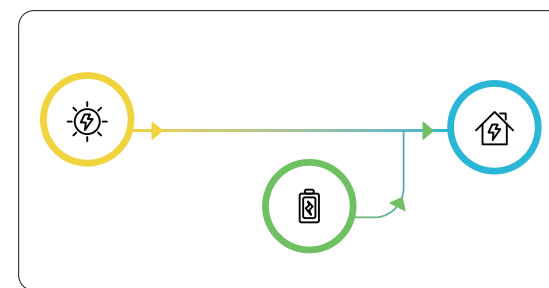
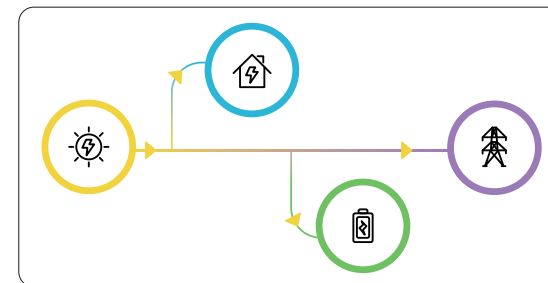
	Warning! In the event of an overload, the inverter will automatically restart. However, if multiple overloads occur, the restart interval will be extended. To restart the inverter immediately, you can use the app to initiate an immediate restart.
	Warning! The LOAD output port of the inverter is equipped with overload capability, allowing it to support standard household loads during off-grid operation. To ensure stable power supply, it is recommended to avoid using loads with high startup currents, such as high-power water pumps. The supported load capacity is as follows: The total power of inductive and capacitive loads $\leq$ inverter's rated output power.



3 Working Modes

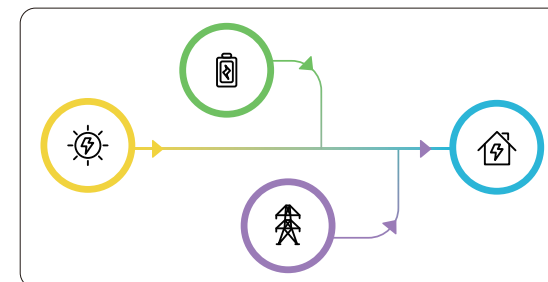
3.1 Regular Mode

When there is sufficient PV energy, priority is given to supplying backup loads and household loads, followed by charging the battery. Any excess energy is then sold to the power grid.

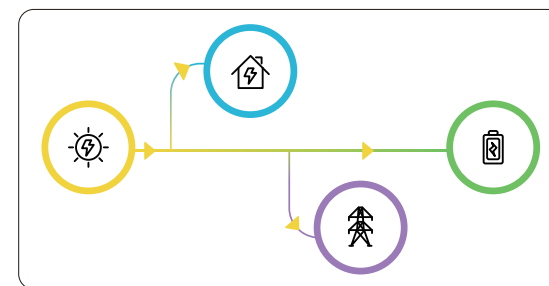


When the PV energy is insufficient to meet the load demands, the power stored in the battery will be used as a priority.

When PV energy and the power stored in the battery are insufficient to meet the load demands, power from the grid will be used.

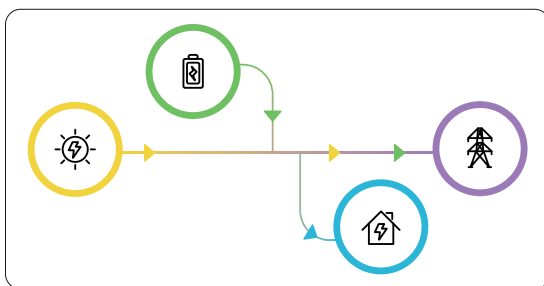


3.2 Electricity Sale Mode

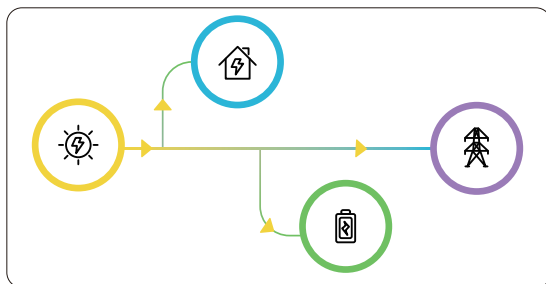


Loads are given priority for power supply and any excess electricity is sold to the power grid at maximum output.

When PV energy is insufficient, the power stored in the battery will be sold as a supplement to the power grid.

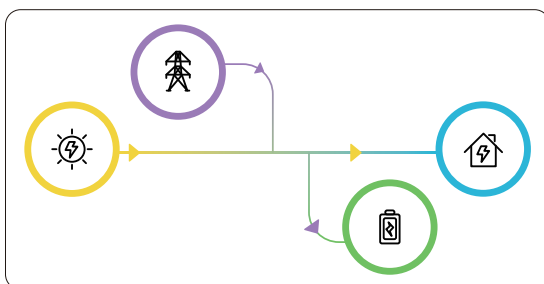


3.3 Emergency Mode

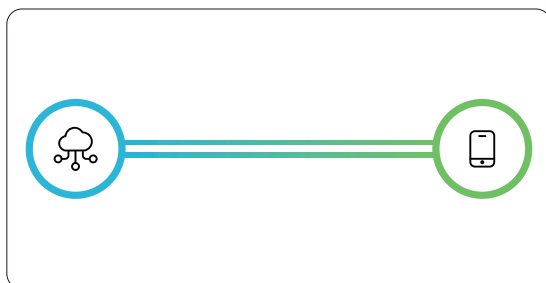


PV energy is prioritized for charging the batteries.

If PV energy is insufficient, batteries will be charged from the power grid. This is particularly suitable for charging the battery in advance in preparation for an emergency. It is recommended to use this mode when the electricity price is low.



3.4 AI Mode



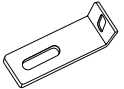
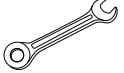
The system will intelligently select the optimal mode depending on the user's environment.

4 Preparation Before Installation

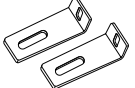
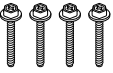
4.1 Packing List

4.1.1 Packing List of Inverter

Item	Specifications	Quantity	Schematic Diagram
Inverter	HM5-MAX/HM10/HM12	1	
User Manual	HM5-MAX/HM10/HM12, English	1	
PV+ Connector	VP-D4B-CHSM4 external terminal casing, including metal terminal	4	
PV- Connector	VP-D4B-CHSF4 internal terminal casing, including metal terminal	4	
LAN Port Connector	RJ45; Assembly type; Line diameter $\phi 3.0$ mm- $\phi 6.0$ mm	3	
COM Port Connector	16 Pin, core diameter $\phi 0.5$ - 0.75 mm ²	1	
COM Port Waterproof Ring	External diameter $\phi 18.6$ mm; Line diameter $\phi 4$ - 6.1 mm, 4 holes	1	
COM Port Nylon Screw Plug	Diameter $\phi 5$ mm, height 17 mm	4	
Grid Terminals	PVAC-03SPSA85-02-BKC-M	1	
Load Terminals	PVAC-03SPSA85-02-BK-M	1	
Generator Port Connector	VPAC06EP-3SD(SC)-A	1	
Connector Removal Tool	Used for Load/Generator/Grid port connector	1	

Item	Specifications	Quantity	Schematic Diagram
Allen Screwdriver M5, M6	M5 used for Load/Grid port connector M6 used for Generator port connector	2	
Insulated Cord End Terminal 16mm ²	EN16-12, Used for grid, load and generator port connectors	9	
Insulated Cord End Terminal 0.75 mm ²	E7512, red, used for COM port connector	16	
Angle Iron	L79.5x32x25 mm	1	
Expansion screw gasket	Inner diameter: 5 mm, outer diameter: 12 mm, SUS304 gasket	1	
Expansion Tubes with Screws	M6×40 mm, used for angle iron	1	
Angle Iron Screws	M4×12 mm	1	
Ring-Shaped Crimp Cable lug	RNB5.5-6, 48 A, Φ=6.5 mm, 5.6×23 mm	1	
Ground Wire Screw	M6×12 mm	1	
Smart Dongle (Optional)	WiFi IoT Max	1	
CTs (Optional)	CT, SCT24L-5K-200	2	
Ratchet wrench	S=7mm	1	

4.1.2 Packing List of Battery

Item	Specifications	Quantity	Schematic Diagram
Battery	5KWH+ residential energy storage battery	1	
Angle Iron	L79.5×32×25 mm	2	
Handlebar Screws	M4×35 mm	4	
Angle Iron Screws	M4×8 mm	2	
Waterproof Gasket for Connector	Silicone, black, matte, 104.5x50.3x10.6 mm	1	
Expansion Tubes Screws	M6×40 mm, Used for Angle Iron	2	
Expansion Screw Gaskets	Inner diameterφ5 mm; Outer diameterφ12 mm, SUS304 gasket	2	

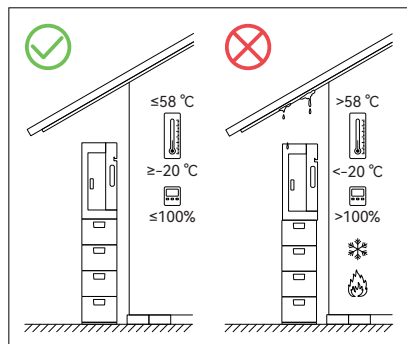
4.1.3 Packing List of Base

Name	Specifications	Quantity	Schematic Diagram
Base	600 mmx305 mmx28 mm	1	
Waterproof Gasket	Silicone, black, matte, 110x39.9x9 mm (installed on the base)	1	
Base mounting screws	M4x8 mm	4	

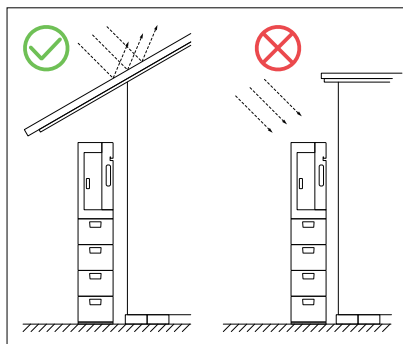
4.2 Selection of The Installation Environment

Please select the site according to the relevant requirements.

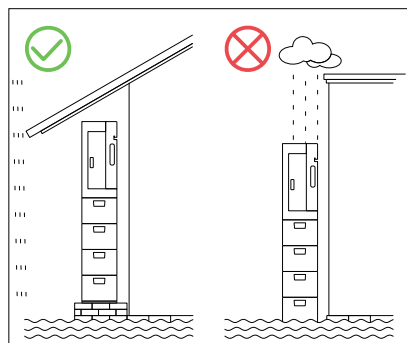
(Install the system in a sheltered area or install an awning to cover the product.)



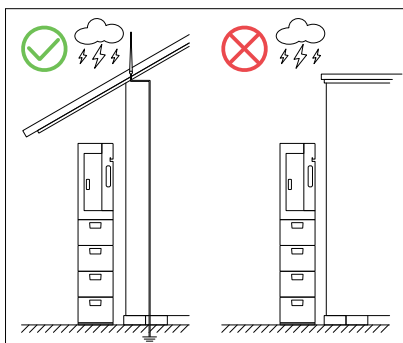
The ambient temperature should be -20 °C to 58 °C and the relative humidity should be 0% to 100%. (no condensation).



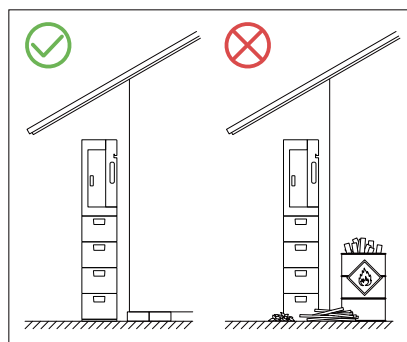
It can be installed outdoors, but must not be directly exposed to sunlight.



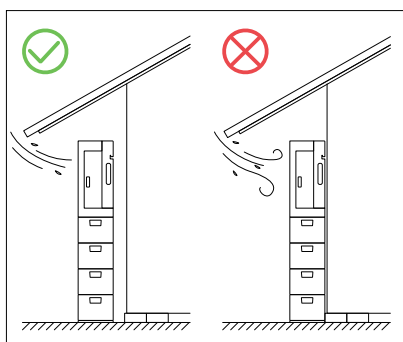
Do not install it in damp or submerged areas.



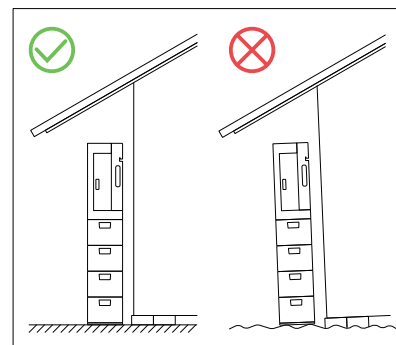
Do not install it in areas prone to lightning strikes.



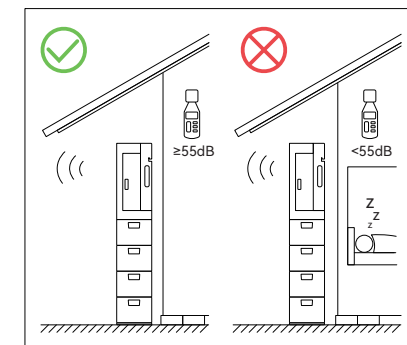
Do not install it in areas prone to lightning strikes.



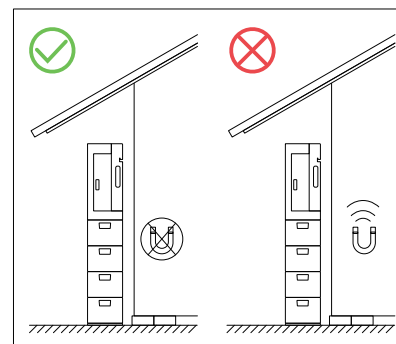
Do not install it near combustibles.



To ensure proper heat dissipation, please install it in a well-ventilated place.

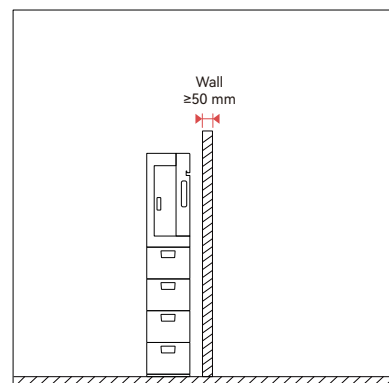


The system generates noise (<55 dB) during operation; please install it away from resting areas.



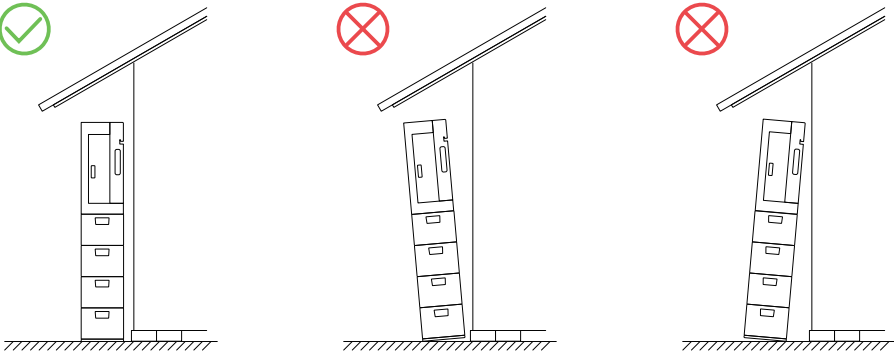
Please keep away from strong magnetic fields to avoid electromagnetic interference.

4.3 Selection of Installation Location



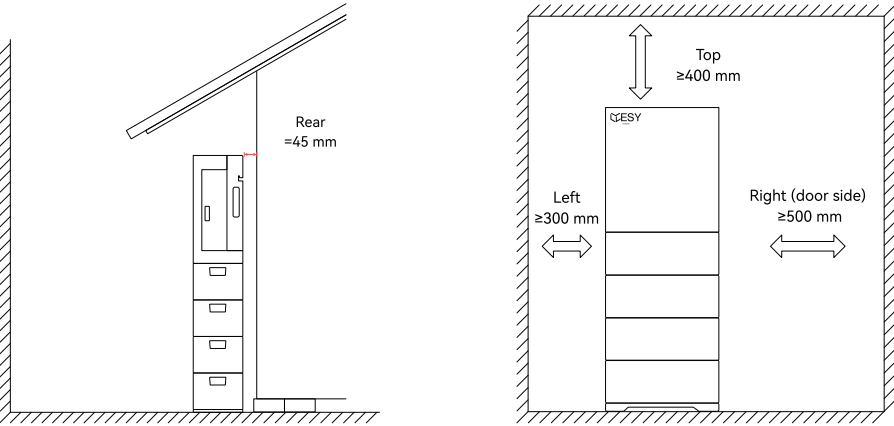
The wall thickness should not be less than 50 mm.

For vertical installation, ensure there is no forward or backward tilting.



The clearances around the inverter must not be less than the following:

Top	Rear	Left	Right (door side)
≥400 mm	=45 mm	≥300 mm	≥500 mm



When the inverter is installed on the ground, the ground bearing capacity is as follows:

Quantity of batteries	1	2	3	4	5	6
Maximum weight	113 kg	163 kg	213 kg	263 kg	313 kg	363 kg
Weight capacity per square meter	618 kg/m ²	891 kg/m ²	1164 kg/m ²	1438 kg/m ²	1711 kg/m ²	1984 kg/m ²

4.4 Preparation of Installation Tools

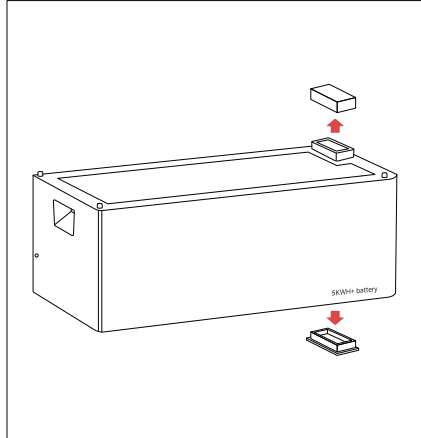
Power drillΦM6	Marker	Measuring Tape	Hammer	Ratchet wrench S=7 mm
Phillips Screwdriver PH1	Allen Screwdriver M5/M6	Level	Crimping Pliers for RJ45	Crimping Pliers for PV Terminals
Ferrule Crimping Pliers	Crimping Pliers	Stripping Pliers	Diagonal Pliers	Cable Cutting Pliers (wire cutter)
Utility Knife	Safety Gloves	Dust Mask	Goggles	Safety Boots

5 Installation

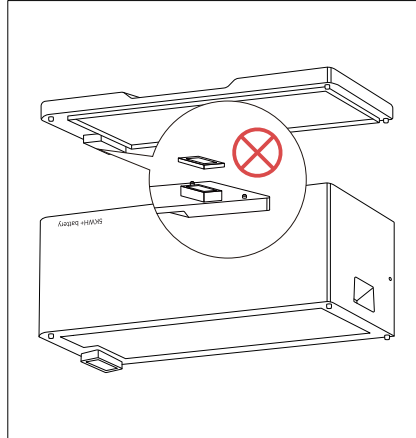
5.1 Base Installation

Tools and accessories required for this step:

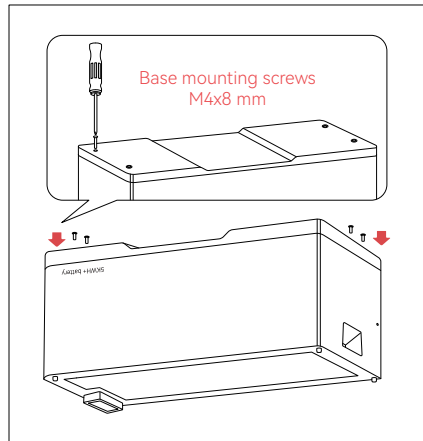
Packing List of Battery	Battery
Packing List of Base	5KWH+ residential energy storage battery base, Waterproof Gasket (for Connector), Base Mounting Screws
Tools	Phillips Screwdriver PH1, Measuring Tape, Level



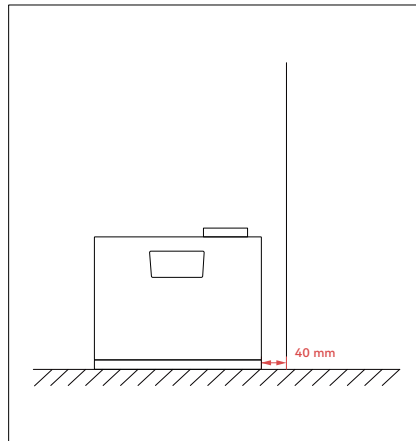
Step 1: Remove the dust cover from the connector. Position the battery with the bottom facing upwards.



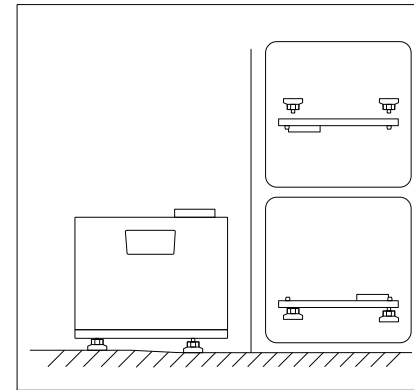
Step 2: Align the waterproof port on the base with the corresponding connector on the battery. (Do not remove the waterproof gasket from the base.)



Step 3: Secure the base by tightening the mounting screws to ensure that the battery and base are properly aligned and firmly connected.



Step 4: Place the battery with the attached base on a suitable surface, ensuring the back of the battery is 40mm away from the wall.



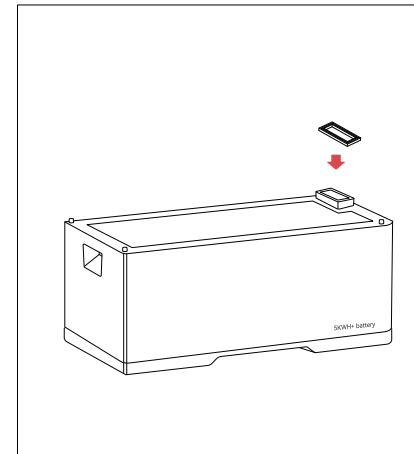
Note

For uneven surfaces, the use of base support feet accessories is recommended.

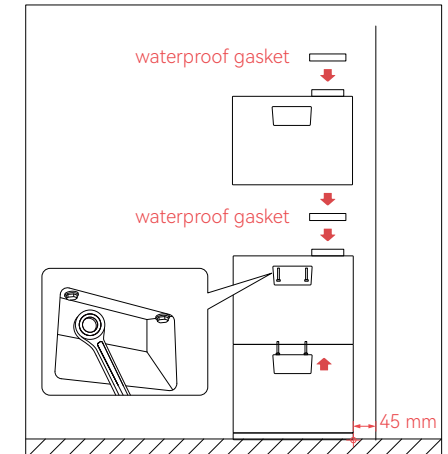
5.2 Batteries Installation

Tools and accessories required for this step:

Packing List of Battery	Batteries, Waterproof Gasket (for Connector), Handlebar Screws
Tools	Ratchet wrench S=7 mm



Step 1: Place the waterproof gasket onto the connector at the top of the battery.



Step 2: Stack the batteries in sequence, tighten the handlebar screws on both sides of the batteries.



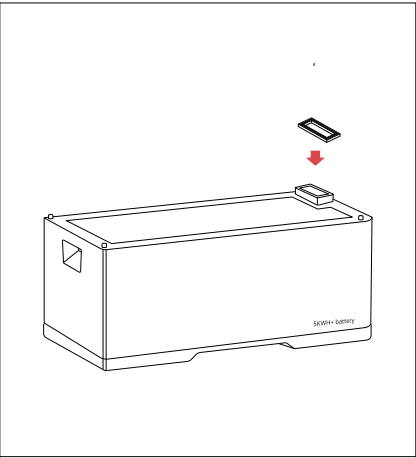
Warning!

Do not exceed 6 batteries.

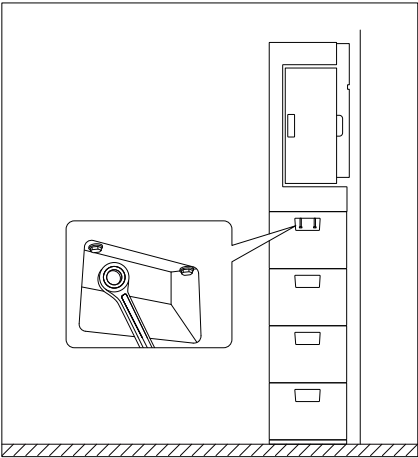
5.2.1 Inverter Installation

Tools and accessories required for this step:

Packing List of Battery	Handlebar Screws, Waterproof Gasket (for Connector)
Packing List of Inverter	HM5-MAX/HM10/HM12
Tools	Ratchet wrench S=7 mm



Step 1: Place the waterproof gasket onto the connector at the top of the battery.

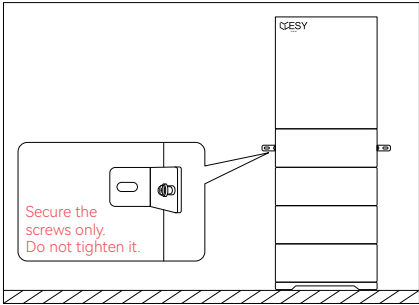


Step 2: Stack the inverter on the battery, tighten the handlebar screws on both sides of the battery.

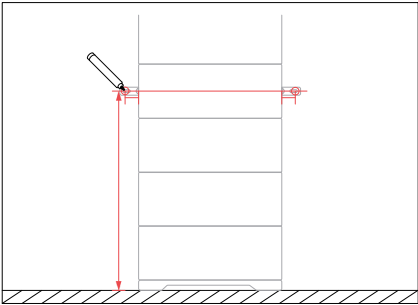
5.2.2 Angle Iron Installation

Tools and accessories required for this step:

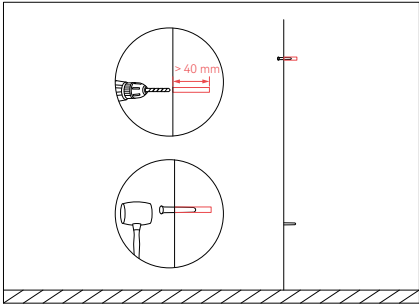
Packing List of Battery	Angle Iron, Angle Iron Screws, Expansion Tubes with Screws, Expansion Screw Gaskets
Packing list of Inverter	Angle Iron, Angle Iron screws, Expansion tubes with screws, Expansion screw gaskets
Tools	Power drillφM6, Hammer, Phillips Screwdriver PH1, Marker



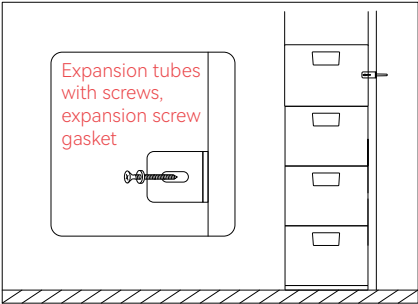
Step 1: Thread the angle iron screws through the angle iron and secure the battery angle iron on both sides of the top battery. Do not tighten the screws at this stage.



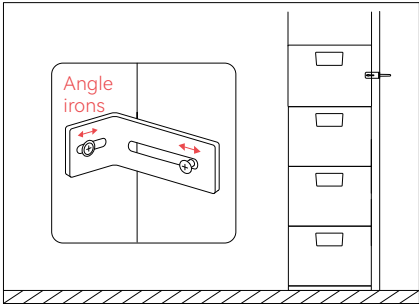
Step 2: Mark the position of the angle irons holes on the wall with a marker.



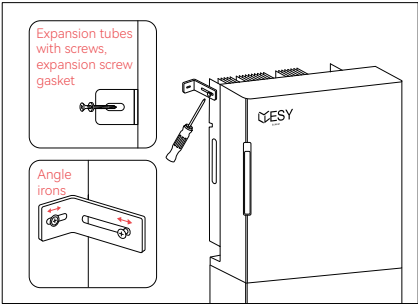
Step 3: Drill the holes at the marked positions with a power drill, and hammer the expansion tubes into the holes.



Step 4: Thread the expansion tube screws through the gaskets and angle iron holes, and secure them on the wall.



Step 5: Tighten the screws after adjusting the angle irons accordingly.



Step 6: Follow the same steps to install the inverter angle iron in the upper left corner of the inverter.

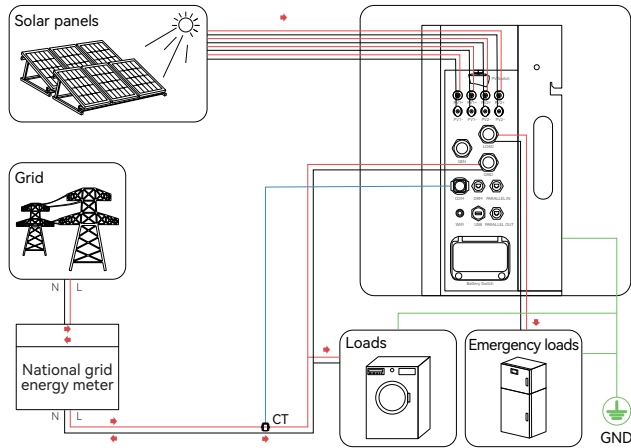
Note

Installation of the angle iron on the inverter is mandatory. If the energy storage system is adequately secured, it is permissible to install the angle iron only on the topmost battery.

6 Wiring

6.1 Instructions before Wiring

6.1.1 Schematic Diagram of System Connection



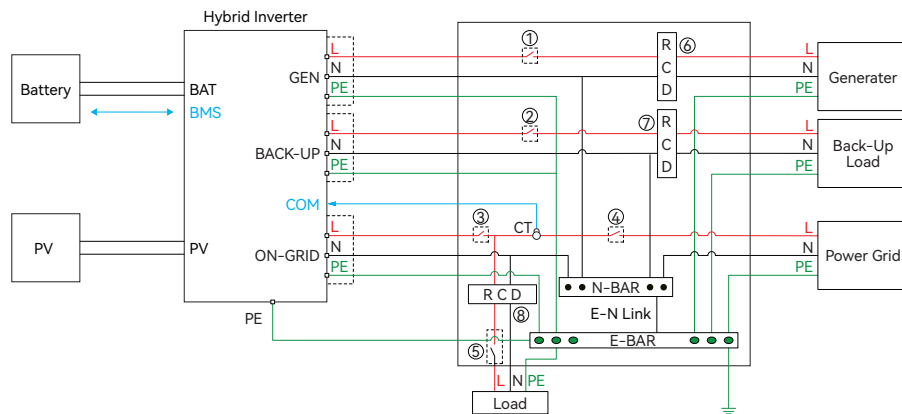
6.1.2 Wiring Diagram

The following wiring diagram is applicable to Australia, New Zealand, South Africa:

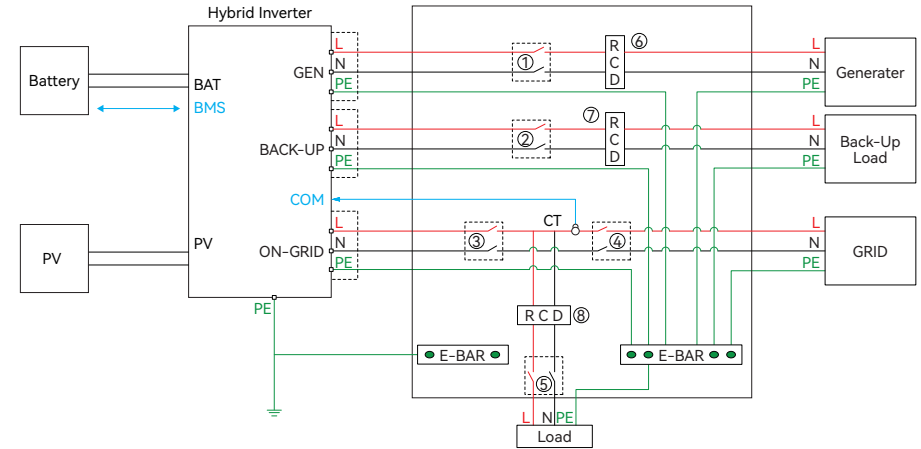


Warning!

For Australia, New Zealand and South Africa, the neutral cables of the GRID side and BACK-UP side must be connected together. Otherwise, the LOAD function will not operate properly.



The following wiring diagram is applicable to regions other than Australia, New Zealand, and South Africa:



6.1.3 Wiring Precautions

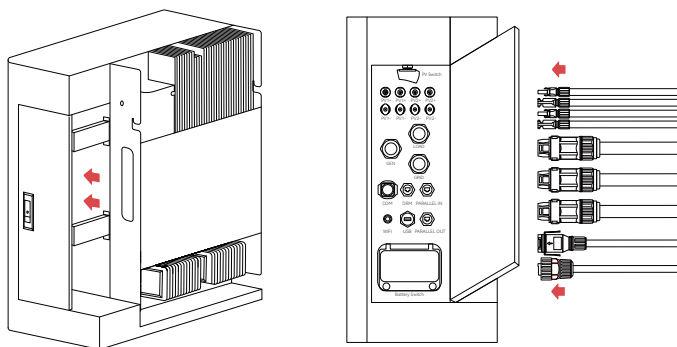


Warning!

When using external wiring cables, the current and system overload capacity through the cables, as well as the ambient temperature, should be considered. The following table shows recommended cables. Engineers should refer to the following table when selecting cables.

Cable	Type	Conductor Cross Section Area	Outer Diameter	Max. current
Grid cable	Outdoor 3-core super flexible copper wire cable	16 mm ² per core	13-18 mm	80 A
Load cable	Outdoor 3-core super flexible copper wire cable	16 mm ² per core	13-18 mm	80 A
Generator cable	Outdoor 3-core super flexible copper wire cable	10-16 mm ² per core	13-18 mm	55 A
PE cable	Conventional yellow and green wire (for inverter)	4-6 mm ²	/	/
PV cable	Standard PV cable in the industry	6 mm ²	5.5-9 mm	20 A
Meter/CT cable	2-core outdoor shielded cable	0.5-0.75 mm ²	4-6 mm	60 mA
RJ45 port cable	Standard Network cable in the industry (recommended type: Cat5e, FTP, UV-resistant for outdoor use)	0.12 -0.2 mm ²	4-6 mm	/

	Warning! If local regulations stipulate alternative cable requirements, the cable specifications must adhere to these regulations.
	Warning! The typical cable length ranges from 2 to 10 meters. Excessively long cables may result in a deviation from the rated voltage. In such case, the cross-sectional area of the cables should be increased accordingly.
	Warning! Before installation and use, grounding protection must be ensured with a wire fitted with a terminal lug (4-6 mm ²).
	Warning! Install all cables through the back of the door to avoid safety hazards.



	Warning! The recommended circuit breaker and RCD specifications in the table below are provided for reference only. Actual specifications should comply with local standards and specific conditions.
---	---

Item	Breaker/RCD	Recommended Model
1	Generator Circuit Breaker	≥63 A/230 V/400 V Circuit Breaker (Select according to the generator power)
2	Backup Load Circuit Breaker	It is advisable to install a single-pole double-throw switch to enable switching the backup load to the grid when the inverter is not operational.
3	Inverter Grid Circuit Breaker	≥100 A/230 V/400 V Circuit Breaker

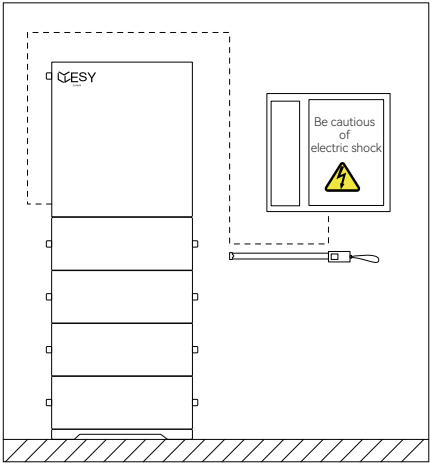
4	Main Grid Circuit Breaker	100 A/230 V/400 V Circuit Breaker (select based on load and inverter power)
5	Household Load Circuit Breaker	Select according to household load power.
6	Generator RCD	30 mA RCD (comply with local regulations)
7	Backup Load RCD	30 mA RCD (comply with local regulations)
8	Household Load RCD	30 mA RCD (comply with local regulations)

	Danger! The current through the CT must not exceed 106 A; exceeding this limit may cause damage to both the CT and the inverter. Please choose the household load current according to the permissible current rating of the CT.
	Warning! HM5-MAX: Household load should not exceed 40 A. HM10: Household load should not exceed 40 A. HM12: Household load should not exceed 26 A.
	Warning! During actual installation, if the rated current of the cable is lower than the recommended circuit breaker current, the circuit breaker specifications should prioritize matching the cable's rated current.
	Warning! The recommended rating for the main grid circuit breaker should exceed the combined current of the household load and the inverter. Evaluate whether a circuit breaker with a higher overcurrent capacity is necessary based on the specific requirements.
	Warning! Do not connect multiple inverters to a single AC circuit breaker.
	Warning! Do not connect any loads between the inverter grid port and the inverter grid circuit breaker.

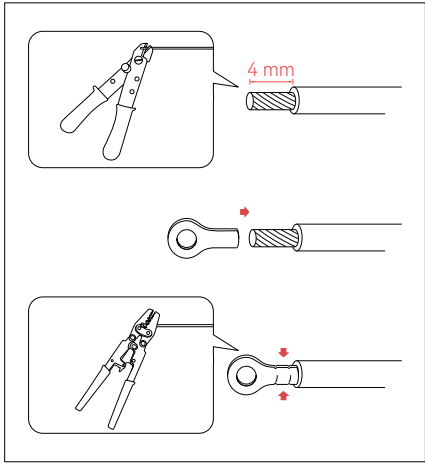
6.2 Grounding Connection

Tools and accessories required for this step:

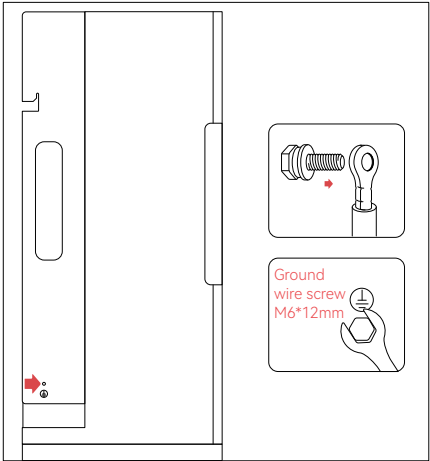
Packing list of inverter	Ring-Shaped Crimp Cable Lug, Ground screw
Tools	Crimping Pliers, Diagonal Pliers, Stripping Pliers, Phillips Screwdriver PH1, Measuring Tape



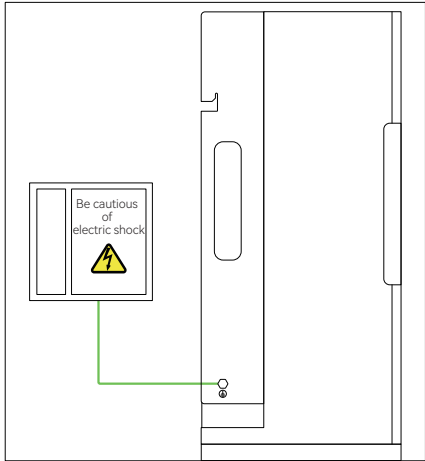
Step 1: Measure the distance between the ground wire connection aperture located on the side of the inverter and the combiner box using a measuring tape.



Step 2: Use stripping pliers to remove 4 mm of insulation from the grounding wire. Install the grounding wire terminal and crimp it tightly using crimping pliers.



Step 3: Attach the ring-shaped crimp cablelug to the right-side heat sink of the inverter using the ground wire screw.

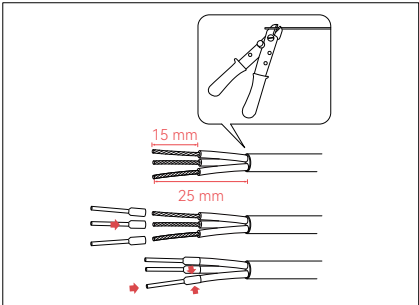


Step 4: Properly ground the other end of the wire with a grounding impedance of 0.1 Ω or less to ensure safety in installation and operation.

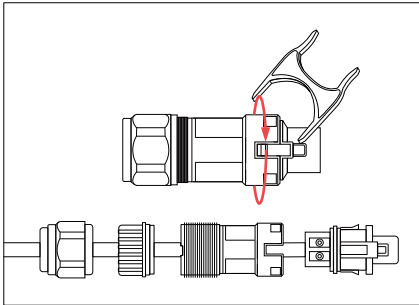
6.3 Load Connection

Tools and accessories required for this step:

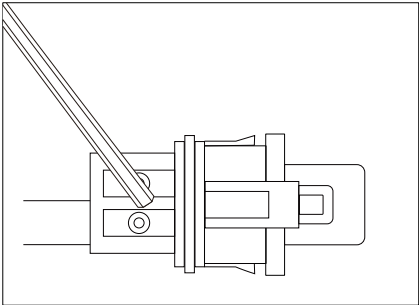
Packing List of Inverter	Load Output Terminal, Insulated cord end terminal 16 mm ² , Connector removal Tool, Allen Screwdriver M5
Tools	Cable Cutting Pliers (wire cutter), Diagonal Pliers, Ferrule Crimping Pliers, Stripping Pliers



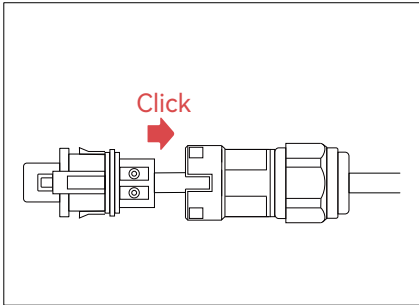
Step 1: Select an appropriate cable and use stripping pliers to remove the insulation. Use ferrule crimping pliers to crimp an insulated cord end terminal (16 mm²) onto the cable.



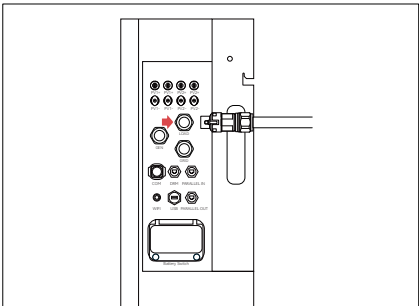
Step 2: Use the connector removal tool to disassemble the connector, and thread the cable through the connector as shown in the diagram.



Step 3: Secure the terminal onto the connector using a Allen Screwdriver M5.



Step 4: Plug the connector head into the connector shell until a "click" sound is heard, it indicates that the connector is securely in place. Tighten the connector tail end nut.



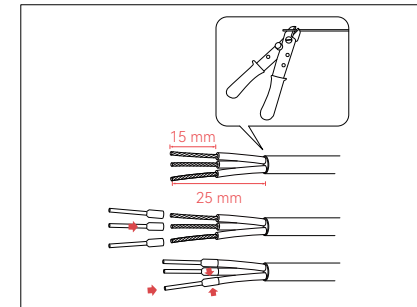
Step 5: Thread the connector through the slit of the inverter door and plug it into the LOAD port.

	Warning! When removing the connector from the inverter, please use the appropriate tools. Please keep the connector removal tool properly.						
	Warning! Please make sure to distinguish between the connector for the load port,grid port and the connector for the generator port. <table><tr><td>Load Port Connector</td><td>Grid Port Connector</td><td>Generator Port Connector</td></tr><tr><td></td><td></td><td></td></tr></table>	Load Port Connector	Grid Port Connector	Generator Port Connector			
Load Port Connector	Grid Port Connector	Generator Port Connector					
	Warning! For HM5-MAX: 1. Inductive Loads (e.g., air conditioners, washing machines, motors): The maximum allowable total power is 5 kVA. 2. Capacitive Loads (e.g., computers, switching power supplies): The maximum allowable total power is 5 kVA.						
	Warning! For HM10: 1. Inductive Loads (e.g., air conditioners, washing machines, motors): The maximum allowable total power is 10 kVA. 2. Capacitive Loads (e.g., computers, switching power supplies): The maximum allowable total power is 10 kVA.						
	Warning! For HM12: 1. Inductive Loads (e.g., air conditioners, washing machines, and motors): The maximum permissible total power is 12 kVA. 2. Capacitive Loads (e.g., computers and switching power supplies): The maximum permissible total power is 12 kVA.						

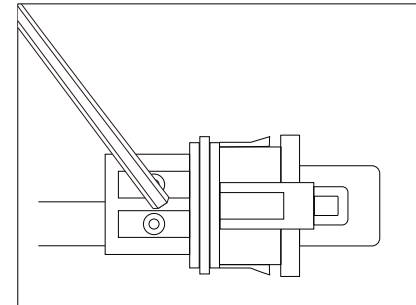
6.4 Generator (GEN) Connection

Tools and accessories required for this step:

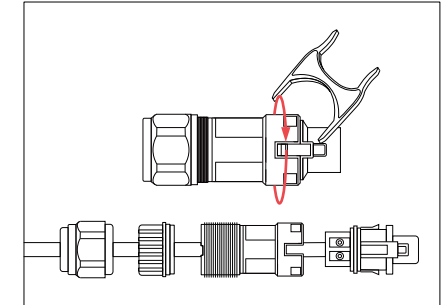
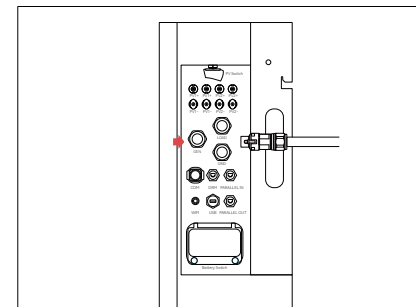
Packing List of Inverter	Generator Port Connector, Insulated cord end terminal 16mm ² , Connector removal Tool, Allen Screwdriver M6
Tools	Cable Cutting Pliers (wire cutter), Diagonal Pliers, Ferrule Crimping Pliers, Stripping Pliers



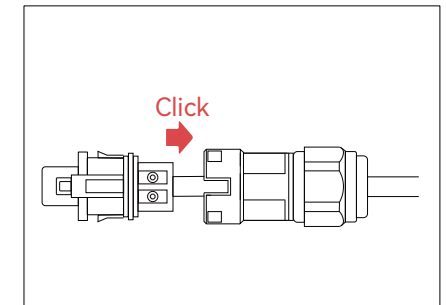
Step 1: Select an appropriate cable and use stripping pliers to remove the insulation. Use ferrule crimping pliers to crimp an insulated cord end terminal (16 mm²) onto the cable.



Step 3: Secure the terminal onto the connector using a Allen Screwdriver S3.



Step 2: Use the connector removal tool to disassemble the connector, and thread the cable through the connector as shown in the diagram.



Step 4: Plug the connector head into the connector shell until a "click" sound is heard, it indicates that the connector is securely in place. Tighten the connector tail end nut.

Step 5: Thread the connector through the slit of the inverter door and plug it into the LOAD port.

	Warning!		
	When installing the generator, it is essential to connect the wires to the COM-7/COM-8 terminals on the COM port connector. Please refer to the user manual for the installation steps of the COM port.		
		COM-7	COM_GEN
		COM-8	COM_GEN_NC
	Warning!		
	When the GEN port is connected to a generator or PV inverter, the energy storage system is in a micro grid state. Before performing any maintenance or inspection on the system, it is crucial to shut down the generator or PV inverter linked to the GEN port.		
	Warning!		
	The generator parameters must meet the requirements of the inverter parameters and include the Automatic Transfer Switch (ATS) function.		
	Warning!		
	Do not connect the load to the GEN port.		
	Warning!		
	The GEN port can also be used for PV inverter connection.		

6.5 Grid Connection

Tools and accessories required for this step:

Packing List of Inverter	Grid Port Connector, Insulated cord end terminal 16mm ² , Connector removal Tool, Allen Screwdriver M5
Tools	Cable Cutting Pliers (wire cutter), Diagonal Pliers, Ferrule Crimping Pliers, Stripping Pliers

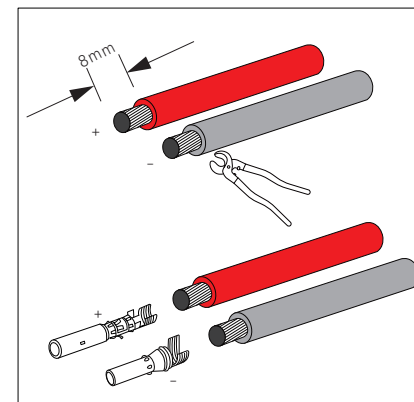
The steps for installing the generator port connector are the same as those for installing the load port connector.

	Warning!		
	When locking the power grid cable into the external grid connector, it is necessary to mark the corresponding cables with L/N, because when installing the CT (Current Transformer), the CT need to be attached to the corresponding L line.		

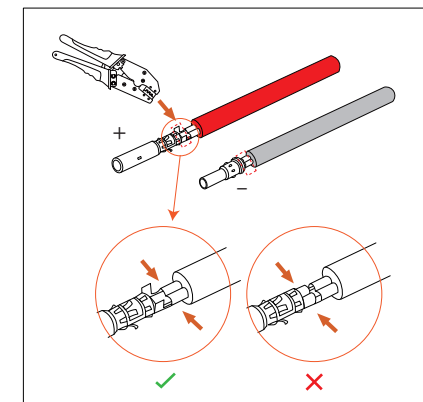
6.6 PV Connection

Tools and accessories required for this step:

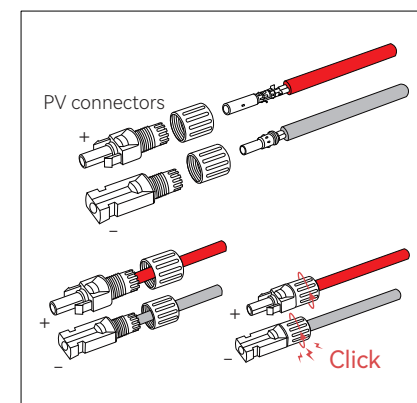
Packing List of Inverter	PV- Connector, PV+ Connector
Tools	Crimping Tool for PV Terminals, Wire cutter



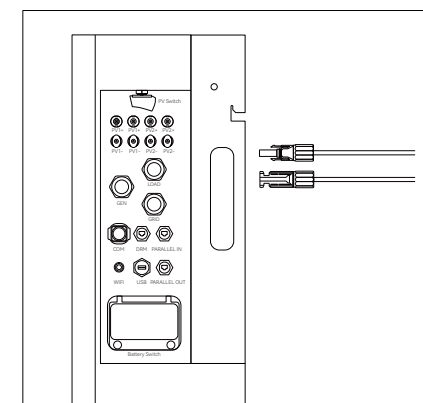
Step 1: Remove 8 mm of insulation from the PV cable, and insert the exposed end of the PV cable into the PV metal pin contacts.



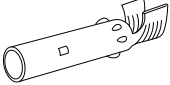
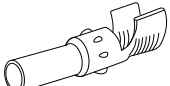
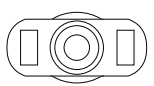
Step 2: Crimp the PV terminal securely onto the PV cable with an MC4 crimping tool.



Step 3: Unscrew the connector at the rear of the PV connector slot in the PV terminals. Listen for a 'click' sound to confirm proper connection. Pull back on the cable to verify the terminals are securely inserted. Tighten the cover at the rear of the PV connector.

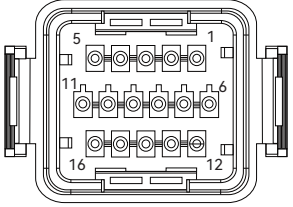


Step 4: Thread the connector through the slit of the inverter door and plug it into the PV ports.

	Warning! Please ensure that the polarity of the PV cables, PV terminals, PV connectors, and PV ports of the inverter are all aligned correctly.			
Polarity	Cables	Terminals	Connectors	PV ports
Positive Pole +	Red			
Negative Pole -	Black			
	Warning! Please use the PV connectors provided by the manufacturer.			
	Warning! Please confirm that all PV modules are of the same type and installation angle.			
	Warning! Please verify that the input voltage and current range of the PV modules aligned with the parameter requirements of ESYSUNHOME.			
	Warning! PV modules must be installed by professional personnel.			
	Warning! Once the PV modules are installed, employ a voltmeter (with a DC voltage range of 1000 V or higher) to verify the polarity of the cables connecting the PV array is correct. Ensure that the open-circuit voltage does not surpass the specified value.			
	Warning! When the ambient temperature exceeds 10°C, the open-circuit voltage of the photovoltaic (PV) array must not exceed 90% of the maximum DC input voltage of the inverter. Exceeding this limit may result in the PV array's voltage surpassing the maximum input voltage of the inverter, potentially leading to damage.			

6.7 COM Connection

6.7.1 COM Port Connector Pin Definitions

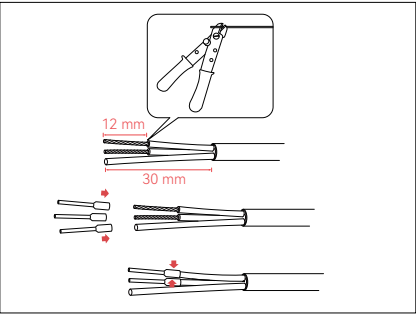
COM Port Connector Pin Definitions			
Diagram	Pin Number	Definition	Instruction
	1	PARALLE_L	Are used for parallel machine communication.
	2	PARALLE_H	
	3	RS485_B	RS485 Upper Computer Communication
	4	RS485_A	
	5	METER_B	RS485 Meter Communication and EV charger Communication (Reserved)
	6	METER_A	
	7	COM_GEN	GEN Dry Contact (Reserved)
	8	COM_GEN_NC	
	9	COM	Reserved
	10	COM_NO	
	11	/	COM Dry Contact (Reserved)
	12	/	
	13	CT1_N	CT Communication
	14	CT1_P	
	15	CT2_N	CT Communication for AC Coupling
	16	CT2_P	

6.7.2 Installation of COM Port Connector

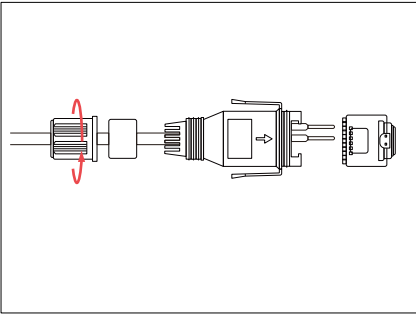
	Warning! Please select the appropriate cable length and quantity based on the actual installation scenario.
	Warning! Please select the correct COM port pin according to the actual installation scenario.

Tools and accessories required for this step:

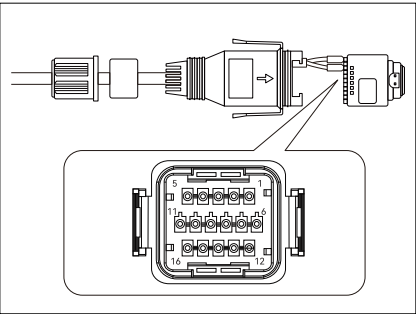
Packing List of Inverter	COM Port Nylon Screw Plug, COM Port Connector, Insulated Cord End Terminal 0.75 mm ²
Tools	Ferrule Crimping Pliers, Stripping Pliers, Cable Cutting Pliers (wire cutter)



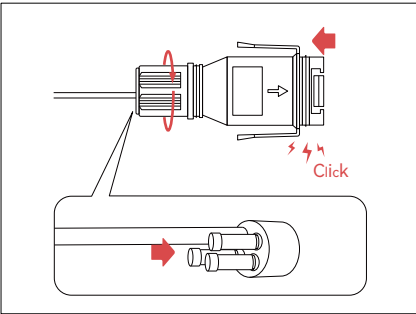
Step 1: Select the appropriate cable and strip off 12 mm of insulation using stripping pliers. Crimp insulated cord end terminal 0.75 mm² onto the cable using the ferrule crimping pliers.



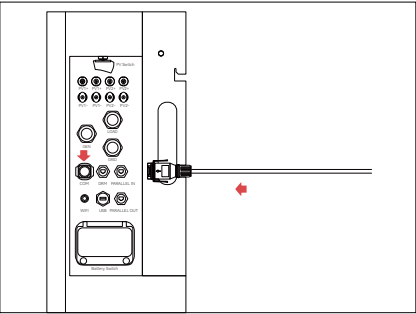
Step 2: Unscrew the nut at the connector end, and thread the cable through the connector following the diagram provided.



Step 3: Plug the cable terminal into the COM port connector, aligning it with the appropriate hole based on the pin definition of the COM port connector.



Step 4: Plug the connector head into the connector shell until a 'click' sound indicates it is locked in place. Seal any unused waterproof holes with the COM port nylon screw plug. Tighten the connector's rear nut.



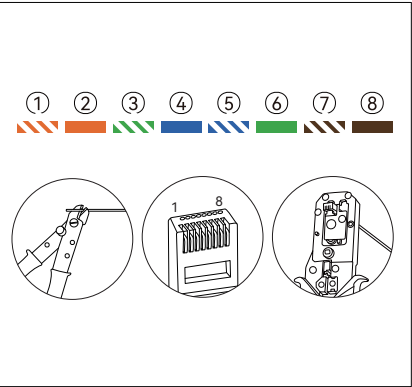
Step 5: Thread the connector through the slit of the inverter door and plug it into the COM port.

6.8 RJ45 Port connection

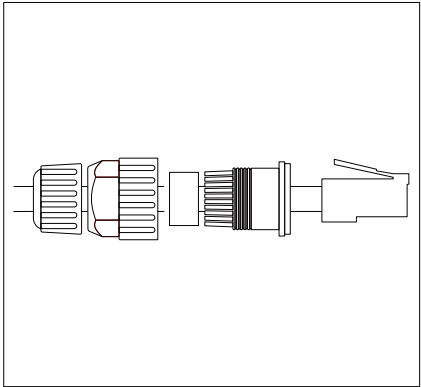
Warning!
Please select the correct COM port pin according to the actual installation scenario.

Tools and accessories required for this step:

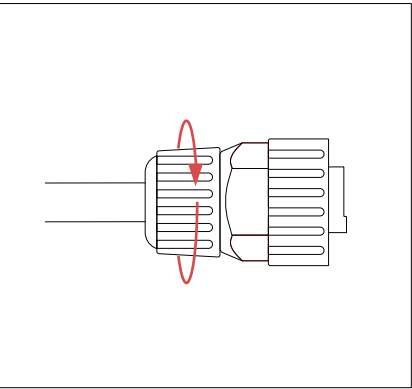
Packing List of Inverter	LAN Port Connector
Tools	Crimping Tool for RJ45, Stripping Pliers, Wire Cutter



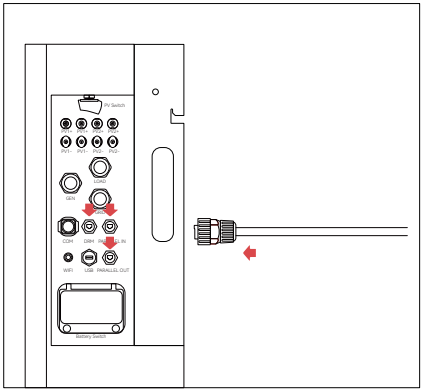
Step 1: Strip the network cable using the stripping pliers and install it through the parts as shown in the figure. Fit crystal head to the network cable according to the color sequence (1-8).



Step 2: Thread the cable through the RJ45 connector as shown in the figure.



Step 3: Tighten the connector end nut.

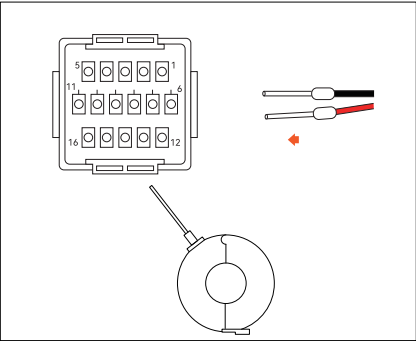


Step 4: Thread the connector through the slit of the inverter door and plug it into the correct RJ45 port.

6.9 Connection

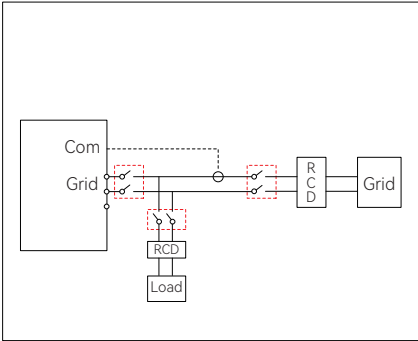
Tools and accessories required for this step:

Packing List of Inverter	LAN Port Connector
Tools	CTs Components (Optional)

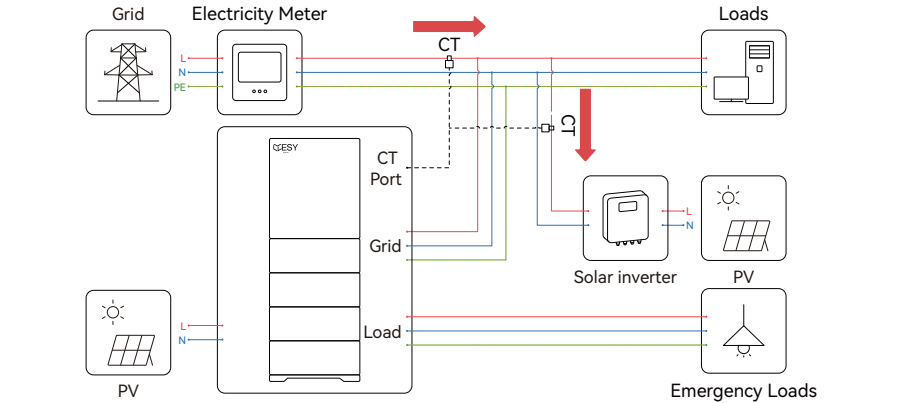


Step1: Connect the grid CT cable to the COM connector, attach the black wire to COM-13 and the red wire to COM-14. In AC coupling scenario, also connect the black wire of another set of CT cable to COM-15 and the red wire to COM-16.

For AC coupling, 2 CTs are needed, please find below system Installation Diagram: one CT for Grid power, the other CT for existing PV inverter power.



Step2: Install the CT between the inverter and the power grid as illustrated in the diagram above.



	Warning! Please pay attention to the direction of the current flow when using the CT. The “→” on the CT points to the inverter.
	Warning! When installing the CT, ensure that the circuit breakers for both the power grid and the inverter are turned off.
	Warning! The current passing through the CT shall be less than 106 A.

6.10 DRM Connection

6.10.1 Connection DRED

DRM Port Connector Pin Definitions		
This interface is exclusively for Australian products and is designed for DRED control, applicable to Australia and New Zealand only. DRED stands for Demand Response Enabling Device. According to the AS/NZS 4777.2:2010 standard, users must support the Demand Response Mode (DRM), which is specifically for inverters meeting the RJ45 requirements outlined in the AS/NZS 4020 standard and is intended for DRMS connections.	1	NC
	2	NC
	3	DRM_COM
	4	DRM_REF
	5	DRM4/8
	6	DRM3/7
	7	DRM2/6
	8	DRM1/5

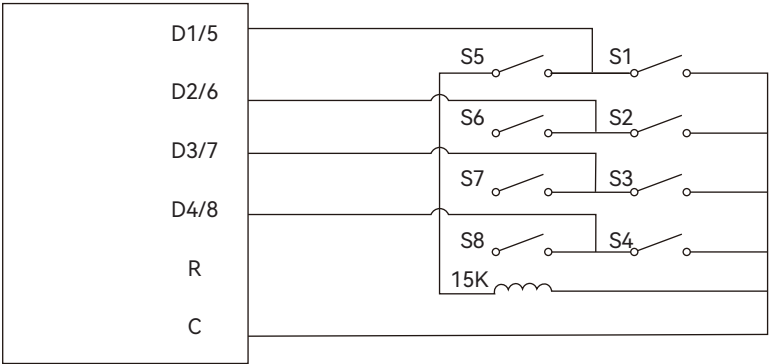
Please refer to the table below for DRM mode explanation. This product is only applicable to DRM0 mode.

Mode	Requirement
DRM0	Operate the disconnection device
DRM1	Do not consume power
DRM2	Do not consume at more than 50% of rate power
DRM3	Do not consume at more than 75% of rate power and source reactive power if capable
DRM4	Increase power consumption (subject to constraints from other active DRMs)
DRM5	Do not generate power
DRM6	Do not generate at more than 75% of rate power and sink reactive power if capable
DRM7	Do not generate at more than 50% of rate power
DRM8	Increase power generation (subject to constraints from other active DRMs)

The DRED can respond to multiple DRMS signals. The following outlines the priority sequence for handling these signals.

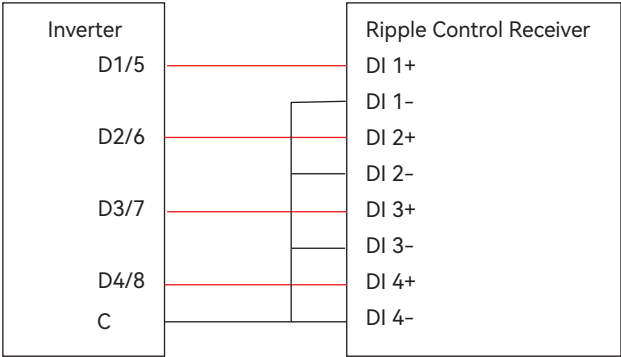
consume power	DRM1>DRM2>DRM3>DRM4
generate power	DRM5>DRM6>DRM7>DRM8

In regions where the AS/NZS 4777 standard is applicable (such as Australia and New Zealand), the connection method between the inverter DRM and the DRED is illustrated in the diagram below:

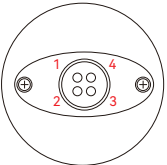


6.10.2 Ripple Control Receiver

When the inverter requires a connection to a Ripple Control Receiver, the wiring configuration for the DRM port is illustrated in the diagram below:



6.11 Communication Dongle Connection (Optional)

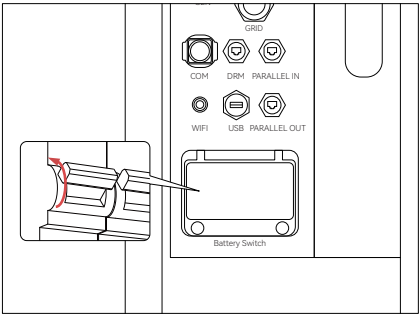
WiFi/Bluetooth Port Connector Pin Definitions		
	1	VCC
	2	GND
	3	Data Communication A
	4	Data Communication B

7 System Operation

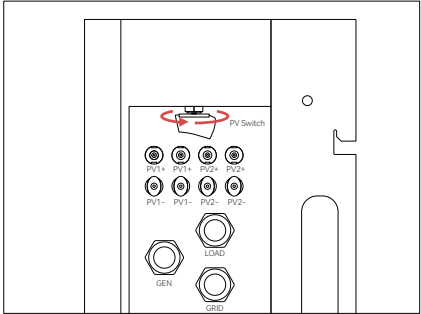
7.1 Power On

	Warning! Please double-check that the installation to ensure it is correct and reliable before powering on.
	Warning! If the backup load, generator, or PV inverter is not installed, do not place the connector into the port.
	Warning! Please shield unused ports with waterproof caps.
	Warning! After installation, please use the lock key to lock the door. Please take good care of the lock key.
	Warning! Please keep the unused connectors and accessories properly.

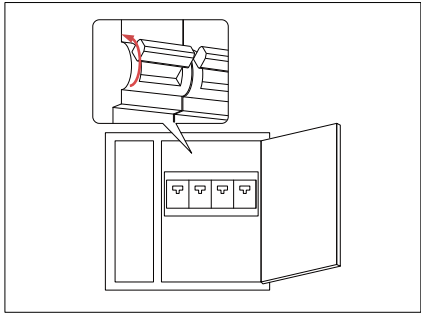
When powering on, please adhere to the following steps:



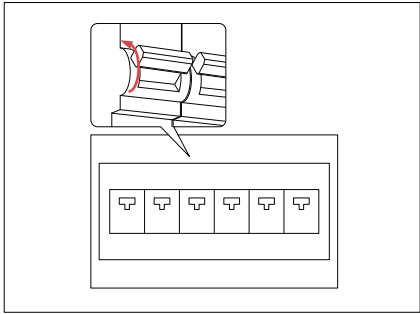
Step 1: Turn on the Battery switch on the inverter.



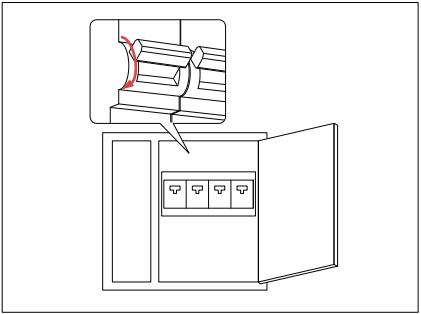
Step 2: Turn on the PV switch on the inverter.



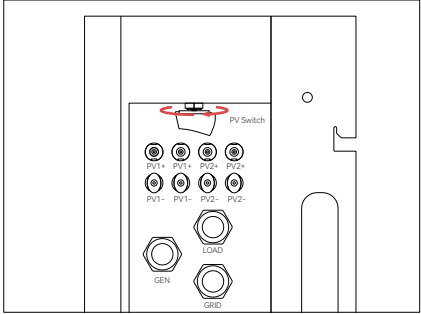
Step 3: Switch the grid breaker to power on.



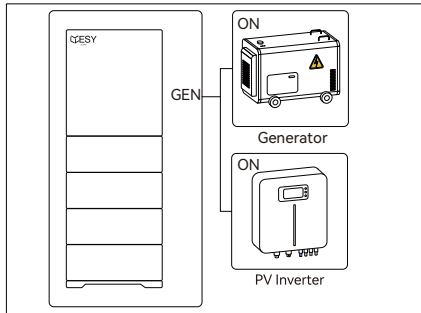
Step 4: Switch the backup load breaker to power on.



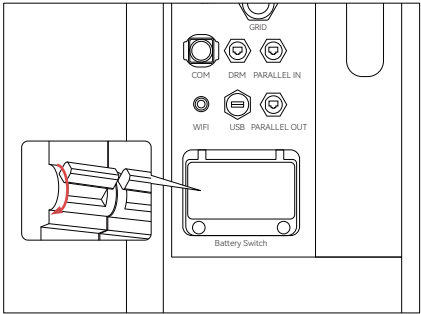
Step 3: Turn off the grid port;



Step 4: Turn off the PV Switch on the inverter;



Step 5: If a generator or photovoltaic inverter is connected to the GEN port, power on the connected generator or PV inverter.



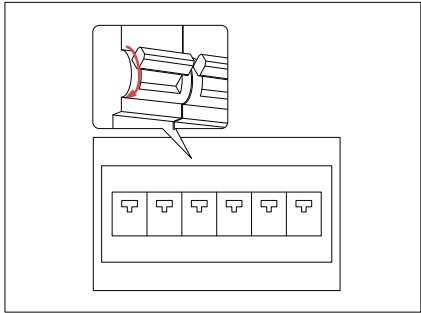
Step 5: Turn off the Battery switch on the inverter;

7.2 Power Off

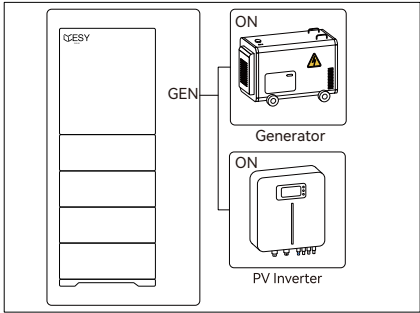
Warning!

After shutdown, please wait for at least 10 minutes before performing any other maintenance operations on the all-in-one equipment.

When powering off, please adhere to the following steps:



Step 1: Turn off the backup load.



Step 2: Turn off the generator or PV inverter connected to the GEN port;

7.3 Precautions

If the system is not powered on for more than 7 days, please disconnect the circuit breakers for the battery, photovoltaic system, grid, and load.

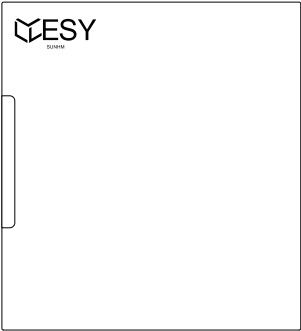
If the system is not used for more than 30 days, please activate the communication input switch or the PV switch, set the inverter to charge mode, and fully charge all batteries to 100%.

After the system is initially installed, make sure to charge all batteries to 100% State of Charge (SOC).

Please perform regular maintenance on the system. Refer to the table below for detailed maintenance procedures:

Maintenance Tasks	Maintenance Method	Maintenance Interval
System Cleaning	Inspect and remove any foreign objects or dust from heat sinks, intake, and exhaust vents. Perform cleaning only after powering down the syste	Annually/ Semi-Annually
DC Switch Check	Operate the DC switch continuously 10 times to verify its proper functionality.	Annually
Electrical Connection Inspection	Verify that the circuit breakers are functioning correctly. Inspect all wiring for signs of aging or damage.	Annually/ Semi-Annually
Sealing Integrity	Examine system connectors and seams for proper sealing. If gaps are found to be excessive or inadequately sealed, re-seal as necessary.	Annually

8 LED Display Description



Status	Instruction
	The "Battery" symbol located at the bottom of the light bar signifies the electricity level. It comprises 20 segments, each representing 5% of electricity. Whenever the power fluctuates by 5%, the light will remain ON for 60 seconds before turning OFF.

The symbol "Power" at the bottom of the light bar indicates the power level. It consists of 20 segments, each representing 5% of the power. Whenever the power changes by 5%, the corresponding segment will be ON for 60 seconds and then turn OFF.

When the indicator at the bottom of the light bar is OFF and the top three indicators are ON, it means that the equipment has an alarm or fault. If the equipment is faulty, please promptly seek assistance from professional personnel to resolve the issue.

Alarm Level	Definition	Buzzer	Light	Schematic Diagram	Alarm Signal Recovery Condition
1	Emergency	Buzzing by default	Top three red indicators ON		Troubleshooting
2	Major	Silent	Top two red indicators ON		Troubleshooting
3	Minor	Silent	Top three yellow indicators ON		60 s
4	Upgrading	Silent	Top three blue indicators ON		Upgrade Completed

Note

The inverter employs visual signals (LED lights) to comply with earth fault alarm requirements as per AS/NZS 5033.

The "Earth Fault" alarm is classified as a Level 2 critical alarm. When the inverter is not properly grounded, the top two red indicator lights will remain illuminated. Please ensure proper grounding to resolve the alarm.

This product should be installed in a high-traffic area where the alarm would be easily noticed.

9 Certification Standards

Safety	
PCS	IEC/EN 62109-1/-2, AS62109
Battery	IEC 62619, IEC 62040, ISO13849
EMC	
PCS	IEC/EN 61000-6-1/-2/-3/-4
Battery	IEC 61000-4-2/3/4
Location Grid Connection	
Germany	VDE-4105
Italy	CEI-021
Austria	TOR25
Australia	AS/NZS 4777.2

10 After-sales Service

Service email: support@esysunhome.com

Or, contact the local installer.